DRAFT

ENVIRONMENTAL IMPACT STATEMENT FOR ENTRY CONTROL RECONFIGURATION AND BASE PERIMETER FENCE RELOCATION IN AREA A, WRIGHT-PATTERSON AIR FORCE BASE, OHIO

88th AIR BASE WING

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COVER SHEET

DRAFT ENVIRONMENTAL IMPACT STATEMENT
ENTRY CONTROL RECONFIGURATION AND BASE PERIMETER FENCE RELOCATION IN AREA A AT WRIGHT-PATTERSON AIR FORCE BASE, OHIO

Responsible Agencies: U.S. Air Force (USAF); Wright-Patterson Air Force Base (WPAFB), Ohio

Affected Location: WPAFB, Ohio

Proposed Action: Reconfigure and Relocate Entry Control Facilities and Base Perimeter Fence

Report Designation: Draft Environmental Impact Statement

Cooperating Agency: Federal Highway Administration

Written comments and inquiries regarding this document should be directed to Ms. Karen Beason, EIAP Program Manager, 88 ABW/CEAOR, 1450 Littrell Road, WPAFB, Ohio, 45433-5209, (937)257-5899, Karen.Beason@wpafb.af.mil.

Abstract: The USAF has analyzed entry control facilities (ECFs) and base perimeter fencing and has determined the need to upgrade and strategically-place a smaller set of ECFs in Area A at WPAFB. The USAF is proposing to reconfigure and relocate the existing ECFs and the base perimeter fence in order to meet the security requirements of the Department of Defense Anti-Terrorism/Force Protection standards. The purpose of reconfiguring and relocating the ECFs is to improve security, safety, and traffic flow into and on the military installation at WPAFB.

This environmental impact statement (EIS) evaluates the Proposed Action, the No Action Alternative, and three alternatives to the Proposed Action. Resources considered in the impact analysis are land use, air quality, noise, geology and soils, water resources, biological resources, cultural resources, socioeconomics, environmental justice, infrastructure, health and safety, hazardous materials/waste, stored fuels, toxic substances, and environmental restoration program, and traffic. The Draft EIS is made available to the public for a 45-day review period, computed from the date of the Draft EIS Notice of Availability Publication in the Federal Register.

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LIST OF ACRONYMS

AASHTO	American Association of State Highway and Transportation Officials
ABW	Air Base Wing
ACM	asbestos-containing materials
ACS	American Community Survey
ADT	average daily traffic
AFB	Air Force Base
AFCEE	U.S. Air Force Center for Engineering and the Environment
AFI	Air Force Instruction
AFIT	Air Force Institute of Technology
AFMC	Air Force Materiel Command
AFPD	Air Force Policy Directive
AFR	Air Force Regulation
AGL	above ground level
AICUZ	Air Installation Compatible Use Zone
AM	Access Management
APE	Area of Potential Effect
AQCR	Air Quality Control Region
AST	above-ground storage tank
ATFP	Anti-Terrorism/Force Protection
AW	Airlift Wing
BHE	BHE Environmental, Inc.
BMP	Best Management Practice
BMP/LTM	Basewide Monitoring Program/Long Term Monitoring
BS1	Burial Site 1
BUSTR	Bureau of Underground Storage Tank Regulations
C&MS	Construction and Material Specifications
CAA	Clean Air Act
CEANP	Pollution Prevention and Sustainment Section of the Environmental Branch in the Asset Management Division, Civil Engineering Directorate
CEANQ	Environmental Quality Section of the Environmental Branch in the Asset Management Division, Civil Engineering Directorate
CEAOR	Planning and Real Estate Section of the Optimization Branch in the Asset Management Division
CEPMP	Patterson Field Section of the Project Management Branch in the Programs Division, Civil Engineering Directorate
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CESQG	Conditionally Exempt Small Quantity Generator
CFR	Code of Federal Regulations
CO_2	carbon dioxide
CO_2-e	carbon dioxide equivalent
CO	carbon monoxide
CORRACTS	Corrective Action Sites
CWA	Clean Water Act
dB	decibel
dBA	A-weighted sound level measurement
DEIS	Draft EIS

LIST OF ACRONYMS (continued)

DERR	(Ohio) Division of Environmental Response and Revitalization
DNL	day-night average A-weighted sound level
DoD	U.S. Department of Defense
EA	environmental assessment
ECFs	entry control facilities
EDR	Environmental Data Resources, Inc.
EIAP	Environmental Impact Analysis Process
EIFS	Economic Impact Forecast System
EIS	environmental impact statement
EO	Executive Order
ERP	Environmental Restoration Program
ES	Engineering Science, Inc.
ESA	Endangered Species Act
ESQD	Explosive Safety Quantity Distance
ESZ	Explosive Safety Zone
°F	degrees Fahrenheit
FAA	Federal Aviation Administration
FEIS	Final EIS
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FIRM	Flood Insurance Rate Maps
ft	foot/feet
FY	fiscal year
GOVs	government-owned vehicles
gpm	gallons per minute
GHG	Greenhouse gas
GWP	global warming potential
HAZMART	hazardous material pharmacy
HHS	Health and Human Services
HUD	U.S. Department of Health and Urban Development
ICP	Integrated Contingency Plan
ICRMP	Integrated Cultural Resources Management Plan
IICEP	Interagency and Intergovernmental Coordination for Environmental Planning
INRMP	Integrated Natural Resources Management Plan
IRP	Installation Restoration Program
IT	International Technology Corporation
JP-8	Jet Fuel-8
kg	kilogram
$L_{10(h)}$	sound level that is exceeded 10 percent of the time
LBP	lead-based paint
$L_{eq(h)}$	one-hour energy equivalent sound level
LF6	Landfill 6
LOS	level of service
LTCSA	long-term coal storage area
LUC	Land Use Control
LUST	Leaking Underground Storage Tank
$\mu g/m^3$	micrograms per cubic meter

LIST OF ACRONYMS (continued)

MACT	Maximum Achievable Control Technology
MCD	Miami Conservancy District
MCL	maximum contaminant level
mgd	million gallons per day
MILCON	military construction
MSA	Metropolitan Statistical Area
MSL	mean sea level
MSW	mixed solid waste
MVRPC	Miami Valley Regional Planning Commission
NAAQS	National Ambient Air Quality Standards
NAC	Noise Abatement Criteria
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NFA	No Further Action
NHPA	National Historic Preservation Act
NOA	Notice of Availability
NOAA	National Oceanic and Atmospheric Administration
NO_x	nitrogen oxides
NO_2	nitrogen dioxide
NOI	notice of intent
NPDES	National Pollution Discharge Elimination System
NPL	National Priorities List
NRCS	Natural Resource Conservation Service
NRHP	National Register of Historic Places
NSR	New Source Review
O_3	ozone
OAC	Ohio Administrative Code
OD	origin-destination
ODH	Ohio Department of Health
ODNR	Ohio Department of Natural Resources
ODOT	Ohio Department of Transportation
OEPA	Ohio Environmental Protection Agency
OSHA	Occupational Safety and Health Administration
OU	operable unit
Pb	lead
PCB	polychlorinated biphenyl
PHWH	Primary Headwater Habitat
$PM_{2.5}$	particulate matter with an aerodynamic particle size less than 2.5 micrometers
PM_{10}	particulate matter with an aerodynamic particle size less than 10 micrometers
POL	petroleum, oils, and lubricants
POV	privately-owned vehicle
ppb	parts per billion
ppm	parts per million
PSD	Prevention of Significant Deterioration
RCRA	Resource Conservation and Recovery Act
RI	remedial investigation
RICE	Reciprocating Internal Combustion Engines
ROD	Record of Decision

LIST OF ACRONYMS (continued)

ROI	region of influence
SAF/IEI	Office of the Assistant Secretary of the Air Force
SARA	Superfund Amendments and Reauthorization Act
SDDCTEA	Surface Deployment and Distribution Command Transportation Engineering Agency
SEL	sound exposure level
Shaw	Shaw Environmental & Infrastructure, Inc.
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SO_2	sulfur dioxide
SPC	Spill Prevention Coordinator
SPCC	spill prevention and control and countermeasures
SR	State Route
STU	shovel test units
SVOCs	semi-volatile organic compounds
SWPPP	Storm Water Pollution Prevention Plan
TCPs	Traditional Cultural Properties
TMDL	total maximum daily load
TNM	Traffic Noise Model
tpy	tons per year
TSCA	Toxic Substances Control Act
TSD	Treatment, Storage, and Disposal Facility
UECs	Unit Environmental Coordinators
UFC	Unified Facilities Criteria
U.S.	United States
USACE	U.S. Army Corps of Engineers
USAF	U.S. Air Force
USC	U.S. Code
USDA	U.S. Department of Agriculture
USDOT	U.S. Department of Transportation
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UST	underground storage tank
VOC	volatile organic compound
WPAFB	Wright-Patterson Air Force Base
YMCA	Young Men’s Christian Association

1.0 PURPOSE AND NEED FOR ACTION

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

1.1 Project Description

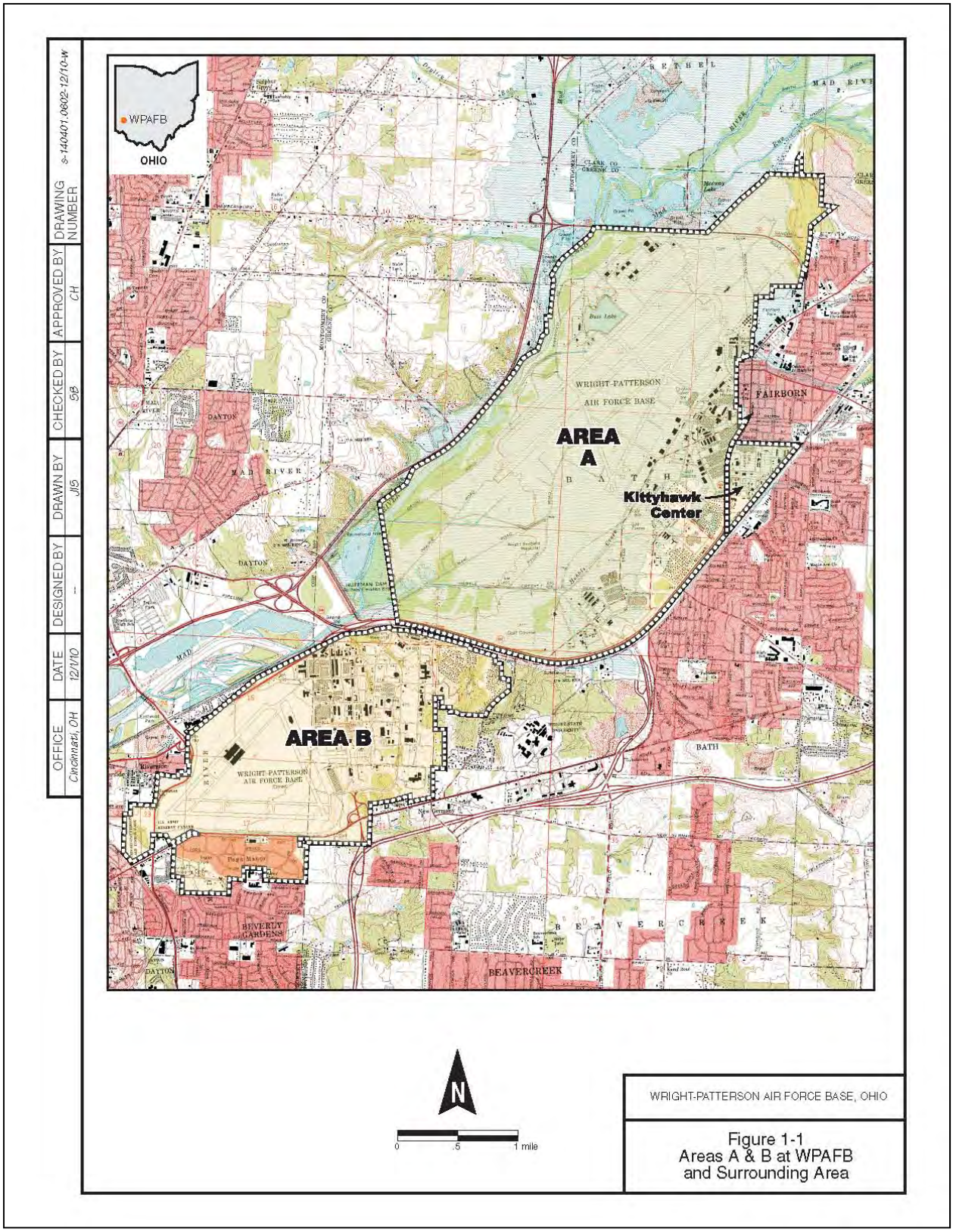
Wright-Patterson Air Force Base (WPAFB or Base) is located in the southwest portion of the state of Ohio in Greene and Montgomery counties, approximately 10 miles east of the city of Dayton. The Base encompasses 8,145 acres and is classified as non-industrial with mixed development. WPAFB is subdivided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

In conformance with security standards, the United States Air Force (USAF) and WPAFB are proposing to implement solutions to improve security, safety, and traffic flow into and on the Base. The existing security environment at WPAFB is not in compliance with the revised USAF anti-terrorism standards as defined by the Military Surface Deployment and Distribution Command Transportation Engineering Agency (SDDCTEA) Pamphlet 55-15, dated 2006, nor the Unified Facilities Criteria (UFC 4-010-01) Department of Defense (DoD) Minimum Antiterrorism Standards for Buildings. The objectives of these standards are two-fold:

- Seek effective ways to minimize the likelihood of mass casualties from terrorist attacks against DoD personnel in the buildings in which they work and live; and
- Improve highway safety and reduce traffic congestion on DoD installation roads and on routes providing access to installations thereby saving lives, decreasing injuries, minimizing lost time, and maintaining readiness.

To improve security, safety, and traffic flow into and on the Base as part of this project, WPAFB will take into consideration and analyze safety concerns and traffic flow to off-Base street networks that may be affected by proposed USAF actions to achieve compliance with the anti-terrorism standards.

The USAF prepared a draft environmental assessment (EA) for the entry control reconfiguration proposal in a document titled, *Draft Environmental Assessment for Entry Control Reconfiguration in Areas and C, Wright-Patterson Air Force Base*, dated May 2011 (LJB 2011). The draft EA preliminarily addressed potential on-Base impacts that would result from the reconfiguration of the entry control facilities (ECFs). During impacts analysis, the USAF determined that an EIS would be necessary to evaluate the potential on-Base and off-Base impacts.


WPAFB
OHIO
AREA A
AREA B
Kittyhawk Center
WRIGHT-PATTERSON AIR FORCE BASE
FAIRBORN
DAYTON
BATH
BEAVERCREEK
MAD RIVER
N
0
.5
1 mile
WRIGHT-PATTERSON AIR FORCE BASE, OHIO
Figure 1-1
Areas A & B at WPAFB
and Surrounding Area
OFFICE
Cincinnati, OH
DATE
12/1/10
DESIGNED BY
DRAWN BY
JJS
CHECKED BY
SB
APPROVED BY
CH
DRAWING NUMBER
s-140401.0602-12/10-w

The USAF is preparing an EIS to evaluate environmental impacts associated with relocating and reconfiguring traffic entry into Area A of the Base, and relocating a portion of the base perimeter fence. This includes consolidating, relocating, and reconfiguring vehicle ECFs; upgrading ECFs to meet current Antiterrorism / Force Protection (ATFP) standards; and extending the base perimeter fence so that Area A and the Kittyhawk Center are contiguous.

Based on a review of potential alternatives during scoping, this EIS will analyze WPAFB's Proposed Action, one reasonable action alternative to the Proposed Action, and the no action alternative. Upon completion of the public comment period for the Draft EIS (DEIS), WPAFB will issue a Record of Decision (ROD) no sooner than 30 days following public distribution of the Final EIS (FEIS). The USAF has prepared this EIS in accordance with the National Environmental Policy Act (NEPA) of 1969; 40 Code of Federal Regulations (CFR), Parts 1500-1508, the Council on Environmental Quality (CEQ) regulations implementing NEPA; and the USAF *Environmental Impact Analysis Process* (EIAP) [32 CFR Part 989].

1.2 Purpose and Need

The **purpose** of the Proposed Action is to provide security, safety, and traffic flow improvements into and on WPAFB. These improvements are **needed** to address the following issues, thereby achieving the Base anti-terrorism mission:

Security Issues. A Base assessment conducted in 2002 revealed two primary security issues:

1. The unsecured corridor of SR 444 that currently bisects the Base between Area A and the Kittyhawk Center comes within 60 feet (ft) of buildings on WPAFB, which is less than the 82 ft safety zone minimum standoff distance from the ECF to inhabited buildings defined in the UFC; and
2. The nine ECFs for WPAFB Area A do not meet ATFP standards as defined by the Military SDDCTEA Pamphlet 55-15, dated 2009.

Safety Issues. The current condition poses the following safety issues:

1. The nine existing ECFs for Area A create multiple high volume traffic entry points, thereby reducing traffic safety within WPAFB;
2. The existing ECFs are not designed for adequate vehicle storage, which results in backups onto the local street network during periods of elevated security levels;
3. The existing commercial vehicle ECF at Gate 16A is closed from 1800 hours (hrs) to 0600 hrs; vehicles that arrive prior to 0600 hrs typically queue on SR 444; and
4. ECF delays may impact Emergency Medical Services response time to the WPAFB Medical Center.

Traffic Flow. The current condition poses the following traffic flow issues:

1. Vehicles travelling from the Kittyhawk Center to Area A have to exit and enter through multiple gates; and
2. The current street network is not designed to handle the high volume traffic that enters/exists Area A via the nine existing ECFs, resulting in traffic congestion in the morning, at lunch time, and at the end of the workday.

1.3 Scope of Environmental Analysis

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

- Section 1, Purpose and Need for Action, includes a background description, purpose and need statement, EIS organization and scope of environmental analysis, and regulatory framework;
- Section 2, Description of Proposed Action and Alternatives, includes a process for alternatives development, alternatives considered but eliminated, and a comparison of impacts;
- Section 3, Affected Environment, includes a description of the natural and man-made environments within and surrounding WPAFB that may be affected by the Proposed Action, any action alternatives, and the No Action Alternative;
- Section 4, Environmental Consequences, includes definitions and discussions of direct and indirect impacts, and mitigation and monitoring;
- Section 5, Environmental Commitments Summary, includes measures that have been developed to minimize short- and long-term impacts to the Proposed Action;
- Section 6, Cumulative Impacts and Other Environmental Considerations, includes an analysis of the potential cumulative impacts on WPAFB; unavoidable adverse impacts; the relationship between short-term use of the human environment and the maintenance and enhancement of long-term productivity; and irreversible and irretrievable commitments of resources;
- Section 7, List of Preparers;
- Section 8, Consultation and Coordination, contains a list of agencies consulted in the preparation of this document;
- Section 9, References, contains references for studies, data, and other resources used in the preparation of the EIS; and
- Appendices, as required.

