



Final

Environmental Assessment Construction of Fully Contained Small Arms Range Complex

Wright-Patterson Air Force Base

Contract No. F33601-01-DW002
Delivery Order 5009

Submitted to:

**Wright-Patterson Air Force Base
88th Air Base Wing
Office of Environmental Management**



**Environmental Management
Wright-Patterson AFB**

Prepared by:

**IT Corporation
11499 Chester Road
Cincinnati, Ohio 45246**

December 2002

Report Documentation Page			Form Approved OMB No. 0704-0188		
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE DEC 2002	2. REPORT TYPE		3. DATES COVERED 00-00-2002 to 00-00-2002		
4. TITLE AND SUBTITLE Environmental Assessment Construction of Fully Contained Small Arms Range Complex Wright-Patterson Air Force Base			5a. CONTRACT NUMBER		
			5b. GRANT NUMBER		
			5c. PROGRAM ELEMENT NUMBER		
6. AUTHOR(S)			5d. PROJECT NUMBER		
			5e. TASK NUMBER		
			5f. WORK UNIT NUMBER		
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) IT Corporation,11499 Chester Road,Cincinnati,OH,45246			8. PERFORMING ORGANIZATION REPORT NUMBER		
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)			10. SPONSOR/MONITOR'S ACRONYM(S)		
			11. SPONSOR/MONITOR'S REPORT NUMBER(S)		
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT Same as Report (SAR)	18. NUMBER OF PAGES 116	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			

FINAL
FINDING OF NO SIGNIFICANT IMPACT

Name of Action: Construction of Fully Contained Small Arms Range Complex, Wright-Patterson Air Force Base (WPAFB), Ohio

The current Small Arms Range is located in Area C off Hebble Creek Road. This facility does not provide for some required training, is outdated and in a state of disrepair, and is out of compliance with minimum Surface Danger Zone (SDZ) distances. A new Fully Contained Small Arms Range Complex (FCSARC) has been proposed. The FCSARC would be located in Area A, off Communications Boulevard on Newark Street.

Proposed Action and Alternative:

The proposed action is to construct the FCSARC, demolish the current SAR, and remediate lead-contaminated soil at the current SAR, if necessary. There were two alternatives analyzed:

Alternative A, the No Action alternative, would have the current SAR remain and the FCSARC would not be constructed. Alternative A also serves as a baseline against which the Proposed Action can be compared.

Alternative B, the Proposed Action, includes the construction of the FCSARC, demolition of the current SAR, and remediation of lead-contaminated soil at the current SAR, if necessary.

Environmental Consequences:

The impacts associated with demolition actions at the current SAR are tiered from the *Final Environmental Impact Statement for the Demolition of Multiple Historic Facilities at Wright-Patterson Air Force Base, Ohio* (U.S. Air Force, 1997). The environmental consequences of the Proposed Action to construct the FCSARC are as follows:

Biological Resources: There would be minor, negative (but intermittent) impacts to wildlife under Alternative A due to disturbance from gunfire during outdoor training activities at the current SAR. Under Alternative B, there would be minor, short-term impacts to vegetation and wildlife during demolition and remediation activities at the current SAR. Impacts to vegetation would be minimized because disturbed areas at the current SAR would be re-vegetated after project activities. In the long-term, there would be minor, beneficial impacts to wildlife due to the cessation of gunfire and potential increase in habitat after removal of the current SAR.

Water Resources: Under Alternative A, groundwater and surface water would not be impacted under typical conditions. In the event of a flood, it is possible that potentially contaminated soil could impact surface water. The degree of potential impact is not known. Under Alternative B, groundwater would not be impacted. Minimal, short-term impacts to surface water would potentially occur due to surface water runoff during demolition and remediation activities at the current SAR. In addition, there would be minimal impacts due to surface water runoff during construction of the FCSARC. At both locations, these impacts would be minimized because erosion and siltation controls would be implemented. Over the long-term, there could be a potential increase in infiltration from the removal of the current SAR. A minor, beneficial impact could occur due to the decrease in runoff. For the FCSARC, there would be

potential minor impacts due to surface water runoff associated with the new parking lot. Incorporating appropriate drainage into the design would minimize impacts.

Land Use: There would be no impact to land use under Alternative A. Under Alternative B, land use designation at the current SAR would change from Industrial to Outdoor Recreation.

Soils: There would be no impact to soils under Alternative A; however, lead could potentially persist in soils at the current SAR. Under Alternative B, there would be potential minor impacts (i.e., soil erosion) during construction, demolition, and potential remediation activities. Impacts, however, would be minimized because erosion and siltation controls would be implemented. There would be no long-term impacts under Alternative B.

Cultural Resources: Under Alternative A, the current SAR would continue to be a visual and physical intrusion into the Huffman Prairie Flying Field. Under Alternative B, cultural resources could potentially be encountered during soil remediation at the current SAR. Impacts would be minimized by consultation with the Base Historic Preservation Officer.

Air Quality: There would be no impact to air quality under Alternative A. Under Alternative B, there would be nominal short-term impacts upon air quality during the construction, demolition, and potential remediation activities from particulate matter and engine exhaust emissions. Impacts would be minimized by the use of dust suppression measures. There would be long-term negligible impact from lead emissions generated during the operation of the FCSARC. Estimated lead emissions would be below air quality standards.

Noise: There would be minor, negative impacts under Alternative A because the current SAR would continue to be a source of noise during use of the outdoor firing range. Under Alternative B, there would be short-term minor impacts due to heavy equipment used during construction, demolition, and potential remediation activities. Increases in noise levels are expected to be intermittent while the proposed action is carried out. Potential impacts to personnel using the FCSARC would be minimized through use of hearing protection and engineered controls. There would be minimal impacts to noise outside the FCSARC. Sound transmission barriers and distance from the facility would reduce noise.

Health and Safety: Under Alternative A, there would be potential impacts to trainees due to inadequate facilities and the nature of the activities being conducted (i.e., weapons training). Under Alternative B, there would be potential impacts to project workers due to accidents during construction, demolition and potential remediation activities. Impacts would be negligible because adherence to health and safety regulations would minimize hazards. There would be positive impacts for trainees due to improved facility conditions. The potential impacts associated with handling weapons would remain; however, this potential exists regardless of which alternative is implemented. No impacts to personnel or children in the surrounding area are anticipated because the FCSARC is fully contained. Estimated lead emissions from the facility would be below air quality standards.

Socioeconomics: There would be no impact to socioeconomics under Alternative A. Under Alternative B, there would be nominal, beneficial impact to the local economy during construction, demolition, and potential remediation activities. Nominal, beneficial long-term impacts could occur for the base because machine gun training would not have to be conducted at off-site locations.

Transportation/Traffic: There would be no impact to traffic under Alternative A. Under Alternative B,

there would be short-term impacts to traffic circulation during project activities. Once activities are completed, a nominal increase in traffic circulation in the vicinity of the FCSARC would be expected, while a nominal decrease in traffic circulation at the former site of the SAR would be expected. Impacts associated with the transportation of small arms munitions to the FCSARC would be positive because this facility is readily accessible to a designated explosives transportation route.

Public Notice:

A public notice was posted in the Dayton Daily News on 27 December 2002. The public comment period for the final EA was 27 December 2002 through 25 January 2003. No comments were received.

Finding of No Significant Impact (FONSI):

The proposed action is to construct the FCSARC, demolish the current SAR, and remediate lead-contaminated soil at the current SAR, if necessary. The No Action Alternative was analyzed where the current SAR would remain and the FCSARC would not be constructed. Based on my review of the facts and analysis contained in the EA, I conclude that Alternative A and B (the Proposed Action) will not have a significant impact either by itself or considering cumulative impacts. Accordingly, the requirements of the National Environmental Policy Act, the Council on Environmental Quality Regulation and 32 CFR 989 have been fulfilled, and an environmental impact statement is not required and will not be prepared.



RONALD J. LESTER, Director
Office of Environmental Management

10 Feb 03

DATE

Final

**Environmental Assessment
Construction of Fully Contained
Small Arms Range Complex**

**Contract No. F33601-01-DW002
Delivery Order 5009**

Submitted to:

**Wright-Patterson Air Force Base
88th Air Base Wing
Office of Environmental Management**

Prepared by:

**IT Corporation
11499 Chester Road
Cincinnati, Ohio 45246**

December 2002

Table of Contents

List of Tables	v
List of Figures	vi
List of Appendices	vii
Acronyms	viii
1.0 Purpose and Need for Action	1-1
1.1 Project Description	1-1
1.2 Decisions Needed	1-2
1.3 Scope of Environmental Analysis	1-2
1.4 Regulatory Requirements	1-3
2.0 Alternatives Including the Proposed Action	2-1
2.1 Introduction	2-1
2.2 Process Used to Formulate Alternatives	2-1
2.3 Alternatives Eliminated From Detailed Study	2-2
2.4 Description of Alternatives Considered	2-2
2.4.1 Alternative A: No Action	2-2
2.4.2 Alternative B: Construction of Fully Contained Small Arms Range Complex (Proposed Action)	2-2
2.5 Comparison of Alternatives	2-3
3.0 Affected Environment	3-1
3.1 Introduction	3-1
3.2 Biological Resources	3-1
3.2.1 Vegetation	3-1
3.2.2 Wildlife	3-1
3.2.3 Threatened and Endangered Species	3-2
3.3 Water Resources	3-3
3.3.1 Groundwater	3-3
3.3.2 Surface Water	3-5
3.3.3 Floodplain	3-6
3.3.4 Wetlands	3-7
3.4 Installation Restoration Program (IRP)	3-7
3.5 Land Use	3-9
3.6 Soils	3-9
3.7 Cultural Resources	3-10

Table of Contents (continued)

3.8	Air Quality	3-11
3.9	Noise	3-13
3.10	Health and Safety	3-15
3.11	Socioeconomics	3-19
3.12	Transportation/Traffic	3-19
4.0	Environmental Consequences	4-1
4.1	Introduction	4-1
4.2	Biological Resources	4-1
4.2.1	Vegetation	4-1
4.2.1.1	Alternative A: No Action	4-1
4.2.1.2	Alternative B: Construction of Fully Contained Small Arms Range Complex	4-1
4.2.2	Wildlife	4-2
4.2.2.1	Alternative A: No Action	4-2
4.2.2.2	Alternative B: Construction of Fully Contained Small Arms Range Complex	4-2
4.2.3	Threatened and Endangered Species	4-2
4.2.3.1	Alternative A: No Action	4-2
4.2.3.2	Alternative B: Construction of Fully Contained Small Arms Range Complex	4-3
4.3	Water Resources	4-3
4.3.1	Groundwater	4-3
4.3.1.1	Alternative A: No Action	4-3
4.3.1.2	Alternative B: Construction of Fully Contained Small Arms Range Complex	4-3
4.3.2	Surface Water	4-4
4.3.2.1	Alternative A: No Action	4-4
4.3.2.2	Alternative B: Construction of Fully Contained Small Arms Range Complex	4-4
4.3.3	Floodplain	4-5
4.3.3.1	Alternative A: No Action	4-5
4.3.3.2	Alternative B: Construction of Fully Contained Small Arms Range Complex	4-5

Table of Contents (continued)

4.3.4	Wetlands	4-6
4.3.4.1	Alternative A: No Action	4-6
4.3.4.2	Alternative B: Construction of Fully Contained Small Arms Range Complex	4-6
4.4	Installation Restoration Program Sites	4-6
4.4.1	Alternative A: No Action	4-6
4.4.2	Alternative B: Construction of Fully Contained Small Arms Range Complex	4-6
4.5	Land Use	4-7
4.5.1	Alternative A: No Action	4-7
4.5.2	Alternative B: Construction of Fully Contained Small Arms Range Complex	4-7
4.6	Soils	4-7
4.6.1	Alternative A: No Action	4-7
4.6.2	Alternative B: Construction of Fully Contained Small Arms Range Complex	4-7
4.7	Cultural Resources	4-8
4.7.1	Alternative A: No Action	4-8
4.7.2	Alternative B: Construction of Fully Contained Small Arms Range Complex	4-8
4.8	Air Quality	4-8
4.8.1	Alternative A: No Action	4-8
4.8.2	Alternative B: Construction of Fully Contained Small Arms Range Complex	4-9
4.9	Noise	4-11
4.9.1	Alternative A: No Action	4-11
4.9.2	Alternative B: Construction of Fully Contained Small Arms Range Complex	4-12
4.10	Health and Safety	4-13
4.10.1	Alternative A: No Action	4-13
4.10.2	Alternative B: Construction of Fully Contained Small Arms Range Complex	4-13
4.11	Socioeconomics	4-16

Table of Contents (continued)

4.11.1	Alternative A: No Action	4-16
4.11.2	Alternative B: Construction of Fully Contained Small Arms Range Complex	4-16
4.12	Transportation/Traffic	4-16
4.12.1	Alternative A: No Action	4-16
4.12.2	Alternative B: Construction of Fully Contained Small Arms Range Complex	4-17
4.13	Cumulative Impacts	4-17
4.14	Unavoidable Adverse Effects	4-17
4.15	Relationship of Short-Term Uses and Long-Term Productivity	4-18
4.16	Irreversible and Irretrievable Commitments of Resources	4-18
5.0	List of Preparers and Contributors	5-1
6.0	List of Agencies and Persons Consulted	6-1
7.0	References	7-1

List of Tables

- | | |
|-------|--|
| 1.4-1 | Summary of Applicable Regulations for the Proposed Action and Alternative |
| 2.5-1 | Comparison of Environmental Consequences of the Proposed Action and Alternatives |

List of Figures

- 1.1-1 Area Location Map
- 1.1-2 Location of Proposed Small Arms Range Complex, Wright-Patterson Air Force Base, Dayton, Ohio
- 1.1-3 Location of Current Small Arms Range and Proposed Location of New Small Arms Range Complex
- 2.4-1 Proposed Location of the Fully Contained Small Arms Range Complex
- 2.4-2 Existing Small Arms Range Located on Hebble Creek Road
- 3.3-1 Boundary of the Buried Valley Aquifer
- 3.3-2 Location of Regional Surface Water Features
- 3.3-3 Storm Sewer Network Outfall Region V
- 3.4-1 Operable Units in Areas A and C
- 3.4-2 Landfill Gas Monitoring Wells: OU4
- 3.6-1 Regional Bedrock Topography

List of Appendices

- A Correspondence with the Ohio Department of Natural Resources
- B Correspondence with the U.S. Fish & Wildlife Service
- C Correspondence with the Miami Conservancy District
- D Correspondence with the State Historic Preservation Office
- E Construction of Fully Contained Small Arms Range Emissions Estimates
- F Weapons Firing in Fully Contained Small Arms Range – PM, PM₁₀, and Lead Emissions Estimates

List of Acronyms/Abbreviations

AFI	Air Force Instruction
AFPD	Air Force Policy Directive
AFMAN	Air Force Manual
AFRIMS	Air Force Restoration Information Management System
AICUZ	Air Installation Compatible Use Zone
ANSI	American National Standards Institute
ASC	Aeronautical Systems Center
bgs	below ground surface
BHE	BHE Environmental, Inc.
BHPO	Base Historic Preservation Officer
BS4	Burial Site 4
BMP	Basewide Monitoring Program
CAAA	Clean Air Act Amendments
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CO	carbon monoxide
CRMP	Cultural Resources Management Plan
dB	decibel
DOC	Department of Census
DoD	U.S. Department of Defense
EA	environmental assessment
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
ESA	Endangered Species Act
ETL	Engineering Technical Letter
FAA	Federal Aviation Administration
FCSARC	Fully Contained Small Arms Range Complex
FICON	Federal Intragency Committee on Noise
FTA1	Fire Training Area 1
FY	Fiscal Year
GLARC	Great Lakes Archaeological Research Center
GLTS	Gravel Lake Tanks Site
gpm	gallons per minute
HAP	hazardous air pollutant
HEPA	high efficiency particulate air
ICI	International Consultants Incorporated
IRP	Installation Restoration Program
IT	IT Corporation
LBP	lead-based paint
LF	Landfill
MCD	Miami Conservancy District

List of Acronyms/Abbreviations (continued)

mg/kg	milligram/kilogram
µg/L	micrograms/liter
MSA	Metropolitan Statistical Area
MSDS	Material Safety Data Sheets
MSL	mean sea level
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NOI	Notice of Intent
NO _x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
O ₃	ozone
OAC	Ohio Administrative Code
ODNR	Ohio Department of Natural Resources
OEPA	Ohio Environmental Protection Agency
ORC	Ohio Revised Code
OSHA	Occupational Safety and Health Administration
OU	Operable Unit
PCBs	polychlorinated biphenyls
PM	Particulate Matter
PM ₁₀	Particulate Matter (less than 10 microns in diameter)
PM _{2.5}	Particulate Matter (less than 2.5 microns in diameter)
PRGs	Preliminary Remediation Goals
PSD	Prevention of Significant Deterioration
PTI	Permit to Install
RAPCA	Regional Air Pollution Control Agency
RI	Remedial Investigation
ROD	Record of Decision
SAIC	Science Applications International Corporation
SAR	Small Arms Range
SCS	Soil Conservation Service
SDZ	Surface Danger Zone
SHPO	State Historic Preservation Office
SO ₂	sulfur dioxide
SWPPP	Storm Water Pollution Prevention Plan
TCE	trichloroethene
tpy	tons per year
USACERL	U.S. Army Construction Engineering Research Laboratory
USAF	U.S. Air Force
USACOE	U.S. Army Corps of Engineers
USC	United States Code
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service

List of Acronyms/Abbreviations (continued)

USGS	U.S. Geological Survey
VOC	volatile organic compound
WPAFB	Wright-Patterson Air Force Base

1.0 Purpose and Need for Action

This environmental assessment (EA) presents the proposed action of constructing a Fully Contained Small Arms Range Complex (FCSARC) at Wright-Patterson Air Force Base (WPAFB), Ohio. This EA has been performed in accordance with the National Environmental Policy Act (NEPA) of 1969, 40 Code of Federal Regulations (CFR), Part 1500, the Council on Environmental Quality (CEQ) regulations implementing NEPA, and the U.S. Air Force (USAF) Environmental Impact Analysis Process (EIAP) [Air Force Instruction (AFI) 32-7061]. The purpose of the proposed action is to construct a new facility to provide adequate training to military personnel that need certification in the use of various weapons. The current Small Arms Range (SAR) does not provide for some required training, is outdated, is in a state of disrepair, and is out of compliance with minimum Surface Danger Zone (SDZ) distances.

1.1 Project Description

WPAFB is located in the southwest portion of Ohio in Greene and Montgomery counties, 10 miles east of the City of Dayton (Figure 1.1-1). The Base encompasses 8,145 acres and is classified as non-industrial with mixed development. WPAFB is subdivided into three areas: A, B, and C. The installation was formed as a consolidation of two bases: Wright Field (Area B) and Patterson Field (Areas A and C). Area B is separated from Areas A and C by State Route 444 and is more developed than the other areas of the Base. Area A contains the majority of administrative functions, Area B focuses on research and development activities, and Area C consists of airfield operations (ICI/SAIC, 1995; WPAFB, 1994a; Woolpert, 2001).

The current SAR is located in Area C off Hebble Creek Road (Figures 1.1-2 and 1.1-3). This facility was constructed in 1970 as an impact (outdoor) range. In 1982, the range was converted to include a baffled range (i.e., indoor range). In its current location and condition, there are a number of concerns regarding the existing SAR. These concerns include the following:

- *The existing SAR does not meet the current training needs of base personnel* – The SAR has 16 firing line positions, which do not meet the volume of daily training requirements. Also, the current configuration of this range does not support machine gun certification training, which must be conducted at off-base locations.
- *The existing SAR is outdated and in a state of disrepair* – The ventilation system, which is designed to minimize smoke and lead dust, does not function properly. This system is also located above the firing line positions and obscures the shooter's view of the targets. Overhead lighting is inadequate. The concrete floor between the firing line and targets is

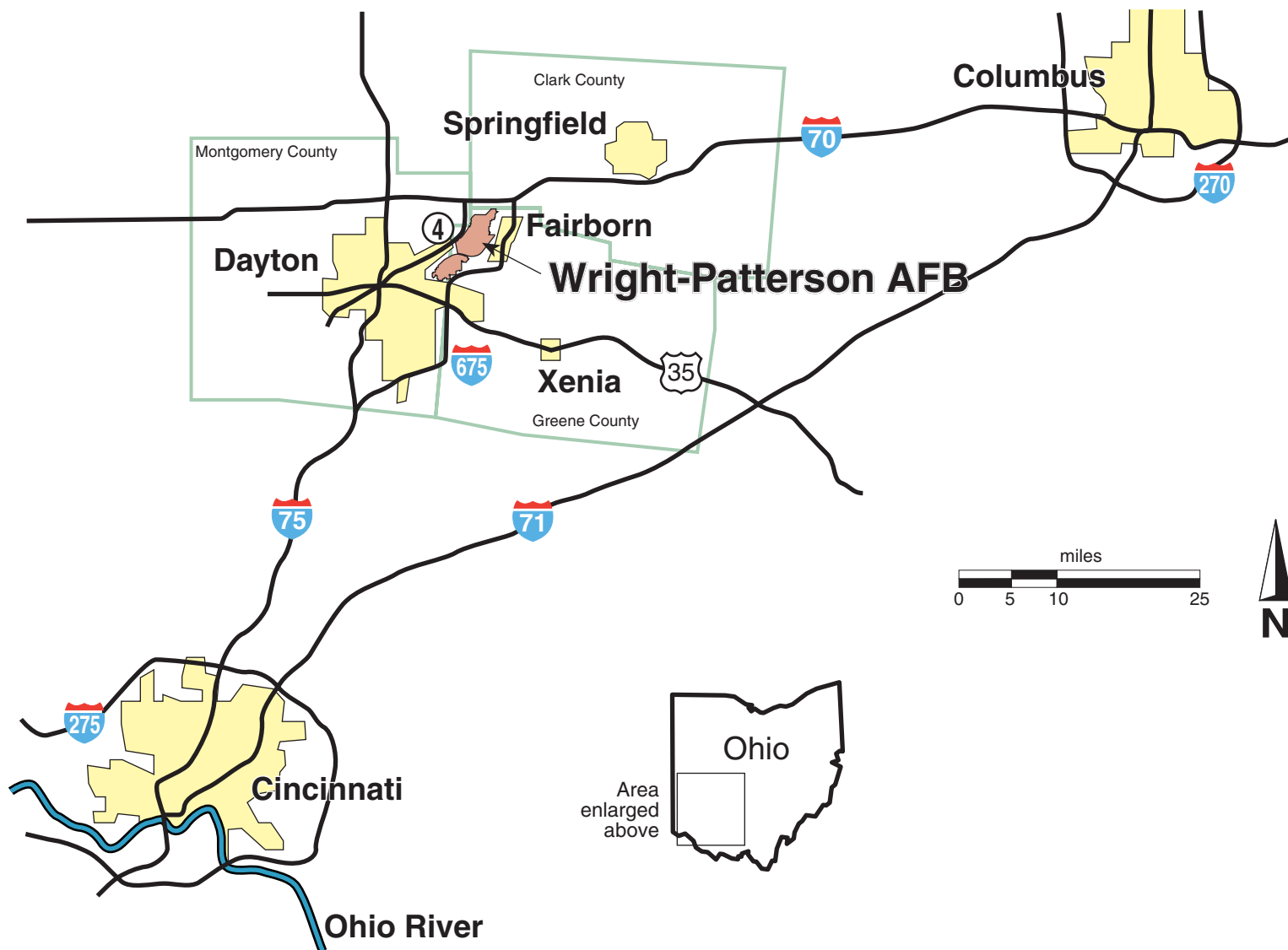
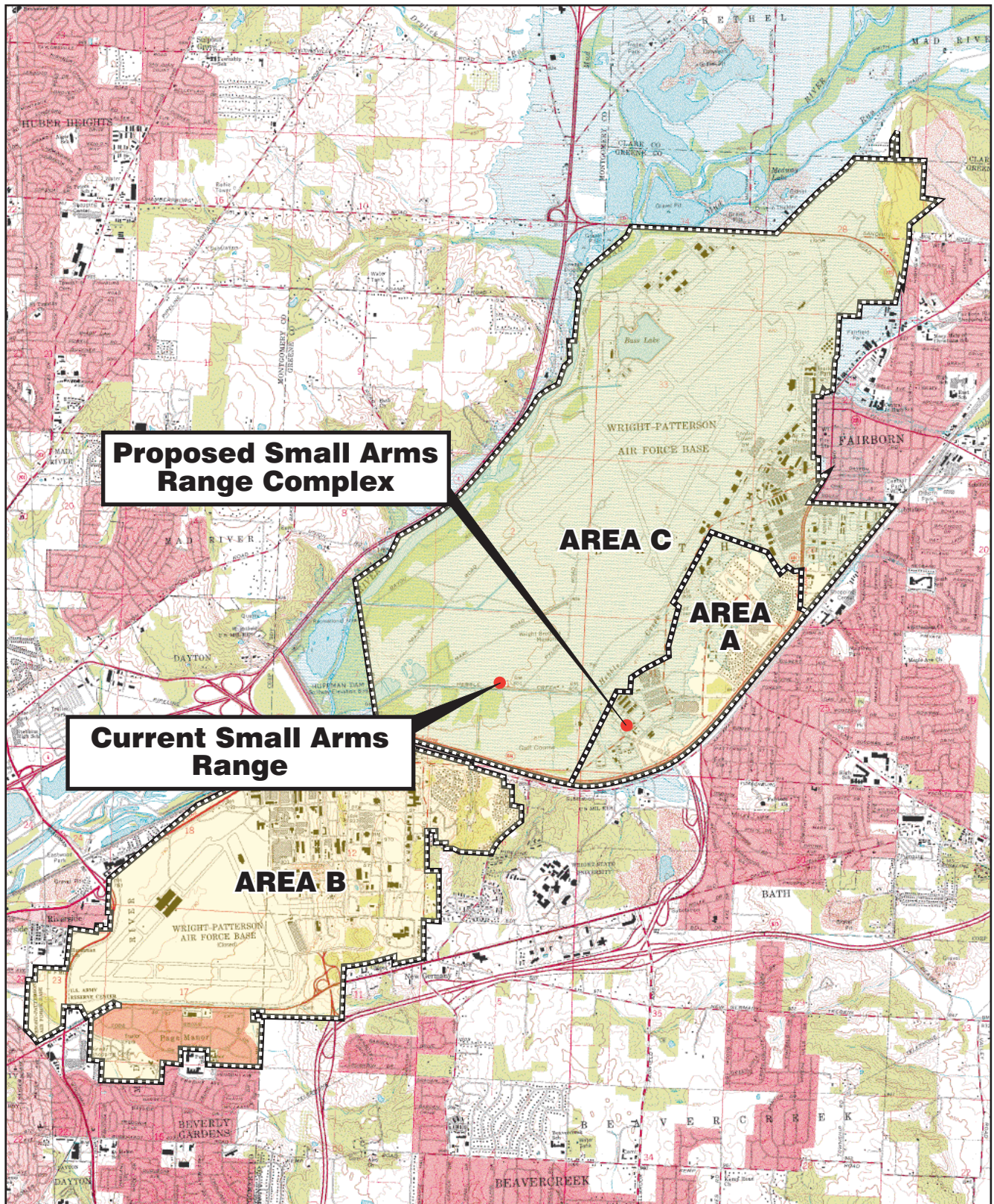


Figure 1.1-1 Area Location Map.