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

Environmental issues analyzed in the EIS include:

- Land Use
- Air Quality
- Noise
- Geology and Soils
- Water Resources
- Biological Resources, including vegetation, wetlands, wildlife, and threatened and endangered species
- Cultural Resources
- Socioeconomics
- Environmental Justice
- Infrastructure
- Health and Safety
- Hazardous Materials/Waste, Stored Fuels, Toxic Substances, and ERP
- Traffic and Transportation

1.4 Regulatory Framework

This section describes the statutes, regulations, and executive orders that govern and/or influence the scope of this EIS. A number of statutes were considered but found to have no influence on this project. Although this list is not all-inclusive, the proposed alternatives must comply with all applicable regulatory requirements.

1.4.1 National Environmental Policy Act

NEPA is a Federal statute requiring the identification and analysis of potential environmental impacts of proposed Federal actions before those actions are taken. NEPA mandates a structured approach to environmental impact analysis that requires Federal agencies to use an interdisciplinary and systematic approach in their decision-making process. This process evaluates potential environmental consequences associated with a proposed action and considers alternative courses of action. The intent of NEPA is to protect, restore, or enhance the environment through well-informed Federal decisions.

The CEQ was established under NEPA to implement and oversee Federal policy in this process. CEQ regulations under Section 1501.4 state "that the Federal agency shall determine under its own procedures whether the proposal is one which normally requires an EIS." Air Force Policy Directive (AFPD) 32-70, *Environmental Quality*, states that the USAF will comply with applicable Federal, State of Ohio, and local environmental laws and regulations, including NEPA. The USAF's implementing regulation for NEPA is EIAP and Section 989.16 specifies that certain classes of environmental impacts normally require preparation of an EIS:

- *Potential for significant degradation of the environment;*
- *Potential for significant threat or hazard to public health or safety; and*
- *Substantial environmental controversy concerning the significance or nature of the environmental impact of a proposed action.*

In the case of this proposed action, the USAF has determined that the potential for environmental controversy exists and preparing an EIS is the appropriate type of NEPA documentation.

To accomplish the needs of WPAFB, it would be necessary to close a segment of SR 444 within the Base boundary. To address the change in local traffic as a result of closing the applicable segment of SR 444, the Ohio Department of Transportation (ODOT) in conjunction with the Federal Highway Administration (FHWA), the city of Fairborn and/or other jurisdictional stakeholders, would develop transportation solutions that would provide for the safe and efficient movement of users in the area. Any action alternatives to address the travel changes would be in accordance with FHWA NEPA requirements, including appropriate public involvement, and would be detailed in a separate and independent NEPA document.

1.4.2 Integration of Other Environmental Statutes and Regulations

To comply with NEPA, the planning and decision making process for actions proposed by Federal agencies involves a study of other relevant environmental statutes and regulations. The NEPA process, however, does not replace procedural or substantive requirements of other environmental statutes and regulations. It addresses them collectively in the form of an EA or EIS, which enables the decision-maker to have a comprehensive view of major environmental issues and requirements associated with the Proposed Action. According to CEQ regulations, the requirements of NEPA must be integrated "with other planning and environmental review procedures required by law or by agency so that all such procedures run concurrently rather than consecutively."

Potentially relevant statutes and regulations to which the USAF must comply are summarized in **Table 1-1**. The regulatory requirements are presented under each appropriate compliance area in Section 3.0.

Table 1-1. Summary of Applicable Regulatory Requirements

Compliance Area	Regulatory Requirements
Air Quality	Clean Air Act as amended, 42 United States Code (USC) § 7401 et seq.
	Air Force Instruction (AFI) 7040 Air Quality Compliance and Resources Management
	National Ambient Air Quality Standards – 40 CFR 81.34 Metropolitan Dayton Intrastate Air Quality Control Region and 40 CFR 81.336 Ohio Attainment Standards
	Ohio Administrative Code (OAC) 3745-17 Particulate Matter Standards
	OAC 3745-31 Permit to Install New Source of Pollution
	OAC 3745-17 Particulate Matter Standards
	OAC 3745-25 Emergency Episode Standards

Compliance Area	Regulatory Requirements
	OAC 3745-15-05 *de minimis* air contaminant source exemption
Cultural/Historic Resources	National Historic Preservation Act as amended, 16 U.S.C § 470 et seq.
	36 CFR Part 800 – Protection of Historic and Cultural Properties
	AFI 32-7065, Cultural Resources Management
Energy	Executive Order (EO) 13514 – Federal Energy Management
Health and Safety	Occupational Safety and Health Act as amended, Subpart Z Toxic and Hazardous Substances
	29 CFR Part 1910 Occupational Safety and Health Standards
	29 CFR Part 1926 Safety and Health Regulations for Construction
	National Fire Protection Association, National Fire Codes
Land Use	AFI 32-7063, Air Installation Compatible Use Zone Program
Water Resources	Clean Water Act, Section 404
	40 CFR Part 6 Appendix A – Protection of Floodplains
	EO 11988 – Floodplain Management
Biological Resources	ESA, 16 U.S.C. §1531 et seq.
	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
	50 CFR Part 200 Wildlife and Fisheries
	50 CFR Part 402 - Interagency Cooperation – ESA of 1973, as amended
	33 CFR Parts 320-330 Discharges of Dredge and Fill Material into Waters of the U.S.
	EO 11990 – Protection of Wetlands
	Ohio Revised Code 1531.25, Protection of Species Threatened with State-Wide Extinction
	National Environmental Policy Act as amended, 42 U.S.C. §4321 et seq.
	AFI 32-7064 - Integrated Natural Resource Management Plan
Noise	29 CFR 1910.95 Occupational Noise Exposure
Wastewater & Storm Water	Federal Water Pollution Control Act (Clean Water Act) as amended, 33 U.S.C. § 1251 et seq.
	Air Force Regulation (AFR) 32-1021 Planning and Programming MILCON Projects
	Air Force Technical Order 42C-1-2, October 2003
	Energy Independence and Security Act § 438 – Stormwater Runoff Requirements
	City of Fairborn Sewer Use Ordinance
	40 CFR Part 122.26 Storm Water Discharges
	OAC 3745-31 Permit to Install New Source of Pollution
	OAC 3745-33 Ohio National Pollution Discharge Elimination System (NPDES) Individual Permits
	OAC 3745-38 Notice of Intent
	OAC 3745-38 Ohio NPDES General Permits
	OAC 3745-42 Permits to Install and Plan Approvals for Water Pollution Control
	City of Dayton Sewer Use Ordinance (September 21, 1994)

In addition to the regulatory requirements listed in **Table 1-1**, the FHWA must address impacts to parks, recreation areas, wildlife and waterfowl refuges, and historic sites in a process referred to as Section 4(f). This requirement is unique to FHWA and will be evaluated as part of any FHWA subsequent NEPA decision.

1.5 Interagency and Intergovernmental Coordination for Environmental Planning and Public Involvement

This section presents a summary of the agency and public participation efforts associated with this EIS and in accordance with the EIAP process. NEPA requirements help ensure that environmental information is made available to the public during the decision making process and prior to actions being taken. The premise of NEPA is that the quality of Federal decisions will be enhanced if proponents provide information to the public and involve the public in the planning process.

The following opportunities for agency and public involvement were made available during the NEPA process and each is briefly discussed in the following sections:

- Interagency and Intergovernmental Coordination for Environmental Planning
- Public scoping meetings and comment period
- Public hearing and comment period for the DEIS

1.5.1 Interagency and Intergovernmental Coordination for Environmental Planning

The Intergovernmental Coordination Act and Executive Order (EO) 12372, *Intergovernmental Review of Federal Programs*, require Federal agencies to cooperate with and consider state and local views in implementing a Federal proposal. AFI 32-7060 requires the USAF to implement a process known as Interagency and Intergovernmental Coordination for Environmental Planning (IICEP), which is used for the purpose of agency coordination and implements scoping requirements.

As lead agency, the USAF has the responsibility to solicit cooperation from other Federal agencies that have jurisdiction by law or special expertise on any environmental issue that should be addressed in the EIS being prepared. Cooperating agencies are required by CEQ Section 1501.6 to devote staff resources that are normally primarily used to critique or comment on a DEIS after its preparation, much earlier in the NEPA process; primarily at the scoping and DEIS preparation stages. If a cooperating agency determines that its resource limitations preclude any involvement, or the degree of involvement requested by the lead agency, it must so inform the lead agency in writing and submit a copy of correspondence to the CEQ. The potential cooperating agency must decide early if it is able to devote any of its resources to a particular proposal.

The USAF requested formal participation from the FHWA in a letter from the Office of the Assistant Secretary of the Air Force (SAF/IEI) dated March 14, 2011. The letter requested that the FHWA participate in various portions of the EIS development noting the following actions:

- Participating in the scoping process;
- Assuming responsibility, upon request by the USAF, for developing information and preparing analyses on issues for which the FHWA has special expertise; and
- Making staff support available to enhance interdisciplinary review capability.

An acceptance letter, dated April 18, 2011, was received from the FHWA indicating their cooperating agency support of the USAFs decision-making process. The ODOT will provide its input and coordination in conjunction with FHWA.

Through the IICEP process, the USAF notified relevant Federal, state, and local agencies of the action proposed and provide them the opportunity to make known their environmental concerns specific to the action. Agencies were initially notified during the scoping period of the intent to prepare an EIS.

IICEP letters were sent in May, June, and October 2011 to the U.S. Fish and Wildlife Service (USFWS); Ohio State Historic Preservation Office (SHPO); the Miami Conservancy District (MCD); recognized Native American tribes; and other Federal, state, and local agencies. Agency comments were provided to the USAF and incorporated into the analysis of potential environmental impacts performed as part of the DEIS development.

IICEP letters were then sent to these same agencies in November 2011 announcing the availability of the DEIS and the scheduled public hearing. Agency comments will be provided to the USAF and incorporated into the FEIS. A list of all agencies contacted as part of the IICEP process is included in **Appendix A**.

1.5.2 Public Involvement

Scoping

CEQ regulations implementing NEPA specifically state, “There shall be an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action. This process shall be termed scoping.”

A minimum 30-day scoping period to solicit input on the proposed project occurred between February 12 and March 18, 2011. A scoping meeting was used to determine the breadth of environmental issues and alternatives to be addressed in this EIS. The USAF conducted two scoping meetings on March 1 and 3, 2011, to introduce the purpose of the project and to solicit input on the proposed project. During the scoping period, the USAF received 16 comments on the proposed action (summary of comments included

in **Appendix A**). Based on input during scoping, issues to be considered in alternatives development include:

- Impacts from potential traffic congestion on Kauffman Avenue and Wright and South Streets due to closure of SR 444;
- Economic impact to businesses on Broad Street from Dayton Drive to Central Avenue;
- Impacts from potential increased traffic crossing the railroad tracks due to closure of SR 444;
- Potential impact to the Buckeye Trail (bikeway/walkway) along Kauffman Avenue and the North Country National Scenic Trail and the Wright Brothers Huffman Prairie Bikeway due to road widening;
- Potential impact to the Marl Road bikeway/walkway due to increased truck traffic at the proposed truck inspection ECF at Gate 26A;
- Impacts from potential increased traffic at the Kauffman Avenue and Huffman Dam intersection due to traffic rerouting; and
- Potential impacts to the Fairborn Fire Department's response time for mutual aid to the Wright-Patterson Medical Center due to closure of SR 444 and crossing the railroad tracks.

Public Comment Period

A Notice of Availability (NOA) for the DEIS will be published in the *Beavercreek News Current*, *Fairborn Daily Herald*, *Dayton Daily News*, the Wright State *Guardian*, the *Xenia Daily Gazette*, and the WPAFB paper, *Skywrighter*, initiating a 45-day public review period. The DEIS will be made available in the Fairborn Public Library. During this time period, public comments will be received. A public hearing will be scheduled during the public comment period. Comments received during the public comment period will be included in **Appendix A**. An NOA will also be prepared for the FEIS followed by a NOA for the ROD.

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1 Introduction

This section provides an introduction to the Proposed Action, criteria used in selecting the Proposed Action and alternatives; a detailed description of the Proposed Action; descriptions of Alternative A and the No Action Alternative; identification of alternatives eliminated from further consideration; and a comparison of environmental consequences between the alternatives (**Table 2-2**).

Terrorism is real, evolving, and continues to increase in frequency and lethality throughout the world. Today, terrorist attacks can impact anyone, at any time, at any location, and can take many forms. While terrorists have many tactics available to them, they frequently use explosive devices when they target large numbers of DoD personnel. While all DoD buildings offer some measure of protection from terrorist attacks, applying the Minimum Antiterrorism Standards for Buildings described in the UFC would provide a greater degree of protection against a possible terrorist attack.

The existing security environment at WPAFB is not in conformity with the USAF anti-terrorism standards as defined by the SDDCTEA Pamphlet 55-15, dated 2006, or the UFC 4-010-01 DoD Minimum Antiterrorism Standards for Buildings. SDDCTEA's mission is to improve highway safety and reduce traffic congestion on DoD installation roads and on routes providing access to installations. The primary objective of SDDCTEA is to save lives, decrease injuries, minimize lost time, and maintain readiness (SDDCTEA 2009).

To achieve the mission of SDDCTEA, two key areas are central: 1) training and education – development of training and educational materials (e.g., traffic engineering/highway safety bulletins, pamphlets, interactive training materials) for distribution throughout the military; and 2) engineering services – roadway planning, geometric design, road safety audits, traffic operations analysis, engineering guidance, and contract assistance (SDDCTEA 2009). SDDCTEA Pamphlet 55-15 will be used as a guidance tool in analyzing potential impacts to on-Base and off-Base roadways resulting from the Proposed Action.

The UFC DoD Minimum Antiterrorism Standards for Buildings document represents a commitment by DoD to seek effective ways to minimize the likelihood of mass casualties from terrorist attacks against DoD personnel in the buildings in which they work and live (UFC 2007). The standoff distance, a distance maintained between a building, or portion thereof, and the potential location for an explosive detonation, will be analyzed for on-Base occupied buildings with regard to the proposed relocation/reconfiguration of ECFs and fence relocation.

The UFC mandates standoff distance requirements as follows for all new and existing inhabited DoD buildings: 82 ft for a controlled perimeter or parking and roadway without a controlled perimeter; and 33 ft for parking and roadways within a controlled perimeter (UFC 2007). The UFC document states that

where these standoff distances cannot be achieved because land is unavailable, where the conventional construction standoff distances are not available, or existing buildings do not meet the required distances, lesser standoff distances may be allowed where the required level of protection can be shown to be achieved through analysis or can be achieved through building hardening or other mitigating construction or retrofit. The UFC document will be used as a guidance tool in analyzing potential impacts to on-Base buildings resulting from the Proposed Action of relocating and reconfiguring ECFs and the base perimeter fence at WPAFB.

The UFC classifies ECFs into four "use" classifications: primary, secondary, limited use, and pedestrian access (SDDCTEA 2009). Classifications are based on the intended function and anticipated usage of the ECF. Primary refers to an ECF with high traffic volumes, is open 24/7, allows entry of individuals with visitor passes, conducts random inspections, accepts authorized visitors, and processes trucks. A secondary classification refers to an ECF with moderate traffic volumes, has regular operational hours but is closed at times, conducts random inspections, conducts truck inspections, and accepts authorized visitors. A limited use ECF refers to an ECF with low traffic volume and is open for special purposes only. For the purpose of this EIS, the pedestrian access classification is not relevant and will not be addressed.

The intent of the UFC standards is to minimize the possibility of mass casualties in buildings or portions of buildings owned, leased, privatized, or otherwise occupied, managed, or controlled by or for DoD. The UFC standards provide appropriate, implementable, and enforceable measures to establish a level of protection against terrorist attacks for all inhabited DoD buildings where no known threat of terrorist activity currently exists.

2.2 Proposed Action and Alternatives Selection Standards

The events of September 11, 2001 necessitated that USAF installations implement enhanced entry control measures. In many cases, entry control focused on reactive measures to address security. As a result, many interim ECFs met ATFP needs, but lacked the infrastructure to address traffic flow and promote a safe environment for guards and motorists. The SDDCTEA developed the following priorities:

- Security and Functional Requirements;
- Safety (guards and motorists);
- Traffic Flow and Congestion; and
- Aesthetics.

SDDCTEA also recognized that ECF planning and design must consider:

- Short- and long-term needs and identification of low-cost enhancements;
- Operational and manpower issues;
- Practical and adaptive solutions;

- Strategic use of technology; and
- The needs of all stakeholders including planners, engineers, security forces, safety officials, and command groups.

The SDDCTEA priorities and guidelines served as the basis for formulating alternatives and developing the following screening and selection standards for this study:

- Any alternative must not impose new security risks. For example, the chosen alternative must not create choke points or other similar tactical barriers that could be seized or demolished to prevent long-term force movement;
- Any alternative must not require the acquisition of a waiver. For example, the chosen alternative must not require the USAF to obtain a waiver to construct within transitional areas or glide slopes; and
- Any alternative must not require the purchase or donation of land to meet the alternative design.

The development of reasonable alternatives also involved discussions with the 88th Air Base Wing Planning and Real Estate Section of the Optimization Branch in the Asset Management Division (88 ABW/CEAOR) at WPAFB personnel to identify a Proposed Action. Impacts to on- or off-Base environmental issues resulting from the Proposed Action or its alternatives will be analyzed for direct, indirect, and/or cumulative impacts set forth in CEQ Regulation 1508.25.

2.3 Description of the Proposed Action

The Proposed Action consists of two parts: reconfiguring ECFs and relocating the base perimeter fence along SR 444. These actions would effectively minimize the likelihood of mass casualties from terrorist attacks against DoD personnel in the buildings in which they work and live, and would improve safety and reduce traffic congestion on WPAFB roads and at the gate approaches for local roads providing access to WPAFB. The Proposed Action is further detailed in the following subsections.

2.3.1 Reconfiguration of ECFs

The Proposed Action involves consolidating the nine gates that offer public access to the Base to three gates. Gates 1A and 26A would be relocated and designed to allow for ATFP improvement and greater traffic flow. Gate 15A would be expanded and redesigned to meet current ATFP guidelines and increases in traffic flow. Construction commencement dates for the major phases of the ECFs include 2-year intervals for Gate 1A, Gate 15A, and Gate 26A activities.

Gates 8A, 9A, 12A, 16A, 38A, and 39A would no longer serve as regularly used ECFs for access to the Base for the most part due to relocation of the Base perimeter fence discussed in Section 2.3.2 below. **Table 2-1** describes the result of the Proposed Action on each gate in Area A and **Figure 2-1** shows the location of each gate as it currently exists.