Source: ES, 1982

DRAWING BY	JIS, III	CHECKED BY	TC	6/30/00	DRAWING NO. S-807583.0103-6/00-w
	6/28/00	APPROVED BY	CH	9/25/00	



Proposed Small Arms Range Complex

Current Small Arms Range

AREA C

AREA A

AREA B

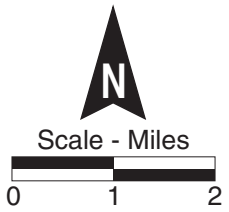


Figure 1.1-2
Location of the Proposed
Small Arms Range Complex
Wright-Patterson Air Force Base
Dayton, Ohio

DRAWING NO.	K-838196-3000-7102-W	
	7/17/02	7/23/02
TC	CH	
CHECKED BY	APPROVED BY	
KMS	7/16/02	
DRAWING BY		

DRAWN BY	MSN	CHECKED BY	TC	10/31/02	DRAWING	2002 49-04.DWG
	7/18/02	APPROVED BY	CH	10/31/02	NUMBER	

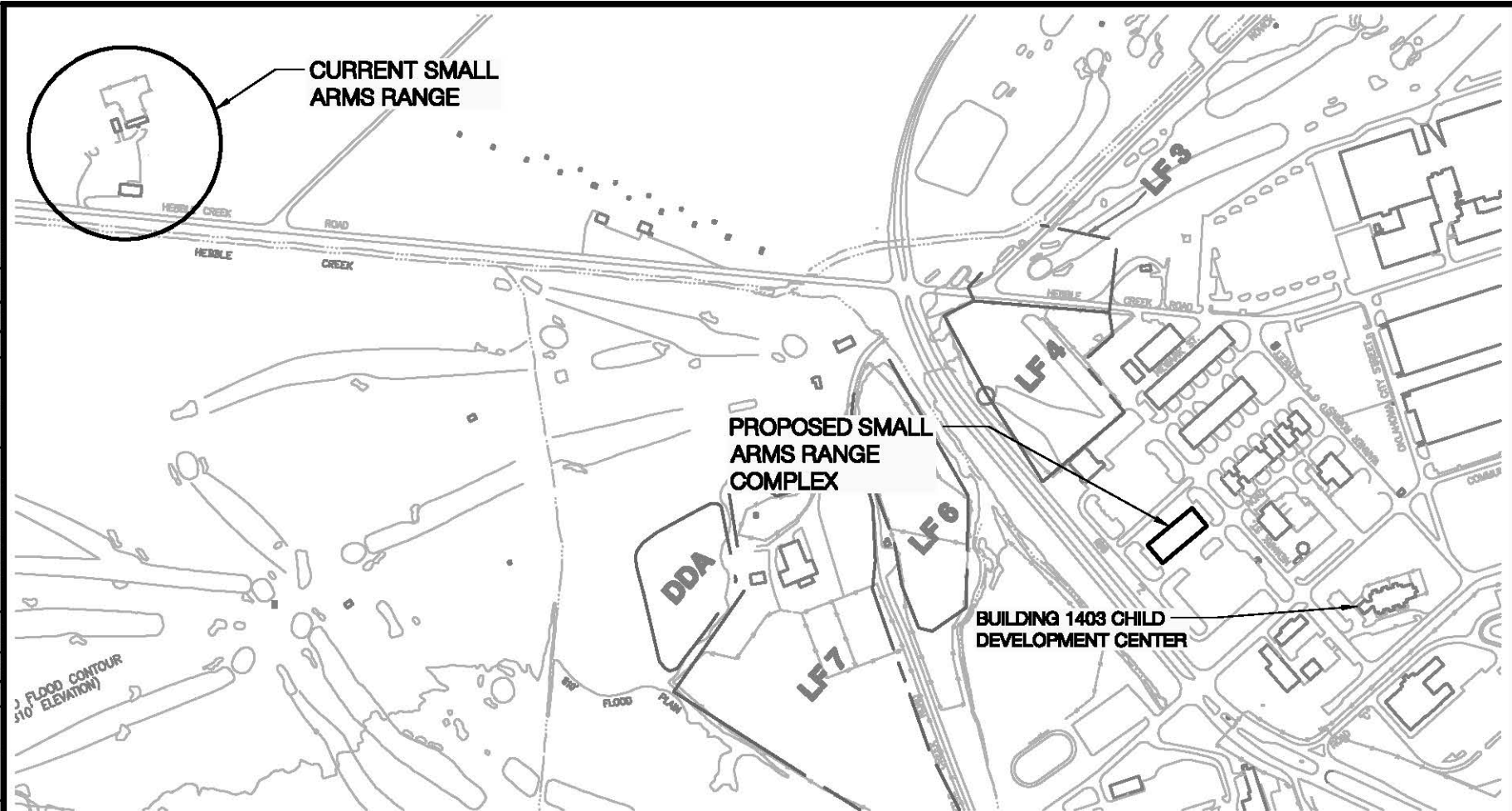


Figure 1.1-3
Location of Current Small Arms Range
and Proposed Location of
New Small Arms Range Complex

PREPARED FOR

Wright-Patterson Air Force Base
Dayton, Ohio



IT CORPORATION
11499 CHESTER ROAD
CINCINNATI, OHIO 45246

cracked and deteriorated and contains an irregular slope. The irregular slope has led to poor drainage and creates a potential ricochet hazard.

- *There are safety concerns associated with the existing SAR* – Due to poor drainage conditions, standing water often accumulates in the SAR. Because of the potential for lead contamination in the water, the range must be closed when standing water is present. As a result, training activities are interrupted. The standing water must be pumped from the range and properly disposed of as hazardous waste. In addition, the existing SAR does not meet minimum SDZ distances. The SDZ is the area designated on the ground of a training complex (including safety areas) for the vertical and lateral containment of projectiles, fragments, and components resulting from firing or detonation of weapons systems. The SDZ of the outdoor training area (impact range) overlaps a portion of the Huffman Prairie Flying Field, which is open to the public.

To eliminate the concerns at the SAR, a fully contained small arms range complex (FCSARC) will be constructed. At this proposed facility, all training activities will be conducted indoors. The proposed location of the FCSARC is in Area A off Communications Boulevard on Newark Street (Figure 1.1-2). The FCSARC will be properly sized to house adequate training facilities and will include training areas (firing positions), classrooms, administrative space, alarmed weapons, ammunition storage areas, supplies and equipment storage areas, and maintenance areas. A detailed description of the proposed FCSARC is included in Section 2.4.2.

1.2 Decisions Needed

The purpose of this EA is to analyze the proposed action and its' alternative (No Action) and determine whether the proposed action (i.e., construction of the FCSARC) is expected to have significant impacts on human health, safety, or the environment. The impacts to be considered include those resulting from all phases of the construction activities: site preparation, building construction, and landscaping, and from the operation of the new facility. Impacts will also be considered for the demolition, potential soil remediation, and landscaping at the existing SAR. The EA will support the interrelated decisions concerning the construction of the FCSARC and provide the decision maker and the public with information required to understand the short-term and long-term consequences of the proposed action and its alternative. Where applicable, mitigation measures will be recommended to minimize adverse impacts. The necessity for the preparation of an Environmental Impact Statement (EIS) will also be determined.

1.3 Scope of Environmental Analysis

The EA will analyze impacts associated with the construction of the FCSARC and potential remediation associated with the demolition of the existing SAR. Although this document will

address all environmental issues specified under NEPA, the primary issues of concern associated with the proposed construction of the FCSARC include:

- Geology and soil
- Health and safety
- Air quality
- Noise
- Transportation/traffic.

Other issues to be addressed, to a lesser degree, include:

- Natural resources
- Water
- Installation Restoration Program (IRP) sites
- Land use
- Cultural/historic resources
- Socioeconomics.

1.4 Regulatory Requirements

Statutes and regulations to which the Air Force must comply are summarized in Table 1.4-1. Requirements for the Combat Arms Program for the Air Force are outlined in AFI 36-2226, Combat Arms Program. This instruction implements Air Force Policy Directive (AFPD) 36-22, Military Training, and describes how to plan, conduct, administer, evaluate, and manage the Combat Arms Program. Guidance for design and construction of Air Force small arms ranges is provided in Engineering Technical Letter (ETL) 01-13: Small Arms Range Design and Construction. The ETL replaces Chapter 3 of Air Force Manual (AFMAN) 36-2227V1, *Combat Arms Training and Maintenance (CATM) Training Management and Range Operations*. It applies to both construction and major renovations.

Permits issued by the Ohio Environmental Protection Agency (OEPA) may be required to cover actions that could potentially affect sewer systems at the base. For example, significant changes or additions to the sanitary sewer systems or installation/ relocation of water mains as a result of building construction may require a "Permit to Install" (PTI). Furthermore, permits may be required for discharges into storm sewers and/or for erosion control. Under the Phase II rule of Storm Water Discharge regulations (40 CFR 122.26), a permit would be required for a construction site involving land disturbance of one to five acres of land. The Phase II rule becomes effective on 10 March 2003. An air permit would not be required for the construction and operation of the new facility as it meets the *de minimis* air contaminant source exemption.

Table 1.4-1
Summary of Applicable Regulations
for the Proposed Action and Alternative
Page 1 of 2

Small Arms Ranges

- Air Force Instruction (AFI) 36-2226, Combat Arms Program
- Engineering Technical Letter (ETL) 01-13: Small Arms Range Design and Construction

Natural Resources

- AFI 32-7064, Integrated Natural Resource Management Plan
- Endangered Species Act of 1973, 16 USC §1531 et seq.
50 CFR Part 200
50 CFR Part 402
33 CFR Parts 320-330
- Executive Order 11990 – Protection of Wetlands
- 40 CFR, Part 6, Appendix A – Protection of Floodplains
- 40 CFR, Part 6, Appendix A – Protection of Wetlands
40 CFR, Part 230 – Protection of Wetlands
40 CFR, Parts 320-330 – Protection of Wetlands
- Clean Water Act, Section 404
- Ohio Revised Code (ORC) 1531.25, Protection of Species Threatened with State-Wide Extinction

Land Use

- AFI 32-7063, Air Installation Compatible Use Zone (AICUZ) Program

Cultural/Historic Resources

- AFI 32-7065, Cultural Resources Management
- National Historic Preservation Act of 1966, as amended
- 36 CFR Part 800 – Protection of Historic and Cultural Properties

Air Quality

- National Ambient Air Quality Standards (NAAQS) – 40 CFR §81.34 and §81.336
- Ohio Administration Code (OAC) 3745-17 Particulate Matter Standards
- OAC 3745-25 Emergency Episode Standards
- OAC 3745-31 Permits to Install New Sources
- OAC 3745-71 Lead Emission Standards
- OAC 3745-15-06 *de minimis* air contaminant source exemption

Table 1.4-1
Summary of Applicable Regulations
for the Proposed Action and Alternatives
Page 2 of 2

Noise

- 29 CFR 1910.95 Occupational Noise Exposure

Health and Safety

- 29 CFR 1910.133 Eye and Face Protection
- 29 CFR 1910.1025 Occupational Safety and Health Standards: Lead
- 29 CFR 1910.1200 Hazard Communication
- 29 CFR 1910.34 Respiratory Protection
- 29 CFR 1910.135 Occupational Head Protection
- 29 CFR 1910.136 Occupational Foot Protection
- Subpart Z Toxic and Hazardous Substances
- Occupational Safety and Health Act of 1970, revised 1978
- 29 CFR 1926 Safety and Health Regulations for Construction
- 29 CFR 1926.62 Occupational Health and Environmental Controls: Lead

Lead-Based Paint

- 40 CFR Parts 240 – 280

Wastewater/Stormwater

- 40 CFR Part 122.26 Storm Water Discharges
- OAC 3745-31 Permit to Install New Source of Pollution
- OAC 3745-33 Ohio National Pollutant Discharge Elimination System (NPDES) Permit
- OAC 3745-38 Notice of Intent
- City of Dayton Sewer Use Ordinance (September 21, 1994)

Installation Restoration Program (IRP)

- OAC 3745-27-12 Explosive Gas Monitoring for a Sanitary Landfill

2.0 Alternatives Including the Proposed Action

2.1 Introduction

This chapter describes the Air Force's proposed construction of a new FCSARC at WPAFB and the demolition and remediation of the current SAR. The following sections also describe a reasonable alternative to the proposed action.

The proposed action and alternative are as follows:

- Alternative A – No action
- Alternative B – Construction of Fully Contained Small Arms Range Complex (Proposed Action)

Section 2.2 describes the formulation of Alternatives; Section 2.3 describes the Alternatives eliminated from detailed study; Section 2.4 describes the proposed action and the Alternative considered (No Action Alternative); and Section 2.5 provides a comparison of the Alternatives.

2.2 Process Used to Formulate Alternatives

As part of the NEPA process, the Air Force must analyze reasonable alternatives to the proposed action and the "no action" alternative, as fully as the proposed action. "Reasonable" alternatives are defined under 32 CFR Part 989.8 as "...alternatives that meet the underlying purpose and need for the proposed action and that would cause a reasonable person to inquire further before choosing a particular course of action." Reasonable alternatives to the proposed action are described below.

The proposed action, Alternative B, was formulated on the basis for the need to provide adequate training to military personnel that require certification in the use of weapons up to 7.62 mm (WPAFB, 2002k). Additional considerations for relocating this activity to a new facility are related to the current conditions of the current SAR. The existing range does not support machine gun certification training. The ventilation system does not function properly, the concrete floor is cracked and deteriorated, and an irregular slope of the floor creates a drainage problem and a potential ricochet hazard. The range must be closed when standing water is present and only re-opened when the water has been removed. In addition, the existing range does not meet the minimum SDZ distance. A portion of the outdoor range SDZ overlaps the

Huffman Prairie Flying Field, a National Historic Landmark and unit of the Dayton Aviation Heritage National Historical Park; the flying field is open to the public.

The No Action alternative, Alternative A, was formulated as the antithesis to constructing a fully contained small arms range complex; that is, a new FCSARC would not be built. The current SAR would continue to be used for training in its current condition. In essence, the no action alternative serves as a “baseline” from which to measure potential impacts resulting from the implementation of the proposed action.

2.3 Alternatives Eliminated From Further Study

The alternatives listed above were designated by the Air Force as reasonable alternatives to be considered for evaluation. No other alternatives (i.e., actions or locations) were considered.

2.4 Descriptions of Alternatives Considered

The proposed action and alternative to the proposed action, the No Action alternative, are described below.

2.4.1 Alternative A: No Action

Under the No Action alternative, it is assumed that the current SAR facility on Hebble Creek Road would remain in use. No alterations or improvements would be made to the buildings or outdoor training area. This alternative will serve as a baseline against which the Proposed Action and alternatives can be compared.

2.4.2 Alternative B: Construction of Fully Contained Small Arms Range Complex (Proposed Action)

The proposed complex would be a one-story structure of approximately 3,906 square meters (42,044 square feet) located north of Communications Boulevard on Newark Street (WPAFB, 2002a) as shown in Figure 2.4-1. The facilities structures would consist of a reinforced concrete foundation, a waterproof concrete floor slab with floor drains, a structural steel frame, and masonry walls. The complex would house the firing range; support facilities such as storage for range supplies and equipment and for target storage and repair; classrooms; administrative space; and storage for alarmed weapons and ammunition. The firing range would include 21 firing line positions for rifles, pistols, and shotguns and two special firing positions for M60 machine guns (WPAFB, 2002k). The firing positions for M60 machine guns would be located separately from the other firing lines. Personnel from WPAFB would use metal-jacketed bullets, with the



View (looking south) of the proposed location for the fully contained small arms range complex.



View of the perimeter road along the northeast boundary of the proposed location for the fully contained small arms range complex.



Figure 2.4-1.
Proposed Location of the
Fully Contained Small Arms Range Complex.

DRAWING BY	KMS 7/23/02	CHECKED BY TC	APPROVED BY CH	12/4/02 12/4/02	DRAWING NO. K-638196-3000-7/02-W

exception of lead or steel shot, which would be used for shotguns. Federal law enforcement personnel may also use the range. It is possible that these groups may use lead bullets.

Site preparation activities associated with the proposed action would begin with stripping the topsoil and removal of the concrete pad, followed by excavation and compaction of the soil. The site would be graded so that storm water runoff would flow to existing drainage. Site work would include mechanical and electrical utilities located both above and below ground. A parking lot with 50 spaces would be constructed. Once construction is completed, the site would be landscaped. Because the FCSARC will be fully contained, the existing fence would be removed (WPAFB, 2002f).

After arms training activities have been transferred to the FCSARC, the two buildings at the existing SAR on Hebble Creek Road will be demolished (Figure 2.4-2). [As discussed in Section 4.0, impacts from the demolition will be tiered from the *Final Environmental Impact Statement of Multiple Historic Facilities at Wright-Patterson Air Force Base, Ohio* (USAF, 1997).] The buildings include a facility housing the indoor firing range and a facility housing classroom space. The two buildings total 2,370 square meters. After the demolition is complete, an investigation of the soil surrounding the building and the outdoor training area will be conducted to determine the presence or absence of lead contamination. If lead is detected above acceptable levels, the soil will require remediation. The extent of the investigation and potential remedial actions has not been determined at this time. For the purpose of this EA, however, it is assumed that soil remediation will be necessary.

2.5 Comparison of Alternatives

The impacts associated with the proposed action and the No Action Alternative are summarized in Table 2.5-1. The information includes a concise definition of the issues addressed under each alternative and the environmental impacts associated with each alternative. The analysis is based on information discussed in detail in Chapter 4.0, Environmental Consequences.



View of the existing small arms range, including the firing range facility (far right) and classroom facility (far left).



View of the outdoor training area at the existing small arms range.

Table 2.5-1
Comparison of Environmental Consequences
of the Proposed Action and Alternatives
Page 1 of 3

Resources	Alternative A: No Action	Alternative B: Construction of Fully Contained Small Arms Range Complex
Biological Resources		
Vegetation	Short-Term: No impact. Long-Term: No impact.	Short-Term: Little, if any, impacts at the proposed construction site. Minor impacts to vegetation during demolition and remediation activities at the current SAR. Long-Term: No impact because areas would be re-vegetated after project activities.
Wildlife	Short-Term: No impact to proposed construction area. Minor, negative impacts (intermittent) due to disturbance of wildlife from gunfire during outdoor training activities. Long-Term: No impact.	Short-Term: No impact to wildlife at proposed construction area. Minor negative impacts during demolition and potential remediation of the current SAR. Long-Term: No impact to proposed construction area. Minor, beneficial impacts due to cessation of gunfire after removal of current SAR. Minor, beneficial impacts due to increase in habitat for birds and other animals.
Threatened and Endangered Species	Short-Term: No impact. Long-Term: No impact.	Short-Term: No impact. Long-Term: No impact.
Wetlands	Short-Term: No impact. Long-Term: No impact.	Short-Term: No impact. Long-Term: No impact.
Water		
Groundwater	Short-Term: No impact. Long-Term: No impact.	Short-Term: No impact. Long-Term: No impact.
Surface Water	Short-Term: No impact. Long-Term: No impact.	Short-Term: Minimal impact from increased surface runoff during demolition and potential remediation activities at the current SAR. Minimal impact from increased surface water runoff during construction of FCSARC. Impacts would be minimized because erosion and siltation controls would be implemented. Long-Term: Potential impact due to surface water runoff associated with parking lot. Impacts would be minimized by designing appropriate drainage. Potential increase in infiltration could result from removal of current SAR. Minor, beneficial impact could occur due to decrease in runoff.

Table 2.5-1
Comparison of Environmental Consequences
of the Proposed Action and Alternatives
Page 2 of 3

Resources	Alternative A: No Action	Alternative B: Construction of Fully Contained Small Arms Range Complex
Floodplain	Short-Term: No impact. Long-Term: No impact.	Short-Term: No impact because there would be no net loss or gain of soil in the floodplain. Long-Term: No impact.
IRP Sites	Short-Term: No impact. Long-Term: No impact.	Short-Term: No impact. Long-Term: No impact.
Land Use	Short-Term: No impact. Long-Term: No impact.	Short-Term: No impact to land use at the proposed construction site. Land use designation of the current SAR would change from Industrial to Outdoor Recreation. Long-Term: No impact.
Geology and Soil	Short-Term: No impact. Long-Term: No impact.	Short-Term: Potential minor impacts during construction, demolition, and remediation activities (i.e., soil erosion). Impacts would be minimized because erosion and siltation controls would be implemented. Long-Term: No impact.
Cultural/Historic Resources	Short-Term: The current SAR would continue to be a visual and physical intrusion into the Huffman Prairie Flying Field. Long-Term: The current SAR would continue to be a visual and physical intrusion into the Huffman Prairie Flying Field.	Short-Term: No impact in the proposed construction area. Cultural resources could potentially be encountered during soil remediation at current SAR. Impacts would be minimized by consultation with BHPO. Long-Term: No impact.
Air Quality	Short-Term: No impact. Long-Term: No impact.	Short-Term: Minor, short-term impact from particulate matter and engine exhaust emissions generated during demolition, construction and remediation activities. Impacts would be minimized by spraying construction sites with water. Long-Term: Negligible impact from lead emissions generated during the operation of the FCSARC. Estimated lead emissions would be below air quality standards.

Table 2.5-1
Comparison of Environmental Consequences
of the Proposed Action and Alternatives
Page 3 of 3

Resources	Alternative A: No Action	Alternative B: Construction of Fully Contained Small Arms Range Complex
Noise	Short-Term: Minor negative impacts. The current SAR would continue to be a source of noise generated during the use of the firing range. Long-Term: Minor negative impacts. The current SAR would continue to be a source of noise generated during the use of the firing range.	Short-Term: Minor impacts on ambient noise from construction activities, demolition activities, and potential remediation activities. Long-Term: Nominal, beneficial impact due to elimination of gunfire from outdoor training activities. Potential impacts on personnel using the FCSARC. Impacts would be minimized by using hearing protection and engineered controls (e.g., absorptive type acoustical surfacing). Minimal impacts on noise outside the facility. Sound transmission barriers and distance from the facility would reduce noise.
Health and Safety	Short-Term: Potential impacts to trainees due to inadequate facilities and the nature of activities (i.e., weapons training). The degree and severity of impacts are not known. Long-Term: Potential impacts to trainees due to inadequate facilities and the nature of activities (i.e., weapons training). The degree and severity of impacts are not known.	Short-Term: Potential impacts to project workers due to accidents during construction and remediation activities. Impacts would be negligible because adherence to health and safety regulations and plans would minimize hazards. Long-Term: Potential impacts due to the nature of activities (i.e., weapons training). Potential exposure to lead dust would be minimized by air supply and exhaust system. Positive impacts to trainees due to improved facility conditions. No impacts to personnel or children in surrounding area because FCSARC is fully contained. Estimated lead emissions generated from the facility are below air quality standards.
Socioeconomics	Short-Term: No impact. Long-Term: No impact.	Short-Term: Nominal, beneficial impact on local economy from revenue generated by action. Long-Term: Nominal, beneficial impact to base by eliminating the need for off-site machine gun training.
Transportation/Traffic	Short-Term: No impact. Long-Term: No impact.	Short-Term: Nominal, intermittent impacts from project traffic. Long-Term: Nominal increase in traffic in proposed construction location (Communications Boulevard). Nominal decrease in traffic along Hebble Creek Road after current SAR is removed.

3.0 Affected Environment

3.1 Introduction

This chapter describes the environment of the areas along Communications Boulevard and Hebble Creek Road that would be potentially affected by the proposed action and alternative. This chapter also provides the background information and a basis for the analysis of environmental impact in Chapter 4.0. Where applicable, information from the *Final Environmental Impact Statement for Demolition of Multiple Historic Facilities at Wright-Patterson Air Force Base* (USAF, 1997) is referenced.

3.2 Biological Resources

3.2.1 Vegetation

The presence of vegetation at the proposed site the FCSARC is limited. This area is fenced and with this fenced area, most surfaces are either covered by concrete or gravel (Figure 2.4-1). Any vegetation present within the proposed location consists of weed and grass species growing at the edge of the fence and in areas not covered by concrete or gravel.

At the location of the current SAR, vegetation consists primarily of grasses and weeds (Figure 2.4-2). Dominant species include tall fescue (*Festuca arundinacea*), Kentucky bluegrass (*Poa pratensis*), dandelion (*Taraxacum officianle*) and clover (*Trifolium pratense* and *T. repens*). This area is designated by the base as “semi-improved grounds.” Semi-improved grounds are routinely maintained so that grass heights are between 7 and 14 inches (BHE/IT, 1999).

3.2.2 Wildlife

According to the Site-wide Characterization Report (ICI/SAIC, 1995), resident mammals commonly found in commercial/industrial areas and other disturbed areas, such as the proposed location of the FCSARC, include eastern cottontail rabbit (*Sylvilagus floridanus*), chipmunk (*Tamias striatus*), opossum (*Didelphis virginiana*), and gray squirrel (*Sciurus carolinensis*). Birds, such as pigeon (*Columba leucocephala*), killdeer (*Charadrius vociferous*), English sparrow (*Passer domesticus*), mockingbird (*Mimus polyglottos*), and red-winged blackbird (*Agelaius phoeniceus*) are also often observed in this area type.

Wildlife that has been observed in areas adjacent to the current SAR, such as Huffman Prairie Flying Field and the Licensed Hunting Preserve, include: songbirds, hawks, owls, groundhogs

(*Marmota monax*), squirrels, cottontail rabbits (*Sylvilagus floridanus*), pheasants (*Phasianus colchicus*), white-tailed deer (*Odocoileus virginianus*), coyote (*Canis latrans*), raccoon (*Procyon lotor*), fox (*Vulpes fulva*), and dove (*Zenaidura macroura*).

3.2.3 Threatened and Endangered Species

Compliance with Air Force Policy Directive (AFPD) 32-70 and AFI 32-7064 requires all Air Force properties to protect species classified as endangered or threatened under the Endangered Species Act of 1973 (ESA) and to comply with State of Ohio Law 1531.25 and its implementing regulations for species listed by the state as threatened and endangered. To comply with these requirements, WPAFB developed an Endangered Species Management Plan (BHE, 2001).

Federal- and state-listed species at WPAFB include the Indiana bat (*Myotis sodalis*), bald eagle (*Haliaeetus leucocephalus*), eastern massasauga rattlesnake (*Sistrurus c. catenatus*), clubshell (*Pleurobema clava*, a mussel), and blazing star stem borer (*Papaipema beeriana*, a moth).

The eastern massasauga rattlesnake is a federal candidate species usually found in wet areas including wet prairies, marshes, and low lying areas. Neither the historic nor current population size and status of massasaugas at WPAFB have been determined. Reports of massasauga sightings have been limited to the Prime BEEF Training Area and Twin Base Golf Course. Because the massasauga rattlesnake is a federal candidate species, there is no requirement to survey construction areas for potential snake habitat. No sightings of the massasauga rattlesnake have been reported within either the current SAR or the proposed FCSARC.

The Indiana bat habitat follows the lower reaches of Hebble Creek, Trout Creek, and the riparian corridor of Mad River from its northern reach in Area A to its confluence with Hebble Creek (ICI/SAIC, 1995; BHE/IT, 1999) where this species roosts during the summer and forages in the floodplain/riparian forests. In July 2000, two Indiana bats (a juvenile female and an adult post-lactating female) were captured along Trout Creek during a base-wide mist net survey (BHE, 2001). Radio tracking of these two bats confirmed the presence of a maternity colony in a dead slippery elm (*Ulmus rubra*) in a woodlot on the campus of Wright State University. No sightings of Indiana bats have been reported within either the proposed FCSARC or the current SAR.

Indiana bats exhibit an annual cycle that includes spring staging, spring migration, summer roosting, foraging, and birth of young, fall migration, swarming, and mating, and winter hibernation. When female Indiana bats emerge from hibernation, they can migrate up to several hundred miles to establish maternity colonies. Females form maternity colonies under exfoliating bark of either dead trees or living trees such as shagbark hickory (*Carya ovata*) in upland and riparian forest.

Indiana bats require a variety of roosts during summer to ensure persistence of the colony (Callahan et al., 1997). Suitability of trees as Indiana bat roosts is determined by (1) tree condition (live or dead), (2) quantity of loose bark, (3) solar exposure and proximity to other trees, and (4) spatial relationship to water sources and foraging areas. Indiana bat maternity colonies use multiple primary and secondary roosts throughout the summer.

Indiana bats forage in a variety of habitats, but most frequently in and around the canopies of riparian/floodplain, and upland forests, along wooded fence rows and borders of croplands, over clearings with early successional vegetation, and over farm ponds in pastures. Streams, floodplain forests, and impoundments appear to be among the preferred foraging habitats for pregnant and lactating Indiana bats. Stream corridors and forest openings are used as flight corridors from roosts to foraging areas.

Copies of correspondence with the Ohio Department of Natural Resources (ODNR) and the U.S. Fish & Wildlife Service (USFWS) regarding the potential occurrences of threatened and endangered species in the project areas are provided in Appendices A and B, respectively.

3.3 Water Resources

Because the proposed FCSARC and the current SAR share the same hydrologic system, the same general characteristics and features for groundwater, surface water, and flood plain management will apply to both locations.

3.3.1 Groundwater

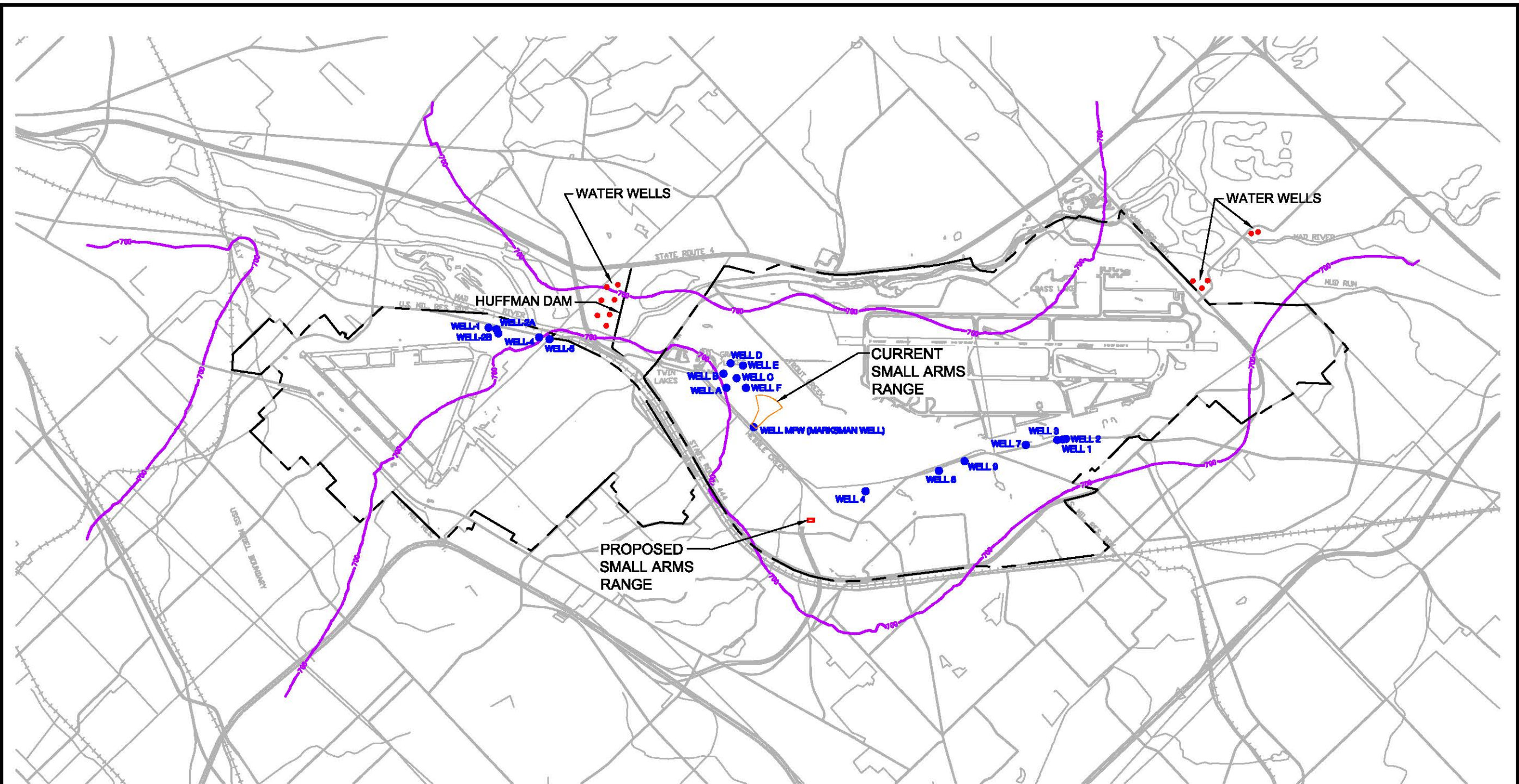
The Buried Valley Aquifer reaches a maximum thickness of approximately 230 feet in the central portions of the bedrock valley and thins to only a few feet at edges of the buried valley (Dumouchelle et. al., 1993). In the vicinity of the proposed FCSARC and the current SAR, the aquifer is conceptualized as a heterogeneous unconfined aquifer because of the discontinuous

nature of fine-grained deposits in the subsurface (Geraghty & Miller, 1987). Water production in this area is very prolific, yielding over 2,000 gallons per minute (gpm) to water supply wells, with the aquifer being very responsive to applied stresses. Data indicate a typical seasonal variation in water levels of approximately 10 feet. The annual low water levels occur during the autumn months (September-October) with annual high levels occurring in spring (April-May). Regional groundwater flow is typically west toward the Mad River and the Huffman Dam well field.

A groundwater investigation was conducted in the vicinity of the proposed FCSARC as part of the Operable Unit 4 Remedial Investigation (OU4 RI) and identified four potential contaminant migration pathways (CH2M Hill, 1994). Groundwater velocity along the four pathways (three pathways in the upper sand and gravel zone and one in the lower sand and gravel zone) ranged from 6.6 to 15.7 feet per day.

The Buried Valley is a designated sole source aquifer under United States Code (USC) §1424(e) of the Safe Drinking Water Act (53 FR 15876) and OAC §3745-27-07(B)(5). The Buried Valley Aquifer is a prolific source of water and is highly utilized as a municipal and industrial source of water (Figure 3.3-1). Groundwater in this area occurs at approximately 12 feet below ground surface. Groundwater extraction in the vicinity of the current SAR location occurs at the 63-foot deep "Marksman" well located adjacent to Building 30883 (Figure 3.3-1). Groundwater at the Marksman well is contaminated with trichloroethene (TCE) at current concentrations of approximately 4 µg/L. The source of the TCE has not been determined. A metals sample was also collected from the Marksman well to check for the presence of lead in the groundwater. Lead was not detected as a suspended solid (total metals) or in the dissolved phase. The base water production wells due west of the current SAR are not in use (Figure 3.3-1). OU4 RI groundwater water samples collected from the monitoring wells closest to the FCSARC (OU4-MW-10A, -10B, -10C) indicate that VOCs were not detected (CH2M Hill, 1994).

In addition, the City of Dayton well fields at Huffman Dam and Rohrer's Island are located hydraulically downgradient of the current SAR. The combined pumping of these well fields can exert significant hydraulic control over the direction and rate of groundwater movement within the area. The current SAR and planned FCSARC locations fall within the City of Dayton's 1-year wellhead protection capture zone. The purpose of the wellhead protection program is to provide control mechanisms to discourage the storage of hazardous chemicals above the aquifer.



LEGEND:

- BASE BOUNDARY
- TOP OF BEDROCK ELEVATION CONTOUR (ft, msl)
(APPROXIMATE BOUNDARY OF BURIED VALLEY AQUIFER)
- WPAFB DRINKING WATER WELL LOCATIONS
- WATER PRODUCTION WELL
- GROUNDWATER FLOW DIRECTION

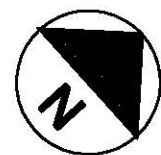


Figure 3.3-1

**BOUNDARY OF THE BURIED
VALLEY AQUIFER**

PREPARED FOR

**WRIGHT-PATTERSON
AIR FORCE BASE
DAYTON, OHIO**



IT CORPORATION
11499 CHESTER ROAD
CINCINNATI, OHIO 45246

3.3.2 Surface Water

WPAFB is located within the Mad River valley of the Great Miami River Basin. The Mad River empties into the Great Miami River near downtown Dayton, Ohio, approximately 5.5 miles downstream (southwest) of Huffman Dam (Figure 3.3-2). Surface water bodies and courses located in the vicinity of the Base include:

- Mad River
- Hebble Creek
- Trout Creek
- Twin Lakes
- Gravel Lake
- Drainage ditches located adjacent to roads and runways
- Wetlands.

Recharge of the local groundwater aquifer occurs at each of these water bodies.

The Mad River is the primary surface water drainage within this region, draining 625 square miles upstream of Huffman Dam [U.S. Geological Survey (USGS, 1993)]. Huffman Dam was constructed on the Mad River, completed in 1921, to control flooding in nearby Dayton, Ohio. The channel of the Mad River ranges from 70 to 150 ft wide within the area of Operable Unit 5 (OU5). Base flow in the river averaged 692 cubic feet per second (cfs) during the period between 1974 and 1993 (USGS, 1993).

Hebble Creek, Trout Creek, the Twin Lakes, and Gravel Lake are the most prominent surface water bodies in this portion of Area C. Hebble Creek is a perennial stream located adjacent to Hebble Creek Road and the current SAR. Hebble Creek begins in Area A, runs parallel to Skeel Avenue and Hebble Creek Road, and ultimately discharges into the Mad River.

The new FCSARC will be located in Storm Sewer Network Outfall Area No. 7 (Figure 3.3-3). This outfall area drains to Hebble Creek near the intersection of Skeel Avenue and Hebble Creek Road (Figure 3.3-1). Hebble Creek discharges into the Mad River through National Pollution Discharge Elimination System (NPDES) Outfall 004. This outfall is sampled and monitored for the parameters of oil and grease, iron, total suspended solids, pH and temperature. Compliance levels for the parameters monitored by NPDES permits 003 and 004 are as follows: pH – 8.2; TSS – 4.0 mg/L; oil and grease – 5.7 mg/L; and iron – 92 µg/L.

DRAWING NO.	S-838 196.3.7/02-W			
	12/4/02	12/4/02	TC	CH
DRAWING BY	JIS, III	7/31/02	CHECKED BY	APPROVED BY



Figure 3.3-2. Location of Regional Surface Water Features.

Source: after Dumouchelle and others, 1993



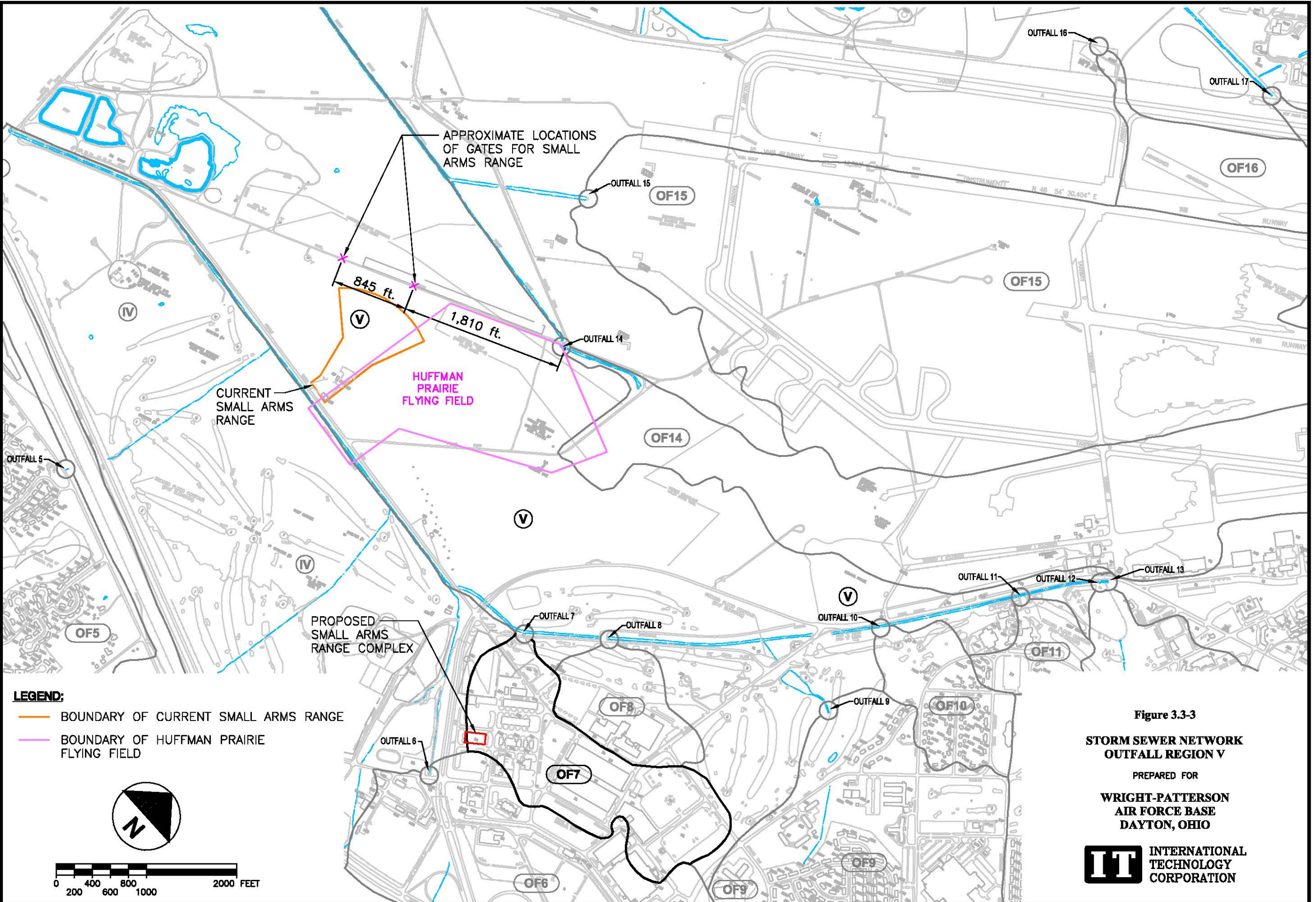


Figure 3.3-3
STORM SEWER NETWORK
OUTFALL REGION V
 PREPARED FOR
WRIGHT-PATTERSON
AIR FORCE BASE
DAYTON, OHIO



The land surface along the southern boundary of the current SAR consists of buildings and a parking lot that generate the majority of the runoff from the site. The outdoor shooting range consists of open fields with level land surface and permeable soil materials that allow much of the precipitation to infiltrate into the soil. The current SAR is located in Storm Sewer Network Outfall Region V (Figure 3.3-3) and water runoff that occurs from the land surface and parking lot drains into Hebble Creek (IT, 1998).

Storm water runoff from construction activities can impact water quality by contributing sediment and other pollutants exposed at construction sites. The NPDES Storm Water Program requires operators of both large and small construction sites to obtain authorization to discharge storm water under an NPDES construction storm water permit. In 1990, the Phase I Storm Water regulations addressed construction activities that disturbed five or more acres of land (40 CFR 122.26(b)(14)(x)). The NPDES Storm Water Program also addresses small construction activities, i.e., those that disturb between one and five acres of land, as a result of the Phase II rule. The Phase II rule becomes effective on 10 March 2003.

3.3.3 Floodplain

The Base Civil Engineering Office uses 814.3 ft above Mean Sea level (MSL) as the 100-year floodplain elevation (ICI/SAIC, 1995). This elevation is based on U.S. Army Corps of Engineers (USACOE) data. The floodplain elevation was determined by the Army Corps of Engineers using HEC-1 Hydrograph model with Bulletin 71 rainfall data and the incorporation of the added storage from the CJ Brown Reservoir just northeast of Springfield, Ohio (WPAFB, 1994b). The location for the proposed FCSARC is at an elevation of approximately 830 ft MSL, which is above the 100-year floodplain. Correspondence with the Miami Conservancy District (MCD) is included in Appendix C.

Land surface elevations in the vicinity of current SAR are characterized by relatively flat topography with surface elevations ranging from approximately 804 ft above Mean Sea Level (MSL) at the intersection of Pylon and Marl Roads to approximately 800 ft MSL at the west boundary. A 100-year flood would cover the current SAR with more than 14 feet of water. At these elevations, portions of the current SAR also lay within the 5-year floodplain of the Mad River at Huffman Dam, which occurs at a river stage of 801.4-ft MSL.

3.3.4 Wetlands

A wetland delineation was conducted on WPAFB in 1999 (BHE, 1999) using the Routine Onsite Determination Method (USACOE, 1987). A total of approximately 23 acres of wetlands were delineated in Areas B and C. No wetlands have been identified in Area A. Area B contains 1 acre of forested wetlands, 0.94 acres of scrub/shrub wetland, and 0.9 acres of emergent wetland. Area C contains 11.65 acres of forested wetlands, 0.68 acres of scrub/shrub wetlands, 5.29 acres of emergent wetlands, and 2.28 acres of open water wetlands.

No wetlands are located in the vicinity of the proposed site for the new FCSARC on Communications Boulevard, which lies in Area A. No wetlands are located near the current SAR on Hebble Creek (Area B). The nearest wetlands are west of the area at Gravel Lake and within the Prime BEEF area, over 0.5 miles away.

3.4 Installation Restoration Program (IRP)

The Department of Defense (DoD) developed the IRP to identify, assess, and control potential environmental contamination that may have resulted from past operations and waste disposal practices. The IRP, an element of the Defense Environmental Restoration Program, is a part of the environmental program at each DoD installation. At WPAFB, the IRP is administered by the 88th Air Base Wing, Air Force Materiel Command, through the Office of Environmental Management, Operations Branch. The base IRP is regulated under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and a Federal Facility Agreement with the U.S. Environmental Protection Agency (USEPA) Region V and Order on Consent with OEPA. WPAFB currently has identified 68 IRP sites per the Air Force Restoration Information Management System (AFRIMS). WPAFB has grouped all confirmed or suspected sites requiring investigation and characterization in 11 geographically-based Operable Units (OUs), designated OUs 1 through 11 (IT, 1999). In addition to the 11 OUs, WPAFB addressed basewide issues of groundwater and surface water contamination under the Basewide Monitoring Program (BMP) (IT, 1995a).

Although the proposed location of the FCSARC at Communications Boulevard is not located on an IRP site, a portion of it does lie within the boundary of OU4 (Figure 3.4-1). OU4 consists of the following IRP sites: Landfill (LF) 3, LF 4, LF 6, LF7, and the Drum Disposal/Storage Area (Figure 3.4-1). A geophysical survey of LF 4 was completed to determine whether its boundaries overlapped the proposed construction site. Results of the investigation concluded

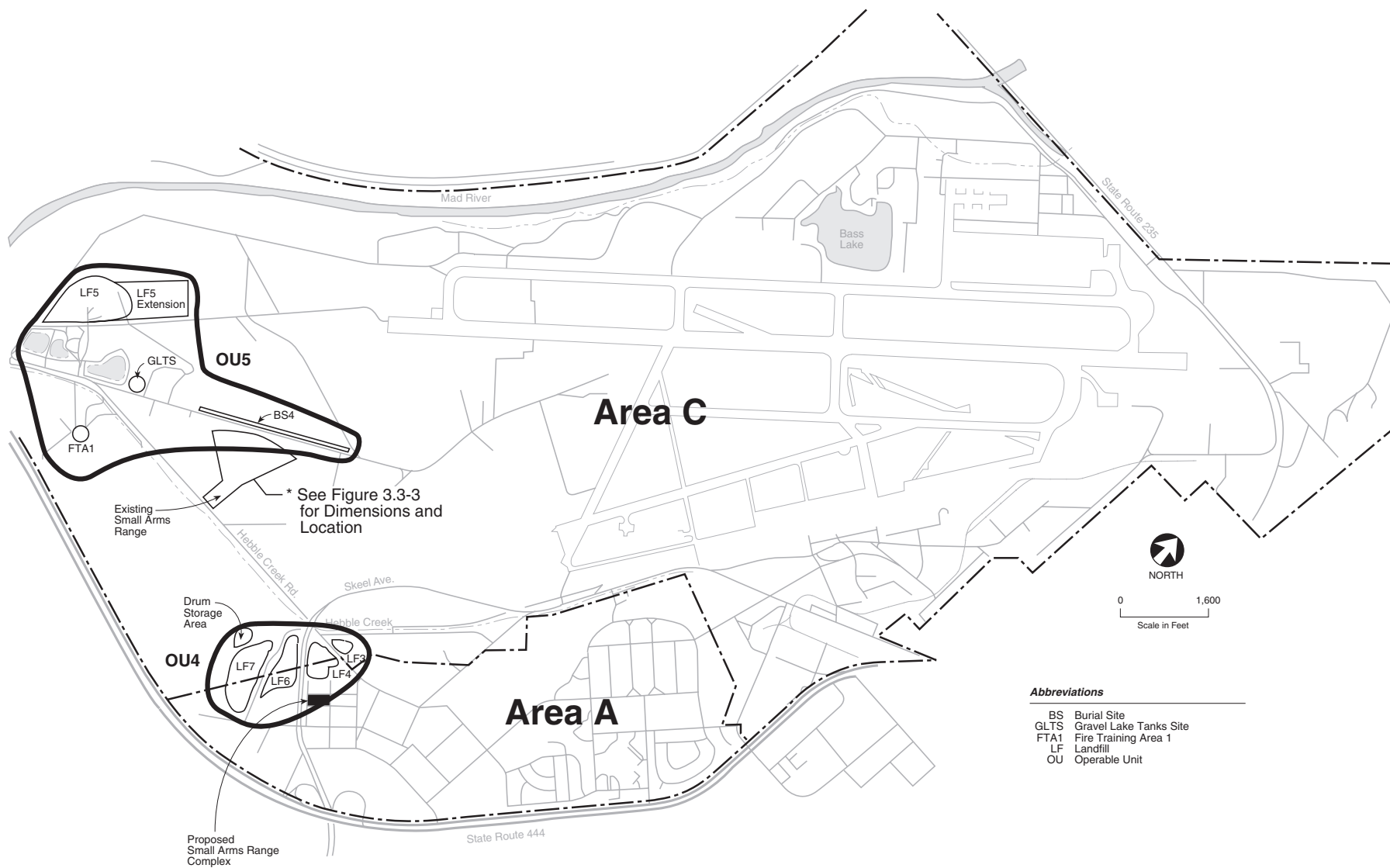


Figure 3.4-1.
Operable Units in
Areas A and C.

DRAWING BY	KMS	CHECKED BY	TC	8/15/02	DRAWING NO. K-838196-3000-8/02-w
	8/15/02	APPROVED BY	CH	8/15/02	
APPROVED BY					

that the area is not part of LF 4 (WPAFB, 2002b). Source control measures have been completed at LFs 3, 4, 6, and 7 under the Basewide Removal Action Plan for Landfill Capping (IT, 1994). Source control measures at LFs 3 and 4 consisted of implementing routine operation and maintenance for landfill gas monitoring and cover maintenance. Source control measures at LFs 6 and 7 consisted of improvements to the existing soil cover to eliminate ponding and improve surface runoff, implementation of routine operation and maintenance for landfill gas monitoring (e.g., methane gas), and cover maintenance (IT, 1999). Three of the eight landfill gas monitoring wells (LG-8, LG-9, and LG-10) associated with OU4 are located in the immediate vicinity (just north) of the proposed location of the FCSARC (Figure 3.4-2). Methane has been consistently detected at monitoring point LG-10; methane has not been detected in LG-8 or LG-9 (IT, 2002).

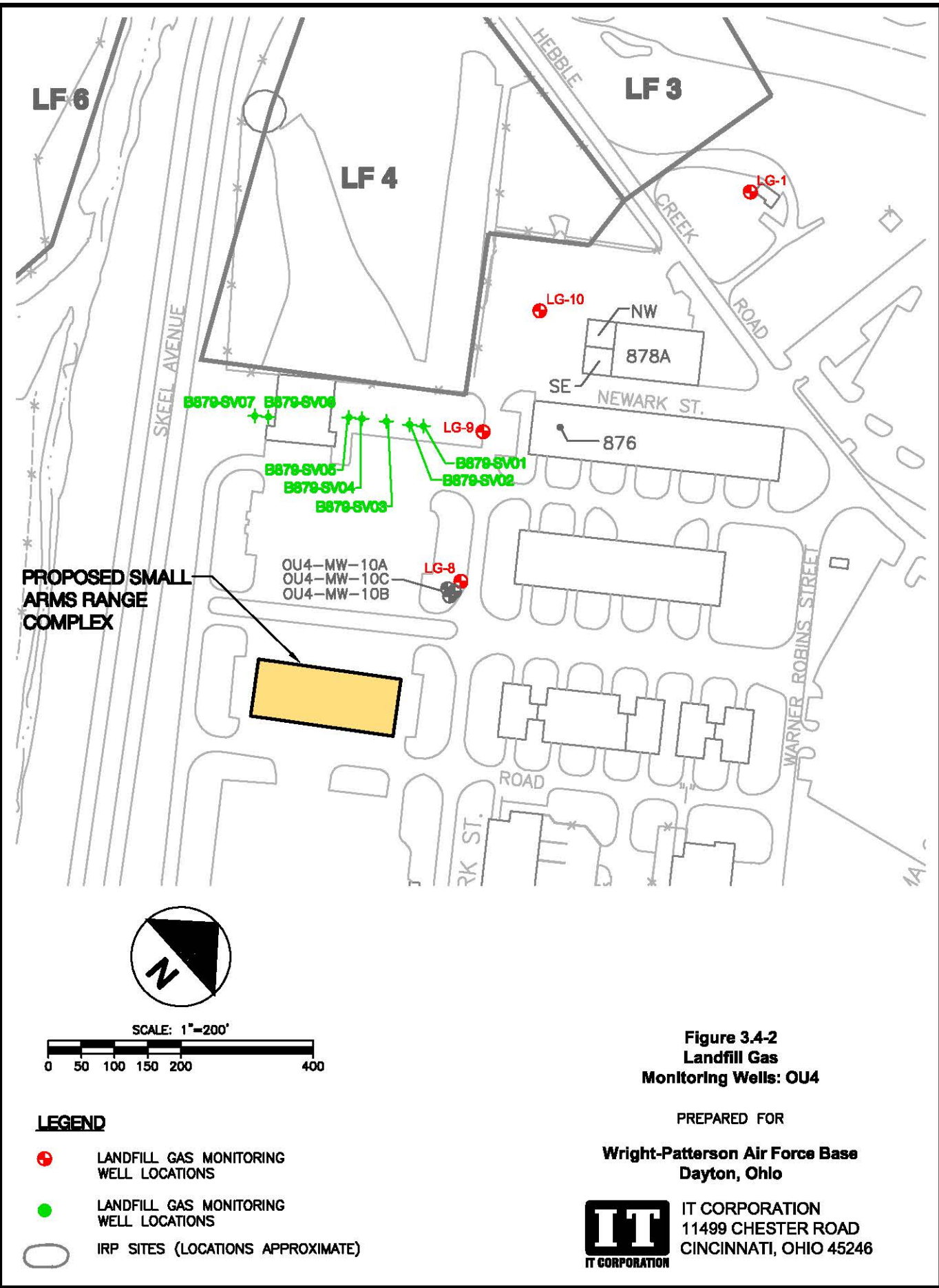
An area adjacent to the northwestern edge of LF 7 is referred to as the Drum Staging Area, and an area northwest of LF 7 is referred to as the Drum Disposal Area. Drums were recovered and disposed of in 1990 (WPAFB, 1998).