Table 2-1. Gates in Area A

Gate No.	Current Purpose / Location	Proposed Action	Result of Proposed Action on Existing Gate
1A	Secondary ECF / SR 444 and Wright Avenue	Relocate / Reconfigure Gate 1A to approximate vicinity of SR 444 and Redwood Street intersection.	Close. Demolish gate and approach pavement. Access to public cemetery will remain.
8A	Limited Use / SR 844 and Schuster Avenue	None	Reopen and unmanned. No access to secured base.
9A	Secondary ECF / SR 444 and Estabrook Road	None	Remain open and unmanned. No access to secured base.
12A	Primary ECF (Visitor Center) / SR 444 and Chidlaw Road	None	Close. Ceremonial openings only. Access to Hope Hotel and Lot 1A will remain.
15A	Secondary ECF / SR 844	Reconfigure Gate 15A as a 24-hour gate to be located in its current vicinity. Roadway to be extended past Communications Boulevard.	Construct a new reconfigured gate.
16A	Commercial Vehicle Inspection / SR 444 and Communications Boulevard	None – The commercial vehicle inspection area would be relocated to the new configured Gate 26A to just north of SR 235 and Circle Drive.	Remain open and unmanned. No access to secured base.
26A	Secondary ECF / SR 235 at 445th AW Area	Reconfigure and Relocate from its existing location north of SR 235 / Loop Road to just north of the SR 235 and Circle Drive intersection.	Close. Demolish gate and approach pavement.
38A	Kittyhawk Center ECF / SR 444 and Oak Street	None	Remain open and unmanned. No access to secured base.
39A	Limited Use / SR 444 south of Redwood Street	None. New Gate 1A relocated to just north of existing Gate 39A at Redwood Street.	Demolish gate and approach pavement.

NOTES: ECF = entry control facility; SR = State Route; AW = Airlift Wing

Relocate and Reconfigure Gate 1A

Under the Proposed Action, Gate 1A would be relocated and designed as a new manned gate that would serve as a secondary ECF in Area A. Gate 1A would be relocated just north of existing Gate 39A at the intersection of Redwood Street and SR 444. Existing Gate 39A would be permanently closed and demolished as a result of the Proposed Action. **Figure 2-2** presents a photograph of existing Gate 1A. Gate 1A would be reconfigured to meet anti-terrorism requirements, including implementation of a final restricting vehicle denial barrier. The new location of Gate 1A would utilize the SR 444 roadway with the addition of low speed curves that would aid in management of threat speeds at the checkpoint. **Figure 2-3** presents the approximate location of existing Gate 1A and its proposed new location.

Relocating Gate 1A to its proposed location on SR 444 would remove on-Base through traffic traveling on Wright Avenue and defer traffic onto Schuster Avenue. The closure of SR 444 as a through roadway would make Schuster Avenue a collector roadway for Area A. Schuster Avenue would be widened to three lanes from SR 444 to Wright Avenue and serve to transition through traffic onto Wright Avenue.

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WRIGHT-PATTERSON AIR FORCE BASE, OHIO

Figure 2-1
Existing ECF Locations at WPAFB

Figure 2-2. Photograph of Existing Gate 1A, Looking On-Base

As a result of closing SR 444 at Gate 39A and relocating and reconfiguring Gate 1A to the proposed location, off-Base streets that would be affected include Greene Street, Ohio Street, and South Street. As part of construction activities under the Proposed Action, these streets may become cul-de-sac streets where they intersect SR 444.

Reconfigure Gate 15A

Due to its proximity to the Air Force Materiel Command (AFMC) headquarters and direct access from SR 844, Gate 15A is currently the highest volume gate in Area A. **Figure 2-4** presents a photograph of existing Gate 15A. Under the Proposed Action, Gate 15A would be reconfigured to meet anti-terrorism requirements and would become a 24-hour manned gate for Area A. Gate 15A would be located in the vicinity of its current location at SR 844 and Davis Monthan Road. The proposed new alignment would extend past Communications Boulevard and add two horizontal curves that would aid in managing threat speeds approaching and leaving the Base at this gate. Access from Gate 15A to Communications Boulevard would be permanently closed, as would access from Gate 15A to Kuglics Boulevard. **Figure 2-5** presents the proposed reconfiguration and relocation of Gate 15A.

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Legend

- Proposed Gate Location
- Proposed Gate Closure/Existing Gate
- Installation Boundary
- Area of Potential Effect
- Proposed Alignment
- Proposed Guard Shack
- Proposed Road Closure/Remove Pavement
- Houses Removed

N

0 300 600 1,200 Feet

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Figure 2-3
Existing and Proposed
Gate 1A Locations

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Figure 2-4. Photograph of Existing Gate 15A, Looking Off-Base

The Proposed Action would improve existing infrastructure in the area of Gate 15A. A new ramp, Ramp J, is proposed for construction and would parallel the existing Ramp K. The addition of Ramp J would allow a high volume of traffic to access Gate 15A from SR 444. Therefore, access to Ogden Avenue through Gate 12A would be closed. The WPAFB Pass and Registration building would be accessed by travelling toward Gate 15A, turning onto Road C (**Figure 2-5**). The intersection of Davis Monthan Road and SR 844 would be signalized to enable traffic leaving the current visitor center (north of Gate 15A) to access SR 444. Due to the Proposed Action resulting in closing access to Communications Boulevard and Kuglics Boulevard from Gate 15A, traffic would be redirected north to the Skeel Avenue and Hebble Creek Road intersection (see **Figure 2-5**).

Under the Proposed Action, the following improvements would be made as a result of reconfiguring Gate 15A:

- Construction of a new Ramp J to add a lane that would separate slow moving traffic turning from SR 444 onto SR 844 at Gate 15A;
- Extend northbound left-turn lane at the SR 444 and Davis Monthan Road intersection;
- Construct a northbound left-turn lane at the intersection of SR 444 and the SR 844 northbound exit ramp;
- Construct dual left-turn lanes at the Gate 12A / Ogden Road and SR 444 intersection;

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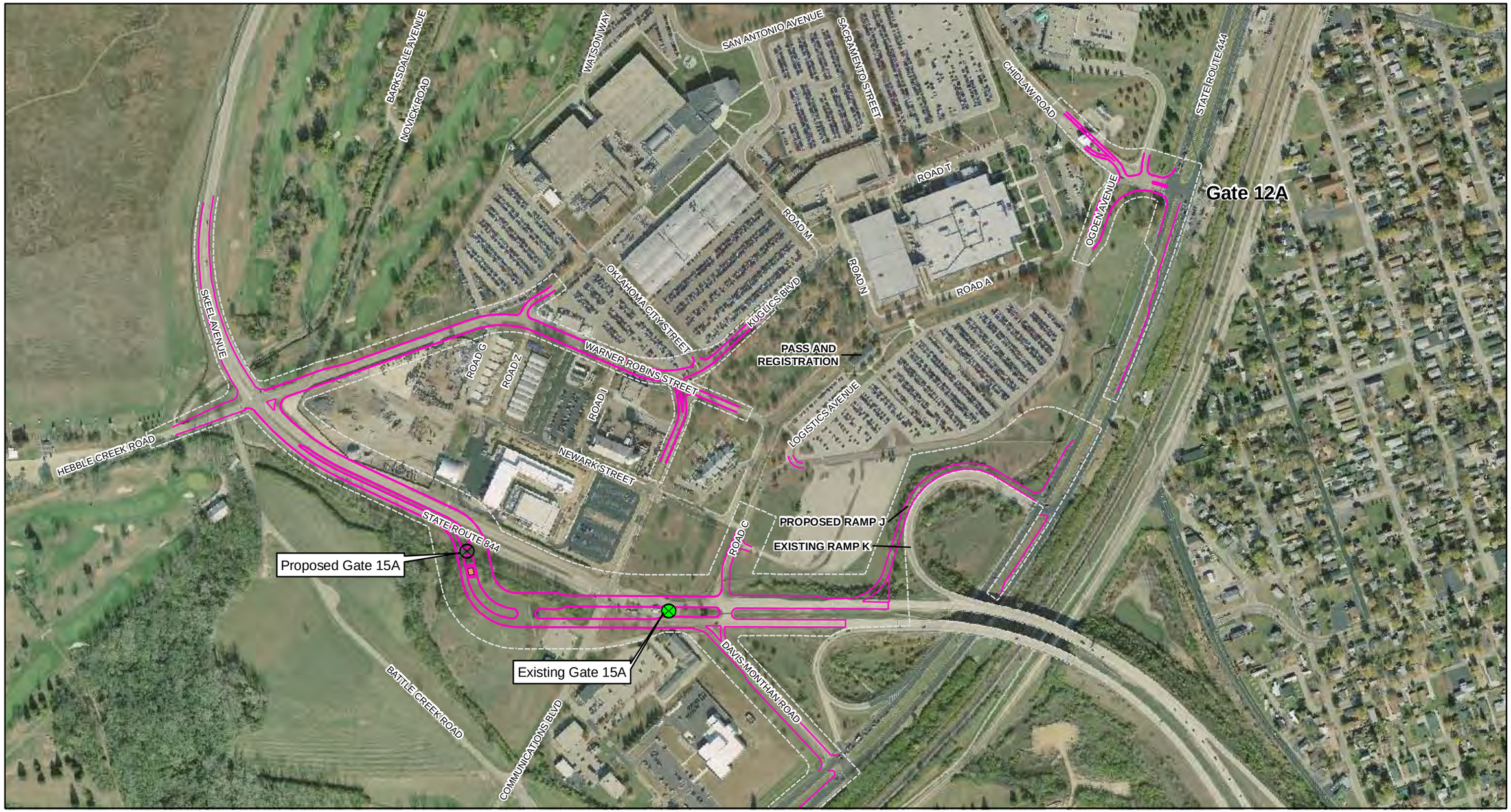

Legend

- Proposed Gate Location
- Proposed Gate Closure/Existing Gate
- Area of Potential Effect
- Proposed Alignment
- Proposed Guard Shack

N

0 250 500 1,000 Feet

WRIGHT-PATTERSON AIR FORCE BASE, OHIO

Figure 2-5
Existing and Proposed
Gate 15A Locations

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- Improvements to the Hebble Creek and Warner Robins Street intersection; and
- Improvements to the Hebble Creek Road and Skeel Avenue intersection.

Relocate Functions of Gate 16A

Gate 16A, the current vehicle inspection gate, is located at the intersection of SR 444 and Communications Boulevard, adjacent and east of the Twin Base Golf Course. Under the Proposed Action, the vehicle inspection function currently located at Gate 16A would be relocated to a new Gate 26A (see *Relocate and Reconfigure Gate 26A* below). Under the Proposed Action, Gate 16A would remain open and unmanned and have no access to secured Base areas.

Relocate and Reconfigure Gate 26A

Under the Proposed Action, Gate 26A would be relocated and reconfigured from its current location to a location north of the Circle Drive and SR 235 intersection. **Figure 2-6** presents a photograph of existing Gate 26A. Gate 26A would serve as a secondary gate to Area A with a primary purpose of inspecting commercial vehicles entering the Base. To accommodate the potential volume of trucks awaiting vehicle inspection at Gate 26A, a 14-stall parking area is proposed outside of the perimeter base fence that would allow trucks to idle while waiting inspection. **Figure 2-7** presents the approximate location of the proposed relocated and reconfigured Gate 26A.

Figure 2-6. Photograph of Existing Gate 26A, Looking Off-Base

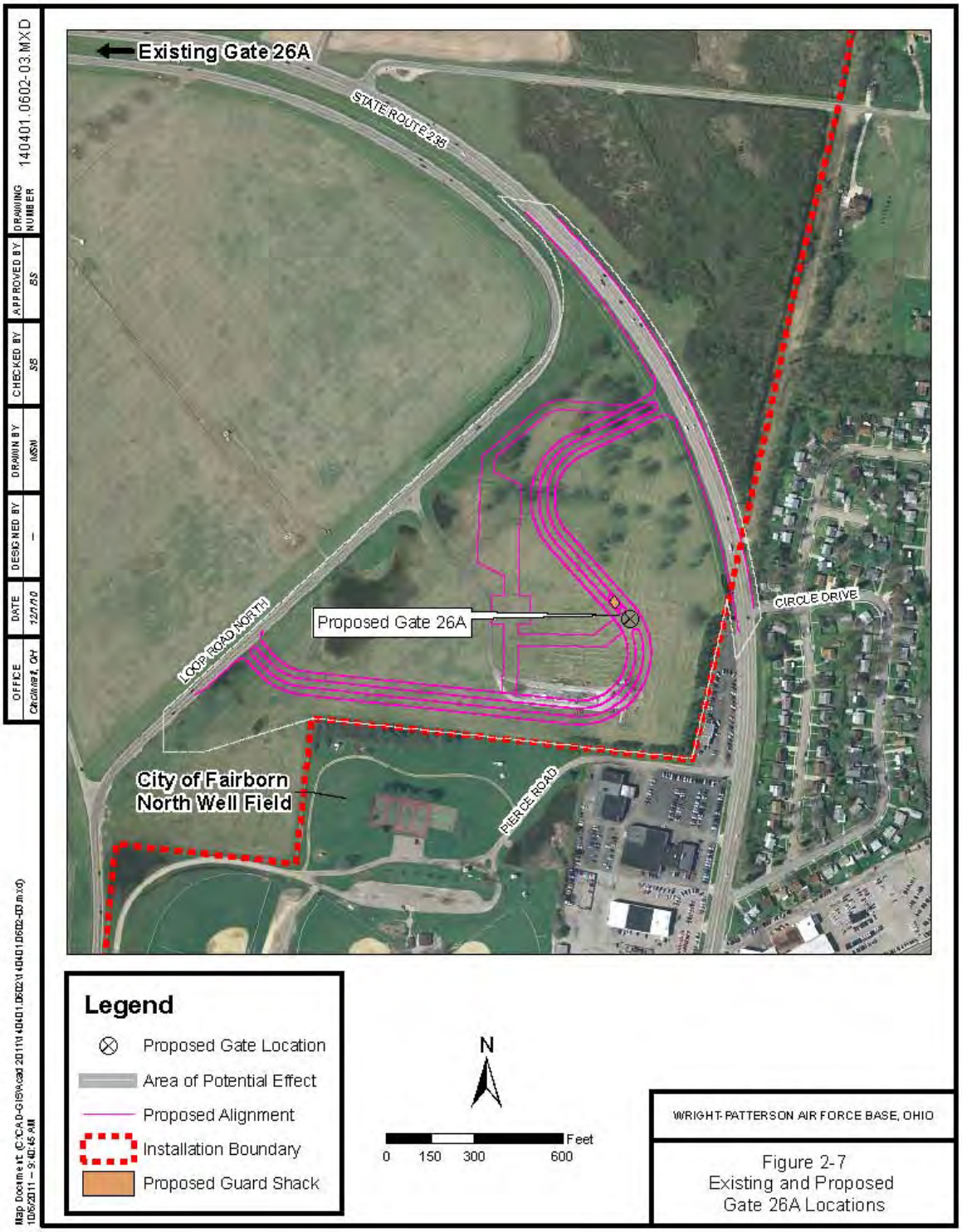
Existing Gate 26A
STATE ROUTE 235
Proposed Gate 26A
LOOP ROAD NORTH
CIRCLE DRIVE
City of Fairborn
North Well Field
PIERCE ROAD
Legend
Proposed Gate Location
Area of Potential Effect
Proposed Alignment
Installation Boundary
Proposed Guard Shack
N
Feet
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Figure 2-7
Existing and Proposed
Gate 26A Locations
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2.3.2 Relocation of Base Perimeter Fence

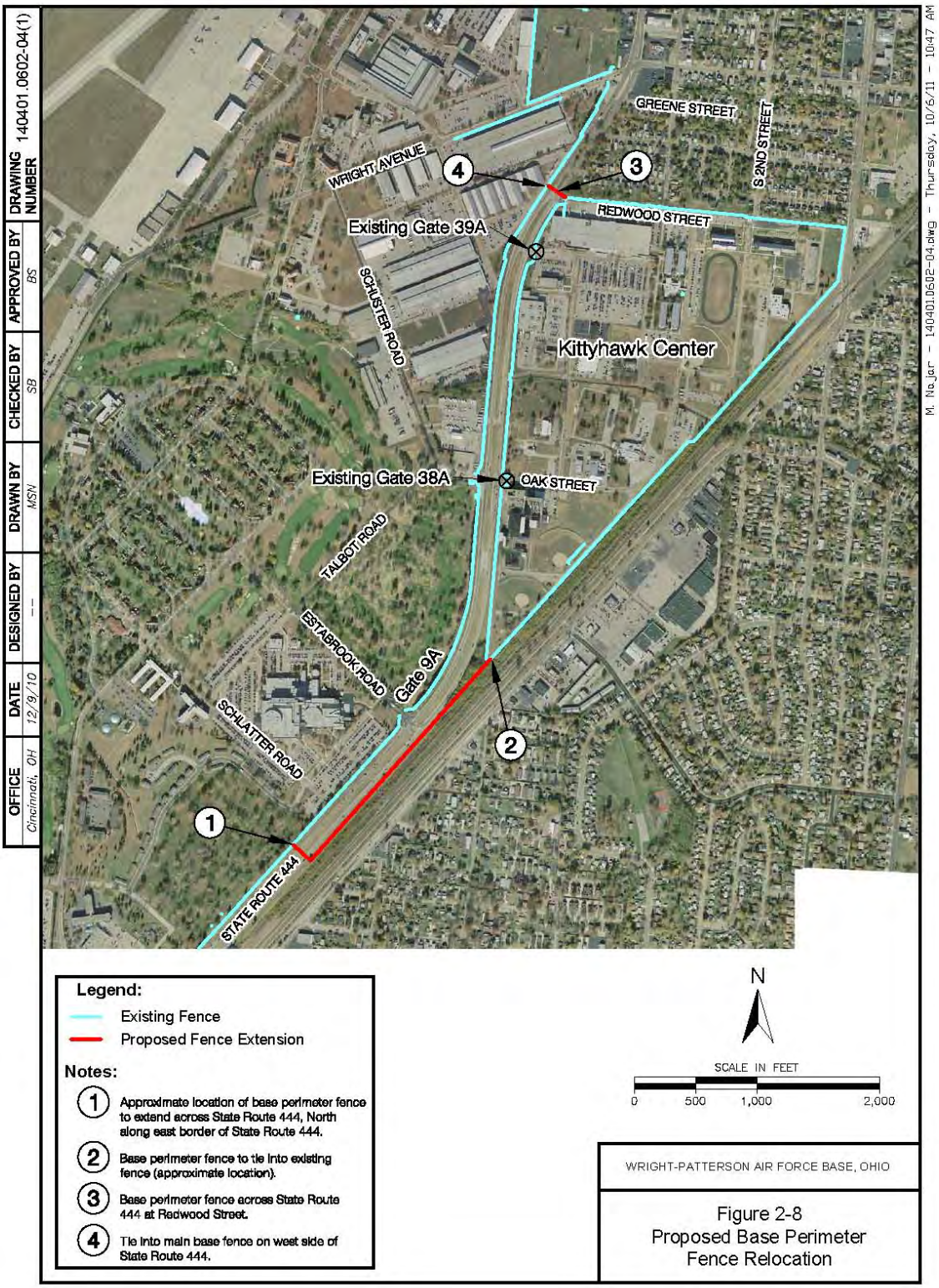
Currently, SR 444 bisects Area A from the Kittyhawk Center. Under the Proposed Action, the Base perimeter fence would be relocated to extend across SR 444 north of Dayton-Yellow Springs Road and along the east border of SR 444 up to the existing Kittyhawk Center fence. The perimeter fence would also be relocated across SR 444 north of existing Gate 39A at Redwood Street and tie into the main fence on the west side of SR 444. This action would close the public highway portion of SR 444 that currently bisects the Kittyhawk Center from the remainder of the Base. The Federal government owns the land underlying the section of SR 444 proposed for closure. In 1932, the U.S. War Department granted Ohio an easement to establish a road at this location, but retained the right to close it at any time. **Figure 2-8** presents the proposed relocation of the base perimeter fence.