Subsequent to the implementation of source control measures at LFs 3, 4, 6 and 7, a Record of Decision (ROD) was prepared and accepted for No Further Action at these sites (WPAFB, 1998).

Although the current SAR on Hebble Creek Road is not located on an IRP site, a portion of the outdoor practice range is located within the boundary of OU5 (Figure 3.4-1). OU5 consists of the following IRP sites: Landfill 5 (LF5), Fire Training Area 1 (FTA1), the Gravel Lake Tanks Site (GLTS), and Burial Site 4 (BS4). Results of the RI are presented in *Final Remedial Investigation (RI) Report, Wright-Patterson Air Force Base, Operable Unit 5, Ohio* (IT, 1995b). An overview of the investigations at OU5 can be found in the *Final Environmental Assessment for the Huffman Prairie Flying Field Cultural Landscape Plan* (USAF, 2001a).

LF5 was capped as a presumptive remedy (WPAFB, 1998). Because sampling data did not indicate a significant risk or threat to public health or the environment, no further action was taken at FTA1, GLTS, and BS4 (WPAFB, 1996). Groundwater in the Buried Valley Aquifer within OU5 contains nine chemicals at levels above Preliminary Remediation Goals (PRGs). There is no evidence that groundwater from OU5 affects groundwater at the current SAR.

DRAWN BY	MSN	CHECKED BY	GP	DRAWING NUMBER
	8/18/02	APPROVED BY	CH	2002 56-06.DWG



3.5 Land Use

WPAFB is divided into three areas: A, B, and C. Area A contains primarily administrative activities; Area B focuses on research and development; and Area C is dominated by airfield operation, maintenance, and civil engineering activities. The base encompasses 8,145 acres and is classified as non-industrial with mixed development. Ten major land use categories have been identified on WPAFB (BHE/IT, 1999).

The proposed location of the FCSARC is situated in an area currently classified as Industrial. The areas adjacent to the proposed location of the FCSARC are classified as Community Commercial. The current SAR on Hebble Creek Road is located in areas currently classified as Industrial (structures associated with the SAR) and Outdoor Recreation (outdoor training area of the SAR). Land use adjacent to the SAR is classified as Open Space and Outdoor Recreation (Woolpert, 2001).

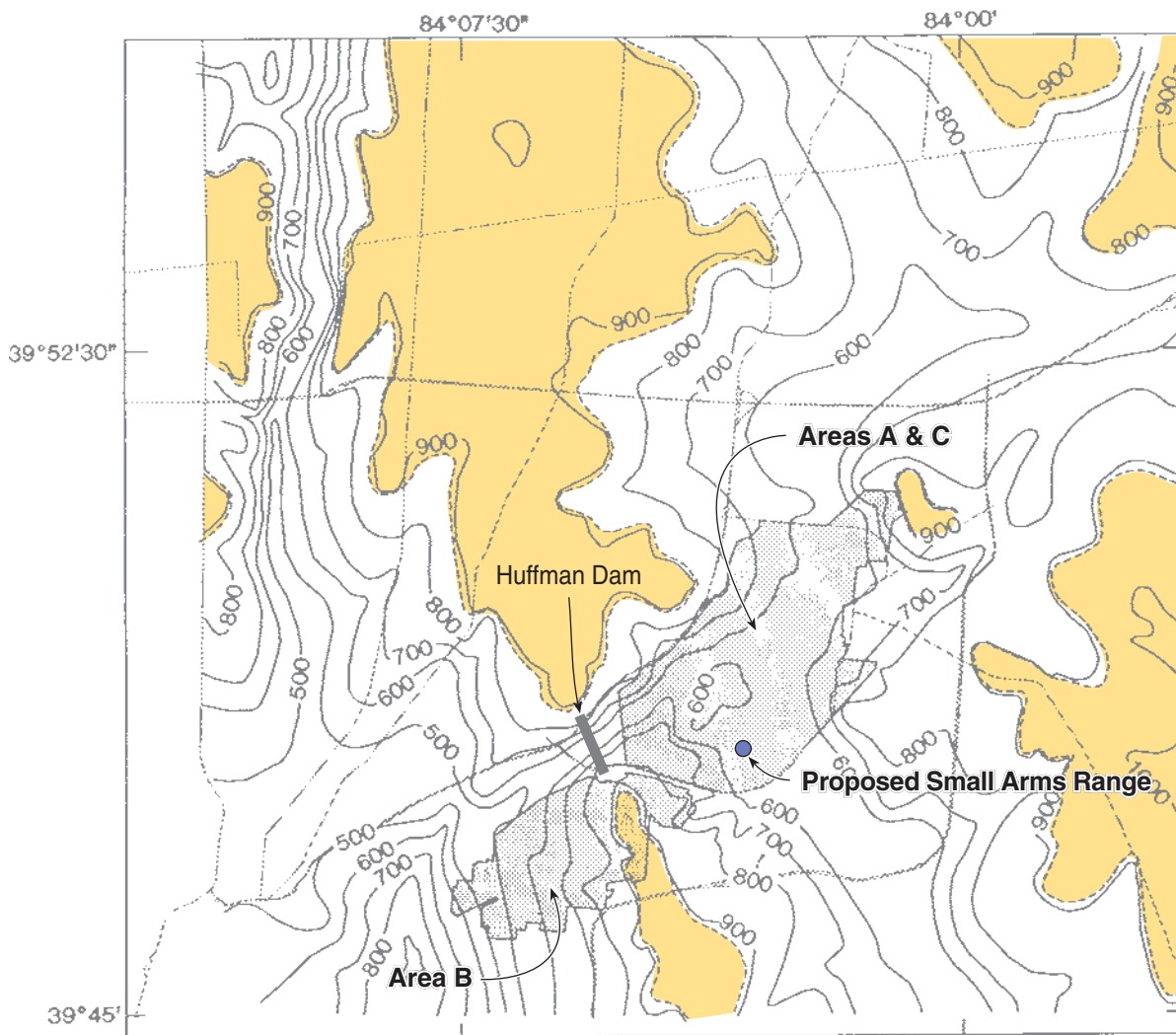
3.6 Soils

The geologic description of this region of the base is based on discussion presented in Norris and Spieker (1966), Dumouchelle et al. (1993), and data collected during the RI for OU5. In summary, OU5 and the present day Mad River overlie a buried Pleistocene valley. Pre-glacial Teays Stage and interglacial Deep Stage drainage systems (Figure 3.6-1) eroded this valley down to Paleozoic shale and limestone. The valleys formed during the development of these drainage systems have been filled and obscured by outwash and till deposits formed during Wisconsin glacial stages and by alluvium deposited by modern streams in the area. The glacial and alluvial deposits form the Buried Valley Aquifer, a major source of water to the area. Further details on the area geology can be found in the OU5 RI report (IT, 1995b).

The U. S. Department of Agriculture (USDA) Soil Conservation Service (SCS) soil survey of Greene County, Ohio (USDA-SCS, 1978), indicates that the majority of the current SAR area surface soils [0 to 5 feet below ground surface (bgs)] are of the Linwood Muck series. Linwood Muck is typical in areas of depressions and swales on flood plains and low terraces, and consists of black, very poorly drained organic soils 16 to 50 inches thick over mineral material.

Surficial soils at the proposed FCSARC site are of the Sloan-Fill land complex. This complex is made up of nearly level soil on floodplains where as much as 50 percent of the original soil has been covered by fill. The main area of the complex is on WPAFB. It is specifically in runways,

DRAWING NO.	S-838196.3-7102-W	
	12/4/02	12/4/02
	TC	CH
CHECKED BY	JIS, III	
APPROVED BY	7/31/02	
DRAWING BY		



EXPLANATION

- WRIGHT-PATTERSON AIR FORCE BASE
- 800— TOP-OF-BEDROCK CONTOUR--Contour interval 100 feet. Datum is sea level
- SILURIAN-ORDOVICIAN CONTACT
- Ordovician Shale Subcrop
- Silurian Limestone Subcrop



Figure 3.6-1. Regional Bedrock Topography.

Source: Dumouchelle and others, 1993

taxiways, and land adjacent to these uses. The fill areas have 3 to 5 feet of fill material, mostly Sloan soil and some Westland and Linwood soils. The fill material is generally mineral soil, organic material, and other organic or inorganic debris from various sources. The parts of the mapping unit that are not covered by fill are mostly Sloan silty clay loam (USDA-SCS, 1978).

The subsurface soils are alluvial deposits consisting primarily of gravel and sand, with intermittent layers of silt and clay. Boring logs from water supply wells completed approximately 1,000 feet west of the current SAR indicate that sand and sand/gravel subsurface deposits range from approximately 4 to 80 feet bgs and are underlain by shale bedrock.

In October and November 2001, an area of lead-contaminated soil was removed from the SAR. Water inside the firing line had drained to a sump located outside the range. Water collected in the sump was pumped through filters and into a stone dry well. The stone and soil in the dry well became contaminated with lead when the system was operated without filters. An area approximately 10 feet long by 6 feet wide by 10 feet deep was excavated. The excavated material was properly disposed of as hazardous waste. Environmental samples were collected from each side wall and excavation bottom. Lead levels in the excavation ranged from <5 mg/kg to 86 mg/kg. The excavated area was backfilled with clean soil and the topsoil was replaced (Tetra Tech, Inc., 2001). There have been no investigations conducted to determine lead contamination of soil of the outdoor training area. As stated in Section 2.4.2, an investigation of the soil will be performed after the demolition of the current site is complete

3.7 Cultural Resources

Over 300 recorded or potential cultural resources have been identified within WPAFB, including prehistoric and historic archaeological sites, historic structures, and historic landscapes (WPAFB, 1999a). The base contains a number of significant cultural resources among those recorded.

The first large-scale prehistoric site survey at the base occurred in 1990 by the US Army Construction Engineering Research Laboratory (USACERL). Additional surveys by USACERL were conducted in 1991, 1992 and 1994. From November 1994 through April 1995, archaeological surveys were conducted at WPAFB by Great Lakes Archaeological Research Center, Incorporated (GLARC). In addition, a survey was conducted in 1995 and 1996 by Earth Tech/NES, Inc. (NES, 1996). Results from these surveys, plus additional surveys conducted at the base, have been summarized and presented in the Cultural Resources Management Plan

(CRMP) (WPAFB, 1999a). The CRMP identifies archaeological sites, historic structures, and other significant cultural resources on WPAFB. A subsequent archaeological survey of selected areas on the base was conducted in 2001. Cultural resources identified in the vicinity of the current SAR and the proposed construction site of the FCSARC are summarized below. Correspondence with the State Historic Preservation Office (SHPO) is included in Appendix D.

Based on information provided in the CRMP, it does not appear that any surveys have been conducted at the proposed location for the FCSARC on Communications Boulevard. The proposed construction site for the FCSARC is located in a portion of the base that has disturbed soils; buildings have been present in this area since World War II. Therefore, cultural resources are not expected to be within this area. No historic buildings are located in the immediate vicinity. According to the CRMP, this area has low archaeological potential. No archaeological survey is required of this area (WPAFB, 2002c). The CRMP does identify one "potentially ineligible site" near the proposed construction area. A potentially ineligible site is one that has been identified as being destroyed or disturbed. This site, R8 T3 S31 #5, is classified as "Residential" and is located south of the proposed construction area (WPAFB, 1999a).

The current SAR is located adjacent to the Huffman Prairie Flying Field. Huffman Prairie Flying Field is a National Historic Landmark and is a unit of the Dayton Aviation Heritage National Historical Park. A portion of the SAR intrudes into the boundaries of Huffman Prairie Flying Field. The outdoor range area of the SAR appears to have undergone limited disturbance. According to the CRMP, this area has low to moderate archaeological potential (WPAFB, 1999a). An archaeological survey was conducted on the undisturbed portions of the SAR in 2001. No prehistoric resources were found (WPAFB, 2002h).

3.8 Air Quality

The Clean Air Act Amendments of 1990 (CAAA) tasked the USEPA with generating a set of rules governing the establishment of air quality standards and rules governing emissions of pollutants. The CAAA of 1990 establishes a diverse program of air quality improvement activities involving research, air pollution controls on motor vehicles, controls of emissions of toxic materials, and issuing federal permits for air pollution sources (WPAFB, 1994b). Included in this program of air quality improvement activities is a mandate in Title I to USEPA to establish National Ambient Air Quality Standards (NAAQS). Accordingly, USEPA has set NAAQS concentration limits for the following pollutants, often referred to as "criteria air

pollutants": carbon monoxide (CO), nitrogen oxides (NO_x), sulfur dioxide (SO₂), lead, ozone (O₃; note: emissions of volatile organic compounds or VOCs are regulated as precursors of ozone), and particulate matter equal to or less than 2.5 microns in diameter (PM_{2.5}). Lead is also regulated as a hazardous air pollutant (HAP). Air quality issues associated with the proposed action for this EA are primarily related to the operation of the new facility and the potential generation of pollutants during demolition and construction activities and fugitive emissions from vehicles.

WPAFB is located in the Dayton/Springfield area.. This area is currently in attainment of all pre-1997 NAAQS [40 CFR 81.336]. In the 5 May 1995 *Federal Register* notice [60 FR 22289], this area was re-designated as "attainment" for ozone. As part of re-designation, the Dayton/Springfield area is considered a maintenance area for at least 10 years after re-designation. Because the base is located in a maintenance area that has a vehicle emissions testing program, all base fleet vehicles and employees' privately owned vehicles must undergo emissions testing, even if registered outside of an E-Check county. This requirement is mandated by Section 118c of the CAA (42 USC 7418). In 1997, USEPA issued a new 8-hr NAAQS for ozone replacing the 1-hr standard. The U.S. Court of Appeals for the D.C. Circuit withheld the implementation of the standard. The U.S. Supreme Court reversed the U.S. Court of Appeals decision. USEPA is reviewing the results of the litigation to determine the approach and schedule for implementation. The Regional Air Pollution Control Agency (RAPCA) in Dayton, Ohio is the Ohio EPA local air agency regulating operations at WPAFB. RAPCA has data indicating that Greene and Montgomery counties do not meet the new 8-hr ozone standard and an official re-designation as "non-attainment area" shall occur at a later date.

The CAA and its subsequent amendments require new major sources of air pollution and major modifications to major stationary sources to obtain an air pollution permit before commencing construction. Permits for sources in attainment areas are referred to as Prevention of Significant Deterioration (PSD) permits.

The base is currently located in an attainment area for all criteria pollutants and is considered a "major stationary source" of air emissions under Title I of the CAA. Any proposed modification to a "major stationary source" needs to be evaluated to determine the applicability of PSD regulations. The new facility will be a potential source of lead and particulate emissions to the air. The significant emissions thresholds for PSD regulations are 0.6 tons for lead, 25 tons for particulate matter (PM) and 15 tons for particulate matter less than 10 micron in diameter

(PM₁₀). Thus, if the potential emissions from the new facility exceed 0.6 tons of lead, 25 tons of PM or 15 tons of PM₁₀, the proposed modification would be considered a “major modification” to an existing “major stationary source” and a PSD permit would be required.

Regulations have been established in the Ohio Administrative Code (OAC) to ensure attainment of the air quality standards is maintained. Air quality standards that apply to the proposed action and its alternative include the Particulate Matter Standards (OAC 3745-17), Lead Emission Standards (OAC 3745-71) and Emergency Episode Standards (OAC 3745-25). The new facility has the potential to emit PM, PM₁₀ and lead and will be considered a new stationary source of air pollution. However, the new facility can be exempt from permitting requirements as a *de minimis* air contaminant source (OAC 3745-15-05) if the potential emissions of PM, PM₁₀ and lead each do not exceed ten pounds per day and the emissions of lead (a HAP) do not exceed 1 ton per day. Pursuant to OAC 3745-71-02, the source is also required to comply with the ambient air quality standard for lead of 1.5 micrograms per cubic meter (µg/m³) as a calendar quarter average.

WPAFB has prepared and submitted a base-wide federal operating permit application for air emissions as specified under Title V of the Clean Air Act Amendments of 1990. This activity included an emissions inventory of approximately 1,450 stationary sources of criteria air pollutants. WPAFB has approximately 139 air emission sources that required permits to install (PTI). The remaining sources were exempt from a PTI by various provisions of OAC 3745-31-03 and OAC 3745-15-05. Of these permitted sources, only 29 are classified as “non-insignificant” air pollution sources in WPAFB's Title V permit application. Nine of these non-insignificant sources are coal and natural gas-fired boilers at the two central heating plants. These nine boilers generate by far the largest quantity of emissions from stationary sources at the base.

3.9 Noise

Noise can be defined as sound that is undesirable because it disrupts speech communication and hearing, is intense enough to damage hearing, or is otherwise irritating. Noise levels associated with WPAFB operations can create conflicts related to activities both on and off the base. Flight activities on WPAFB that contribute to the noise environment include the 445th Airlift Wing, the 47th Airlift Flight, and the Aero Club. The base also receives transient aircraft that represent the largest user group at 45 to 50 percent of the aircraft arriving and departing. The second largest user is the Aero Club.

When measuring sound to determine its effect on human population, A-weighted sound levels in decibels (dBA) are typically used to account for the response of the human ear. A-weighted sound levels represent adjusted sound levels according to a prescribed frequency response established by the American National Standards Institute (ANSI, 1983). An unusual property of noise is that the sound pressure levels of two separate sounds are not directly additive. For example, two sounds of 70 decibels (dB) each occurring in the same location results in a cumulative noise level of 73 dB, not a doubling to 140 dB. In addition, if two sounds are of different levels, the lower level adds less to the cumulative total as the difference increases. For example, if a 60 dB noise source is used in conjunction with a 70 dB noise source, then a cumulative noise level of 70.5 dB would result. When two noise sources have greater than 10 dB difference, the lower noise source adds almost nothing to the higher noise level.

Noise levels can be considered in terms of levels ranging from those in a typical home at 40 dB, and levels at which noise begins to harm hearing if exposed for a long period (8 hours) at 90 dB. The following conclusions were obtained using 65 to 70 dB as a general background noise level and following USEPA prepared responses to sound-level increases (Chemical Nuclear Systems, 1990):

<u>Sound-Level Increase</u>	<u>Expected Community Response</u>
0 to 5 dB	No observed reaction
5 to 10 dB	Sporadic complaints
10 to 15 dB	Widespread complaints
15 to 25 dB	Threats of community action
More than 25 dB	Vigorous community action

Typical noise sources in and around the proposed FCSARC include aircraft and human activities. Military (and civilian) aircraft operations are the existing primary sources of noise in the vicinity of the flying field.

The L_{dn} is an accepted unit for quantifying human annoyance to general noise that has been officially adopted for aircraft noise impact characterization and land use compatibility planning in the United States. This unit is the time-integrated average A-weighted sound level during a 24-hour period. Specific L_{dn} land use compatibility criteria have been adopted by the Federal Intragency Committee on Noise (FICON, 1992) or the Federal Aviation Administration (FAA) recommended L_{dn} ranges for various land use categories based upon the committee's guidelines.

In airport analyses, areas with L_{dn} above 65 dB are often considered in land use compatibility planning and environmental assessments; therefore, the contours of L_{dn} greater than 65 dB are of particular interest.

To address both noise and safety, the DoD required military departments to establish an Air Installation Compatible Use Zone (AICUZ) program. The goal of AICUZ is to promote compatible land use on and off base to minimize noise complaints and safety hazards. According to the AICUZ study, the proposed location of the FCSARC is located in the <65 dB noise zone. According to the AICUZ study, the current SAR is located in the 70 - 74 dB zone. (WPAFB, 1995). These noise ranges represent existing conditions to which potential noise levels from construction, demolition, and remediation can be compared.

3.10 Health and Safety

General health and safety issues associated with the proposed FCSARC include worker safety and public safety during the construction as well as health and safety of trainees during subsequent operation of the facility. For the current SAR, these issues include the health and safety of trainees as well as public safety under existing conditions. Occupational and public safety issues are addressed with respect to demolition and remediation activities.

Proposed FCSARC

Health and safety issues for the FCSARC include hazards associated with construction of the complex and its subsequent operation and use. Such hazards include physical hazards (including heavy and light on-site equipment usage), potential hazardous materials, and underground/overhead utility work.

As discussed in Section 3.4, the proposed construction site is located within an OU. The FCSARC will not, however, be built on an IRP site. To determine the extent of nearby LF4 (Figure 3.4-1), a geophysical survey was conducted. There were no anomalies detected in the proposed construction area (WPAFB, 2002b). Furthermore, methane gas monitoring is conducted at LF4 on a quarterly basis. The results from the monitoring points between LF4 and the proposed site have been negative for methane (IT, 2002).

With regard to subsequent operation of the facility, the area surrounding the FCSARC site is classified as industrial/commercial. As previously mentioned, small arms munitions would be

fired and stored at the FCSARC. These munitions are considered a moderate fire hazard (WPAFB, 2002 e). If a fire or explosion were to occur, an evacuation distance of 300 ft would be observed. A child care center (Building 1403) is located approximately 600 feet southeast on Communications Boulevard between Newark Street and Warner Robins Street, i.e., outside of the expected evacuation distance.

The Air Force AICUZ program is 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 additions, 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, APZ I, and APZ II. The Clear Zone represents the most hazardous area. Although administrative uses (industrial, business services, manufacturing) are permitted in the APZs, “people-intensive” uses (e.g., auditoriums, classrooms) are discouraged in these areas. According to AFI 32-7063, all new construction is required to comply with the AICUZ. The proposed site for the FCSARC is located outside of all APZs.

Potential hazards to trainees, instructors, and range personnel would consist of physical and chemical hazards. Physical hazards could include gunshot wounds or other injuries incurred while handling weapons as well as noise (see Section 3.8). Another physical hazard concerns ricochet hazards in indoor ranges. Poorly maintained traps or misdirected shots can cause fragments to be thrown back toward the firing line (U.S. Navy, 2002). Chemical hazards would include exposure to lead dust and other chemicals associated with firing weapons or maintaining the facility.

Potential exposure to lead is a primary concern during the operation of the proposed FCSARC. During firing, hot gases from the propellant can vaporize lead in the bullet. Even with “full jacketed” bullets, lead may be vaporized if the base of the bullet is not jacketed (U.S. Navy, 2002). In addition, misalignment of the barrel, cylinder, clips, or magazines may chip lead from the bullet. Trainees and range personnel could inhale lead particles (dust) during firing, maintenance, and cleaning of the range. Lead dust does not penetrate the skin easily. However, contamination on hands, arms, or the face may allow ingestion of lead during eating, drinking, smoking, or applying cosmetics if the skin is not adequately cleaned.

The effects of lead are the same whether it enters the body through inhalation or ingestion (ATSDR, 1997). The main target for lead toxicity is the nervous system, both in adults and in children. Long-term exposure of adults to lead at work has resulted in decreased performance in some tests that measure functions of the nervous system. Lead exposure may also cause weakness in fingers, wrists, or ankles. Some studies in humans have suggested that lead exposure may increase blood pressure, but the evidence is inconclusive. Lead exposure may also cause anemia. At high levels of exposure, lead can severely damage the brain and kidneys. In pregnant women, high levels of exposure to lead may cause miscarriage. High-level exposure in men can affect the reproductive system.

Children are more sensitive to the effects of lead than adults (ATSDR, 1997). Ingestion of large amounts of lead can result in blood anemia, kidney damage, colic, muscle weakness and brain damage. At lower levels of exposure, lead can affect a child's mental and physical growth. Exposure in the womb, in infancy or in early childhood may also slow mental development and lower intelligence later in childhood.

The Occupational Safety and Health Administration (OSHA) set exposure limits for lead. The Permissible Exposure Limit (PEL) for an 8-hour time-weighted average (TWA) exposure to airborne lead is 50 micrograms per cubic meter (ug/m^3) of air. The Action Level (AL) for an 8-hour exposure to airborne lead is 30 ug/m^3 (without regard to use of a respirator). Exposure to airborne lead at or above the AL, for more than 30 days per year, triggers biological monitoring and medical surveillance requirements.

Current SAR

The current SAR does not allow for efficient and safe training on today's complete arsenal of weapons (WPAFB, 2002a). The ventilation system, designed to minimize smoke and lead dust, fails to function properly. It is directly in front of each individual firing line position obstructing the shooter's target view. Overhead lighting located behind the ventilation ducts and the shooter's head, results in poor task illumination. The concrete floor between the firing line and the target is cracked and deteriorated, and contains an irregular slope that results not only in poor drainage, but creates a potential ricochet hazard. The current SAR is not in compliance with minimum SDZ distances (WPAFB, 2002a).

Because the current SAR is adjacent to the Huffman Prairie Flying Field, public safety issues regarding the firing range were evaluated in the *Final Environmental Assessment for Realignment Visitor Circulation at Huffman Prairie Flying Field at Wright-Patterson Air Force Base, Ohio* (USAF, 2002). The current SAR includes the baffled Small Arms Range and the 40-mm grenade practice range. The 40-mm range is only used once or twice per quarter, but the baffled Small Arms Range is generally used daily. When the range complex is being used, a section of Marl Road falls within the SDZ and use is restricted (WPAFB, 2002i).

With respect to demolition of the current SAR, potential physical hazards to workers are similar to the hazards that were presented in Section 3.3.1 of the EIS for building demolition (USAF, 1997). The demolition crew would be responsible for adhering to applicable health and safety regulations (Table 1.4-1).

Potential hazardous materials of concern to demolition projects are described in the Section 3.3.2 (Hazardous Materials Management) of the EIS. These materials generally include: hazardous materials (e.g., munitions, fire retardants, cleaning agents, petroleum products), hazardous waste, storage tanks, asbestos-containing materials, pesticide usage, polychlorinated biphenyls (PCBs), radon, medical/biohazard waste, ordnance, and lead-based paint. The status of these materials or items is typically determined prior to building demolition. Specifically, munitions, lead, and asbestos are discussed in the following paragraphs.

Due to the nature of the SAR, small arms munitions are fired and stored at the current SAR. These munitions are considered a moderate fire hazard (WPAFB, 2002e). In addition, munitions used at the SAR contain lead. Hazards associated with exposure to lead were discussed in the previous section for the proposed FCSARC. The Office of Environmental Management has shut down the existing drainage system in the range due to potential lead contamination (WPAFB, 2002a).

Another source of lead, lead-based paint (LBP) is known to exist at the current SAR, regulations pertaining to removal and disposal of LBP would apply (Table 1.4-1). In addition, LBP would be handled in accordance with Base Specification 020290, dated January 2002 (WPAFB, 2002h). There is no asbestos at the current SAR (WPAFB, 2002h).

The soil associated with the outdoor range for the current SAR is potentially contaminated with lead that was generated from lead shot in the past. After the buildings are demolished at the current SAR, an investigation will be conducted to determine the need for remediation of the soil (WPAFB, 2002b).

With respect to AICUZ, the current SAR is located in APZ I. Because the SAR is an existing facility, there is no requirement to comply with AICUZ.

3.11 Socioeconomics

Total population in the Dayton-Springfield Metropolitan Statistical Area (MSA) in 1992 was estimated by the Department of Census (DOC) as 961,547 (DOC, 1991). Between 1980 and 1990, total population in the MSA increased 1 percent. Further description of the population is available in the DOC statistics (DOC, 1991; ICI/SAIC, 1995).

Employment in the four-county area is concentrated in the services, manufacturing, retail, and government sectors. Income by industry for persons employed in the MSA during 1992 was greatest in manufacturing (29.6 percent), services (24.9 percent), government (18.5 percent), and health services (10.8 percent) (ICI/SAIC, 1995). WPAFB, with 19,011 employees in 1999, provides a major source of employment in the four-county area (WPAFB, 1999b).

It is estimated that 20,179 secondary jobs have been created in private industry in the four-county region surrounding WPAFB. WPAFB awards numerous contracts every year to local businesses. In Fiscal Year (FY) 1999, for example, contract activity in the economic impact region exceeded \$643.8 million (WPAFB, 1999b).

3.12 Transportation/Traffic

Several major highways are located near WPAFB, including Interstate 675, a major bypass highway situated to the east and south of the base. Interstate 70, a major east/west highway is located north of the base; Interstate 75, a major north/south highway is located west and south of the Base; State Route 444 bisects the base.

From off base, the proposed construction site for the FCSARC would be accessed through Gate 15A on Skeel Avenue to Communications Boulevard to Newark Street. Traffic volume in the vicinity of Gate 15A is heavy, with an estimated average daily traffic count of 6,149 westbound

on Skeel Avenue near Communications Boulevard in 1994 (ICI/SAIC, 1995). There are no recent traffic counts for Communications Boulevard (WPAFB, 2002d). Traffic counts near the intersection of San Antonio Avenue and Communications Boulevard were 1,543 for 1994 (ICI/SAIC, 1995).

The current SAR is accessed via Hebble Creek Road. Traffic in this area is relatively light. Traffic counts were available for Hebble Creek Road and Marl Road. The most recent traffic counts in this area were obtained in conjunction with projects for the Huffman Prairie Flying Field (USAF, 2002). A 1996 traffic count to determine average daily volume showed traffic volume eastbound on Hebble Creek Road to be 4,492 and traffic westbound to be 502 (WPAFB, 2000). During a 1998 traffic count (daylight hours), Marl Road averaged approximately 31 vehicles/hour (PES/Metcalf & Eddy, 1998).

4.0 Environmental Consequences

4.1 Introduction

The purpose of this chapter is to provide an evaluation of the potential impacts associated with the proposed action (construction of the FCSARC) as well the No Action alternative presented in Chapter 2.0. The No Action alternative represents the baseline conditions to which the proposed action is compared. The proposed action and alternative contain two general areas to be potentially affected: (1) Communications Boulevard, the proposed location for the construction of the small arms range complex, and (2) Hebble Creek Road, the location of the current SAR. The evaluation of the proposed action and alternative is summarized in Table 2.5-1.

The impacts associated with the demolition actions at the current SAR will be tiered from *Final Environmental Impact Statement for the Demolition of Multiple Historic Facilities at Wright-Patterson Air Force Base, Ohio* (USAF, 1997). General issues relating to routine building demolition will not be covered in this EA but will be referenced to the EIS for building demolition. For actions at the current SAR, the impact analysis presented below will focus on impacts from remedial activities that may be required for any lead-contaminated soil potentially present.

4.2 Biological Resources

4.2.1 Vegetation

4.2.1.1 Alternative A: No Action

Vegetation at either location would not be impacted under the No Action alternative.

4.2.1.2 Alternative B: Construction of Fully Contained Small Arms Range Complex

Much of the proposed construction site is covered by concrete or gravel. Little, if any, impact to vegetation would be expected during the construction of the FCSARC. Vegetation at the site primarily consists of grasses and weeds, which are commonly found throughout the base. After construction of the FCSARC is complete, the area would be landscaped with grasses, ornamental shrubs and trees.

Some vegetation surrounding the foundation of the buildings and parking lot would be disturbed during demolition of the current SAR. If the soil at the current SAR were remediated, the vegetation covering the soil would be removed. However, impacts to vegetation at the current SAR would be minor because the vegetation in this area is common throughout the base, and the area would be landscaped with similar vegetative species (e.g., grasses) once remediation activities were completed.

4.2.2 Wildlife

4.2.2.1 Alternative A: No Action

There would not be impacts under the No Action alternative at Communications Boulevard.

Minor, intermittent impacts to wildlife could occur from gunfire during outdoor training activities at the current SAR on Hebble Creek Road.

4.2.2.2 Alternative B: Construction of Fully Contained Small Arms Range Complex

Impacts to wildlife would not be expected during the construction of the FCSARC, nor would any long-term impacts be expected.

Minor, negative impacts to wildlife could occur during demolition activities and potential soil remediation activities. Impacts would be short in duration and cease once the site has been remediated. Minor, beneficial impacts could be observed after the removal of the current SAR because outdoor training would cease, thereby eliminating some disturbance of wildlife by gunfire from the facility. There could also be a minor increase in habitat for species such as birds and ground-dwelling animals (e.g., rabbits) if the area is re-designated as Open Space or Outdoor Recreation and not converted into other uses.

4.2.3 Threatened and Endangered Species

4.2.3.1 Alternative A: No Action

Threatened and endangered species would not be impacted under the No Action alternative.

4.2.3.2 *Alternative B: Construction of Fully Contained Small Arms Range Complex*

No threatened or endangered species are located in the vicinity of the proposed construction site at Communications Boulevard. Therefore, no impacts would be expected.

No impacts to threatened or endangered species would be expected during activities at the current SAR. No trees are expected to be removed during soil remediation efforts at the site. In accordance with the recommendations of USFWS and the WPAFB Endangered Species Management Plan, a base policy has been established that no trees are to be cut during the maternity season for the Indiana bat (15 April through 15 September) to avoid incidental take of roosting bats. In the event that trees would be cut, cutting would take place outside of the maternity season, in accordance with this policy.

In the case of the massasauga rattlesnake, no sightings have been reported within the current SAR. Reports of massasauga sightings have been limited to the Prime BEEF Training Area and Twin Base Golf Course. The current SAR is located outside of the primary habitat for the massasauga rattlesnake and the presence of this species in these areas is unlikely. Based on delineation of high potential areas, the potential for encountering the massasauga rattlesnake during activities at the current SAR is low (BHE, 2001).

4.3 *Water Resources*

4.3.1 *Groundwater*

4.3.1.1 *Alternative A: No Action*

The No Action alternative would not impact groundwater under current conditions. Sampling of the water supply well at the current SAR indicates that lead shot remaining in the surface soil at the outdoor range has not impacted groundwater at the facility. However, groundwater quality impacts from the historic operation of the current SAR will be further evaluated in future environmental site investigations.

4.3.1.2 *Alternative B: Construction of Fully Contained Small Arms Range Complex*

Actions to be implemented at the proposed site of the new FCSARC and within the current SAR boundary are described in Section 2.4. Actions that penetrate the land surface at the proposed FCSARC (removal of the existing fence, trenching for utility lines and building foundation) and

current SAR (e.g., removal of fences, buildings and utility lines) would be limited to the shallow subsurface. Because groundwater in this area occurs at approximately 13 to 14 ft bgs, the proposed actions would not alter the subsurface hydrogeology and would not create a potential source of groundwater contamination. Thus, neither construction nor demolition activities are expected to impact groundwater resources.

After demolition is completed, groundwater quality impacts from the historic operation of the current SAR will be evaluated in conjunction with the soil investigation of the outdoor range.

4.3.2 Surface Water

4.3.2.1 Alternative A: No Action

The No Action alternative is not expected to impact surface water resources under typical conditions. In the event of a flood, it is possible that potentially contaminated soil could impact surface water. The degree of potential impact is not known.

4.3.2.2 Alternative B: Construction of Fully Contained Small Arms Range Complex

Building construction activities at the proposed location will involve minor land surface disturbance while the building is being built. As discussed in Sections 1.4 and 3.3.2, a permit for discharge associated with disturbance of five or more acres of land would be required under Phase I of the storm water regulations. A permit for discharge associated with disturbance of one to five acres of land would be required under Phase II. The Phase II rule becomes effective on 10 March 2003 (WPAFB, 2002I). The total area to be disturbed during the proposed project includes the FCSARC (42,044 ft² or 0.96 acres) and a parking lot, which is assumed to accommodate 50 cars (12,000 ft² or 0.28 acres). The area of the affected land is anticipated to be between one to five acres in size. Therefore, a NPDES construction permit from the Ohio EPA would be required.

As the land surface at this location is also typically flat (although elevated in relation to the drainage ditches paralleling Skeel Avenue), erosion control measures would inhibit erosion during heavy rain events. Construction activities would not alter the surface water hydrology and would not create a potential source of surface water contamination. Therefore, the construction activities for the new FCSARC facility are not expected to impact surface water resources. There would be no long-term impacts associated with the construction of the

FCSARC because the facility would be fully contained and the remaining soil surface would be vegetated. There would be potential impacts due to the increased impermeable surface associated with the parking lot. Impacts would be minimized by accounting for appropriate drainage and connections to the sewer system in the design of the parking lot.

Potential impacts for surface water runoff during demolition activities are addressed in Section 4.12 of the EIS for building demolition (USAF, 1997). Demolition at the current SAR would temporarily alter the land surface (e.g., fence, building, and parking lot removal) and potentially increase runoff from the site until the vegetation ground cover was established. Although the land surface is flat, erosion control measures (i.e. straw over seeded areas, straw bails in drainages) would inhibit erosion during heavy rain events.

4.3.3 Floodplain

4.3.3.1 Alternative A: No Action

The current SAR would remain vulnerable to flooding under the No Action Alternative. Floodplain management, however, would not be impacted.

4.3.3.2 Alternative B: Construction of Fully Contained Small Arms Range Complex

As discussed in Section 3.3.3, the Mad River 100-year flood stage at WPAFB is 814.3 ft MSL. The flood control basin upgradient of Huffman Dam is regulated by the Miami Conservancy District (MCD). Structures or additions of any type within the floodplain behind Huffman Dam shall not be erected more than 5 feet below the Huffman Dam spillway elevation (835 ft MSL) except by authorization by the MCD (MCD, 1996). The land surface at the proposed FCSARC site is at an elevation of approximately 830 ft MSL, which is the cutoff elevation for requiring building authorization from the MCD. Construction of the new FCSARC would not impact floodplain management.

The current SAR lies within the 100-year floodplain. The area is subject to floodplain development restrictions specified in the Base Comprehensive Plan (WPAFB, 1988). Acceptable development in the floodplain includes all uses that allow free flow of flood waters, do not add a net volume of fill into the floodplain, and do not significantly reduce water percolation into soils. Removal of the existing structures and parking lot will not negatively impact floodplain management or reduce flood control storage capacity but will increase the

infiltration capacity of this area. In the event that surface soil in the outdoor range would need to be removed, remedial activities would be performed so that there would be no net gain or loss of soil in the floodplain.

4.3.4 Wetlands

4.3.4.1 Alternative A: No Action

There are no wetlands in the vicinity of either location. Therefore, wetlands would not be impacted under the No Action alternative.

4.3.4.2 Alternative B: Construction of Fully Contained Small Arms Range Complex

There are no wetlands in the vicinity of either location. Therefore, wetlands would not be impacted.

4.4 Installation Restoration Program Sites

4.4.1 Alternative A: No Action

The No Action alternative would have no impact on any IRP sites.

4.4.2 Alternative B: Construction of Fully Contained Small Arms Range Complex

Although both the proposed construction site and current SAR are located within OU boundaries, neither site is located on an IRP site. No impacts to any IRP sites would be expected to occur. Because of the proximity of the proposed construction site to several landfill gas monitoring wells and LF 4, however, an additional survey was recommended to determine the presence of landfill gases (WPAFB, 2002b). On August 15, 2002, soil vapor samples were collected from seven shallow subsurface locations and analyzed in the field for methane, carbon dioxide, oxygen, and lower explosive limit. The sampling points were located adjacent to Building 879 and north of the proposed construction site (Figure 3.4-2). Subsurface sampling holes were created by driving a punch-bar two feet into the soil using a slide-hammer. Soil vapor samples were then collected and analyzed using a Landtec GA-90 gas analyzer. Methane was not detected at any of the monitoring locations. To minimize potential impacts from methane in the future, an additional landfill gas monitoring well would be added to the quarterly monitoring program for the FCSARC (Section 3.4).

The proposed construction site for the FCSARC is approximately 350 feet southwest of LF4. It is not expected that landfill material would be encountered during construction. However, in the event that landfill material is encountered during construction, the Office of Environmental Management would be notified.

4.5 Land Use

4.5.1 Alternative A: No Action

Land use would not change under Alternative A. Therefore, Alternative A would have no impact on land use.

4.5.2 Alternative B: Construction of Fully Contained Small Arms Range Complex

Land use would not change at the proposed construction site for the FCSARC because this area is currently classified as Industrial. The industrial area, however, borders land that is classified as Community Commercial. The proposed FCSARC would be located approximately 600 feet northwest of a child care center and 2,000 feet west of the Air Force Materiel Command headquarters. Impacts to the Community Commercial would not be expected. The facility would be designed such that potential lead emissions would be controlled to levels below the ambient air quality standard and noise would be reduced by engineered sound barriers.

The area currently designated as Industrial at the SAR (i.e., the area with the buildings and parking lot) would be re-classified as Outdoor Recreation (WPAFB 2002f,g). The area where the outdoor training area is currently located would remain Outdoor Recreation.

4.6 Soils

4.6.1 Alternative A: No Action

Soils would not be impacted under the No Action Alternative. Under the No Action Alternative, however, it is assumed that there would be no remediation of lead in soil. Lead could potentially persist in soils at the current SAR.

4.6.2 Alternative B: Construction of Fully Contained Small Arms Range Complex

Construction of the new FCSARC facility would have the potential for soil erosion until the foundation is constructed. This impact would be short-term. Erosion control measures should be utilized as needed. The removal of the parking lot and demolition of three buildings at the current SAR site would initially increase the erosion of surface soils until vegetation was

established. Impacts to soil due to building demolition are addressed in Section 4.11 of the EIS for building demolition. However, due to the flat topography at the current SAR, excessive erosion is not anticipated. Actions completed under Alternative B are not expected to result in long-term impacts to soils. Under the subsequent remedial investigation of the current SAR, the extent and amount of soils to be removed or otherwise remediated (if any) will be determined. This will be considered a separate action from the current building removal assessment and will address the associated potential soil impacts under that action.

Potential soil removal and remediation will be considered a separate action from the demolition of the buildings. The location(s) and the amount of soil to be removed will depend upon the remedial investigation.

The new FCSARC will be fully enclosed and, therefore, will not have potential impacts to soil. A potential impact to soil quality exists during the demolition of the current SAR facility. Any remaining lead shot from the indoor range would be collected and disposed of per procedures prior to demolition to avoid surface soil contamination. Surface soil quality in the surrounding outdoor shooting range will be addressed in future environmental site investigations.

4.7 Cultural Resources

4.7.1 Alternative A: No Action

Under the No Action alternative, the current SAR would continue to be a visual and physical intrusion into the Huffman Prairie Flying Field.

4.7.2 Alternative B: Construction of Fully Contained Small Arms Range Complex

Because the proposed construction site (Communications Boulevard) is located in an area that has been disturbed, no impacts to cultural resources are expected to occur under the proposed action. No known archaeological, historic, or Native American ceremonial/traditional sites are expected within the site boundaries. In the event that cultural items are encountered during project activities, work would cease immediately and the Base Historic Preservation Officer (BHPO) would be contacted to assess the items.

There are no known archaeological resources at the current SAR. In the event that cultural items are encountered during demolition or any remediation activities, work would cease immediately and the BHPO would be contacted to assess the items.

Because of the physical overlap of the current SAR and Huffman Prairie Flying Field, remediation of soil at the SAR would have the potential to adversely impact the flying field. Remediation measures to be undertaken within or immediately adjacent to Huffman Prairie Flying Field would be coordinated with the BHPO and the SHPO.

4.8 Air Quality

4.8.1 Alternative A: No Action

Because no demolition or construction would take place, no increase in emissions would be expected. The existing facility would continue to have small quantity of lead emissions. In a previous study of lead emissions at the current SAR, the lead emissions were estimated to be 0.19 lbs/day (IT, 1997). There would be no change in the impact to air quality.

4.8.2 Alternative B: Construction of Fully Contained Small Arms Range Complex

Air quality impacts associated with demolition are detailed in the EIS for building demolition (USAF, 1997). Specifically, the demolition of the current SAR would potentially generate ozone-depleting substances (refrigerants from air conditioners), lead (LBP), and fugitive dusts from demolition activities and project-related vehicles. Impacts would be minimized by measures described in Section 4.8 of the EIS (USAF, 1997). In the short-term, there would be minor, negative impacts to air quality. There would be no long-term impacts due to fugitive dust because the site would be re-vegetated.

Short-term impacts from construction of the FCSARC include minor, negative effects from the generation of fugitive dust from removal and grading of soil for the foundation and parking lot and emissions from vehicles that would travel in the construction area. During construction, dust suppression measures would be used to minimize fugitive dust emissions. To establish a basis for comparison of air quality impacts from the project alternatives with respect to normal base operations, estimates of normal baseline particulate emissions were considered to be air emissions reported in the Annual Emission Fee Report submitted by WPAFB to OEPA (WPAFB, 2001). Emission factors for fugitive emissions associated with heavy construction operations were obtained from Section 13.2.3 of AP-42, *Compilation of Air Pollutant Emission Factors, Volume I: Stationary Sources, Fifth Edition* (USEPA, 1995) based on 80 percent control efficiency for wet suppression (using engineering estimates). Emissions were estimated for Alternative B and were compared to estimated emissions due to normal base activities.

For construction activities at the new FCSARC, particulate matter (PM₁₀) emissions of 1.79 tons per year (tpy) were estimated. This amount is approximately 8.6% of the estimated normal baseline (20.9 tpy) at WPAFB. Supporting data for these estimates are shown in Appendix E.

For the day-to-day operations at the FCSARC, PM, PM₁₀ and lead emissions were also estimated. For determining the applicability of PSD regulations, the potential uncontrolled emissions were calculated by assuming the potential maximum annual throughput for each type of ammunition would be 10 times the estimated maximum throughput. It was assumed that all types of ammunition are lead-jacketed (worst case) and thus, the particulate emissions would be the same as lead emissions. This calculation did not take into account any control efficiency (i.e., high efficiency particulate air or HEPA filters) as the control requirement is not federally enforceable. The maximum worst-case uncontrolled lead emissions are 745 pounds of lead or 0.37 tons of lead. Assuming all lead emissions are PM₁₀, the maximum worst-case uncontrolled PM and PM₁₀ emissions are also 0.37 tons. As the potential PM, PM₁₀ and lead emissions are below the significant thresholds for PSD regulations, the new facility will be considered a minor modification to a major stationary source and thus, will not be subject to the PSD regulations. Supporting data for these estimates are shown in Appendix E.

For determining the applicability of *de-minimis* air contaminant source exemption, the potential daily emissions were reviewed. The potential uncontrolled daily emissions from the new facility will be 2.052 pounds per day each for PM, PM₁₀ and lead and 0.37 tons for hazardous air pollutants (HAPs). Thus, the emissions unit is exempt as a *de minimis* air contaminant source pursuant to OAC 3745-15-05. Supporting data for these estimates are shown in Appendix F.

For demonstrating compliance with the ambient air quality standard for lead (OAC 3745-71-02), the maximum hourly lead emissions were estimated. Data provided by the base indicated that the maximum firing rate was between 10 and 150 rounds per hour per firing lane. Maximum hourly lead emissions were calculated from each type of ammunition assuming a firing rate of 15 rounds per hour, assuming all 21 lanes are operating and assuming the two additional machine gun lanes are also operating at the same time. It was also assumed that all ammunition is lead-jacketed while in reality, only the shotgun ammunition would be lead-jacketed. The worst-case total hourly emissions from the 21 firing lanes were added to the emissions from the two machine gun firing lanes to calculate the maximum hourly lead emissions.

Emissions would be controlled by a HEPA filter. A HEPA filter, by definition, has a minimum 99.97% control efficiency for particulate matter 0.3 microns or less. Because the design of the FCSARC is not yet complete, the actual exhaust parameters are unknown at this time. As a worst-case assumption, it was assumed that the air would be exhausted through one vent, close to ground level (2.5 feet high). If the exhaust is vented through a vertical stack, a higher vent or multiple vents, all scenarios will give better dispersion and less ambient impact. A USEPA approved screening model (SCREEN3) was used to evaluate the maximum ground level impact from a horizontal source (i.e., building vent) located near the ground, taking into account the building downwash effects (OEPA, 1997). It should be noted that the screening level approach produces a value that is conservatively high, generally an order of magnitude greater than a refined approach that takes into account the variables such as physical layout of the emission source, meteorology, and receptor location. The hourly impact was converted to a quarterly impact. The quarterly impact from the maximum hourly lead emissions is $0.28 \mu\text{g}/\text{m}^3$, which is less than the ambient air quality standard of $1.5 \mu\text{g}/\text{m}^3$. Thus, the new facility would be in compliance with the ambient air quality standards. Supporting data for these estimates are shown in Appendix F.

The daily lead emissions from the new facility will be 1.23×10^{-4} lbs/day, which in comparison to Alternative A, is a 99.9% reduction in lead emissions.

Alternative B would have would have a negligible impact on the ability of the Dayton-Springfield area to retain its "Attainment" status. A conformity determination, in accordance with 40 CFR 93.153(c)(1), is not required because the total of direct and indirect emissions from Alternative B would be below the thresholds specified for maintenance areas at 40 CFR 93.153(b)(1). The threshold specified for particulate matter (PM_{10}) is 100 tpy. The estimated PM_{10} emissions from construction activities (1.79 tpy) and the maximum estimated worst-case (i.e., uncontrolled) PM_{10} emissions from the facility (0.37 tpy) are below the threshold.

4.9 Noise

4.9.1 Alternative A: No Action

The No Action alternative would have minor, negative impacts because the current SAR would continue to be a source of noise generated during the use of the outdoor firing range (USAF, 2002).

4.9.2 Alternative B: Construction of Fully Contained Small Arms Range Complex

For persons at a distance of approximately 50 feet, minor (i.e., 0-10 dB increase over background noise) to moderate (i.e., 10-15 dB increase) impacts on ambient noise could result from construction activities involving heavy equipment such as trucks and bulldozers. Noise levels associated with common construction equipment are: bulldozers (79-91 dB at 50 ft), backhoes (73-94 dB at 50 ft), trucks (83-93 dB at 50 ft), front-end loader (75-79 dB at 50 ft), and roller or compactors (72-75 dB at 50 ft) (WPAFB, 1994c). There would be short-term minor impacts to occupants of buildings near the FCSARC. Increases in noise levels are expected to be intermittent while the proposed action is carried out.

Short-term adverse impacts could be experienced by construction crews. Noise levels would be more intense in the construction area. However, impacts would be minimized because workers would be responsible for adhering to health and safety regulations.

Impacts to noise during demolition activities are described in Section 4.9 of the EIS for building demolition (USAF, 1997). Impacts specific to the current SAR are short-term minor impacts to individuals that would be visiting the Huffman Prairie Flying Field during the course of the demolition activities. Visitors would be located at distances well over 50 feet of the demolition site. Because there are no other buildings near the current SAR, there would be no impacts on building occupants during the course of the construction project.

The discharge of weapons creates hazardous impulse noise levels (U.S. Navy, 2002). In a firing range, the impulse noise may act differently when it reflects off hard surfaces. Repeated exposure to impulse noise greater than 140 dB can cause significant hearing loss. In accordance with AFI 36-2226, Combat Arms Program, all personnel would wear hearing protection. The hearing protection would meet or exceed the decibel ratings of the range environment.

Another source of noise would be the ventilation system inside the FCSARC. Noise from this system would be limited to 85 dB (WPAFB, 2001b).

The range would be designed to reduce noise from the facility as much as possible (USAF, 2001b). Noise reduction inside the range and outside the range requires two different designs considerations (U.S. Navy, 2002, USAF, 2001b). Mass and limpness are two desirable attributes

of sound transmission barriers. Unpainted heavy masonry walls would provide mass. Absorptive type acoustical surfacing can reduce the noise within the range. Given information from visits to similar ranges, impacts to noise outside the facility are expected to be minimal. For example, it may be possible to hear gunshots from the parking lot of the facility, but impacts to occupants in nearby buildings would not be expected (WPAFB, 2002k). The building materials would also absorb sound.

4.10 Health and Safety

4.10.1 Alternative A: No Action

Under the No Action alternative, potential hazards to health and safety posed by the current conditions at the SAR would persist. The likelihood or severity of accident or injury cannot be quantified in this EA. Furthermore, the current SAR will continue to be out of compliance with SDZ distances.

Personnel using the current SAR would potentially be exposed to smoke and lead dust because the ventilation system fails to function properly (WPAFB, 2002a). In addition, the facility would continue to emit a small quantity of lead (IT, 1997).

Use of Marl Road would continue to be restricted by the existing gates during operation of the baffled range at the current SAR.

4.10.2 Alternative B: Construction of Fully Contained Small Arms Range Complex

Because construction workers at the FCSARC would be responsible for complying with standard operating procedures and applicable health and safety regulations (Table 1.4-1), no impacts to health and safety would be expected. "Digging clearances" would be obtained from the Department of Civil Engineering and Base Utilities prior to excavating soil and installing utility lines. As discussed in Section 3.10, the construction area is outside of the boundaries of IRP sites in OU4. Results from the methane monitoring program for OU4 (Section 3.4) as well as recent soil vapor analyses (Section 4.4) indicate that no impacts due to methane would be expected.

Use of the completed FCSARC would result in positive impacts on the health and safety of the trainees at the complex. With respect to public safety, there will be no impacts associated with weapons used at the range because the FCSARC is fully contained. In the event of a fire or

explosion, the Fire Department at WPAFB is equipped to handle fires associated with small arms munitions. An evacuation distance of 300 ft would be observed. Although there has been no current detection of methane in the subsurface soil at the FCSARC site, an additional landfill gas monitoring well would be added to the quarterly monitoring program (Section 4.4.2).

Impacts to health and safety associated with building demolition projects are presented in Section 4.3 of the EIS for building demolition (USAF, 1997). Because demolition crews would be responsible for adhering to standard operating procedures and applicable health and safety regulations, no impacts to worker safety would be expected. In addition, there would be no impacts due to hazardous materials identified at the current SAR because it is base policy to identify and remove hazardous materials from buildings prior to demolition (USAF, 1997). The demolition of the current SAR would have a positive impact on personnel and public safety because the SDZ from the outdoor firing range would no longer overlap portions of Marl Road and Huffman Prairie Flying Field.