The points along SR 444 that would close public access would be constructed with cabled fence, gates, temporary guard shacks, and utility connections. These access denial points would conform to UFC 4-010-01 and SDDCTEA Pamphlet 55-15 guidance. The northern gate would be located on SR 444 north of existing Gate 39A at Redwood Street. The southern gate would be located on SR 444 north of Dayton-Yellow Springs Road and would not be an access gate to the secured Base. Under the Proposed Action, existing Gate 1A would be permanently closed.

The closure of SR 444 and relocation of the perimeter fence would improve Base security by securing the portion of SR 444 that bisects Area A from the Kittyhawk Center. The closure of SR 444 and relocation of base perimeter fence would also increase protection to occupied on-Base buildings located adjacent to SR 444 by removing public traffic through this area of the Base. Under the Proposed Action, the closure of a portion of SR 444 to public traffic would reduce the number of ECFs, which would result in enhanced management of resources including security police personnel performing check procedures at gates.

To summarize, **Figure 2-9** depicts proposed activities at Gates 1A, 15A, and 26A, as a result of the Proposed Action.

Proposed activities under the Proposed Action include closing SR 444 and reconfiguring the ECFs. The planning schedule for the proposed projects is not absolute. Modifications may be made to priorities and specific implementation dates of future requirements. Funding availability would be the primary driver of schedule compliance. Additionally, specific requirements could change over the life of the individual plans, especially during the last years of implementation. For these reasons, the USAF would employ an adaptive management approach whereby it would evaluate and adjust features of proposed actions in consideration of internal and external factors (i.e., funding, new mission(s), new technologies, and changes in the natural or physical environment). Even with these changes, the overall concept is anticipated to remain intact and be implemented when the USAF completes compliance with NEPA; Federal, state, and local regulations; and approval of state and local permits.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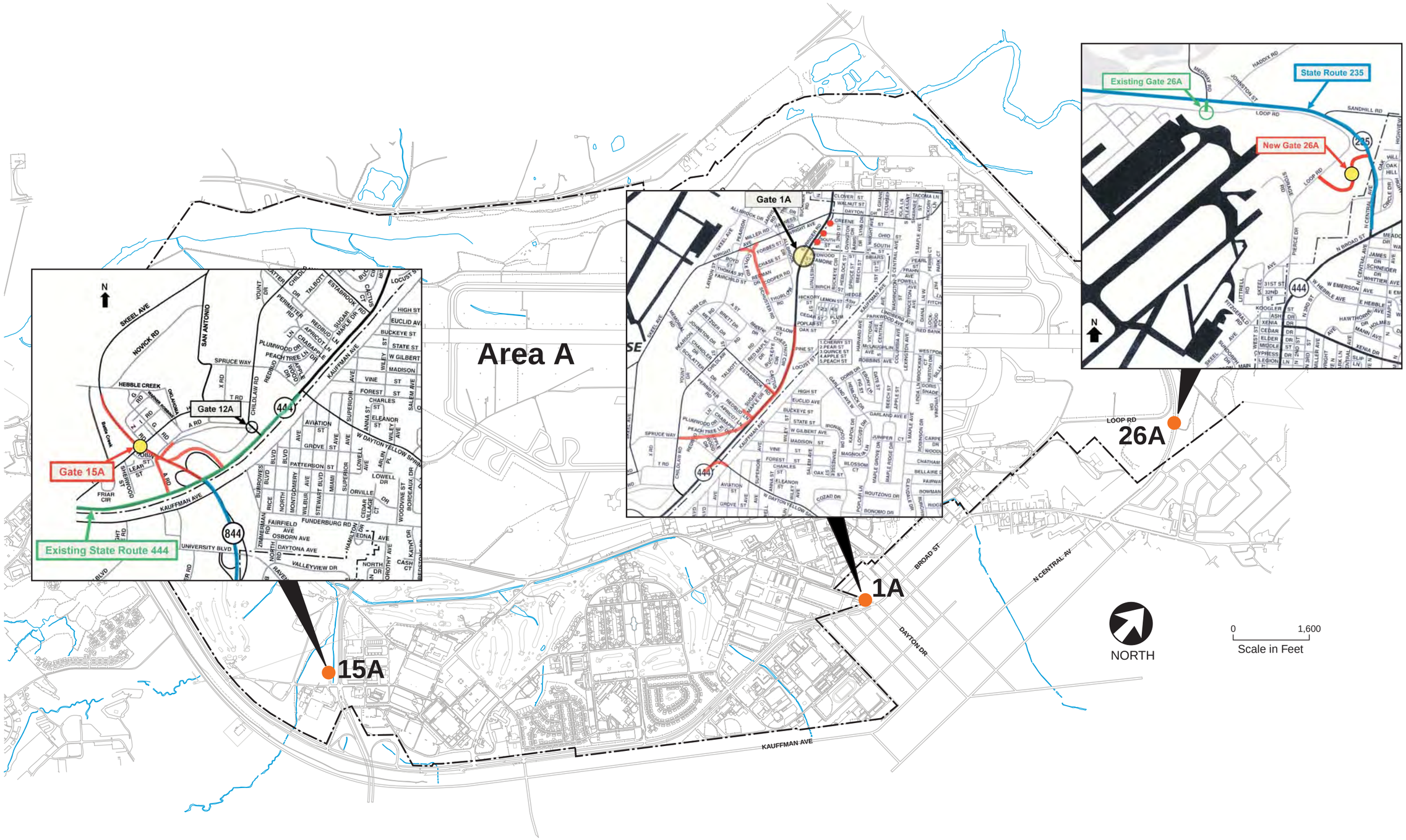
GREENE STREET
S 2ND STREET
WRIGHT AVENUE
REDWOOD STREET
Existing Gate 39A
SCHLATTER ROAD
Kittyhawk Center
Existing Gate 38A
OAK STREET
TALBOT ROAD
ESTABROOK ROAD
Gate 9A
SCHLATTER ROAD
STATE ROUTE 444
1
2
3
4
Legend:
Existing Fence
Proposed Fence Extension
Notes:
1 Approximate location of base perimeter fence to extend across State Route 444, North along east border of State Route 444.
2 Base perimeter fence to tie into existing fence (approximate location).
3 Base perimeter fence across State Route 444 at Redwood Street.
4 Tie into main base fence on west side of State Route 444.
N
SCALE IN FEET
0
500
1,000
2,000
WRIGHT-PATTERSON AIR FORCE BASE, OHIO
Figure 2-8
Proposed Base Perimeter
Fence Relocation



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WRIGHT-PATTERSON AIR FORCE BASE, OHIO

Figure 2-9
Proposed Reconfigured, Relocated, and Consolidated ECF Locations at WPAFB

2.4 Alternative A

Reasonable alternatives to the Proposed Action were considered, then formulated, based on the purpose and need of reconfiguring and relocating gates and relocating the base perimeter fence. A reasonable alternative is one that achieves, in large part, the agency's defined purpose and need while aiming to minimize environmental impacts. Alternative A, described below, will be analyzed as part of this EIS.

Alternative A would involve enclosing the Kittyhawk Center within Area A by extending the base perimeter fence across SR 444 at existing Gate 9A along the eastern border of SR 444 up to the Kittyhawk Center fence and then again across SR 444 north of existing Gate 39A (to be demolished under Alternative A) at Redwood Street to tie in to the main fence on the west side of SR 444. Cabled fence with a gate, temporary guard shack, and utility connections at the north end would be constructed under this alternative. The southern end of the Kittyhawk Center at SR 444 would have fencing making the Kittyhawk Center contiguous with Area A.

Alternative A meets the selection standards:

- It would not impose new security risks because it would not create choke points or other similar tactical barriers that could be seized or demolished.
- By extending the base perimeter fence enclosing the Kittyhawk Center within Area A, military forces would be able to move between Area A and the Kittyhawk Center at any location within the installation boundary and long-term movement of forces would not be compromised.

Under Alternative A, Gate 1A would remain as is and not be relocated as proposed under the Proposed Action. Existing Gate 9A would remain open and unmanned under this alternative and be accessible from the south. Off-Base roadway traffic on SR 444 would continue to be rerouted at Dayton-Yellow Springs Road. **Figure 2-10** presents this alternative.

2.5 No Action Alternative

Under the No Action Alternative, the existing nine ECFs would remain in place and no reconfiguration or improvements would be made to gates in Area A. Gates 1A, 15A, and 26A would remain as is and would not be upgraded or reconfigured. SR 444 would remain open as a public roadway between Area A and the Kittyhawk Center and the Kittyhawk Center would remain separate from Area A. Traffic would continue to pass within 60 ft of occupied buildings on Base and would not meet the anti-terrorism requirements in UFC 4-010-01.

Although the No Action Alternative does not meet the purpose and need of improving Base security under current ATFP standards, it is included in the environmental analysis to provide a baseline for comparison with the Proposed Action and is analyzed in accordance with CEQ regulations for implementing NEPA. Although this alternative would eliminate unavoidable adverse impacts associated

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Legend:

- Installation Boundary
- Gate to Remain Open
- Proposed Unmanned Gates
- Proposed Guard Shack
- Proposed Gate

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WRIGHT-PATTERSON AIR FORCE BASE, OHIO

Figure 2-10
Alternative A, Enclose Kittyhawk Center within Area A

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with the Proposed Action, the No Action Alternative would not satisfy selection standards established under the purpose and need for this project.

2.6 Alternatives Eliminated from Further Study

As part of the NEPA process, potential alternatives to the Proposed Action must be evaluated. For alternatives to be considered reasonable and warrant further detailed analysis they must be affordable, implementable, and meet the purpose and need for the action based on the project requirements stated in Section 2.2. In addition to Alternative A identified in Section 2.4, other alternatives to the Proposed Action were considered for their feasibility as viable alternatives to implementing solutions that would improve security, safety, and traffic flow into and on the Base through the relocation and reconfiguration of traffic entry into Area A at WPAFB.

Alternatives considered were either presented during the public scoping period or were formulated by the USAF, and included upgrading Gate 26A at its current location, constructing a bridge over/tunnel under SR 444 connecting the Kittyhawk Center to Area A, and realigning SR 444 east of the Kittyhawk Center. A description of each alternative considered and its reason for elimination is presented below.

Upgrade Gate 26A at its Current Location

Upgrading Gate 26A at its current location was considered; however, due to the proximity to SR 235, Loop Road, and the airfield, there would not be adequate space or distance for an upgraded ECF at this location that would meet ATFP requirements. In addition, Gate 26A at its current location is situated approximately 100 ft south of SR 235, which also does not meet the ATFP requirement of an ECF having a corridor of at least 140 ft wide. And, due to the proximity of Gate 26A to SR 235 and the inadequacy of stacking distance, if congestion occurred at this gate, the queues may extend into adjacent intersections or cause congestion on feeder roads. Therefore, upgrading Gate 26A at its current location was eliminated from further study.

Construct a Bridge over SR 444

A bridge constructed over SR 444 was considered as an alternative to closing SR 444 at the Kittyhawk Center. A bridge constructed over the length of SR 444 that currently bisects the Kittyhawk Center from Area A would allow non-base thru traffic to travel along SR 444 but at a higher elevation than the existing roadway. This alternative would provide a connection between the Kittyhawk Center and Area A, but it would not secure the SR 444 corridor or provide this area of the Base with an ECF. A bridge over the Kittyhawk Center/Area A would not meet ATFP requirements since existing buildings do not meet the standoff distance requirement of 82 ft. This alternative does not meet one of the alternative selection standards; it imposes a new security risk by constructing a high vantage point that could be seized or damaged, thereby preventing movement between Area A and the Kittyhawk Center. For these reasons, this alternative was eliminated from further study.

Construct a Tunnel under SR 444

The construction of a tunnel under SR 444 was also considered as an alternative to closing SR 444 at the Kittyhawk Center. A tunnel constructed under the length of SR 444 that currently bisects the Kittyhawk Center from Area A would allow non-base thru traffic to travel along SR 444 but at a lower elevation than the existing roadway. This alternative would provide a connection between the Kittyhawk Center and Area A, but it would not secure the SR 444 corridor or provide this area of the Base with an ECF. A tunnel under the Kittyhawk Center/Area A would not meet ATFP requirements since existing buildings do not meet the standoff distance requirement of 82 ft.

This alternative does not meet either of the alternative selection standards: (1) it imposes a new security risk because it could create a potential terrorist target, whereby any blast in the tunnel would hurt civilians and military personnel (required to use the tunnel to enter the Base from the north) using the tunnel; and (2) the construction design would require the north side of the tunnel to extend beyond USAF property, thereby requiring land purchase or donation. For these reasons, this alternative was eliminated from further study.

SR 444 Realignment East of Kittyhawk Center

The realignment of SR 444 east of the Kittyhawk Center and west of the existing railroad tracks along Kauffman Avenue was also considered as an alternative to the Proposed Action. The realignment of SR 444 east of the Kittyhawk Center would be similar to Alternative A discussed in Section 2.4. Traffic could be diverted at Dayton-Yellow Springs Road, Gate 9A, Gate 1A, or Dayton Drive. Diverted SR 444 traffic would travel along the east side of the Kittyhawk Center either on Kauffman Avenue or on a new segment of SR 444 constructed between the Kittyhawk Center and the railroad tracks. However, due to the location of the existing railroad track and Kauffman Road, there would not be adequate land to construct a new segment of SR 444 at this location. Although this alternative meets the purpose and need of making Area A contiguous with the Kittyhawk Center, it does not meet the ATFP standard for minimum standoff distances for buildings; therefore, it was eliminated from further study.

2.7 Comparison of Environmental Consequences

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

Table 2-2. Comparison of Environmental Consequences

Affected Environmental Issue	Proposed Action	Alternative A	No Action
Land Use On-Base	Short-Term: Minor impacts from construction activities. Occupants of on-site buildings adjacent to project areas would be subject to temporary or intermittent impacts and inconveniences from modified parking and pedestrian patterns, and from increases in background noise would be experienced. Long-Term: Minor adverse impact to land use in the vicinity of Gates 1A, 15A and 26A, and associated proposed road widening; however, land use would remain consistent with the WPAFB General Plan.	Short-Term: Minor adverse impact to land use in the vicinity of Gates 9A and 38A; however, land use would remain consistent with the WPAFB General Plan. Long-Term: Similar to short-term.	Short-Term: No impact. Long-Term: No impact.
Off-Base	Short-Term: Minor adverse impacts to Greene, Ohio, and South Streets; however, land use would not change at these locations. Long-Term: Same as short-term.	Short-Term: No impact. Long-Term: No impact.	
Air Quality On-Base	Short-Term: Minor adverse impact from particulate matter and engine exhaust emissions generated during construction activities. Long-Term: Negligible impact due to decreased idling and congestion at entry control facilities (ECFs).	Short-Term: Similar to Proposed Action. Long-Term: Similar to Proposed Action.	Short-Term: No impact. Long-Term: No impact.
Off-Base	Short-Term: Negligible adverse impact because total amount of traffic not expected to change. Long-Term: No impact.	Short-Term: Similar to Proposed Action. Long-Term: No impact.	

Affected Environmental Issue	Proposed Action	Alternative A	No Action
Noise			
On-Base	Short-Term: Minor impacts on ambient noise from construction activities; however, activities would be carried out during normal working hours and would cease upon completion of construction activities.	Short-Term: Similar to Proposed Action.	
	Long-Term: Positive effect on residential/recreational areas as a result of less traffic at fewer ECF locations.	Long-Term: Similar to Proposed Action.	Short-Term: No impact. Long-Term: No impact.
Off-Base	Short-Term: Impacts similar to on-Base ambient noise short-term impacts.	Short-Term: Similar to Proposed Action.	
	Long-Term: Moderate adverse impact from increased traffic noise levels at these roadways: Dayton-Yellow Springs Road, Kauffman Avenue, Central Avenue, Dayton Drive, and Broad Street.	Long-Term: Similar to Proposed Action.	
Geology and Soils			
On-Base	Short-Term: Minor impact to soils from construction activities. Sediment and erosion control measures would be implemented to minimize potential impacts.	Short-Term: Minor impact to soils from construction activities at Gates 9A and 38A, and in areas where the perimeter fence is relocated across State Route (SR) 444. Sediment and erosion control measures would be implemented to minimize potential impacts.	
	Long-Term: No impact.	Long-Term: No impact.	Short-Term: No impact. Long-Term: No impact.
Off-Base	Short-Term: Minor adverse impact to soil during construction activities. Impacts would be minimized through implementation of erosion and siltation controls.	Short-Term: Similar to Proposed Action.	
	Long-Term: Negligible adverse impacts would occur to local geology, but regional geology would not be affected.	Long-Term: Similar to Proposed Action.	

Affected Environmental Issue	Proposed Action	Alternative A	No Action
Water Resources			
Groundwater			
On-Base	Short-Term: Minor adverse impact to groundwater during construction activities from construction at or near existing ECFs. Erosion and sedimentation controls would be implemented as a best management practice (BMP).	Short-Term: Similar to Proposed Action.	
	Long-Term: Minor adverse effect on groundwater would continue to occur as a result of roadway operations.	Long-Term: Similar to Proposed Action.	
Off-Base	Short-Term: Minor adverse impact to groundwater from increased siltation to streams and stormwater conveyances within the roadway improvement project areas during construction.	Short-Term: Similar to Proposed Action.	
	Long-Term: Minor adverse effect on groundwater would continue to occur as a result of roadway operations.	Long-Term: Similar to Proposed Action.	Short-Term: No impact. Long-Term: No impact.
Surface Water			
On-Base	Short-Term: Moderate impact to unnamed tributary of Hebble Creek in area of Gate 15A. Environmental commitments would be implemented in accordance with the Clean Water Act Section 404 and 401 permits. Other open drainages would be impacted by culvert extensions. Erosion and sedimentation controls will be implemented as a BMP.	Short-Term: Minor adverse impact to surface water during construction activities as the proposed activities would be conducted at existing ECFs. Erosion and sedimentation controls would be implemented as a BMP.	
	Long-Term: Minor adverse impact. Environmental commitments will ensure no net loss of function.	Long-Term: Minor adverse effect on surface water would continue to occur as a result of roadway operations.	
Off-Base	Short-Term: Moderate impact to culvert extensions.	Short-Term: Similar to Proposed Action.	
	Long-Term: Similar to short-term.	Long-Term: Similar to Proposed Action.	

Affected Environmental Issue	Proposed Action	Alternative A	No Action
Floodplains On-Base	Short-Term: Minor adverse impact as a portion of Gate 15A is located within the 100-year floodplain. Construction in this area would be stipulated and restricted by the Miami Conservancy District (MCD). Long-Term: Similar to short-term.	Short-Term: Similar to Proposed Action. Long-Term: Similar to short-term.	Short-Term: No impact. Long-Term: No impact.
Off-Base	Short-Term: Minor adverse impact as a small segment of Kauffman Avenue is located within the 100-year floodplain. Long-Term: Similar to short-term.	Short-Term: Similar to Proposed Action. Long-Term: Similar to Proposed Action.	
Biological Resources Vegetation On-Base	Short-Term: Minor adverse impact during construction activities due to removal of common vegetation. Long-Term: Negligible impact from vegetation removal as no rare vegetation would be affected. Environmental commitments would involve replanting with similar vegetation.	Short-Term: Minor adverse impacts during construction activities due to removal of common vegetation at Gates 9A and 38A due to extending the base perimeter fence across SR 444. Long-Term: Similar to Proposed Action.	Short-Term: No impact. Long-Term: No impact.
Off-Base	Short-Term: Minor adverse impact to vegetation from construction activities disturbing soil. Long-Term: Similar to short-term.	Short-Term: Similar to Proposed Action. Long-Term: Similar to Proposed Action.	

Affected Environmental Issue	Proposed Action	Alternative A	No Action
Biological Resources (continued)			
Wildlife			
On-Base	Short-Term: Negligible adverse impact as no unusual or high quality habitat would be affected. Long-Term: Similar to short-term.	Short-Term: Similar to Proposed Action. Long-Term: Similar to Proposed Action.	
Off-Base	Short-Term: Negligible adverse impact as no unusual or high quality habitat would be affected. Long-Term: Similar to short-term.	Short-Term: Similar to Proposed Action. Long-Term: Similar to Proposed Action.	
Threatened and Endangered Species			
On-Base	Short-Term: Negligible impact on low quality habitat of Indiana bat and bald eagle; impacts would be minimized by implementing tree cutting in accordance with the Integrated Natural Resources Management Plan (INRMP). Long-Term: Negligible impact from loss of potential designated habitat areas for Indiana bat and bald eagle; impacts would be minimized by implementing tree cutting in accordance with the INRMP.	Short-Term: Similar to Proposed Action. Long-Term: Similar to Proposed Action.	Short-Term: No impact. Long-Term: No impact.
Off-Base	Short-Term: No impact; there are no known or potential designated habitat areas. Long-Term: Similar to short-term.	Short-Term: Similar to Proposed Action. Long-Term: Similar to Proposed Action.	

Affected Environmental Issue	Proposed Action	Alternative A	No Action
Wetlands On-Base	Short-Term: Negligible impact because no wetlands are located within the project areas. Long-Term: No impact.	Short-Term: Similar to Proposed Action. Long-Term: No impact.	Short-Term: No impact. Long-Term: No impact.
Off-Base	Short-Term: Negligible impact because no wetlands are located within the area of influence. Long-Term: No impact.	Short-Term: No impact. Long-Term: No impact.	
Cultural Resources On-Base	Short-Term: Negligible impact to National Register of Historic Places (NRHP) eligible sites. Long-Term: No impact.	Short-Term: Similar to Proposed Action. Long-Term: No impact.	Short-Term: No impact. Long-Term: No impact.
Off-Base	Short-Term: Negligible impact to NRHP eligible sites. Long-Term: No impact.	Short-Term: Similar to Proposed Action. Long-Term: No impact.	
Socioeconomics On-Base	Short-Term: Beneficial impact on local economy from revenue generated by construction activities. Long-Term: No impact.	Short-Term: Similar to Proposed Action. Long-Term: No impact.	Short-Term: No impact. Long-Term: No impact.
Off-Base	Short-Term: Positive impact to viability of downtown Fairborn as traffic and visibility increase. Long-Term: Similar to short-term.	Short-Term: Similar to Proposed Action. Long-Term: Similar to Proposed Action.	
Environmental Justice On-Base	Short-Term: No impact. Long-Term: No impact.	Short-Term: No impact. Long-Term: No impact.	Short-Term: No impact. Long-Term: No impact.
Off-Base	Short-Term: Unknown impacts would be determined at such time as the FHWA/ODOT makes their separate NEPA determination. Long-Term: Similar to short-term.	Short-Term: Similar to Proposed Action. Long-Term: Similar to Proposed Action.	

Affected Environmental Issue	Proposed Action	Alternative A	No Action
Infrastructure On-Base	Short-Term: Minor adverse impact from intermittent roadway closures during construction and to local traffic in area of gates from additional construction vehicles. Long-Term: Beneficial impact to utilities and services as efficiencies increase.	Short-Term: Similar to Proposed Action. Long-Term: Similar to Proposed Action.	Short-Term: No impact. Long-Term: No impact.
Off-Base	Short-Term: Additional studies would occur during project planning and design for utility and other infrastructure needs. Long-Term: Similar to short-term.	Short-Term: Similar to Proposed Action. Long-Term: Similar to Proposed Action.	
Health and Safety On-Base	Short-Term: Minor adverse impact to workers during construction activities; impacts would be minimized by adherence to safety standards. Long-Term: No impact.	Short-Term: Similar to Proposed Action. Long-Term: Similar to Proposed Action.	Short-Term: Negative impact to safety of employees, residents, and visitors of the Base resulting from continued non-compliancy with Air Force anti-terrorism standards. Long-Term: Similar to short-term.
Off-Base	Short-Term: Moderate impact and increased risk to safety of vehicles and pedestrians traversing the railroad tracks at SR 444 and Kauffman Avenue and crossing Central Avenue to access Central Park. Long-Term: Similar to short-term.	Short-Term: Similar to Proposed Action. Long-Term: Similar to Proposed Action.	Short-Term: No impact. Long-Term: No impact.

Affected Environmental Issue	Proposed Action	Alternative A	No Action
Hazardous Materials			
On-Base	Short-Term: Negligible impact as hazardous materials used during construction would not be expected to increase. Long-Term: No impact.	Short-Term: Similar to Proposed Action. Long-Term: No impact.	
Off-Base	Short-Term: Minor adverse impact to areas of known active Leaking Underground Storage Tank (LUST) sites. Long-Term: No impact.	Short-Term: Similar to Proposed Action. Long-Term: No impact.	
Hazardous Waste			
On-Base	Short-Term: Negligible impact as hazardous materials generated during construction would not be expected to increase. Long-Term: Similar to short-term.	Short-Term: Similar to Proposed Action. Long-Term: Similar to Proposed Action.	Short-Term: No impact. Long-Term: No impact.
Off-Base	Short-Term: Minor adverse impact to areas of known active LUST sites. Long-Term: No impact.	Short-Term: Similar to Proposed Action. Long-Term: No impact.	
Environmental Restoration Program (ERP) Sites			
On-Base	Short-Term: Negligible impact as the project areas are not located directly over any landfills or burial sites; however, any activity that may disturb ERP sites will be coordinated with the Base ERP Program Manager in the CEANQ. Long-Term: Similar to short-term.	Short-Term: Similar to Proposed Action. Long-Term: Similar to Proposed Action.	

Affected Environmental Issue	Proposed Action	Alternative A	No Action
Traffic and Transportation			
On-Base	Short-Term: Beneficial impact at ECFs as a result of improvements. Construction activities would result in a minor adverse impact on traffic generation, volume, and street use.	Short-Term: Similar to Proposed Action.	Short-Term: No impact.
	Long-Term: Similar to short-term.	Long-Term: Similar to Proposed Action.	Long-Term: Minor to moderate adverse impacts on traffic in and around WPAFB as a result of continued vehicle delays and time-consuming vehicle inspections.
Off-Base	Short-Term: Minor impact from increased volume of traffic on local street network as off-Base traffic would travel further to access available ECF. Level of Service would decrease and average vehicle delays would increase on local street networks as traffic diverts from the closure of a segment of SR 444.	Short-Term: Similar to Proposed Action.	Short-Term: No impact.
	Long-Term: Similar to short-term.	Long-Term: Similar to Proposed Action.	Long-Term: No impact.

3.0 AFFECTED ENVIRONMENT

This section describes the current environmental and socioeconomic conditions both on-Base and off-Base most likely to be affected by the Proposed Action. The off-Base area of influence is depicted in **Figure 3-1**. The off-Base area of influence includes roads where vehicle traffic would likely increase as a result of the Proposed Action. The off-Base area of influence was selected based on anticipated changes in traffic flow and the most likely travelled route as a result of closing a segment of SR 444. Roadways included in the off-Base area of influence include Kauffman Avenue, South Central Avenue, West Dayton Drive, and South Broad Street.

This section provides information to serve as a baseline from which to identify and evaluate environmental and socioeconomic changes likely to result from implementation of the Proposed Action.

3.1 Land Use

3.1.1 Definition of the Resource

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

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

Two main objectives of land use planning are to ensure both orderly growth and compatible uses among adjacent property parcels or areas. Tools supporting land use planning include written master plans/management plans and zoning regulations. In appropriate cases, the locations and extent of proposed actions need to be evaluated for their potential effects on project sites and adjacent land uses. The foremost factor affecting a proposed action in terms of land use is its compliance with any applicable land use or zoning regulations. Other relevant factors include existing land use at the project site, the types of land uses on adjacent properties and their proximity to a proposed action, the duration of a proposed activity, and its “permanence.”

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

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Legend

- Study Area
- Installation Boundary

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WRIGHT-PATTERSON AIR FORCE BASE, OHIO

Figure 3-1
Off-Base Area of Influence

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aircraft operations, noise exposure, and accident potential to local governments. The most recent AICUZ for WPAFB was conducted in 1995 (WPAFB 1995a, 2001).

The current AICUZ Program is based on a study completed by WPAFB in 1995. As part of this study, the Maximum Mission (also known as Mission Capacity) Scenario was established for WPAFB to provide consistency when zoning and land use policies in the community are established. Because the noise contours were based on conservative assumptions regarding future missions, local zoning does not need to be adjusted with changes in missions. Therefore, the 1995 noise contours for the Maximum Mission Scenario remain in effect for local community planning purposes. The noise contour analysis is addressed in Section 3.3 of this EIS.

3.1.2 Existing Conditions

On-Base

WPAFB is mostly comprised of Federal lands and is zoned GOV, Government. As a Federal property, the Base is not subject to local zoning regulations. The majority of land surrounding WPAFB is within the city of Fairborn, and is zoned as R-2, R-3, R-4 (Residential) and B-1, B-2, B-3 (Business) (Greene 2011). WPAFB comprises 8,145 acres near Dayton, Ohio, and is divided into two areas: A and B. Area A contains administrative activities, airfield operation, maintenance, and civil engineering activities; and Area B focuses on acquisition, education, research, and development. The Base is expected to fulfill numerous roles within the USAF, incorporating both natural and man-made development constraints within the Base boundaries. Over 2,500 acres of WPAFB remain undeveloped due to various development constraints.

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

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

WPAFB is divided into two areas: A and B. Gates 1A, 15A, 26A, and the perimeter fence near the Kittyhawk Center are located in Area A. As shown on **Figure 3-2**, land use in these areas is mixed between residential, commercial, industrial, institutional, open space, and includes an airfield.

Off-Base

Land uses around WPAFB vary from heavily urbanized to rural agricultural (**Figure 3-2**). Most of the urbanized areas are west of the Base, with the low-density or agricultural areas located east of the Base.

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

Development in this area caters to local residents with commercial establishments such as gas stations, grocery stores, and dry cleaners. Stores fronting the sidewalks have limited setbacks, off-street parking, and limited landscaping. The prominent educational facilities in the area include Fairborn public and private schools, Wright State University, and Strayer University. Cultural and entertainment resources include the Wright Brothers Memorial, various Young Men's Christian Association (YMCA) locations, the Kettering Recreation Center, the Dayton Museum, public libraries, and numerous public and private golf courses.

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

3.2 Air Quality

3.2.1 Definition of the Resource

Criteria Pollutants

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

The CAA directed the U.S. Environmental Protection Agency (USEPA) to develop, implement, and enforce strong environmental regulations that would ensure clean and healthy ambient air quality.

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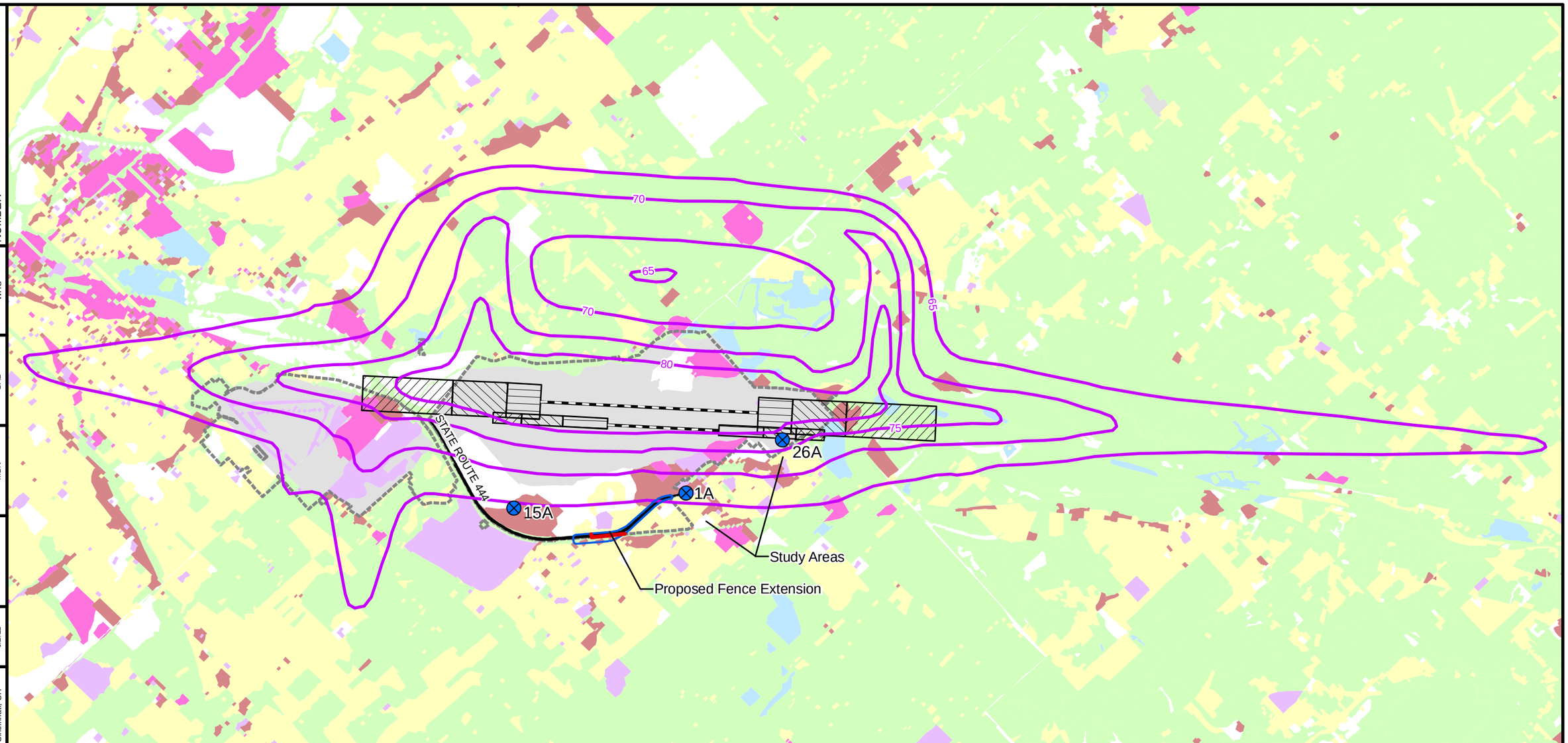

Legend:

- Clear Zones
- APZ I
- APZ II
- Gate Locations
- Installation Area
- Runways
- Study Area
- Proposed Fence Extension
- Maximum Mission DNL Noise Contours
- State Route 444
- Residential
- Commercial
- Industrial
- Institutional
- Open Space
- Vacant and Agricultural
- Extractive
- Airports

Source: 1995 AICUZ Study Maximum Mission

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

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WRIGHT-PATTERSON AIR FORCE BASE, OHIO

Figure 3-2
Existing Land Use and
Maximum Mission Noise Contours
in the Project Area

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

Table 3-1. National Ambient Air Quality Standards

Pollutant	Standard Value [6]		Standard Type
Carbon Monoxide (CO)			
8-hour average	9 ppm	(10 mg/m^3)	Primary
1-hour average	35 ppm	(40 mg/m^3)	Primary
Nitrogen Dioxide (NO_2)			
Annual arithmetic mean	0.053 ppm	(100 µg/m^3)	Primary and Secondary
1-hour average[1]	0.100 ppm	(188 µg/m^3)	Primary and Secondary
Ozone (O_3)			
1-hour average[2]	0.12 ppm	(235 µg/m^3)	Primary and Secondary
8-hour average[2]	0.075 ppm	(147 µg/m^3)	Primary and Secondary
Lead (Pb)			
3-month average [3]		0.15 µg/m^3	Primary and Secondary
Particulate <10 Micrometers (PM_{10})			
24-hour average[4]		150 µg/m^3	Primary and Secondary
Particulate <2.5 Micrometers ($PM_{2.5}$)			
Annual arithmetic mean[4]		15 µg/m^3	Primary and Secondary
24-hour average[4]		35 µg/m^3	Primary and Secondary
Sulfur Dioxide (SO_2)			
1-hour average[5]	0.075 ppm	(196 µg/m^3)	Primary
Annual arithmetic mean[5]	0.03 ppm	(80 µg/m^3)	Primary
24-hour average[5]	0.14 ppm	(365 µg/m^3)	Primary

Notes:

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

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

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

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

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

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

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

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

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

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

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

Title V of the CAA Amendments of 1990 requires states and local agencies to implement permitting programs for major stationary sources. A major stationary source is a facility (e.g., plant, base, or activity) that has the potential to emit more than 100 tons annually of any one criteria air pollutant, 10 tons per year (tpy) of a hazardous air pollutant, or 25 tpy of any combination of hazardous air pollutants.