In the event that soil at the current SAR would require remediation, workers would be responsible for adhering to applicable health and safety regulations. The extent of protection to workers and the public during remedial activities would be determined after the investigation of soil at the current SAR is completed.

Impacts to trainees, instructors, and range personnel would be minimized by taking appropriate health and safety precautions. Section 3.7 of AFI 36-2226 requires Combat Arms personnel to be trained in the use of all authorized equipment (power tools, hand tools, etc). In addition, personnel would be familiar with Material Safety Data Sheets (MSDS). Health and safety issues for personnel involved in weapons training are specifically addressed in Section 5.4 of AFI 36-2226. The AFI includes the following topics, as outlined in Section 5.4:

- Lead contamination risks
- Range specification
- Firing line officials
- Trespass notices
- Warning signs
- Road guards
- Range communications
- Posting of range safety rules
- Display of flag and streamers

- Emergency equipment
- Unsafe acts and conditions.

The FCSARC would meet specific design and construction criteria (USAF, 2001b). Furthermore, the FCSARC would be subject to inspections and maintenance per AFI 36-2226. Specific impacts associated with the design and operation of the FCSARC are discussed in the following sections.

To minimize potential lead exposures to trainees and range personnel, Air Force personnel would use full metal-jacketed bullets for weapons at the FCSARC, with the exception of shotguns.

As specified in ETL 01-13 (USAF, 2001b), the ventilation system would be designed to control exposure to lead in accordance with 29 CFR 1910.1025, Lead Exposure. The supply and exhaust air system is critical to the operation of the indoor range and the health of the building inhabitants. The design would include a positive exhaust system for removal of airborne lead. A slight negative air pressure would be maintained on the range, which can be achieved by exhausting three to seven percent more air than is supplied. Supply and exhaust fan systems would have control interlocks to ensure simultaneous operation. All doors into the negative pressure area would have air locks. The FCSARC would be divided into three separate areas: 21 firing positions, two firing positions for machine guns, and support administrative area (WPAFB, 2002k). Each area would be equipped with a separate system.

Ammunition may contain other metals, such as barium and antimony (U.S. Navy, 2002). The ignition of primers and propellants during firing can produce other toxic compounds (e.g., carbon monoxide, oxides of nitrogen, and unburned propellant). However, ventilation systems that adequately control lead should also control exposures to other toxic compounds that could be generated during firing.

Safety equipment is specified in AFI 36-2226. In addition to hearing protection, this equipment includes eye protection, gloves for line operation, and gloves for working with weapons. Brass deflectors for M16 rifles would help reduce the hazard of trainees being burned by hot brass. Lead removal from the FCSARC would be accomplished by trained personnel wearing the proper personal protection (USAF, 2001b).

To minimize lead exposure outside the FCSARC, the filtration system would include a HEPA filter (WPAFB, 2002j). By definition, this filter provides 99.97 percent control efficiency. The filters would be individually tested and certified to have an efficiency of not less than 95 percent.

Potential exposures to lead by nearby workers or occupants of buildings as well as children at the child care center in Building 1403 were addressed as part of the air quality evaluation. As shown in Section 4.8, lead emissions from the FCSARC were estimated using conservative assumptions about the design and operation of the FCSARC. The results of air modeling indicate that the estimated quarterly emissions from the facility ($0.28 \mu\text{g}/\text{m}^3$) are less than the ambient air quality standard ($1.5 \mu\text{g}/\text{m}^3$). Given the distance of the FCSARC from the child care center at Building 1403 (approximately 600 feet), estimated quarterly emissions of lead would be reduced approximately 10-fold (Appendix F). Therefore, impacts to children would be expected to be negligible.

4.11 Socioeconomics

4.11.1 Alternative A: No Action

The No Action alternative would have no effect on socioeconomics.

4.11.2 Alternative B: Construction of Fully Contained Small Arms Range Complex

Nominal, temporary socioeconomic impacts could occur during construction, demolition, and remediation activities. Although there would be no significant impact on the overall economic activities surrounding the base, there would be a short-term beneficial impact on the local economy. Contractors and local businesses would benefit from employment and income through contracts associated with the proposed task.

Nominal, beneficial long-term impacts could occur for the base because machine gun training would not have to be conducted at off-site locations.

4.12 Transportation/Traffic

4.12.1 Alternative A: No Action

The No Action alternative would have no effect on transportation/traffic.

4.12.2 Alternative B: Construction of Fully Contained Small Arms Range Complex

There would be a short-term impact to traffic circulation due to project-related vehicles using primary and secondary arterial roadways to the designated sites (Communications Boulevard and Hebble Creek Road). A nominal increase in traffic circulation along Communications Boulevard would be expected, while nominal decrease to traffic circulation along Hebble Creek Road would be expected.

Impacts associated with transport of small arms munitions to the FCSARC would be positive because the new facility is readily accessible from Skeel Avenue, a designated explosives transportation route.

4.13 Cumulative Impacts

Cumulative effects are those which may result from the incremental impact of the federal action (construction of a FCSARC) when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such actions (See 40 CFR § 1508.7).

No other actions are known to be occurring during the timeframe of the construction of the FCSARC on Communications Boulevard. Therefore, cumulative impacts would not be expected.

An action is being conducted at the Huffman Prairie Flying Field, which is adjacent to the current SAR. Improvements are being made to the flying field to increase its interpretive value. A description of the activities associated with improvements to the flying field can be found in the *Final Environmental Assessment for Realigning Visitor Circulation at Huffman Prairie Flying Field* (USAF, 2002). Actions associated with Alternatives A and B would not be expected to result in cumulative effects on the resources evaluated in the preceding sections.

4.14 Unavoidable Adverse Effects

If the proposed action were implemented, there would be a commitment of soil that is excavated as part of the site preparation/construction work and a commitment of soil and vegetation that is excavated if soil remediation is necessary. Impacts to vegetation would be minor because the species types are common to the base (i.e., ordinary vegetation) and the areas excavated would be re-seeded/landscaped. Minor impacts from noise would slightly affect passers-by and nearby

workers. The increase in noise would be primarily due to construction/excavation equipment. The noise would only exist during working hours and would end at the completion of the operation. Negligible increases in traffic would occur during the proposed action and once the FCSARC becomes operational.

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

By constructing the FCSARC, adequate training facilities would be provided for military personnel in the use of various hand-held weapons (e.g., machine guns, rifles). Construction and subsequent use of this facility would also eliminate non-compliance issues (i.e., minimum SDZ distances), safety issues, and inadequate training capabilities related to the current SAR.

4.16 Irreversible and Irretrievable Commitments of Resources

CEQ regulations in 40 CFR 1502.16 require that an agency identify any irreversible or irretrievable commitments of resources that would be involved in the proposed action, should it be implemented. Capital, energy, materials, and labor would be required for the action. These resources are not retrievable.

5.0 List of Preparers and Contributors

The following individuals assisted in the preparation of or provided background information for this EA.

<u>Name/Expertise</u>	<u>Role</u>	<u>Affiliation</u>
Ajay Bahri Air Quality	Air Quality	IT Corporation - Cincinnati, OH
Teresa Carleton NEPA Procedures, Biology	Primary Author	IT Corporation – Cincinnati, OH
Cynthia Hassan NEPA Procedures	Project Manager Noise, Health & Safety	IT Corporation – Cincinnati, OH
Robert Hickman	Ammunition Data	IT Corporation – Knoxville, TN
Gregory Plamondon Geology	Soils, Water	IT Corporation – Cincinnati, OH
Rajib Sinha Engineering	Senior Review	IT Corporation – Cincinnati, OH

6.0 List of Agencies and Persons Consulted

The following agencies and persons have been consulted during the preparation of this EA.

<u>Name</u>	<u>Role</u>	<u>Affiliation</u>
Treva Bashore	Storm Water Permitting	88 ABW/EMO
Rick Baumann	Traffic Engineer	88 ABW/CECP
Patrick Curren	Civil Engineering	88 ABW/CECP
Richard Cunningham	Weapons Safety	ASC/Weapons Safety
Kim Ehret	IRP Sites/Restoration	88 ABW/EMO
Dr. Jan Ferguson	Base Historic Preservation Officer	88 ABW/EMO
Ken Lammers	Threatened and Endangered Species	U.S. Fish and Wildlife Service
Terri Lucas	Natural Resources	88 ABW/EMO
Jerry Merryman	Design Review	88 ABW/EMY
Randy Parmenter	Project Engineer	88 ABW/CECP
Thomas Perdue	EIAP Program Manager	88 ABW/EMO
James Richardson	Asbestos/Lead-Based Paint	88 ABW/EMY
Chief Master Sgt. Dana Russell	Weapons Training	88 SFS/SFAR
Don Smith	Base Mapping	88 ABW/CE
Connie Strobbe	Air Quality	88 ABW/EMY
Debbie Woischke	Natural Resources	Ohio Department of Natural Resources; Division of Natural Areas & Reserves; Columbus, OH

7.0 References

American National Standards Institute (ANSI), 1983, ANSI SI.4-1983, Specifications for Sound Level meters, New York.

BHE Environmental, Inc. (BHE), 1999, Wetland Inventory of Wright-Patterson Air Force Base.

BHE Environmental, Inc. (BHE), 2001, Endangered Species Management Plan for Wright-Patterson Air Force Base, Wright-Patterson Air Force Base, 88th Air Base Wing, Office of Environmental management, WPAFB, Ohio, October.

BHE Environmental, Inc. and IT Corporation (BHE/IT), 1999, Final Integrated natural Resources management Plan, Wright-Patterson Air Force Base, Ohio, December.

Callahan, E.V., R.D. Drobney, and R.L. Clawson, 1997, Selection of summer roosting sites by Indiana bats (*Myotis Sodalis*) in Missouri, *Journal of Mammalogy*, 78(3):818-825.

CH2M HILL, 1994, Remedial Investigation Report: Operable Unit 4, Wright-Patterson Air Force Base, Ohio.

Chemical-Nuclear Systems, Inc., 1990, Environmental Assessment for Dismantlement and Disposal of the Air Force Nuclear Engineering Center, Wright-Patterson Air Force Base, Ohio, April.

Dumouchelle, D. H., C. W. Schalk, G. L. Rowe, and J. T. de Roche, 1993, Hydrogeology, Simulated Ground-Water Flow, and Ground Water Quality, Wright-Patterson Air Force Base, Ohio, U.S. Geological Survey Water Resources Investigation Report 93-4047, U.S. Geological Survey, Columbus.

Engineering Science (ES), 1990, Installation Restoration Program Project Work Plan for Remedial Investigation/Feasibility Study at WPAFB, Wright-Patterson AFB, Ohio, December.

Federal Intragency Committee on Noise (FICON), 1992, Federal Agency Review of Selected Analysis Issues, August.

Geraghty & Miller, Inc., 1987, Mad River Well Field Assessment, City of Dayton, Ohio, Geraghty & Miller, Inc., Milwaukee, Wisconsin.

Great Lakes Archaeological Research Center, Inc. (GLARC), 1996, Archaeology, Geomorphology and Land Use History at Wright-Patterson Air Force Base, Ohio, Reports of Investigations 389, September.

International Consultants Incorporated and Science Applications International Corporation (ICI/SAIC), 1995, Final Site-Wide Characterization Report, Wright-Patterson Air Force Base Environmental Management 88th Air Base Wing, 3 March.

IT Corporation (IT), 1994, Basewide Removal Action Plan for Landfill Capping.

IT Corporation (IT), 1995a, Site-Specific Work Plan for Remedial Design Tasks for the Base-Wide Monitoring Program.

IT Corporation (IT), 1995b, Final Remedial Investigation (RI) Report, Wright-Patterson Air Force Base, Operable Unit 5, Ohio, August.

IT Corporation (IT), 1997, Draft Study of Lead Emissions from the Bullet Trap Facility, Facility 886 – Area C, Wright-Patterson Air Force Base, Ohio. 8 August.

IT Corporation (IT), 1998, Storm Water Pollution Prevention Plan, Wright-Patterson Air Force Base.

IT Corporation (IT), 1999, Final Engineering Evaluation/Cost Analysis, Groundwater Basewide Monitoring Program, Wright-Patterson Air Force Base, Evaluation of Remedies for Groundwater Operable Unit, Wright-Patterson Air Force Base, Ohio, 31 March.

IT Corporation (IT), 2002, Final Long-Term Monitoring Report: October 2001, Wright-Patterson Air Force Base, Ohio, August.

The Miami Conservancy District (MCD), 1996, Facsimile from Kurt Rinehart regarding Policy and Procedure for Permits in Retarding Basins, 4 October.

NES, Inc., 1996, Phase I Archaeological Investigation of 35 Historical Period Sites, Wright-Patterson Air Force Base, Dayton, Ohio. Prepared with Earth Tech for U.S. Army Corps of Engineers, Fort Worth District, and Wright-Patterson Air Force Base.

Norris, S. E. and A. M. Spieker, 1996, Groundwater Resources of the Dayton Area, Ohio, U. S. Geological Survey Water Supply Paper 1808, 167 p., Washington, D.C.

Pacific Environmental Services, Inc. and Metcalf & Eddy (PES/Metcalf & Eddy), 1998, Final Environmental Assessment Cumulative Impacts of Military Training Exercises at the Prime BEEF Area, Wright-Patterson Air Force Base, Ohio, 26 October.

Ohio Environmental Protection Agency, 1997. Ohio Environmental Protection Agency Engineering Guide 69. 16 October.

Ohio Environmental Protection Agency, 2000, Emissions Inventory Data for Clark, Greene, Miami, and Montgomery Counties, www.epa.state.oh.us/dapc/aqmp/eiu/eiu.html.

Tetra Tech, Inc., 2001, Remove Contaminated Soil at Combat Arms and Training Maintenance Facility, Wright-Patterson Air Force Base, Ohio, 14 December.

U.S Air Force (USAF), 1997, Final Environmental Impact Statement for the Demolition of Multiple Historic Facilities at Wright-Patterson Air Force Base, Ohio, July.

U.S Air Force (USAF), 2001a, Final Environmental Assessment of the Huffman Prairie Flying Field Cultural Landscape Plan, Wright-Patterson Air Force Base, Ohio.

U.S. Air Force (USAF), 2001b, Engineering Technical Letter (ETL) 01-13: Small Arms Range Design and Construction, HQ AFCESA/CES, Tyndall Air Force Base, Florida. 31 December.

U.S Air Force (USAF), 2002, Final Environmental Assessment for Realigning Visitor Circulation at Huffman Prairie Flying Field, Wright-Patterson Air Force Base, Ohio, 25 February.

U.S. Army Corps of Engineers (USACOE), 1987, Wetlands Delineation Manual, Department of Army, Waterways Experiment Stations, Corps of Engineers, Washington, D.C.

U.S. Department of Agriculture, Soil Conservation Service (USDA-SCS), 1978, Soil Survey of Greene County, Ohio, in cooperation with Ohio Department of Natural Resources and Ohio Agricultural Research and Development Center.

U.S. Department of Commerce (USDOC), Bureau of the Census, 1991, Decennial Census of the Population.

U.S. Environmental Protection Agency (USEPA), 1995, Compilation of Air Pollutant Emission Factors, Volume I: Stationary Sources, Fifth Edition.

U.S. Geological Survey (USGS), 1993, Water Resources Data, Ohio, Water Year 1993, Volume 1: Ohio River Basin Excluding Project Data, U.S. Geological Survey Data Report OH-93-1, 1993.

Woolpert Consultants, 1992, Area B Traffic Study, Wright-Patterson Air Force Base, Ohio, October.

Woolpert Consultants, 2001, 95 Percent Submittal, Wright-Patterson Air Force Base General Plan, Wright-Patterson Air Force Base, Ohio, May.

Wright-Patterson Air Force Base (WPAFB), 1988, Base Comprehensive Plan, Component Plan D, Land Use Plan, Wright-Patterson Air Force Base, Ohio.

Wright-Patterson Air Force Base, 1994a, Acquisition Management Facility Improvement Plan (Revised and Abbreviated) Area B, Wright-Patterson Air Force Base, Ohio, March.

Wright-Patterson Air Force Base (WPAFB), 1994b, Personal communication between Cynthia Crecelius (Ohio Department of Natural Resources) and representatives of ABW/EME.

Wright-Patterson Air Force Base (WPAFB), 1994c, Environmental Assessment, Source Control Operable Unit Landfills 8 and 10, Wright-Patterson Air Force Base, Ohio.

Wright-Patterson Air Force Base (WPAFB), 1995, Air Installation Compatible Use Zone (AICUZ) Study, Wright-Patterson Air Force Base, Ohio.

Wright-Patterson Air Force Base (WPAFB), 1996, Record of Decision for 21 No Action Sites, Wright-Patterson Air Force Base, Ohio, August 26.

Wright-Patterson Air Force Base (WPAFB), 1998, Final Record of Decision for 41 No Action Sites, Wright-Patterson Air Force Base, Ohio, 28 August.

Wright-Patterson Air Force Base (WPAFB), 1999a, Final Cultural Resources Management Plan, November.

Wright-Patterson Air Force Base (WPAFB), 1999b, Economic Impact Analysis, Wright-Patterson Air Force Base, Ohio, June.

Wright-Patterson Air Force Base (WPAFB), 2000, Personal communication between 2Lt. David Wong (WPAFB) and Cynthia Hassan (IT Corporation), 28 June.

Wright-Patterson Air Force Base (WPAFB), 2001, Annual Emission Fee Report, Wright-Patterson Air Force Base, Ohio.

Wright-Patterson Air Force Base (WPAFB), 2002a, FY 2003 Military Construction Project Data (DD Form 3191), Fully Contained Small Arms Range, Project Number ZHTV063201, provided to IT Corporation at 25 June 2002 meeting.

Wright-Patterson Air Force Base (WPAFB), 2002b, Personal communication between Kim Ehret (WPAFB) and Cynthia Hassan (IT Corporation), 9 August.

Wright-Patterson Air Force Base (WPAFB), 2002c, Personal communication between Dr. Jan Ferguson (WPAFB) and Suzette Cortina (IT Corporation), 9 August.

Wright-Patterson Air Force Base (WPAFB), 2002d, Personal communication between Richard Baumann (WPAFB) and Suzette Cortina (IT Corporation), 12 August.

Wright-Patterson Air Force Base (WPAFB), 2002e, Personal communication between Richard Cunningham (WPAFB) and Cynthia Hassan (IT Corporation), 14 August.

Wright-Patterson Air Force Base (WPAFB), 2002f, Personal communication between Patrick Curren (WPAFB) and Cynthia Hassan (IT Corporation), 15 August.

Wright-Patterson Air Force Base (WPAFB), 2002g, Personal communication between Dr. Jan Ferguson (WPAFB) and Cynthia Hassan (IT Corporation), 15 August.

Wright-Patterson Air Force Base (WPAFB), 2002h, Personal communication between James Richardson (WPAFB) and Cynthia Hassan (IT Corporation), 15 August.

Wright-Patterson Air Force Base (WPAFB), 2002i, Personal communication between Richard Cunningham (WPAFB) and Jan Lindstedt (IT Corporation), 4 October.

Wright-Patterson Air Force Base (WPAFB), 2002j, Personal communication between Connie Strobbe (WPAFB) and Ajay Bahri (IT Corporation), 28 and 31 October.

Wright-Patterson Air Force Base (WPAFB), 2002k, Personal communication between Chief Master Sergeant Dana Russell (WPAFB) and Cynthia Hassan (IT Corporation), 7 and 8 November.

Wright-Patterson Air Force Base (WPAFB), 2002l, Personal communication between Treva Bashore (WPAFB) and Cynthia Hassan (IT Corporation), 7 November.

Appendix A
Correspondence with the
Ohio Department of Natural Resources



IT Corporation

11499 Chester Road
Cincinnati, OH 45246-4012
Tel. 513.782.4700
Fax. 513.782.4807

A Member of The IT Group

August 6, 2002

Heritage Data Services
Division of Natural Areas and Preserves
Ohio Department of Natural Resources
Fountain Square, Building F
Columbus, Ohio 43224

Request for Data for Proposed Projects at
Communications Boulevard (Area A) and Hebble Creek Road (Area C)
Wright-Patterson Air Force Base, Ohio

Dear Ms. Woischke:

The purpose of this letter is to request information from the Natural Heritage Program for State and Federally-listed threatened or endangered plants and animals in the vicinities of Communications Boulevard (Area A) and Hebble Creek Road (Area C) at Wright-Patterson Air Force Base (WPAFB). Under contract to WPAFB, we are currently preparing an environmental assessment (EA) to address potential impacts associated with the construction of a new indoor small-arms range complex and the demolition of the existing indoor/outdoor small arms range. The intent of the EA is to satisfy requirements under the National Environmental Policy Act (NEPA) of 1969.

The geographic location of the proposed construction site for the new range is Greene County, R.8, T.3. This location is depicted in Figures 1 and 2. The location of the proposed small arms range complex is in a land use area described as Industrial. Currently, this site is partially paved and used to stockpile gravel and dirt. There are no natural resources (i.e., woodland, prairie, wetlands, ponds, and streams) in the vicinity of the proposed construction site.

The geographic location of the current small arms range is Greene County, R.8, T.2 (Figures 1 and 2). The existing small arms range is located in a land use area designated as Outdoor Recreation. Land use adjacent to this area is designated as Open Space and includes sites such as Huffman Prairie Flying Field and Huffman Prairie. Trout Creek and Hebble Creek are located in the vicinity of this facility. Two Indiana bats (*Myotis sodalis*) were captured on the base in July 2000 near the intersection of Prairie Road and Symmes Road along Trout Creek. This site appears to be within one-half mile of the area.

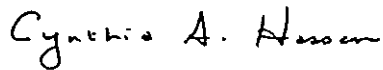
Activities associated with the proposed small arms range complex would include site preparation, construction, and landscaping. The new complex would be fully contained (i.e., all activities would be indoors) and would comprise 3,906 square meters of space. Activities

associated with the current small arms range would include demolition of two buildings totaling 2,370 square meters, site remediation of lead-contaminated soil (if necessary), and landscaping.

A form for a Data Request has been attached. We would appreciate any information from your database that applies to our project area. Please expedite our request, if possible, and contact me at 513/782-4967 if you have any questions or require further information. Thank you for your attention to this request.

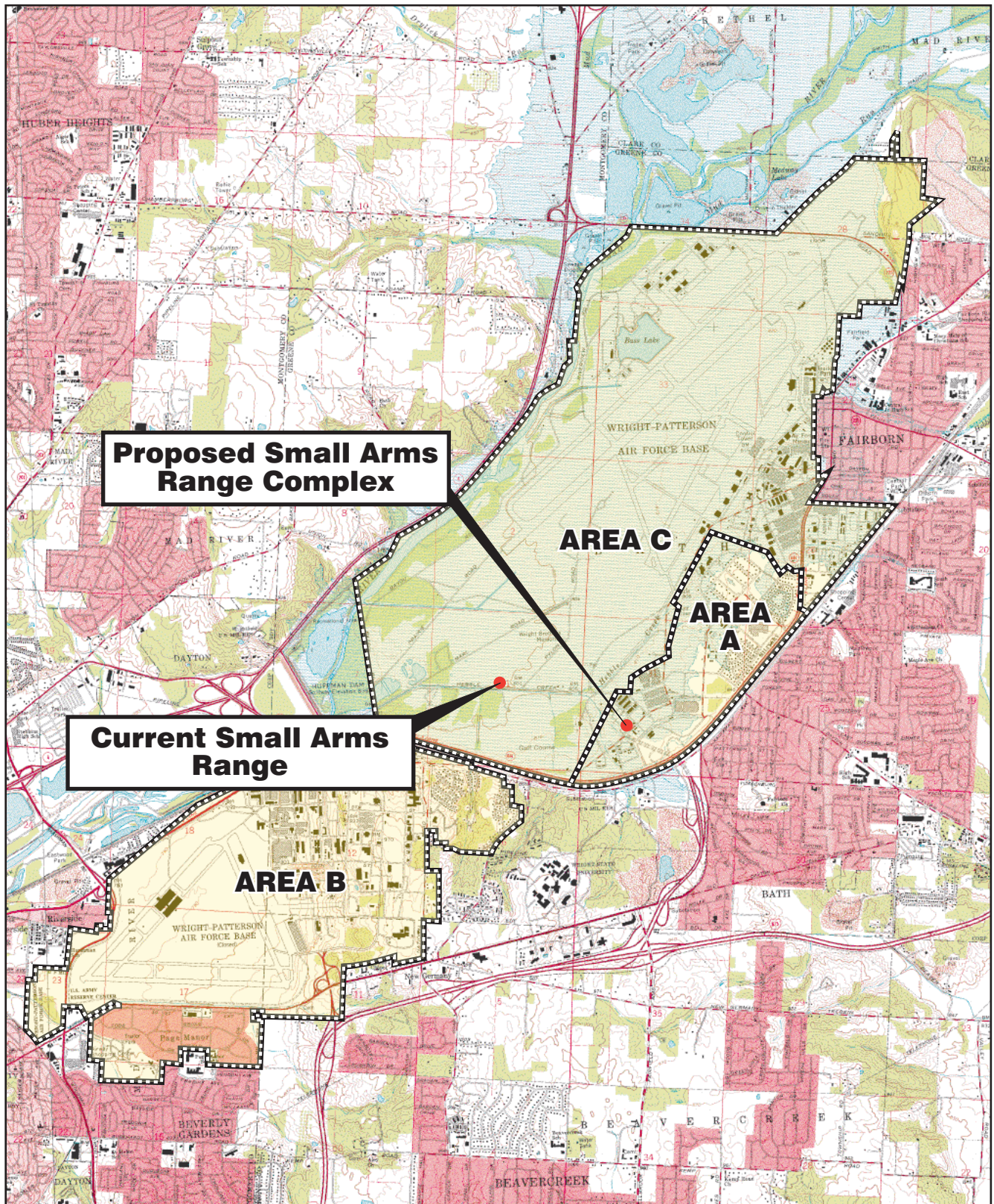
Sincerely,

IT Corporation



Cynthia A. Hassan
Project Manager

cc: T. Perdue (88 ABW/EMO, WPAFB)



DRAWING NO.	K-838196-3000-7102-W	
	7/17/02	7/23/02
TC	CH	
CHECKED BY	APPROVED BY	
KMS	7/16/02	
DRAWING BY		

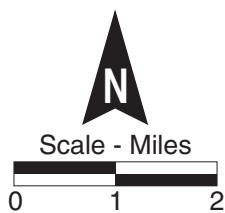


Figure 1
Location of the Proposed
Small Arms Range Complex
Wright-Patterson Air Force Base
Dayton, Ohio