However, lower pollutant-specific "major source" permitting thresholds apply in nonattainment areas. For example, the Title V permitting threshold for an "extreme" O_3 nonattainment area is 10 tpy of potential VOC or NO_x emissions. The purpose of the permitting rule is to establish regulatory control over large, industrial-type activities and monitor their impact on air quality.

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

Greenhouse Gases

Greenhouse gases (GHGs) are gases that trap heat in the atmosphere. These emissions are generated by both natural processes and human activities. The accumulation of GHGs in the atmosphere helps regulate the earth's temperature and is believed to contribute to global climate change.

GHGs include water vapor, carbon dioxide (CO_2), methane, nitrous oxide, O_3, and several hydrocarbons and chlorofluorocarbons. Each GHG has an estimated global warming potential (GWP), which is a function of its atmospheric lifetime and its ability to absorb and radiate infrared energy emitted from the earth's surface. The GWP of a particular gas provides a relative basis for calculating its carbon dioxide equivalent (CO_2-e) or the amount of CO_2 equivalent to the emissions of that gas. CO_2 has a GWP of 1, and is, therefore, the standard by which all other GHGs are measured.

According to the CEQ *Draft NEPA Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions* memorandum dated February 18, 2010, CEQ advises Federal agencies to consider, in scoping their NEPA analysis, whether analysis of the direct and indirect GHG emissions from their proposed actions may provide meaningful information to decision makers and the public. If a proposed action would be reasonably anticipated to cause direct emissions of 25,000 metric tons or more of CO_2-e GHG emissions on an annual basis, agencies should consider this an indicator that a quantitative and qualitative assessment may be meaningful to decision makers and the public. CEQ does not propose this as an indicator of a threshold of significant effects, but rather as an indicator of a minimum level of GHG emission that may warrant some description in the appropriate NEPA analysis for agency actions involving direct emissions of GHGs. CEQ also notes this indicator serves as a minimum standard for reporting emissions under the CAA. GHG emissions as a result of the Proposed Action are discussed further in Section 4.2.2.

3.2.2 Existing Conditions

Regional Climate

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

Regional Air Quality

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

On-Base

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

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

Air quality is typically good in the vicinity of WPAFB, and is generally affected only locally by military and civilian vehicle emissions, particulate pollution from vehicle traffic, emissions from wastewater treatment plants, industrial sources, and construction activities. Mobile sources, such as vehicle and aircraft emissions, are generally not regulated and are not covered under existing stationary source permitting requirements. Stationary emissions sources at WPAFB include natural gas and coal-fired

boilers; research and development sources, such as laboratory fume hoods and test cells; paint spray booths; refueling operations; and emergency power generators.

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

Off-Base

The area surrounding WPAFB is also located in the Metropolitan Dayton Intrastate AQCR. Ambient air quality standards and air quality are similar to on-Base air quality standards, as discussed above.

3.3 Noise

3.3.1 Definition of the Resource

Noise is defined as any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, or is otherwise annoying. Human response to noise varies according to the source type, characteristics of the noise source, distance between source and receptor, receptor sensitivity, and time of day. Sound is measured with instruments that record instantaneous sound levels in decibels (dB). Decibels are used to characterize sound levels that can be sensed by the human ear. "A-weighted" decibels (dBA) incorporate an adjustment of the frequency content of a noise event to represent the way in which the average human ear responds to the noise event. All sound levels analyzed in this EIS are A-weighted.

Day-Night Average A-Weighted Sound Level

The day-night average (DNL) noise metric incorporates a "penalty" for nighttime noise events to account for increased annoyance. DNL is the energy-averaged sound level measured over a 24-hour period, with a 10 dB penalty assigned (added) to noise events occurring between 10:00 p.m. and 7:00 a.m. DNL is the preferred noise metric of the U.S. Department of Housing and Urban Development (HUD), Federal Aviation Administration (FAA), USEPA, and DoD for modeling aircraft noise in airport environs.

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

Noise Criteria and Regulations

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

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

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

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

ODOT noise screening criteria states that potential noise impacts occur if a project results in a substantial increase in traffic noise levels, defined as an increase of 10 dBA or more, or when traffic noise levels generated by the transportation facility reach 60 dBA. Under NEPA, noise impacts and measures to mitigate adverse impacts must be identified, including the identification of impacts for which no or only partial noise abatement is possible. Under the FHWA traffic noise abatement requirements, traffic noise impacts must be considered for abatement when the predicted noise levels would "approach or exceed" the agency's noise abatement criteria (NAC) or when the predicted noise levels would substantially exceed existing noise levels and it is both reasonable and feasible to provide noise abatement (USDOT 2011). **Table 3-2** presents the FHWA NAC.

Table 3-2. FHWA Noise Abatement Criteria – Hourly A-Weighted Sound Level dBA[1]

Activity Category	Activity Criteria[2] Leq(h)	Activity Criteria[2] L10(h)	Evaluation Location	Activity Description
A	57	60	Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B[3]	67	70	Exterior	Residential
C[3]	67	70	Exterior	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites (publicly owned parks, recreation areas, etc.), schools, television studios, trails, and trail crossings.
D	52	55	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E[3]	72	75	Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D or F.
F	-	-	-	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing.
G	-	-	-	Undeveloped lands that are not permitted.

Source: USDOT 2011

Notes: dBA = A-weighted decibel; Leq(h) = one-hour energy equivalent sound level; L10(h) = sound level that is exceeded 10% of the time; 1 = either Leq(h) or L10(h) but not both may be used on a project; 2 = the Leq(h) and L10(h) Activity Criteria values are for impact determination only and are not design standards for noise abatement measures; 3 = includes undeveloped lands permitted for this activity category.

Response to Noise Events

Noise can cause a person to be irritated or annoyed. Noise annoyance is defined by USEPA as any negative subjective reaction to noise by an individual or group. DNL is an accepted unit for quantifying annoyance to humans by general environmental noise, including aircraft noise. **Table 3-3** describes the percentage of people who were "highly annoyed" when exposed to various levels of noise measured in DNL. The data shown provides a perspective on the level of annoyance that might be anticipated. For example, 15 to 25 percent of persons exposed on a long-term basis to DNL of 65 to 69 dBA are expected to be highly annoyed by noise events.

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

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

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

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

3.3.2 Existing Conditions

On-Base Noise Sources – Aircraft Noise

Aircraft traffic is the primary source of noise generated by the Base that would potentially affect off-Base noise sensitive land uses. WPAFB airfield is located as close as 0.5 miles northwest of the study area and is expected to contribute noise spikes at noise sensitive land uses when aircraft take-off and land at the Base. The sound exposure level (SEL) measurement describes a noise event, such as an aircraft overflight, comprising a period of time when an aircraft is approaching a receptor and noise levels are increasing, the instant when the aircraft is closest to the receptor and the maximum noise level is experienced, and the period of time when the aircraft moves away from the receptor resulting in decreased noise levels. SEL is a measure that accounts for both loudness and duration of a noise event.

The SEL metric relates to a single event, which is useful when calculating noise effects of aircraft flyovers. Frequency, magnitude, and duration vary according to aircraft type, engine type, and power setting. Therefore, individual aircraft noise data are collected for various types of aircraft and engines at different power settings at various phases of flight. These values form the basis for the individual-event noise descriptors at any location, and are adjusted to the location by applying appropriate corrections for temperature, humidity, altitude, and variations from standard aircraft operating profiles and power settings. **Table 3-4** provides SEL values at various altitudes for aircraft operating directly over head at various speeds and power settings depending on aircraft type (values in the table represent averages) (WPAFB 2011a).

Table 3-4. SEL dB Values for Aircraft Operating in the Vicinity of WPAFB

Altitude (feet AGL)	C-5 [1]	C-17 [1]	KC-135R [1]	F-16C [1]
200	118.5	107.6	102.3	100.9
500	111.7	100.2	95.9	94.4
1,000	105.8	93.4	90.8	89.0
2,000	98.9	85.1	85.1	82.9
3,150	93.4	79.1	80.8	78.4
5,000	86.5	73.0	76.0	73.3

Notes: 1 = Day based on steady, level flight and using Omega 10.9 aircraft profile data from actual overflight noise measurements. Omega 10.9 is a standalone DoD noise-modeling program that allows the user to retrieve data from the NOISEMAP database. AGL = above ground level.

The 1995 AICUZ Study for WPAFB (WPAFB 1995a), as part of the DoD program that identifies compatible use zones for air installations, established that no noise-sensitive receptors were identified in the compatible use zones in the vicinity of WPAFB. In addition, WPAFB has initiated a project to transition their aircraft fleet from the existing C-5 aircraft to the quieter C-17 (WPAFB 2011a). This transition is expected to be combined with a reduction in total airfield operations compared to the maximum operational scenario for WPAFB.

Off-Base Noise Sources – Traffic Noise

Traffic is the primary noise generator in the off-Base area. SR 444 is currently the preferred route when travelling to the existing Base gates from the northeast or southwest, and also serves local traffic to and from the Broad Street retail area. Lesser levels of traffic currently utilize the proposed redirected route resulting from the closure of SR 444, which provides access to Kauffman and Central Avenue retail and service establishments, Central Park, the Fairborn YMCA, and the adjacent residential neighborhoods.

An active Norfolk Southern railroad line travels parallel to Kauffman Avenue through the project area and is expected to contribute to noise levels in the area. This contribution would be expected to be reflected in the noise screening measurements. According to ODOT, traffic along this line is projected to increase significantly over the next decade.

A Traffic Noise Screening Report was prepared as part of this EIS. The purpose of the traffic noise screening was to document existing and future potential traffic noise conditions along roadways potentially impacted by the Proposed Action. **Figure 3-3** presents the off-Base noise receptor locations studied as part of this EIS. Results of the Traffic Noise Screening Report are discussed in Section 4.3.2 with the report presented in **Appendix C**.

3.4 Geology and Soils

3.4.1 Definition of the Resource

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

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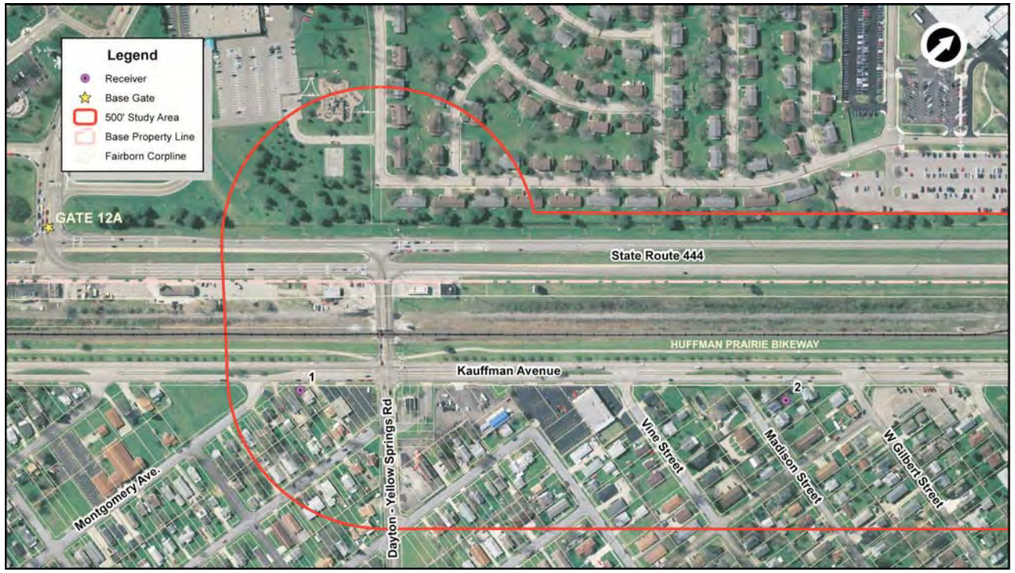

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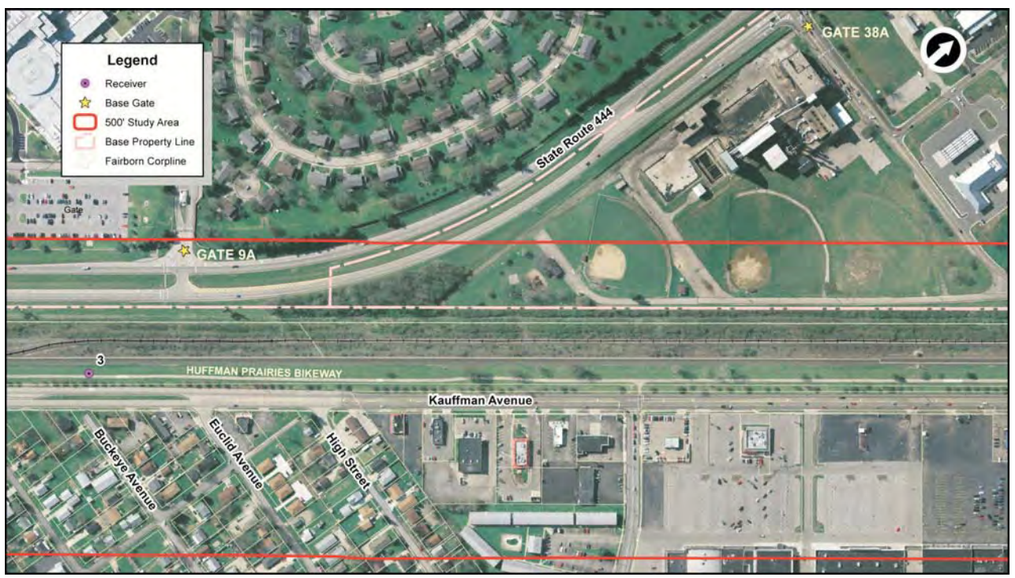

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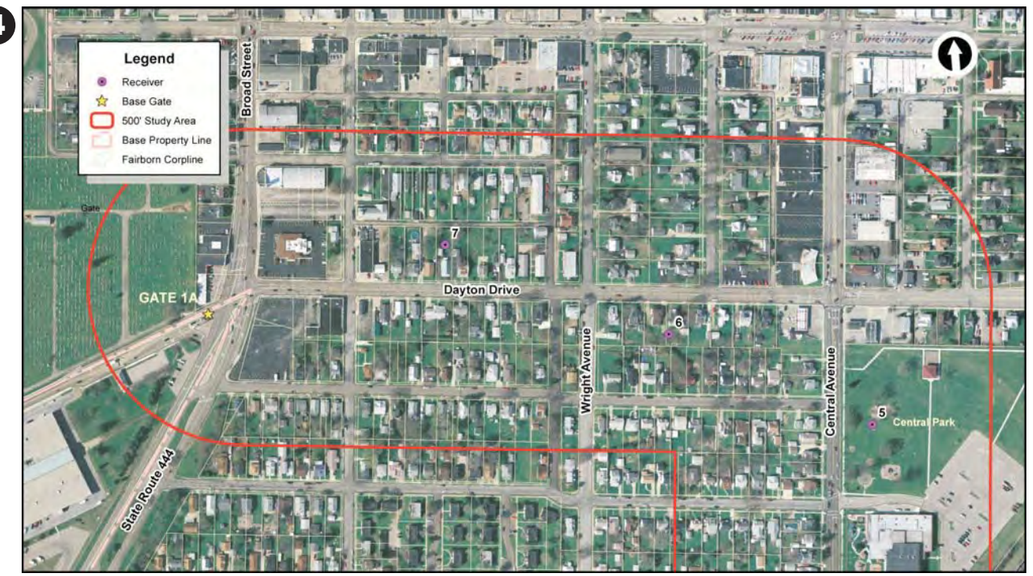
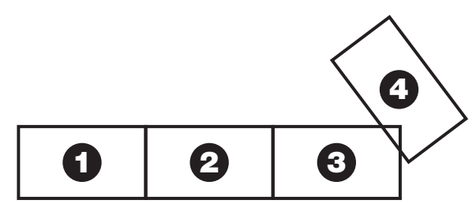




WRIGHT-PATTERSON AIR FORCE BASE, OHIO

Figure 3-3
Off-Base Sensitive Noise Receptor Locations

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

Soils are the unconsolidated materials overlying bedrock or other parent material. Soils typically are described in terms of their complex type, slope, and physical characteristics. Differences among soil types in terms of their structure, elasticity, strength, shrink-swell potential, and erosion potential affect their abilities to support certain applications or uses. In appropriate cases, soils properties must be examined for their compatibility with particular construction activities or types of land use.

3.4.2 Existing Conditions

On-Base

Topography and Geology

The topography of Area A is flat with some portions located within the 100-year floodplain of the Mad River. The highest elevations on the Base are in Area B and occur along a bedrock ridge that extends from the southeast corner of Area B to the Wright Memorial. The majority of the Base is on the broad alluvial plain of the Mad River Valley, which overlies Ordovician-age Richmond shale and limestone bedrock (WPAFB 2001). The land surface elevation on Base ranges from approximately 760 to 980 ft above mean sea level (MSL) (WPAFB 2001).

WPAFB is within the glaciated till plain region of southwestern Ohio, an area within the Central Lowlands Physiographic Province. The Central Lowlands province is characterized by low rolling hills, level plains, and flat alluvial valleys (WPAFB 2007a).

Natural Hazards

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

Soils

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

According to the NRCS, the soil survey for Greene County, Ohio indicated that the soils in the project area are of the Miamian, Westland, and Warsaw Series (USDA 1978). Miamian Series soils (MrB and MrC) are described as gently to moderately sloping soils that formed in glacial till. These soils are well drained and have a surface layer of brown silty clay loam with a moderate amount of organic matter over an underlying layer of brown loam. These soils, which occur within Gate 1A and 15A project areas, exhibit moderately low permeability and are well-drained.

Westland-Urban land complex soils (Wt) are nearly level, very poorly drained soils. The surface layer is a silty clay loam and has a high content of organic matter. This soil is hydric and is present in the northern tip of the Gate 15A project area, in the area north of the Hebble Road and Skeel Avenue intersection.

Warsaw Series soils (WbA, WcA) are described as nearly level, well drained soils. The surface layer is loam with a moderate content of organic matter. These soils are not hydric. These soils are located in the Gate 26A, Skeel Avenue, Wright Avenue, and Schuster Avenue project areas and at the northern tip of the Gate 1A project area.

Off-Base

Topography and Geology

Off-Base topography and geology is similar to on-Base. The off-Base areas are generally flat and occur on the broad alluvial plain of the Mad River Valley, which overlies Ordovician-age Richmond shale and limestone bedrock. Land surface elevation ranges from approximately 760 to 980 ft above MSL.

The project areas are located within the glaciated till plain region of southwestern Ohio, an area within the Central Lowlands Physiographic Province. The Central Lowlands province is characterized by low rolling hills, level plains, and flat alluvial valleys.

Natural Hazards

Off-Base natural hazards are similar to those found on-Base as described above.

Soils

Off-Base surface soils are similar to those found on-Base, which formed on unconsolidated deposits, primarily alluvium, glacial outwash, glacial till, and loess. According to the NRCS, the soil survey for Greene County, Ohio indicated that the soils in the off-Base project areas are of the Warsaw and Miamian Series (USDA 1978). Soils along SR 235 near Gate 26A and soils north of the Kittyhawk Center consist of the Warsaw Series (WbA) and are described as nearly level, well drained soils that formed in loamy glacial outwash over sand and gravel. These soils are on terraces along major streams and their larger tributaries. Soils in the area of Kauffman Avenue consist of the Miamian-Urban land complex (MrB) and are described as nearly level, well drained soils. The surface layer is loam with a moderate content of organic matter. None of these soils are defined as hydric soils for Greene County.

3.5 Water Resources

3.5.1 Definition of the Resource

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

Groundwater

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

Surface Water

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

Discharges of stormwater from construction activities are regulated by the OEPA under the National Pollutant Discharge Elimination System (NPDES). Under the OEPA General Permit for Discharges from Construction Activities, a notice of intent (NOI) to use the general permit must be submitted for any construction activities that involve land disturbance over 1 acre. OEPA's permit also requires the preparation and implementation of a site specific stormwater pollution prevention plan, which specifies the sediment and erosion control methods to be utilized. WPAFB also includes erosion control

requirements in all construction contracts on the installation as part of its municipal stormwater permit and overall stormwater management responsibilities.

Floodplains

Floodplains are areas of low-level ground present along rivers, stream channels, or coastal waters. Such lands might be subject to periodic or infrequent inundation due to rain or melting snow. Flood potential is evaluated by the Federal Emergency Management Agency (FEMA), which defines the 100-year floodplain. The 100-year floodplain is the area that has a 1 percent chance of inundation by a flood event in a given year.

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

In addition, all floodplain related construction activities must be coordinated with the MCD for approval. The MCD, through the *Land Use Agreement* (dated January 7, 2000) and the *Policy and Procedure for Permits in Retarding Basins*, regulates all construction on land within the Huffman Dam Retardation Basin and more than 5 ft below the spillway elevation of 835 ft above MSL.

3.5.2 Existing Conditions

On-Base

Groundwater

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

Groundwater can also be found in large volumes in the Silurian-age (415 to 465 million years ago) limestone and dolomite bedrock underneath the buried valley aquifer system. Private wells and smaller

public systems typically use this bedrock aquifer because, though not as productive as the buried aquifer, it is adequate for such uses (MCD 2002). Underneath the limestone and dolomite bedrock is Ordovician-age (465 to 510 million years ago) bedrock shale and limestones of the Richmond Group. The lower bedrock aquifer system generally produces less than 5 gallons per minute (gpm) and is only productive enough for livestock use.

The buried valley aquifers coincide with the present Great Miami River and its tributaries. Water underground generally follows the same flows as surface waters with upland areas serving as recharge areas and groundwater divides (MCD 2002). At WPAFB, the Mad River flows the course of the Mad River Buried Aquifer, part of the Miami Valley Buried Aquifer system. South of Huffman Dam (a flood control dam that is managed by the MCD), a till zone divides the Mad River Buried Aquifer into an upper water table unit and a lower confined unit.

However, north of the dam and other parts of the buried valley aquifer, till zones occur less frequently as discontinuous, less-permeable zones within the more permeable outwash deposits (WPAFB 1995b). Vertical hydraulic gradients vary throughout the area, and both upward and downward gradients have been recorded in nested monitoring wells at WPAFB. Most of the wells in the outwash deposits yield between 750 and 1,500 gallons per minute (gpm), but can vary from less than 200 to more than 4,000 gpm (WPAFB 1995b). The City of Dayton groundwater production wells at Huffman Dam are screened at depths of over 100 ft below ground surface. Groundwater at WPAFB is typically hard due to the limestone and dolomite bedrock (Debrewer et al. 2000).

Surface Water

WPAFB is in the Mad River Valley. The Mad River originates approximately 40 miles north of Springfield, Ohio, and flows south and southwest past WPAFB to its confluence with the Great Miami River in Dayton, Ohio. The Great Miami River flows into the Ohio River, which flows into the Mississippi River. Sustained flow of the Mad River originates from groundwater discharge of glacial deposits upstream of Huffman Dam.

The Mad River approaches WPAFB from the north and flows along the northern border of Area B in the vicinity of Gate 1B. OEPA has divided the Mad River watershed into five areas: the headwaters; Mad River between Kings and Chapman Creeks; Buck Creek; Mad River from Chapman to Mud Creeks; and the lower Mad River (Mud Creek to the Great Miami River). Mud Creek enters the Mad River 2,000 ft due north of the SR 235 bridge, near the northern portion of Area A. WPAFB lies adjacent to the northernmost portion of the lower Mad River segment.

OEPA has determined that segments of the Mad River watershed do not support designated aquatic life uses for Warmwater Habitat, Modified Warmwater Habitat, Coldwater Habitat, or the Primary Contact Recreational use (OEPA 2009). Specifically, OEPA has identified the lower segment of the Mad River,

adjacent to WPAFB, as an impaired water under Section 303(d) of the Clean Water Act (CWA) for not meeting aquatic life and recreation use standards (OEPA 2010).

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

Located within the Mad River watershed, an unnamed tributary of Hebble Creek and multiple open and concrete lined roadside ditches are present within the Gate 15A project area. Hebble Creek flows along Skeel Avenue and then west across Area C into the Mad River. An unnamed tributary of Hebble Creek flows through a portion of the Gate 15A project area, west of Skeel Avenue, just north of Communications Boulevard. These streams would be expected to meet the U.S. Army Corps of Engineers (USACE) and USEPA criteria as “waters of the United States” as they appear to be relatively permanent waters that ultimately flow into a navigable water of the United States. The open and concrete-lined drainage channels near the ramps to SR 444 in the Gate 15A project area are likely not regulated as “waters of the United States.”

The headwaters of Hebble Creek are located within the Gate 1A project area. The stream appears to be culverted in sections through Area A and then flows overland south of Skeel Avenue. As discussed previously, Hebble Creek ultimately flows into the Mad River and would be expected to meet the USACE and USEPA criteria as a “water of the United States.”

There are several recreational lakes in Area A of WPAFB. The largest is Bass Lake located in the northeastern corner of Area A. The Twin Lakes Recreational Area, comprised of East Twin Lake, West Twin Lake, and Gravel Lake, is located in the southwest corner of Area A (WPAFB 1999). Trout and Hebble creeks are minor surface water features located in Area A. These creeks flow in a general westward direction into the Mad River. Mud Run is another small surface water feature joining the Mad River along the Base’s northern border. Of these, the Mad River is the nearest body of water, which is located north of Area B.

The WPAFB Storm Water Management Plan (SWMP) and the Storm Water Pollution Prevention Plan (SWPPP) (prepared to comply with the CWA and the Ohio Water Pollution Control Act) provides detailed descriptions of storm drainage areas and their associated outfalls, potential storm water pollution sources, and material management approaches to reduce potential storm water contamination (WPAFB 2007b). The SWPPP was last updated in September 2011 while the SWMP was last updated in April

2011. An OEPA industrial permit (NPDES 1IO00001) and a municipal NPDES General permit (OHQ000002) cover the WPAFB storm water program (WPAFB 2011b).

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

WPAFB's NPDES permit was last modified in January 2011 and expires in September 2014. There are 20 defined drainage or "Outfall Areas" on Base (WPAFB 2011b). Outfall Areas in Area A drain west and north toward the Mad River, just north of Springfield Pike (WPAFB 2007b). There are 23 NPDES discharge monitoring points on Base that are addressed under the NPDES permit. **Table 3-5** provides specific information about monitoring points 7 and 21, which primarily receive stormwater runoff from areas near Gates 1A and 15A and are currently monitored under the NPDES permit. Monitoring point 6 is no longer monitored as there it exists in a non-industrial area. There are no monitoring points in the area of proposed Gate 26A. Under the NPDES permit, these outfalls are monitored for general activities and coal-fired heating plant potential sources of pH, total suspended solids, oil and grease, nickel, zinc, and copper. The outfalls currently monitored that drain Area A are shown in **Figure 3-4**.

Table 3-5. Drainage Areas in Area A Monitored Under NPDES Permit

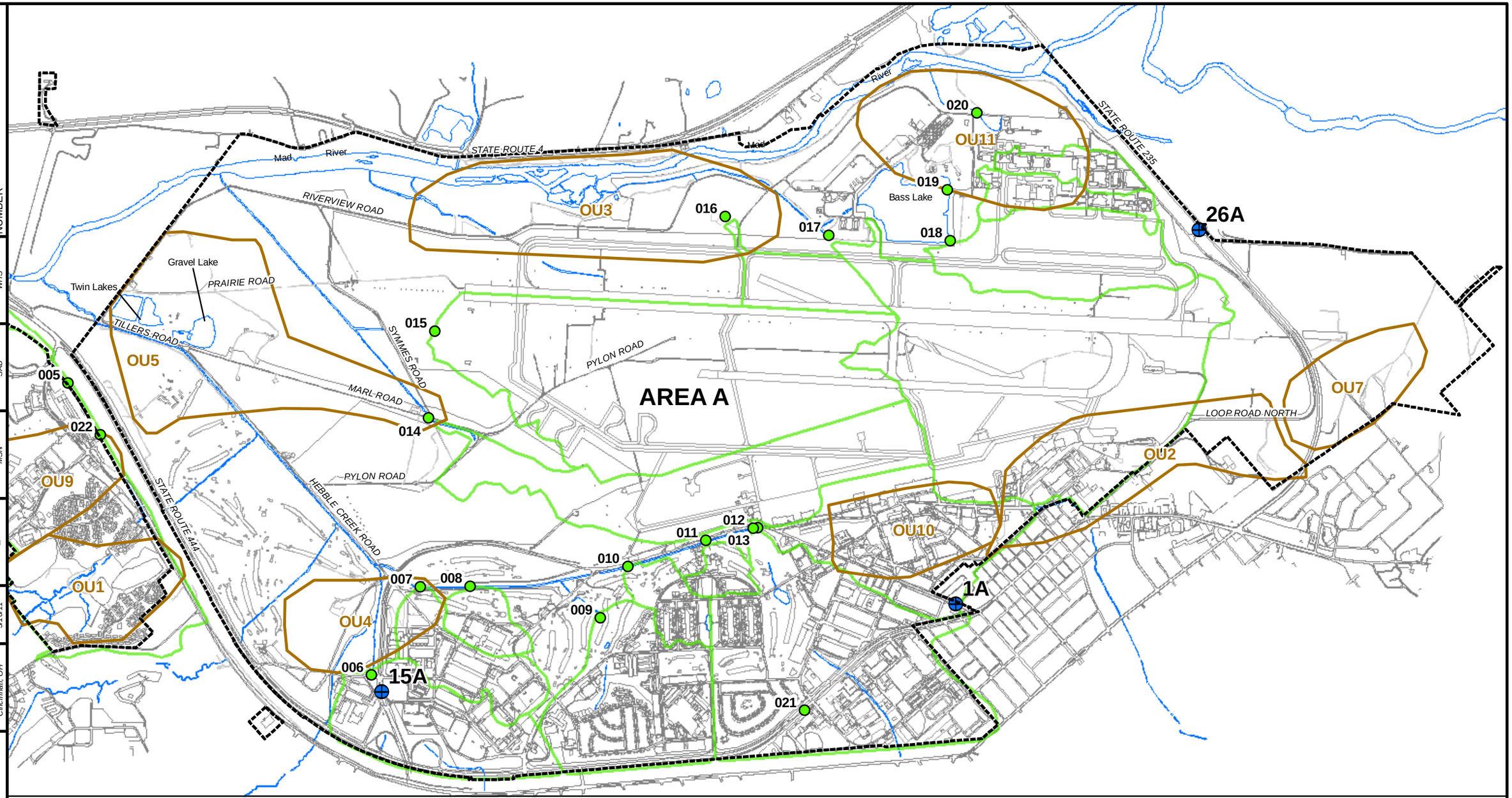
Drainage Basin Number [1]	Description
6	Drainage is generally to the north with runoff from the area discharging to Hebble Creek, near the intersection of Hebble Creek Road and Skeel Avenue.
7	Outfall Area 7 encompasses 76 acres of the west central portion of Area A and includes the Civil Engineering pavement and grounds operations and the Air Force Materiel Command Headquarters (Buildings 10262 and 10266). Storm water runoff and condensate but prior to discharge to Hebble Creek via a storm water pipe. Hebble Creek receives the storm water discharge from this outfall area just south of the intersection of Hebble Creek Road and Skeel Avenue.
21	Final effluent from coal pile runoff treatment facility (Building 31240) but prior to discharge to unnamed tributaries of Hebble Creek.

Source: WPAFB 2007b
Notes: 1 = Drainage basin number corresponds to NPDES monitoring points indicated on Figure 3-4.

Floodplains

A large portion of WPAFB lies within the Mad River floodplain. The 10-year floodplain is at 804.7 ft above MSL, and the 100-year floodplain is at 814.3 ft above MSL. The Gate 15A project area is located within the designated 100-year floodplain. Gates 1A and 26A are located outside of the floodplain.

Approval from MCD would be required for any fill placement below the Huffman Dam spillway elevation of 835 MSL.



DRAWING NUMBER	APPROVED BY	CHECKED BY	DRAWN BY	DESIGNED BY	DATE	OFFICE
140401.0801-04.mxd	WHS	SAB	MSN	-	5/16/11	Cincinnati, OH

Map Document: (C:\CAD-GIS\Acad 2011\140401.0801\140401.0801-04.mxd)
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Legend

- Installation Area
- Gate Locations
- Storm Sewer NPDES Monitoring Points
- Operable Unit Areas
- Storm Sewer NPDES Area

Source: Base Map, Storm Sewer NPDES Points, Operable Units, and Storm Sewer NPDES Area data from WPAFB.

N

0 1,000 2,000 4,000 Feet

WRIGHT-PATTERSON AIR FORCE BASE, OHIO

Figure 3-4
Environmental Restoration Program Sites and NPDES Monitoring Points at WPAFB

Off-Base

Groundwater

Off-Base groundwater is similar to that as described above for on-Base. In addition, there are two City of Fairborn backup well fields (North Well Field and Central Park Well) that are in close proximity to the proposed project areas. The North Well Field, located at Fairfield Park (also known as Jack Stewart Field), is located approximately 500 ft adjacent and southwest of the proposed Gate 26A location (**Figure 2-7**). This well field was developed over a period of time from the 1930s to 1960s and has four low yield wells with a total capacity of 1,850 gpm. There were past issues of VOC detections that were below the OEPA maximum contaminant levels (MCLs) but recent testing has shown no detectable VOC contamination. This reduction may be due to a combination of reduced pumpage of the well field combined with groundwater remediation efforts at WPAFB.

The Central Park Well is located in Central Park, which is located adjacent and east of the off-Base boundary along S. Central Avenue. This well was developed in the 1970s and is a single low yield (500 gpm) well with a history of low-level nitrate detection that was below the OEPA MCLs and was most likely attributable to lawn treatment at the park.

The OEPA requires the city to maintain both backup well fields and accounts for less than 1 percent of the city's annual water usage (Fairborn 2011). Water from these wells do not receive treatment other than on-site chlorination.

Surface Water

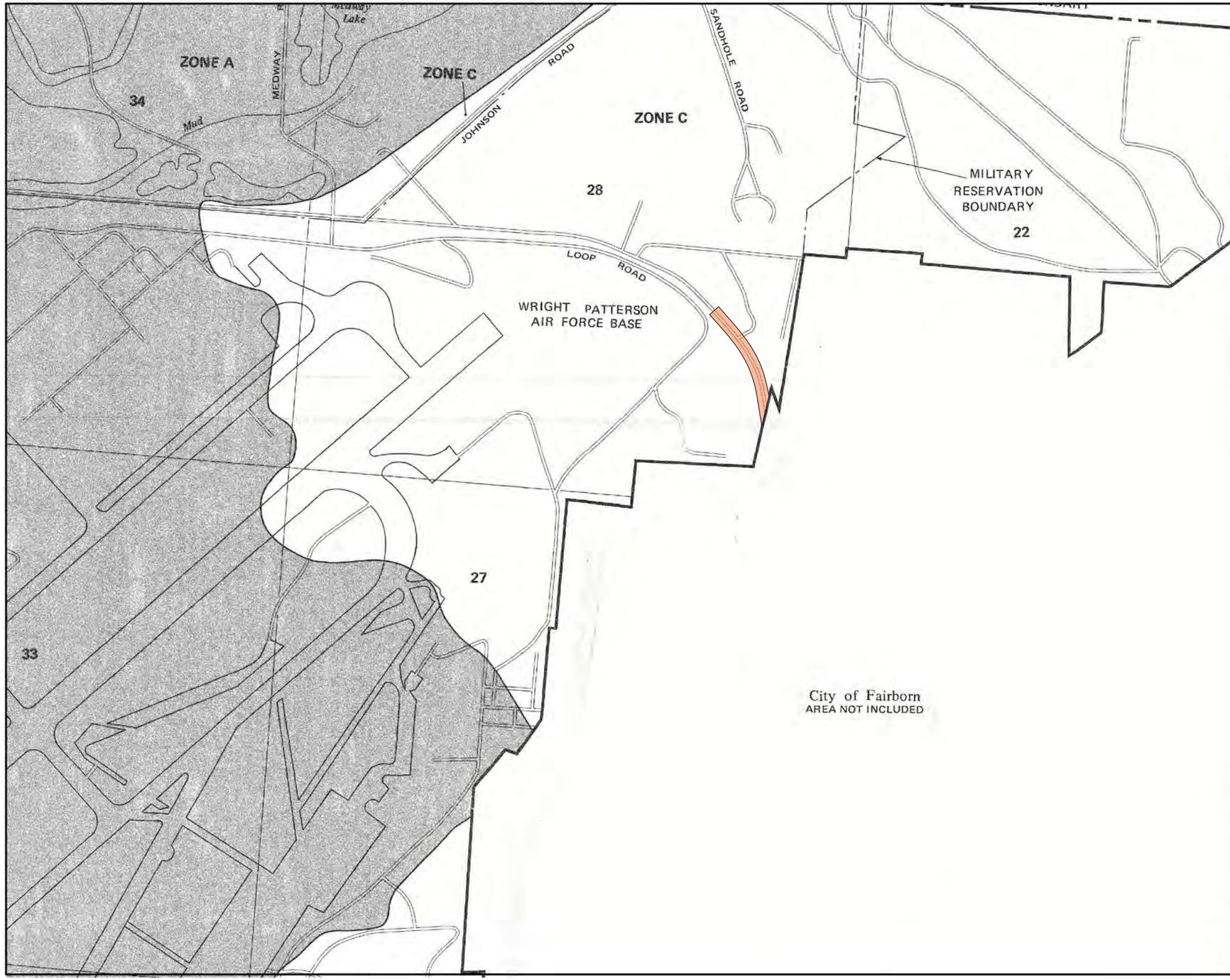
Off-Base surface water is similar to that as described above for on-Base; the Mad River Valley is nearest the off-Base project areas. The Mad River originates approximately 40 miles north of Springfield, Ohio, and flows in a south/southwest direction to its confluence with the Great Miami River in Dayton, Ohio. The Great Miami River flows into the Ohio River, which flows into the Mississippi River. Sustained flow of the Mad River originates from groundwater discharge of glacial deposits upstream of Huffman Dam.