DRAWN BY	MSN	CHECKED BY	TC	7/18/02	DRAWING NUMBER	2002 49-04.DWG
	7/18/02	APPROVED BY	CH	7/23/02		

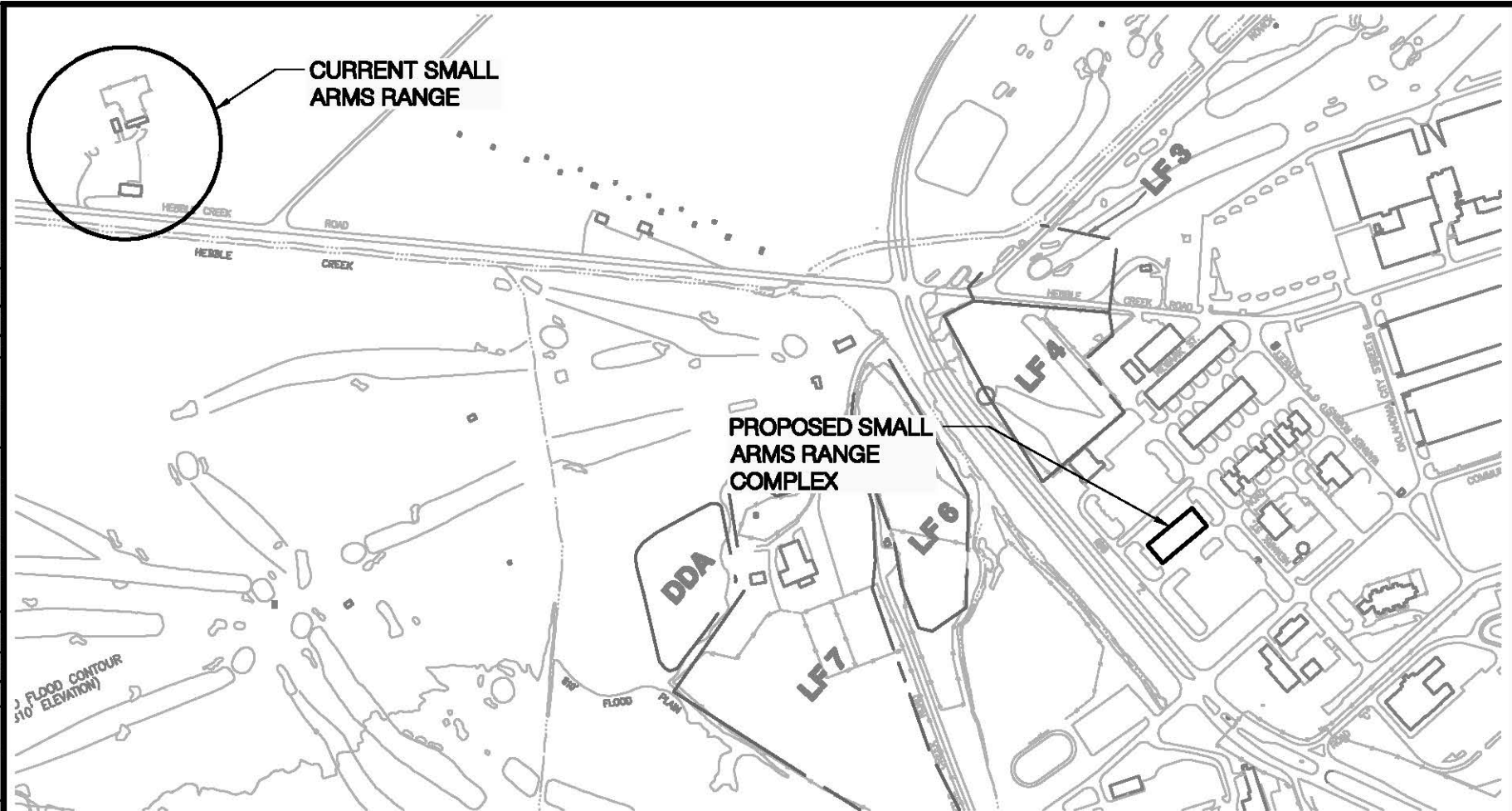


Figure 2
Location of Current Small Arms Range
and Proposed Location of
New Small Arms Range Complex

PREPARED FOR

Wright-Patterson Air Force Base
Dayton, Ohio



IT CORPORATION
11499 CHESTER ROAD
CINCINNATI, OHIO 45246

DATA REQUEST
OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF NATURAL AREAS AND PRESERVES
HERITAGE DATA SERVICES
1889 FOUNTAIN SQUARE COURT, BUILDING F-1
COLUMBUS, OHIO 43224
PHONE: 614-265-6453; FAX: 614-267-3096

INSTRUCTIONS:

Print this form from your browser. Then fill out both pages, sign it and return it to the address or fax number listed above along with: (1) a letter formally requesting data and describing your project, and (2) a map detailing the boundaries of your study area. A photocopy from 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.

FEES:

Fees are determined by the amount of time it takes to complete your project. The charge is \$25.00 per 1/2 hour with a 1/2 hour minimum. We can perform a data search manually or by computer. The Heritage Data Services staff will determine the most cost-efficient method of doing your search. A cost estimate can be provided upon request. Unless otherwise specified, an invoice will accompany the data services response.

This request is being submitted by: ☐ fax ☒ mail ☐ both

Date: 8/6/02

Your Agency/Organization: IT Corporation

Your Name/Title: Cynthia A. Hassan, Project Manager

Address: 11499 Chester Road

City/State/Zip: Cincinnati, OH 45246-4012

Phone/Fax: 513/782-4967 Fax: 513/782-4807

Project Name/Number: Environmental Assessment (EA) for Construction of a Small Arms Range Complex, Wright-Patterson Air Force Base, Ohio

Project is located on the following USGS 7.5 minute topographic map(s):

Fairborn Quad, R.8, T.3 (new small arms range complex); R.8, T.2 (current small arms range)

If there is a program or contracting agency requiring this information, please give the name and phone number of a contact person:

Thomas Perdue, 88 ABW/EMO, WPAFB 937/257-5535, ext. 257

The Natural Heritage Data Base contains records for the categories of species and features listed below. Check the appropriate item/s to indicate your selection.

PLANTS: ☐ Federal Status Only ANIMALS: ☐ Federal Status Only
 ☐ State Legal Status Only ☐ State Legal Status Only
 ☐ Rare (non-legal status) ☐ Rare (non-legal status)
 ☒ All of the above ☒ All of the above

PLANT COMMUNITIES: ☒ All
 ☐ Wetlands Only
 ☐ Other _____

OTHER FEATURES: ☐ Geologic Features
 ☐ Breeding/Non-breeding Animal Concentrations
 ☐ Champion Trees
 ☐ State Nature Preserves and Natural Areas
 ☐ State Wild, Scenic and Recreational Rivers
 ☐ State Parks, Forests, Wildlife Areas
 ☒ All of the above
 ☐ Other _____

Besides name, location and status, specify any additional information you need:

None.

The area you want to search: ☐ study area as outlined on the map
 ☒ study area plus ½ mile radius
 ☐ study area plus 1 mile radius
 ☐ other _____

How will the information be used:

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

The information supplied above is complete and accurate. Any material supplied by the Natural Heritage Data Base will not be published without prior written permission and without crediting the Division of Natural Areas and Preserves as the source of the material.

Your Signature: Cynthia A. Hassen



Ohio Department of Natural Resources

BOB TAFT, GOVERNOR

SAMUEL W. SPECK, DIRECTOR

Division of Natural Areas and Preserves

Stuart Lewis, Chief

1889 Fountain Square, Bldg. F-1

Columbus, OH 43224-1388

Phone: (614) 265-6453; Fax: (614) 267-3096

August 12, 2002

Cynthia Hassan
IT Corporation
11499 Chester Rd.
Cincinnati, OH 45246-4012

Dear Ms. Hassan:

After reviewing our Natural Heritage maps and files, I find the Division of Natural Areas and Preserves has no records of rare or endangered species in either project site for the construction of a new indoor small arms range complex or the demolition of the existing indoor-outdoor small arms range complex, including a half mile radius around each site, at Wright-Patterson Air Force Base in Greene County on the Fairborn Quad.

There are no existing or proposed state nature preserves or scenic rivers at either project site. We are also unaware of any unique ecological sites, geologic features, breeding or non-breeding animal concentrations, champion trees, or state parks, forests or wildlife areas within a half mile radius of either project area.

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. Please note that although we inventory all types of plant communities, we only maintain records on the highest quality areas. Also, we do not have data for all Ohio wetlands. For National Wetlands Inventory maps, please contact Madge Fitak in the Division of Geological Survey at 614-265-6576.

Please contact me at 614-265-6818 if I can be of further assistance.

Sincerely,

A handwritten signature in cursive script, reading "Debbie Woischke".

Debbie Woischke, Data Specialist
Division of Natural Areas & Preserves

Appendix B
Correspondence with the
U.S. Fish & Wildlife Service



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

1 Aug 02

88 ABW/EMO
5490 Pearson Road, Building 89
Wright-Patterson Air Force Base, OH 45433-5332

Mr. Ken Lammers, Acting Director
U.S. Fish and Wildlife Service
Ecological Services
6950 Americana Parkway, Suite H
Reynoldsburg, Ohio 43068-4115

Dear Mr. Lammers:

The U.S. Air Force is seeking informal consultation with the U.S. Fish and Wildlife Service in compliance with Section 7 of the Endangered Species Act for the proposed construction of a new indoor small-arms range complex and the demolition of the existing indoor/outdoor small arms range. Wright-Patterson Air Force Base (WPAFB) has initiated an environmental assessment (EA) for this project in accordance with the requirements of the National Environmental Policy Act (NEPA) of 1969. The geographic location of the proposed construction site is Greene County, R.8, T.3, while the geographic location of the demolition site is Greene County, R.8, T.2 (see attached figures).

The tasks associated with the proposed action would include site preparation, construction, and landscaping for the new small arms range complex. The proposed small arms range complex, comprising 3,906 square meters of space, would be fully contained (i.e., all activities would be indoors) and would include 21 firing line positions for rifle, pistol, and shot gun and three special firing positions for machine guns and their associated bullet traps. The facility would also house classroom, administrative, weapons cleaning, and storage areas. Activities associated with the current small arms range would include demolition of two buildings totaling 2,370 square meters, removal of lead-contaminated soil, if present, and landscaping.

The location of the proposed new small arms range complex is in a land use area designated as Industrial. Currently, this site is partially paved and used to stockpile gravel and dirt. There are no natural resources (i.e., woodland, prairie, wetlands, ponds, and streams) in the vicinity of the proposed construction site. The existing small arms range is located in a land use area designated as Outdoor Recreation. Land use adjacent to this area is designated as Open Space and includes sites such as Huffman Prairie Flying Field and Huffman Prairie. Trout Creek and Hebble Creek are located in the vicinity of this facility. Two Indiana bats (*Myotis sodalis*) were captured on the base in July 2000 near the intersection of Prairie Road and Symmes Road along Trout Creek. This site appears to be within one-half mile of the area.

In addition to the proposed action of constructing the new complex and demolition of the existing range, the No Action alternative will be evaluated. Under the No Action alternative, the current indoor/outdoor small arms range would remain in use and the fully contained small arms range complex would not be constructed. No other alternatives will be evaluated.

I am requesting comment from your agency regarding the presence or absence of federal- and state-listed species that may be located within 0.5 miles of the proposed project location. Threatened and endangered species known to exist within the vicinity of the base include the Indiana bat, bald eagle (*Haliaeetus leucocephalus*), eastern massasauga rattlesnake (*Sistrurus c. catenatus*), clubshell (*Pleurobema clava*, a mussel), and blazing star stem borer (*Papaipema beeriana*, a moth).

In addition, please comment on the presence or absence of areas of ecological concern including wetlands, national wild and scenic rivers, wildlife areas, wildlife refuges, wildlife management areas, and wildlife sanctuaries that may be located within the areas likely to be disturbed by the project. The attached maps (see Figures 1 and 2) depict the locations of the proposed project areas. We have also contacted the ODNr's Division of Natural Areas and Preserves for a search of their Natural Heritage Database.

Please send your comments to me at the address located on the letterhead. If you have any questions, please call me at 937-257-5535 ext. 257. Thank you in advance for your time.

Sincerely,

A handwritten signature in black ink, appearing to read "Thomas Perdue". The signature is fluid and cursive, with the first name "Thomas" and last name "Perdue" clearly distinguishable.

Thomas Perdue
ELAP Program Manager
Operations Branch
Office of Environmental Management

DRAWN BY	MSN	CHECKED BY	TC	7/18/02	DRAWING NUMBER	2002 49-04.DWG
	7/18/02	APPROVED BY	CH	7/23/02		

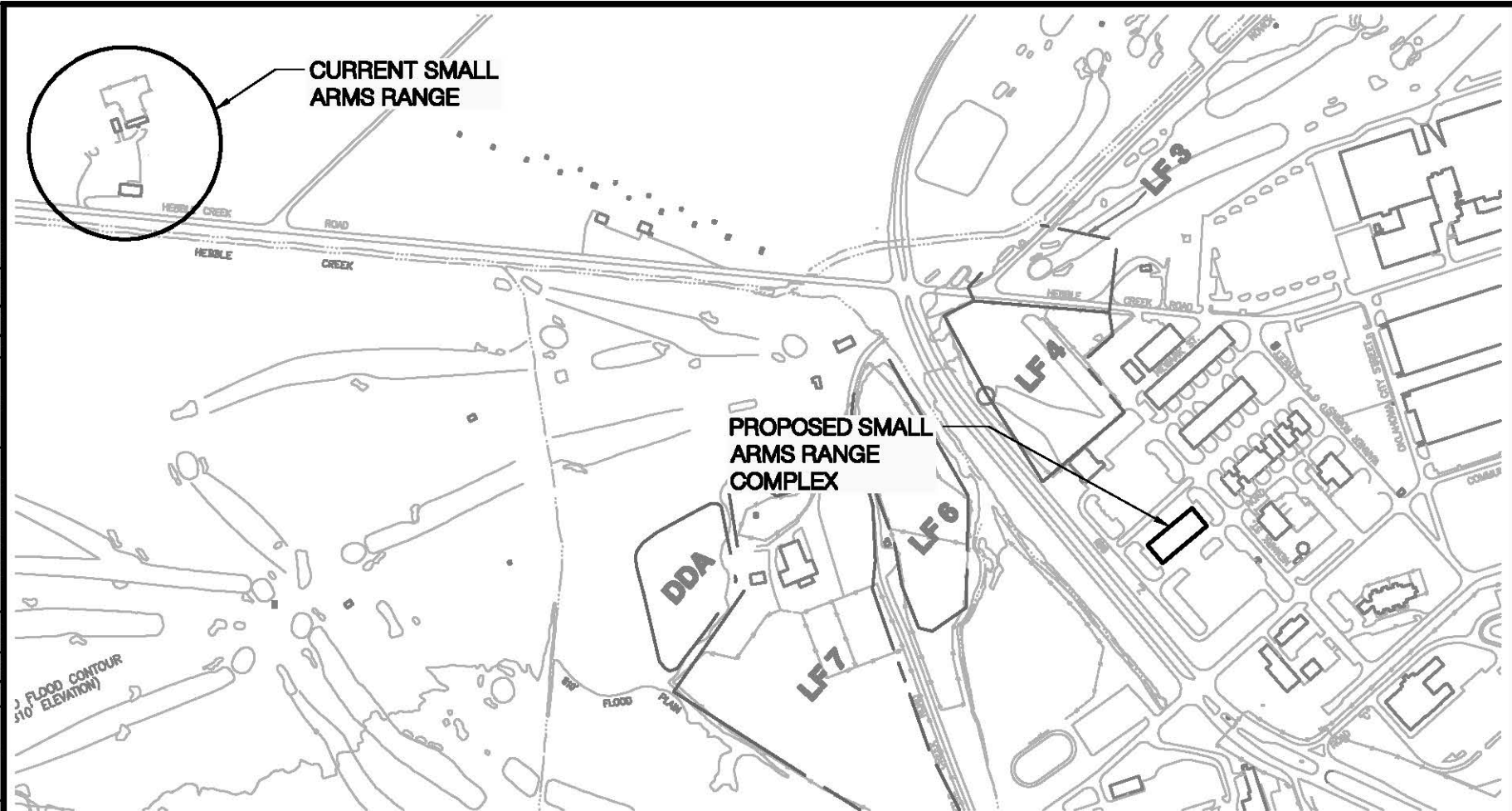


Figure 2
Location of Current Small Arms Range
and Proposed Location of
New Small Arms Range Complex

PREPARED FOR

Wright-Patterson Air Force Base
Dayton, Ohio



IT CORPORATION
11499 CHESTER ROAD
CINCINNATI, OHIO 45246

Appendix C
Correspondence with the
Miami Conservancy District



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

88 ABW/EMO
5490 Pearson Road, Building 89
Wright-Patterson Air Force Base, OH 45433-5332

09 OCT 2002

Miami Conservancy District
38 E. Monument Avenue
Dayton, OH 45402-1210

Dear Sir/Madam:

The U.S. Air Force is providing notification to the Miami Conservancy District (MCD) with respect to the proposed demolition of the current Small Arms Range (SAR) training facility located on Hebble Creek Road in Area C at Wright-Patterson Air Force Base (WPAFB). The geographic location of the SAR is Greene County, R.8, T.2, Section 1, and is depicted in Figures 1 and 2. The SAR facility is at an elevation of approximately 800 feet MSL and is within the 100-year floodplain of the Mad River at Huffman Dam of 814.3 feet above mean sea level (MSL). Using the HEC-1 watershed model and Bulletin 71 precipitation data, the U.S. Army Corps of Engineers established the 100-year floodplain elevation for WPAFB in 1994. The tasks associated with the demolition of the SAR include removal of the indoor firing range and support buildings and removal of the paved parking lot. It may also be necessary to remove the upper eight to ten inches of topsoil from the outdoor firing range due to the potential presence of lead in the soil. The current SAR is approximately 16 acres.

This project also includes the construction of a fully contained SAR complex approximately 4,000 feet east of the current SAR at location R.8, T.3, Section 31. The land surface at the new SAR facility site is flat with an elevation of approximately 830 ft MSL. We understand that structures or additions of any type within the floodplain behind Huffman Dam shall not be erected more than 5 feet below the Huffman Dam spillway elevation (835 ft MSL) except by authorization by the MCD. The elevation of the new facility is at the cutoff elevation for building authorization. Construction of the new SAR would not impact floodplain management.

WPAFB has initiated an environmental assessment (EA) for the project in accordance with the requirements of the National Environmental Policy Act of 1969. We would appreciate your input regarding the level of significance that the proposed project would have on the Miami Conservancy District. If you need more information or have comments on the proposed plan, please contact me at (937) 257-5535, ext. 257.

Sincerely,

Thomas Perdue
EIAP Program Manager
Operations Branch
Office of Environmental Management

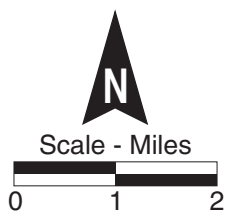
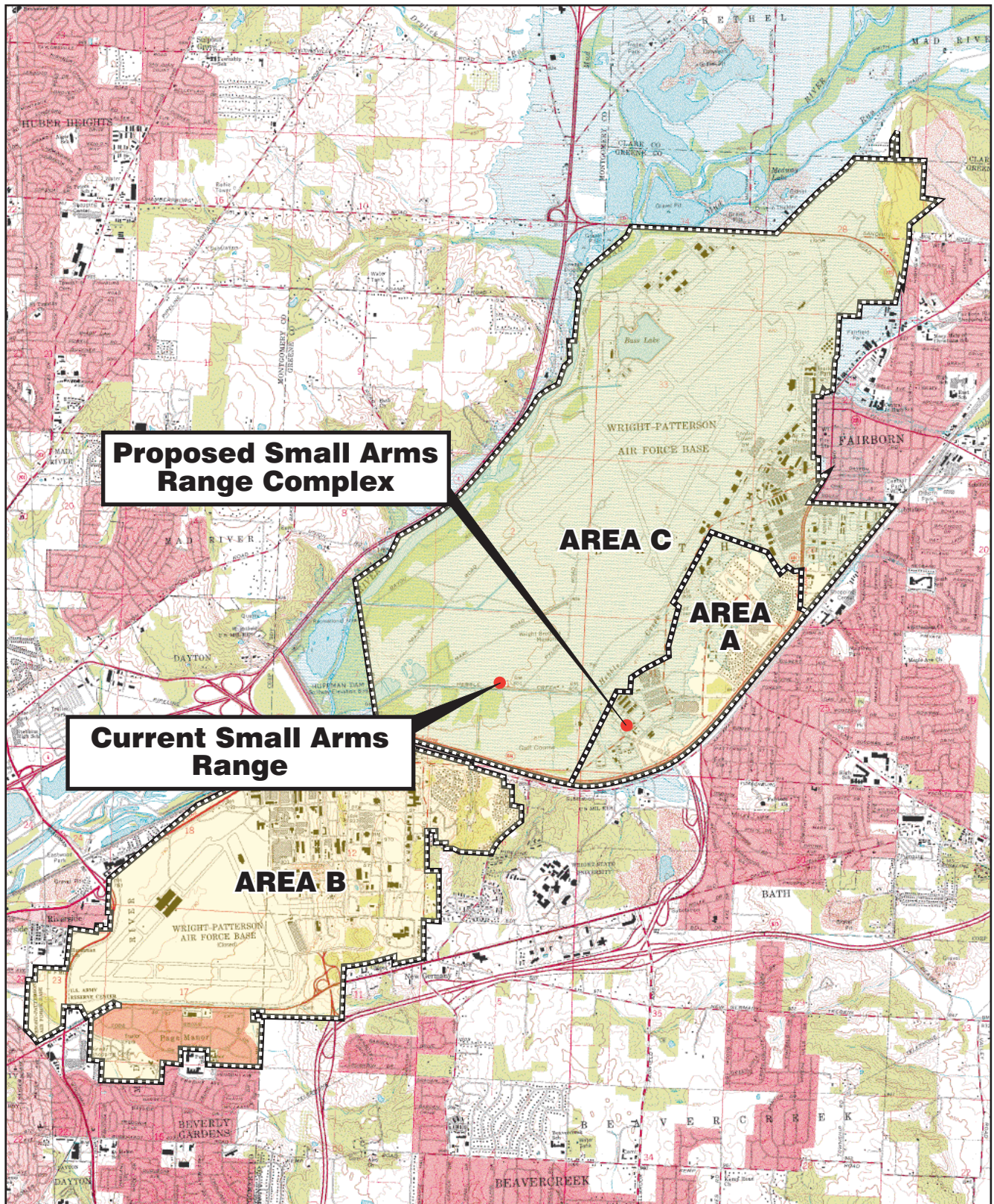


Figure 1
Location of the Proposed
Small Arms Range Complex
Wright-Patterson Air Force Base
Dayton, Ohio

DRAWING NO.	K-838196-3000-7102-W	
	7/17/02	7/23/02
TC	CH	
CHECKED BY	APPROVED BY	
KMS	7/16/02	
DRAWING BY		

DRAWN BY	MSN	CHECKED BY	TC	7/18/02	DRAWING NUMBER	2002 49-04.DWG
	7/18/02	APPROVED BY	CH	7/23/02		

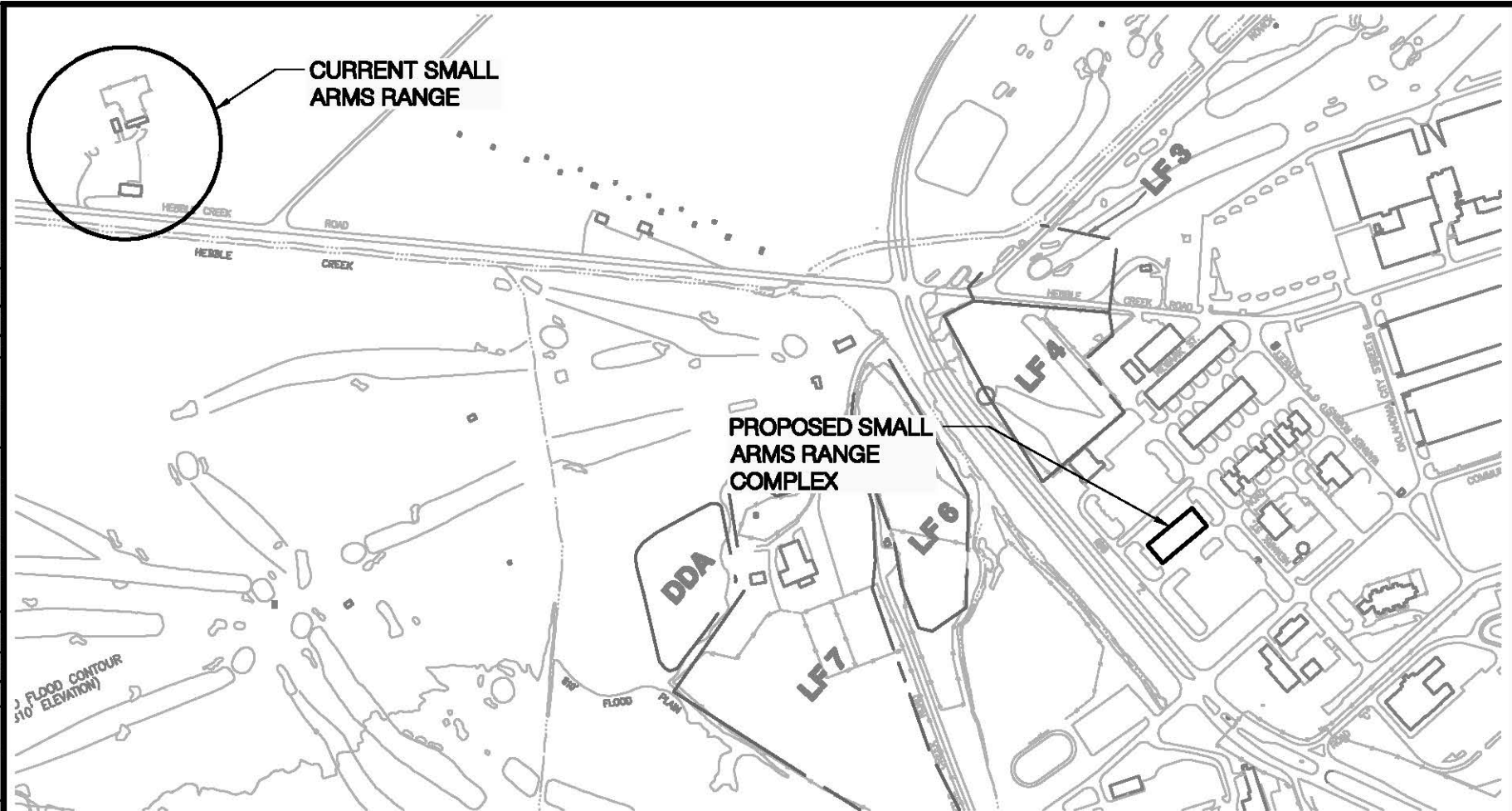


Figure 2
Location of Current Small Arms Range
and Proposed Location of
New Small Arms Range Complex

PREPARED FOR

Wright-Patterson Air Force Base
Dayton, Ohio



IT CORPORATION
11499 CHESTER ROAD
CINCINNATI, OHIO 45246



SCALE: 1"=600
 0 200 400 600 1200 FEET



MIAMI
CONSERVANCY
DISTRICT

10-17-02A10:45 RCVD

BOARD OF DIRECTORS
William H. Hobart
Gayle B. Price, Jr.
Thomas B. Rentschler
GENERAL MANAGER
P. Michael Robinette

October 14, 2002

Mr. Thomas Perdue
WPAFB
5490 Pearson Road, Bldg. 89
WPAFB, Ohio 45433-5332

Re: Huffman Retarding Basin, Range 8, Town 03, Section 31, Bath Township, Greene County, Ohio, MCD Parcel No. 3211

Dear Mr. Perdue:

Our records indicate the above-referenced property is located within the Huffman Retarding Basin. Therefore, the property is subject to all terms and conditions of a Flooding Easement (MCD Parcel No. 3211) granted to The Miami Conservancy District on December 16, 1922 as recorded in Greene County Deed Book 129, Page 146.

Construction within the Huffman Retarding Basin is permitted in accordance with the District's Building Restriction Policy and, unless otherwise authorized, will be subject to the following requirements:

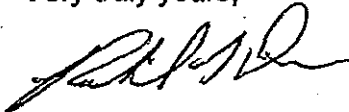
1. The **NATURAL** ground elevation at the existing and/or proposed building site **MUST** be a minimum elevation of 830.0 for all commercial and residential structures.
2. The existing and/or proposed commercial or residential structure is to have **NO** openings (doors, windows, vents, etc.) below elevation 830.0.
3. **NO** fill material is to be placed on the property below elevation 835.0 at any time without prior District approval. All material excavated during construction must be removed to an elevation above 835.0 or removed from the Englewood Retarding Basin.
4. The property owner must acquire written approval prior to building any structures below elevation 830.0. Furthermore, upon completion, all newly constructed and/or remodeled structures must be approved by the District prior to use and/or occupancy.

Mr. Thomas Perdue
October 11, 2002
Page 2

We have reviewed the proposed development and the structure as shown on the attached drawing would be above the minimum required building elevation of 830.0.

Should you have any further questions or need additional information please contact me, at (937) 223-1278, Ext. 3219.

Very truly yours,

A handwritten signature in black ink, appearing to read "Richard L. Doran", written in a cursive style.

Richard L. Doran
Property Administrator

Enclosure

cc: Bill Bogan

File: Huff-Basin

5/9/2001

Appendix D
Correspondence with the
State Historic Preservation Office



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

11 Sep. 2002

88 ABW/EMO Bldg 89
5490 Pearson Road
Wright-Patterson AFB OH 45433-5332

Mr. Mark Epstein
Department Head, Resource Protection & Review
Ohio Historic Preservation Office
567 East Hudson Street
Columbus OH 43211-1030

Dear Mr. Epstein

Wright-Patterson Air Force Base is proposing to construct a Fully Contained Small Arms Range Complex (FCSARC), in Area A, off Communications Boulevard on Newark Street. We are enclosing for your review and comment a copy of the *Draft Environmental Assessment, Construction of Fully Contained Small Arms Range Complex, Wright-Patterson Air Force Base* (Attachment 1).

The current Small Arms Range (SAR) is located in Area C off Hebble Creek Road, immediately adjacent to, and partially intruding into, Huffman Prairie Flying Field, a National Historic Landmark. The current facility does not provide for some elements of required training, is outdated and in a state of disrepair, and is out of compliance with minimum Surface Danger Zone (SDZ) distances. The proposed action is to construct the FCSARC, demolish the current SAR, and remediate lead contaminated soil at the current SAR, if necessary. Appropriate actions would be taken to ensure that any soil remediation within the boundaries of Huffman Prairie Flying Field would be conducted in a manner that does not impact the site. It is our opinion that the proposed action will have no adverse effect on Huffman Prairie Flying Field.

We request that you review the enclosed draft environmental assessment and provide us with Section 106 consultation comments regarding the proposed action and alternatives. We would appreciate comments at your earliest convenience. Should you or your staff have questions regarding the assessment, I can be reached at (937) 257-5535, extension 254.

Sincerely

JAN FERGUSON
Cultural Resources Program Manager
Operations Branch
Office of Environmental Management

Attachment
Draft EA

Appendix E
Construction of Fully Contained Small Arms Range
Emissions Estimates

Emissions Estimate

Construction Emissions

Area Description	Area		Project Duration	Emission Factor	Control Efficiency	Estimated Emissions
	A		T	EM _{FAC}	CE	E _{TON}
	A = L * W		†2	†3	†4	E _{TON} = A * T * EM _{FAC}
	(ft. ²)†1	(acre)	(months)	(ton/acre/month)	(%)	(ton)
Overall Construction Area including Parking Lot for 50 Cars	54,044.	1.24	6	1.2	80%	1.79

Normal Base-wide Emissions	Variable Description
E _{NORM}	Symbol
†5	Footnote
(ton/yr.)	Units
20.9	Values

Conclusions:

Based upon previous estimates of basewide particulate emissions as referenced, and the conservative emissions estimate provided here the proposed project is expected to have only short-term negligible impacts on air quality.

LEGEND

†1 Note: Area of construction = 42,044 sq. ft + Parking lot for 50 cars = 12,000 sq. ft (estimated at 15'x8' per car x 2 for distance between lanes).

†2 Note: Project duration = Dec 02 - Apr 04. Conservatively high estimate for excavation work = 6 months.

†3 Note: Emission factor Section 13.2.3 "Heavy Construction Operations" (dated 1/95), of AP-42, "Compilation of Air Pollutant Emission Factors", 5th Edition, U.S. EPA, Research Triangle Park, NC, 1998.

†4 Note: Table 2.1.1-3 - "Summary of Techniques, Efficiencies, and Costs for Controlling Fugitive Dust from Paved and Unpaved Surfaces," Fugitive Dust Control Technology Orlemann (1993).

Control efficiency for watering of paved surfaces.

†5 Note: Particulate emissions from WPAFB Fee Emission Report for 2001.

Appendix F
Weapons Firing in Fully Contained Small Arms Range –
PM, PM₁₀, and Lead Emissions Estimates

**Weapon Firing in Fully Contained Small Arms Range
PM, PM₁₀ and Lead Emissions Estimate**

It is assumed that all lead emissions will be PM₁₀. Thus, PM emissions = PM₁₀ emissions = Lead emissions.

Potential Firing Emissions

Bullet Size & Weapon Type	Bullet Weight	Quantity of Ammunition Used	Total Bullet Weight Fired	Uncontrolled Emissions from Firing	Uncontrolled Emissions from Impact	Variable Description
	W _B	Amm _{YR}	TW _B	E _{Firing}	E _{Impact}	Symbol
	†1	†6	†4	†5	†5	Footnote
	(lbs)	(rounds/yr)	(lbs/yr)	(lbs/yr)	(lbs/yr)	Units
5.56 mm - rifle	0.0080	1,500,000	12,042.86	7.23	120.43	
7.62 mm - rifle	0.021	1,500,000	31,564.29	18.94	315.64	
45 caliber - pistol	0.033	50,000	1,671.43	1.00	16.71	
9 mm - pistol	0.016	50,000	821.43	0.49	8.21	
9 mm - sub-machine gun	0.016	1,450,000	23,821.43	14.29	238.21	
12 gauge - shotgun	0.074	10,000	737.14	0.44	7.37	

Total: 42.40 706.59
Total Uncontrolled Lead Emissions (lb/yr): 748.98
Total Uncontrolled Lead Emissions (lb/hr): 0.2565
Total Uncontrolled Lead Emissions (lb/day): 2.052
Total Uncontrolled PM emissions = PM₁₀ Emissions (lb/day): 2.052

Actual Firing Emissions

Bullet Size & Weapon Type	Bullet Weight	Lead Jacketed	Quantity of Ammunition Used	Total Bullet Weight Fired	Uncontrolled Emissions from Firing	Uncontrolled Emissions from Impact	Variable Description
	W _B		Amm _{YR}	TW _B	E _{Firing}	E _{Impact}	Symbol
	†1	†2	†3	†4	†5	†5	Footnote
	(lbs)	(Y/N)	(rounds/yr)	(lbs/yr)	(lbs/yr)	(lbs/yr)	Units
5.56 mm - rifle	0.0080	Y	150,000	1,204.3	0.7	12.04	
7.62 mm - rifle	0.021	Y	150,000	3,156.4	1.9	31.56	
45 caliber - pistol	0.033	Y	5,000	167.1	0.1	1.67	
9 mm - pistol	0.016	Y	5,000	82.1	0.0	0.82	
9 mm - sub-machine gun	0.016	Y	145,000	2,382.1	1.4	23.82	
12 gauge - shotgun	0.074	Y	1,000	73.7	0.0	0.74	

Total: 4.24 70.66
Total Lead Emissions (lb/yr): 74.90
Total Lead Emissions (lb/day): 0.205
Total Controlled Lead Emissions (lb/hr): 7.70E-06
Total Controlled Lead Emissions (lb/day) - max. two 8 hr classes/day: 1.23E-04
Total Controlled PM Emissions = PM₁₀ Emissions (lb/hr): 7.70E-06

**Weapon Firing in Fully Contained Small Arms Range
PM, PM₁₀ and Lead Emissions Estimate**

Hourly Firing Emissions

Bullet Size & Weapon Type	Bullet Weight	Maximum Ammunition Used	Total Ammunition Used	Total Bullet Weight Fired	Uncontrolled Emissions from Firing	Uncontrolled Emissions from Impact	Variable Description
	W _B	Amm _{StationHR}	Amm _{HR}	TW _B	E _{FiringHR}	E _{ImpactHR}	Symbol
	†1	†7	†8	†4	†5	†5	Footnote
	(lbs)	(rounds/station/hr)	(rounds/hr)	(lbs/hr)	(lbs/hr)	(lbs/hr)	Units
5.56 mm - rifle	0.0080	150	3,150	25.29	0.0152	0.253	
7.62 mm - rifle	0.021	150	3,150	66.29	0.0398	0.663	
45 caliber - pistol	0.033	150	3,150	105.30	0.0632	1.053	
9 mm - pistol	0.016	150	3,150	51.75	0.0311	0.518	
9 mm - sub-machine gun	0.016	150	300	4.93	0.00296	0.0493	
12 gauge - shotgun	0.074	150	3,150	232.20	0.139	2.322	

Total †9: 0.142 2.37

Total Uncontrolled Lead Emissions (lb/hr): 2.51

Total Controlled Lead Emissions (lb/hr): 7.54E-04

Total Controlled Lead Emissions (g/s): 9.50E-05

Constants

Description	Footnote	Value	Units
Emission Factor	†10	1.2 lb Lead/ton Bullets	
Number of Firing Stations	†3	21 Firing Stations	
Number of M60 Firing Stations	†3	2 Firing Stations	
Downtime Between Shooting	†3	6 hr	
Max Length of Training Session	†3	8 hr/day	
Annual Hours of Training		2,920 hr/yr	
Percent that Disintegrates	†11	1%	
Control Efficiency	†12	99.97%	

**Weapon Firing in Fully Contained Small Arms Range
PM, PM₁₀ and Lead Emissions Estimate**

LEGEND

- †1 Note: Bullet weight and slug weight obtained via email from IT Corporation (Mr. Robert Hickman, 256-233-0302).
- †2 Note: Via phone conversation (WPAFB, 2002k), the only bullets that WPAFB uses that are lead jacketed are the 12 gauge shotgun shells. However, the small arms range is open to the federal law enforcement and they may use lead jacketed bullets. Therefore, as a worst case estimate it was assumed that all the bullets fired are lead.
- †3 Note: Quantity of ammunition used, number of firing stations, downtime, and length of a training session obtained via email (WPAFB, 2002j).
- †4 Note: Calculated from the number of rounds per year (or hour) and the weight of the bullet.
- †5 Note: Emissions from firing a weapon are based on an emission factor of 1.2 lb Lead/ton bullets. Emissions from the impact of the bullet are based on engineering judgment of 1% of the bullet disintegrates upon striking the bullet trap.
- †6 Note: A factor of 10 was used in estimating the potential number of bullets that could be fired in one year.
- †7 Note: As a worst case estimate, the maximum number of rounds fired per hour is obtained via e-mail (WPAFB, 2002j), where it was stated that the maximum number of rounds that could be fired in one hour is 150. Therefore, for all the weapon/bullet types, the maximum hourly rate per firing station was estimated to be 150 rounds/hr.
- †8 Note: The total ammunition fired per hour is based on 21 firing stations for every weapon except for the machine guns, which can only be used in the 2 special firing stations.
- †9 Note: The total hourly emissions are the hourly machine gun emissions plus the maximum hourly emissions from the other weapons/bullet types.
- †10 Note: Emission factor from Chapter 13 Section 3 "Explosives Detonation" (dated 2/80, reformatted 1/95), Table 13.3-1; of AP-42, "Compilation of Air Pollutant Emission Factors", 5th Edition, U.S. EPA, Research Triangle Park, NC, 1998.
- †11 Note: Based on engineering judgment, assumed that 1% of the bullet becomes particulate matter upon striking the bullet trap.
- †12 Note: By definition, a HEPA filter achieves a minimum control efficiency of 99.97% for 0.3 micron dust.

SCREEN3 Modeling Input Parameters

Stack Parameters

Diameter†1	1.000 feet
	0.305 meters
Height†2	2.5 feet
	0.762 meters
Velocity†3	0.2 fpm
	0.001 m/s
Temperature	20 °C

Building Dimensions

Length	200.67 feet
	61.16 meters
Width	157.33 feet
	47.96 meters
Height	21.33 feet
	6.502 meters

SCREEN3 Modeling Results

Lead Controlled Potential Emission Rates

Total Lead	9.50E-05 g/s
------------	--------------

Maximum SCREEN Concentration Reported for 1.0 g/s

Simple Point Source (1-hour)	29,670 µg/m³
Simple Point Source (quarterly)†4	2,967 µg/m³
Distance to Impact from Stack	20 m
Distance to Impact from Stack	65.6 ft

Lead Scaled to Actual Emission Rate

Simple Point Source	0.28 µg/m³
---------------------	------------

NAAQS for Lead	1.5 µg/m³
----------------	-----------

Lead NAAQS Exceedence Evaluation

Lead	N	Exceedence? (Y/N)
------	---	-------------------

LEGEND

- †1 Note: Because the exhaust vents have not been designed at this time, the diameter of the "stack" was estimated to be 1 foot. However, the diameter does not affect the concentration at this low flow rate.
- †2 Note: Because the exhaust vents have not been designed at this time, the height of the "stack" was estimated to be 2.5 feet off the ground to give a conservatively high estimate of the concentration predicted by SCREEN3.
- †3 Note: Because the exhaust vents have not been designed yet, it was assumed that the vents would have a horizontal exhaust. SCREEN3 assumes that the velocity of a "stack" is an upward velocity, therefore, a flow rate of 0.01 m/s was used for the velocity.
- †4 Note: To convert a 1-hour concentration to a quarterly average, an overall conversion factor of 0.1 was used.

11/18/02
15:57:48

*** SCREEN3 MODEL RUN ***
*** VERSION DATED 96043 ***

WPAFB Small Arms Firing Range

SIMPLE TERRAIN INPUTS:

SOURCE TYPE	=	POINT
EMISSION RATE (G/S)	=	1.00000
STACK HEIGHT (M)	=	.7620
STK INSIDE DIAM (M)	=	.3050
STK EXIT VELOCITY (M/S)	=	.0010
STK GAS EXIT TEMP (K)	=	293.0000
AMBIENT AIR TEMP (K)	=	293.0000
RECEPTOR HEIGHT (M)	=	.0100
URBAN/RURAL OPTION	=	RURAL
BUILDING HEIGHT (M)	=	6.5000
MIN HORIZ BLDG DIM (M)	=	47.9600
MAX HORIZ BLDG DIM (M)	=	61.1600

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

BUOY. FLUX = .000 M**4/S**3; MOM. FLUX = .000 M**4/S**2.

*** FULL METEOROLOGY ***

*** SCREEN AUTOMATED DISTANCES ***

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
1.	.0000	0	.0	.0	.0	.00	.00	.00	NA
100.	5648.	6	1.0	1.0	10000.0	.76	6.79	8.27	SS
200.	3214.	6	1.0	1.0	10000.0	.76	10.33	9.56	SS
300.	2136.	6	1.0	1.0	10000.0	.76	13.75	10.81	SS
400.	1603.	6	1.0	1.0	10000.0	.76	17.10	11.59	SS
500.	1236.	6	1.0	1.0	10000.0	.76	20.38	12.61	SS
600.	989.9	6	1.0	1.0	10000.0	.76	23.62	13.59	SS
700.	832.3	6	1.0	1.0	10000.0	.76	26.81	14.25	SS
800.	702.6	6	1.0	1.0	10000.0	.76	29.96	15.10	SS
900.	603.3	6	1.0	1.0	10000.0	.76	33.07	15.93	SS
1000.	525.4	6	1.0	1.0	10000.0	.76	36.16	16.74	SS
1100.	462.8	6	1.0	1.0	10000.0	.76	39.22	17.52	SS
1200.	411.7	6	1.0	1.0	10000.0	.76	42.25	18.28	SS
1300.	369.3	6	1.0	1.0	10000.0	.76	45.26	19.03	SS
1400.	333.6	6	1.0	1.0	10000.0	.76	48.25	19.76	SS
1500.	303.4	6	1.0	1.0	10000.0	.76	51.22	20.47	SS
1600.	277.4	6	1.0	1.0	10000.0	.76	54.17	21.17	SS
1700.	262.3	6	1.0	1.0	10000.0	.76	57.10	21.23	SS
1800.	242.3	6	1.0	1.0	10000.0	.76	60.02	21.88	SS

1900.	225.2	6	1.0	1.0	10000.0	.76	62.92	22.46	SS
2000.	210.0	6	1.0	1.0	10000.0	.76	65.80	23.02	SS
2100.	196.5	6	1.0	1.0	10000.0	.76	68.67	23.58	SS
2200.	184.4	6	1.0	1.0	10000.0	.76	71.53	24.12	SS
2300.	173.5	6	1.0	1.0	10000.0	.76	74.38	24.65	SS
2400.	163.7	6	1.0	1.0	10000.0	.76	77.21	25.18	SS
2500.	154.8	6	1.0	1.0	10000.0	.76	80.03	25.69	SS
2600.	146.6	6	1.0	1.0	10000.0	.76	82.84	26.20	SS
2700.	139.2	6	1.0	1.0	10000.0	.76	85.63	26.70	SS
2800.	134.8	6	1.0	1.0	10000.0	.76	88.42	26.70	SS
2900.	128.5	6	1.0	1.0	10000.0	.76	91.20	27.16	SS
3000.	122.8	6	1.0	1.0	10000.0	.76	93.96	27.57	SS
3500.	100.1	6	1.0	1.0	10000.0	.76	107.66	29.52	SS
4000.	83.80	6	1.0	1.0	10000.0	.76	121.15	31.34	SS
4500.	71.61	6	1.0	1.0	10000.0	.76	134.46	33.05	SS
5000.	62.21	6	1.0	1.0	10000.0	.76	147.60	34.66	SS
5500.	54.76	6	1.0	1.0	10000.0	.76	160.60	36.19	SS
6000.	48.74	6	1.0	1.0	10000.0	.76	173.47	37.64	SS
6500.	43.78	6	1.0	1.0	10000.0	.76	186.22	39.04	SS
7000.	39.84	6	1.0	1.0	10000.0	.76	198.85	40.17	SS
7500.	36.43	6	1.0	1.0	10000.0	.76	211.38	41.33	SS
8000.	33.51	6	1.0	1.0	10000.0	.76	223.81	42.44	SS
8500.	30.97	6	1.0	1.0	10000.0	.76	236.16	43.51	SS
9000.	28.76	6	1.0	1.0	10000.0	.76	248.41	44.54	SS
9500.	26.81	6	1.0	1.0	10000.0	.76	260.59	45.55	SS
10000.	25.09	6	1.0	1.0	10000.0	.76	272.68	46.52	SS

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 1. M:
 20. .2967E+05 4 1.0 1.0 320.0 .76 2.38 4.65 SS

DWASH= MEANS NO CALC MADE (CONC = 0.0)
 DWASH=NO MEANS NO BUILDING DOWNWASH USED
 DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
 DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
 DWASH=NA MEANS DOWNWASH NOT APPLICABLE, $X < 3 \times LB$

*** REGULATORY (Default) ***
 PERFORMING CAVITY CALCULATIONS
 WITH ORIGINAL SCREEN CAVITY MODEL
 (BRODE, 1988)

*** CAVITY CALCULATION - 1 ***	*** CAVITY CALCULATION - 2 ***
CONC (UG/M**3) = 1677.	CONC (UG/M**3) = 2139.
CRIT WS @10M (M/S) = 1.00	CRIT WS @10M (M/S) = 1.00
CRIT WS @ HS (M/S) = 1.00	CRIT WS @ HS (M/S) = 1.00
DILUTION WS (M/S) = 1.00	DILUTION WS (M/S) = 1.00
CAVITY HT (M) = 6.50	CAVITY HT (M) = 6.50
CAVITY LENGTH (M) = 31.93	CAVITY LENGTH (M) = 29.50
ALONGWIND DIM (M) = 47.96	ALONGWIND DIM (M) = 61.16

END OF CAVITY CALCULATIONS

 *** SUMMARY OF SCREEN MODEL RESULTS ***

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
-----	-----	-----	-----
SIMPLE TERRAIN	.2967E+05	20.	0.
BLDG. CAVITY-1	1677.	32.	-- (DIST = CAVITY LENGTH)
BLDG. CAVITY-2	2139.	30.	-- (DIST = CAVITY LENGTH)

 ** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **

FINAL FINDING OF NO SIGNIFICANT IMPACT

Name of Action: Construction of Fully Contained Small Arms Range Complex, Wright-Patterson Air Force Base (WPAFB), Ohio

The current Small Arms Range is located in Area C off Hebble Creek Road. This facility does not provide for some required training, is outdated and in a state of disrepair, and is out of compliance with minimum Surface Danger Zone (SDZ) distances. A new Fully Contained Small Arms Range Complex (FCSARC) has been proposed. The FCSARC would be located in Area A, off Communications Boulevard on Newark Street.

Proposed Action and Alternative:

The proposed action is to construct the FCSARC, demolish the current SAR, and remediate lead-contaminated soil at the current SAR, if necessary. There were two alternatives analyzed:

Alternative A, the No Action alternative, would have the current SAR remain and the FCSARC would not be constructed. Alternative A also serves as a baseline against which the Proposed Action can be compared.

Alternative B, the Proposed Action, includes the construction of the FCSARC, demolition of the current SAR, and remediation of lead-contaminated soil at the current SAR, if necessary.

Environmental Consequences:

The impacts associated with demolition actions at the current SAR are tiered from the *Final Environmental Impact Statement for the Demolition of Multiple Historic Facilities at Wright-Patterson Air Force Base, Ohio* (U.S. Air Force, 1997). The environmental consequences of the Proposed Action to construct the FCSARC are as follows:

Biological Resources: There would be minor, negative (but intermittent) impacts to wildlife under Alternative A due to disturbance from gunfire during outdoor training activities at the current SAR. Under Alternative B, there would be minor, short-term impacts to vegetation and wildlife during demolition and remediation activities at the current SAR. Impacts to vegetation would be minimized because disturbed areas at the current SAR would be re-vegetated after project activities. In the long-term, there would be minor, beneficial impacts to wildlife due to the cessation of gunfire and potential increase in habitat after removal of the current SAR.

Water Resources: Under Alternative A, groundwater and surface water would not be impacted under typical conditions. In the event of a flood, it is possible that potentially contaminated soil could impact surface water. The degree of potential impact is not known. Under Alternative B, groundwater would not be impacted. Minimal, short-term impacts to surface water would potentially occur due to surface water runoff during demolition and remediation activities at the current SAR. In addition, there would be minimal impacts due to surface water runoff during construction of the FCSARC. At both locations, these impacts would be minimized because erosion and siltation controls would be implemented. Over the long-term, there could be a potential increase in infiltration from the removal of the current SAR. A minor, beneficial impact could occur due to the decrease in runoff. For the FCSARC, there would be

potential minor impacts due to surface water runoff associated with the new parking lot. Incorporating appropriate drainage into the design would minimize impacts.

Land Use: There would be no impact to land use under Alternative A. Under Alternative B, land use designation at the current SAR would change from Industrial to Outdoor Recreation.

Soils: There would be no impact to soils under Alternative A; however, lead could potentially persist in soils at the current SAR. Under Alternative B, there would be potential minor impacts (i.e., soil erosion) during construction, demolition, and potential remediation activities. Impacts, however, would be minimized because erosion and siltation controls would be implemented. There would be no long-term impacts under Alternative B.

Cultural Resources: Under Alternative A, the current SAR would continue to be a visual and physical intrusion into the Huffman Prairie Flying Field. Under Alternative B, cultural resources could potentially be encountered during soil remediation at the current SAR. Impacts would be minimized by consultation with the Base Historic Preservation Officer.

Air Quality: There would be no impact to air quality under Alternative A. Under Alternative B, there would be nominal short-term impacts upon air quality during the construction, demolition, and potential remediation activities from particulate matter and engine exhaust emissions. Impacts would be minimized by the use of dust suppression measures. There would be long-term negligible impact from lead emissions generated during the operation of the FCSARC. Estimated lead emissions would be below air quality standards.

Noise: There would be minor, negative impacts under Alternative A because the current SAR would continue to be a source of noise during use of the outdoor firing range. Under Alternative B, there would be short-term minor impacts due to heavy equipment used during construction, demolition, and potential remediation activities. Increases in noise levels are expected to be intermittent while the proposed action is carried out. Potential impacts to personnel using the FCSARC would be minimized through use of hearing protection and engineered controls. There would be minimal impacts to noise outside the FCSARC. Sound transmission barriers and distance from the facility would reduce noise.

Health and Safety: Under Alternative A, there would be potential impacts to trainees due to inadequate facilities and the nature of the activities being conducted (i.e., weapons training). Under Alternative B, there would be potential impacts to project workers due to accidents during construction, demolition and potential remediation activities. Impacts would be negligible because adherence to health and safety regulations would minimize hazards. There would be positive impacts for trainees due to improved facility conditions. The potential impacts associated with handling weapons would remain; however, this potential exists regardless of which alternative is implemented. No impacts to personnel or children in the surrounding area are anticipated because the FCSARC is fully contained. Estimated lead emissions from the facility would be below air quality standards.

Socioeconomics: There would be no impact to socioeconomics under Alternative A. Under Alternative B, there would be nominal, beneficial impact to the local economy during construction, demolition, and potential remediation activities. Nominal, beneficial long-term impacts could occur for the base because machine gun training would not have to be conducted at off-site locations.

Transportation/Traffic: There would be no impact to traffic under Alternative A. Under Alternative B,

there would be short-term impacts to traffic circulation during project activities. Once activities are completed, a nominal increase in traffic circulation in the vicinity of the FCSARC would be expected, while a nominal decrease in traffic circulation at the former site of the SAR would be expected. Impacts associated with the transportation of small arms munitions to the FCSARC would be positive because this facility is readily accessible to a designated explosives transportation route.

Public Notice:

A public notice was posted in the Dayton Daily News on 27 December 2002. The public comment period for the final EA was 27 December 2002 through 25 January 2003. No comments were received.

Finding of No Significant Impact (FONSI):

The proposed action is to construct the FCSARC, demolish the current SAR, and remediate lead-contaminated soil at the current SAR, if necessary. The No Action Alternative was analyzed where the current SAR would remain and the FCSARC would not be constructed. Based on my review of the facts and analysis contained in the EA, I conclude that Alternative A and B (the Proposed Action) will not have a significant impact either by itself or considering cumulative impacts. Accordingly, the requirements of the National Environmental Policy Act, the Council on Environmental Quality Regulation and 32 CFR 989 have been fulfilled, and an environmental impact statement is not required and will not be prepared.

RONALD J. LESTER, Director
Office of Environmental Management

DATE