Floodplains

A search for FEMA FIRMs was conducted using the FEMA online database for locations of off-Base areas within a FEMA-designated flood zone (FEMA 2011). The off-Base area along SR 235 is located within flood Zone C (**Figure 3-5a**). Flood Zone C is defined as an area of minimal flooding, but not located within the 100-year flood zone. An area along Kauffman Avenue is designated in Flood Zone A2, which is defined as an area within the 100-year flood zone (**Figure 3-5b**).

Areas surrounding Zone A2 consist of Zone B (areas between the limits of the 100-year flood and 500-year flood) and Zone C (area of minimal flooding).

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Cincinnati, OH	5/20/11	--	JIS	SB	BS	s-140401.0801-5/11-w



APPROXIMATE SCALE
1000 0 1000 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

COUNTY OF
GREENE,
OHIO
(UNINCORPORATED AREAS)

PANEL 5 OF 105
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
390193 0005 B

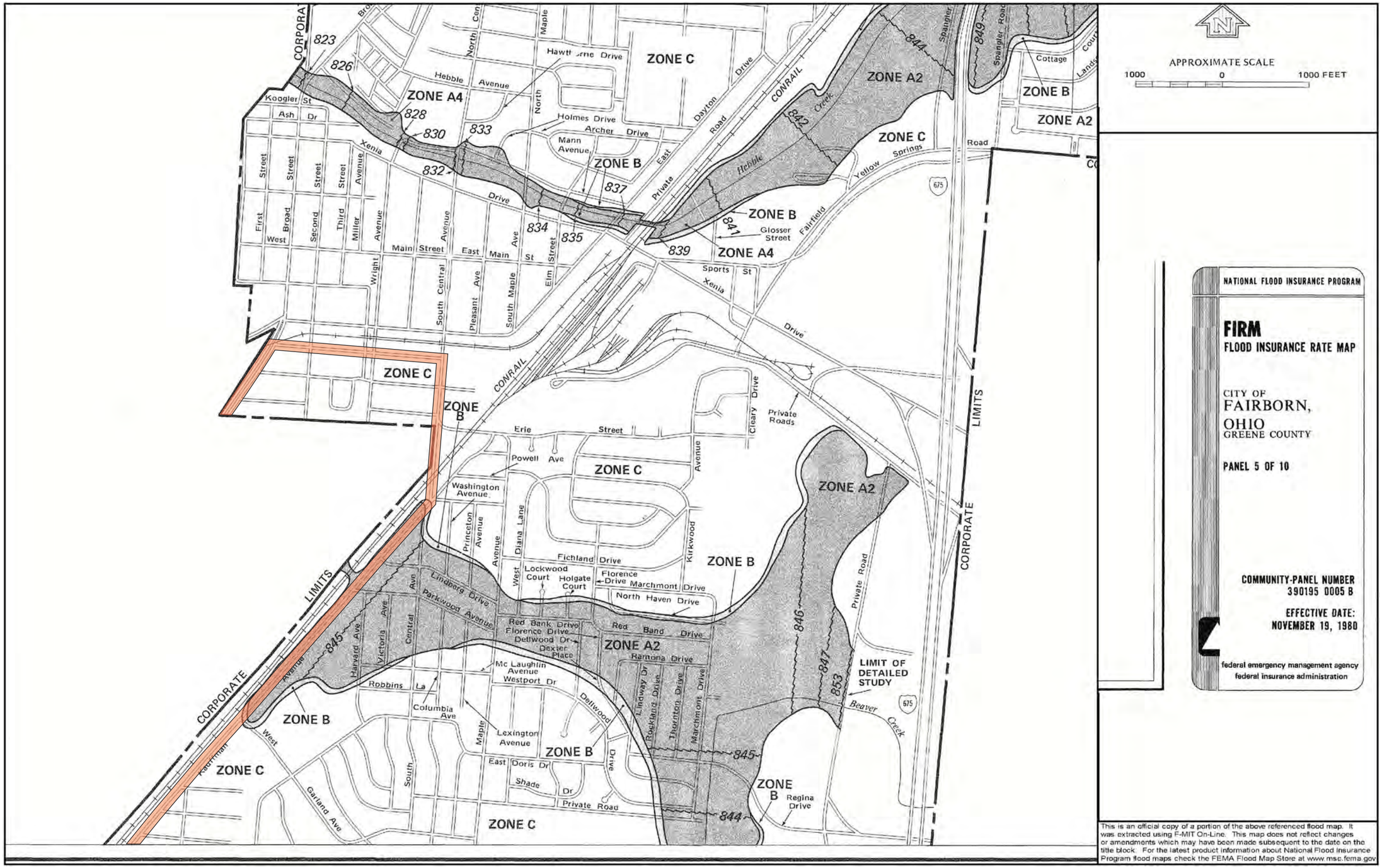
EFFECTIVE DATE:
APRIL 1, 1981

federal emergency management agency
federal insurance administration

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

WRIGHT-PATTERSON AIR FORCE BASE, OHIO

Figure 3-5a
Off-Base Area of Influence
Flood Zones - State Route 235



DRAWING NUMBER	APPROVED BY	CHECKED BY	DRAWN BY	DESIGNED BY	DATE	OFFICE
s-140401.0801-5/11-w	BS	SB	JIS	--	5/20/11	Cincinnati, OH

WRIGHT-PATTERSON AIR FORCE BASE, OHIO

Figure 3-5b
Off-Base Area of Influence
Flood Zones - Kauffman Avenue

3.6 Biological Resources

3.6.1 Definition of the Resource

Biological resources include native or naturalized plants and animals, and the habitats, such as wetlands, forests, and grasslands, in which they exist. Sensitive and protected biological resources include plant and animal species listed as threatened, endangered, or special status by the USFWS or a state.

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

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

Under the Endangered Species Act (ESA) (16 U.S.C. 1536), an "endangered species" is defined as any species in danger of extinction throughout all or a large portion of its range. A "threatened species" is defined as any species likely to become an endangered species in the foreseeable future. The USFWS also maintains a list of species considered to be candidates for possible listing under the ESA. Although candidate species receive no statutory protection under the ESA, the USFWS has attempted to advise government agencies, industry, and the public that these species are at risk and might warrant protection under the Act.

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

3.6.2 Existing Conditions

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

A biological survey was conducted for the proposed project area during March 2011 (Shaw 2011). The survey was conducted to support the NEPA process for the proposed project and information developed from the survey is used as a basis for describing existing conditions and evaluating potential impacts in this EIS. The USFWS, ODNR, MCD, and private persons were contacted as the basis for a comprehensive baseline study of those vegetation communities, wildlife, and wetlands present within the project area. The natural resources report prepared as part of this EIS is included in **Appendix D**.

Qualitative surveys and observations were conducted to assess current conditions and note any changes to previous knowledge. The field survey consisted of characterizing the existing vegetation, wildlife, streams, and wetlands, within or adjacent to the proposed project areas. This survey of natural resources followed guidance presented in the February 2010 ODOT, *Ecological Manual* (ODOT 2010).

During the survey, all plant communities, natural or otherwise, were identified, and dominant species were recorded. Surveys were conducted for the presence of suitable habitat for threatened and endangered species known from within, or in the vicinity of the proposed project areas based on the literature review including habitat for both Federal- and state-listed species.

A survey for potential wetlands was conducted following guidelines provided in the USACE, *Wetland Delineation Manual* (USACE 1987). A jurisdictional waters determination was performed in the field to determine if waterways that possessed a defined channel and streambed as defined by the ordinary high water mark were present in the proposed project areas. If present, these streams would be evaluated to determine whether the waterway qualified as a Primary Headwater Habitat (PHWH) stream, as defined by the OEPA or a non-headwater stream as defined by Rankin (Rankin 1989).

On-Base

Vegetation

WPAFB contains four general types of natural vegetative communities including forest, old fields, prairie, and wetlands. Areas that may be impacted by the Proposed Action are primarily disturbed areas. These include maintained areas that are frequently mowed such as right-of-ways, lawns, and recreational areas, and have been designated by the Base as turf and landscaped areas. There are occasional tree lines along small tributaries within the proposed project areas containing species common to the area. There is one small old field area within the Gate 15A proposed project area, just southwest of an unnamed tributary to Hebble Creek (Shaw 2011).

Wildlife

WPAFB is home to a variety of wildlife. Previously conducted surveys documented the presence of 23 mammals, 118 birds, 8 reptiles, and 6 amphibians on the Base (3D 1998, BHE 1999b, BHE 2005). The majority of the project area is located within disturbed areas on the Base and those species occurring in such areas are common species to the Base and surrounding area (Shaw 2011).

Threatened and Endangered Species

Endangered and threatened species on the Base are protected under the ESA. In addition, AFPD 32-70 and AFI 32-7064 require all USAF installations to protect species classified as federally or state endangered or threatened. The Endangered Species Management Plan (BHE 2001), which has been incorporated into the INRMP (WPAFB 2007a), provides species-specific protection and conservation measures to protect known special status species occurring on the Base. Protected wildlife species known to occur or known to have occurred on WPAFB include:

<u>Federally-Listed</u>

- Indiana bat (*Myotis sodalis*), endangered
- Eastern massasauga rattlesnake (*Sistrurus c. catenatus*), candidate species
- Clubshell (*Pleurobema clava*), endangered

<u>State-Listed</u>

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

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

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

occurring within open wetlands for winter hibernation with adjacent upland forests for foraging during the summer.

As part of this EIS, consultation with the ODNR was conducted to request National Heritage Program information for state- and federally-listed threatened and endangered plants and animals in the vicinity of the project areas. According to the ODNR Biodiversity Database, the following species were identified within a 1-mile radius of the proposed project areas (identified by gate vicinity). In addition, a 5-mile radius search of each project area was conducted for the Indiana bat. A copy of the ODNR letter and maps identifying noteworthy species are included in **Appendix A**.

<u>Gate 1A</u>

- *Bartramia longicauda* – Upland Sandpiper. This threatened species is identified as No. 3 and is located northwest of the Gate 1A project area.
- *Carex mesochorea* – Midland Sedge. This endangered species is identified as No. 4 and is located north of the Gate 1A project area.

<u>Gate 15A</u>

- Dayton Aviation Heritage National Historical Park – National Park Service. This national park is identified as letter 'A' and is located northwest of the Gate 15A project area.
- *Cistothorus platensis* – Sedge Wren (species of concern) and *Papaipema beeriana* – Beer's Noctuid (endangered). These species are identified as No. 5 and are located north of the Gate 15A project area.
- Indiana bat capture sites – Four capture sites have been identified west/northwest of the Gate 15A project area.

<u>Gate 26A</u>

- *Spiranthes magnicamporum* – Great Plains Ladies' tresses (potentially threatened) and *Agalinis auriculata* – Ear-leaved-foxglove (endangered). These species are identified as Nos. 1 and 2 and are located north of the Gate 26A project area.
- Indiana bat capture site – One capture site has been identified west/northwest of the Gate 26A project area.

The USFWS was also contacted as part of this EIS to request known presence or absence of Federal- and state-listed species that may be located within the project vicinity. The USFWS provided comments of known species in the vicinity of the project area in a letter dated October 20, 2011, noting migratory bird and endangered species and provided a letter of concurrence on October 28, 2011. Results of consultation with the USFWS are provided in **Appendix A**. In addition to the species noted above, clubshell, snuffbox, and rayed bean (freshwater mussels) were noted by the USFWS as federally listed species and species currently being considered for potential listing as federally endangered.

The clubshell is a federally listed endangered freshwater mussel occurring in 12 streams in Kentucky, Pennsylvania, Indiana, Ohio, Michigan, and West Virginia. Past surveys by 3D/International, Inc. (1998) and BHE Environmental (1999) documented clubshell subfossil remains at the confluence of Trout Creek

and the Mad River and near the confluence of Mud Run and the Mad River (WPAFB 2007a). No sightings of the clubshell have been reported within the project area.

The snuffbox (*Epioblasma triquetra*) occurs in swift current of riffles and shoals over gravel and sand with occasional cobble and boulders. The snuffbox is known to be present in the Stillwater and Little Miami River and drainages where preferred habitat exists. No sightings of the snuffbox have been reported within the project area.

The rayed bean (*Villosa fabalis*) is generally known to exist in small headwater creeks, but records exist indicating this species has been sited in larger rivers. The rayed bean is usually found in or near shoal or riffle areas, and in the shallow, wave-washed areas of lakes. Substrates typically include gravel and sand, and the rayed bean is often associated with, and buried under the roots of vegetation, including water willow and water milfoil. The rayed bean is known to exist in perennial streams in Greene and Montgomery Counties where preferred habitat exists. No sightings of the rayed bean have been reported within the project area.

Wetlands/Jurisdictional Waters

No wetlands occur within the on-Base portion of the proposed project areas. An unnamed tributary of Hebble Creek (Stream 1) and multiple open and concrete lined roadside ditch and small unnamed tributary to Hebble Creek are present within the Gate 15A proposed project area. The open and concrete-lined drainage channel (Stream 2) lies near the ramps to SR 444. Another unnamed tributary and headwater stream of Hebble Creek (Stream 3) is located within the Gate 1A proposed project area. **Figure 3-1** in **Appendix D** shows the approximate locations of Streams 1, 2, and 3. Identified streams are considered to be jurisdictional waters of the U.S. and were analyzed as PHWH Streams as designated by OEPA (Shaw 2011). All streams (unnamed tributaries) within the proposed and alternative project areas show minimal evidence of biological activity as might be expected in highly disturbed urban environments.

Off-Base

Vegetation

Vegetation within the off-Base area of influence is limited to previously disturbed vegetation along roadways and rights-of-way.

Wildlife

Similar to the wildlife community found in disturbed areas at WPAFB, and generally common to urban environments, the common urban wildlife can be found in adjacent off-Base areas.

Threatened and Endangered Species

There is no potential habitat for any federally- or state-listed species within the off-Base portion of the area of influence except for the midland sedge. While there is some potential habitat for the midland sedge, this species is quite similar to more common species like oval-leaf sedge (*C. cephalaphora*), both of which can occur in lawns, right-of-ways, and other open disturbed areas. So, while some potential habitat does exist, mowing schedules for these disturbed areas lessen the likelihood of fruiting and identifiable plants. Additionally, in July 2000, two bats were captured during a base-wide mist net survey and were fitted with radio transmitters. The bats were tracked to a small maternity colony in a dead tree within a woodlot on the campus of Wright State University and outside of the off-Base portion of the area of influence.

Wetlands/Jurisdictional Waters

No wetlands occur within the off-Base portion of the area of influence. Streams 2 and 3 are both culverted under Kauffman Avenue and continue off-Base and continue their flow outside the area of influence.

3.7 Cultural Resources

3.7.1 Definition of the Resource

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

Native American tribes may view cultural resources very broadly as the resources necessary for the survival and maintenance of their way of life. Ethnographic resources include plants and animals, ceremonial sites, tribal historic sites, and areas of sacred geography possessing mythic/spiritual significance.

Typically, cultural resources are subdivided into archaeological resources (prehistoric or historic sites where human activity has left physical evidence of that activity but no structures remain standing) or architectural resources (buildings or other structures or groups of structures, or designed landscapes that are of historic or aesthetic significance). Archaeological resources comprise areas where human activity has measurably altered the earth or deposits of physical remains are found (e.g., arrowheads and bottles). Archaeological evidence generally is considered to be at least 50 to 100 years in age. Specified or

effective thresholds vary across federal, state, and local laws, regulations, and guidance, but NHPA Section 106 process generally is implemented with a 50-year age cut-off.

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

The regulations implementing the NHPA (36 CFR Part 800) direct Federal agencies to consider their responsibilities under Section 106 of the NHPA as early as possible in the NEPA process, and to plan their public participation, analysis, and review in such a way that they can meet the purposes and requirements of both statutes in a timely and efficient manner. As discussed in Section 1.4.3, a 30-day scoping period was held from February 12, 2011 until March 18, 2011 to solicit public input on the proposed project. 36 CFR 800.2(d) (1) requires agency officials to "seek and consider the views of the public in a manner that reflects the nature and complexity of the undertaking and its effects on historic properties, the likely interest of the public in the effects on historic properties, confidentiality concerns of private individuals and businesses, and the relationship of the Federal involvement to the undertaking". Thus, public participation under NEPA was considered adequate for purposes of Section 106 for this EIS.

WPAFB is obliged to consider the effects of the proposed new activities on any historic properties. In doing so, WPAFB must first define the Area of Potential Effects (APE). According to 36 CFR § 800.16(d), the APE is defined as:

> *The geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The area of potential effects is influenced by the scale and nature of the undertaking and may be different for different kinds of effects cause by the undertaking.*

In accordance with Section 106 of the NHPA, determinations regarding the potential effects of an undertaking on historic properties are presented to the SHPO/Tribal Historic Preservation Office.

Archaeology is the study of past ways of life through analysis of surviving physical remains. Methods of archaeological investigations include a three phase approach to locate (Phase I), evaluate (Phase II), and treat (Phase III), significant archaeological resources or sites. This commonly used descriptive Phase approach is not specified in NHPA Section 106 regulations, but it is addressed in the State of Ohio's "Archaeological Guidelines" (OHPO 1994). The purpose of a Phase I survey is to identify and describe archaeological sites within the defined project area. A Phase II survey evaluation is used to determine the

significance of any archaeological site that will be impacted or potentially impacted by the proposed project and to make recommendations pertaining to eligibility for listing in the NRHP (OHPO 1994).

3.7.2 Existing Conditions

On-Base

WPAFB, in consultation with the SHPO, has determined that the APE for the on-Base portion of this project consists of the ECF locations and associated roadway improvements. These areas are shown on **Figure 2-9**. Area A of WPAFB contains multiple known prehistoric and historic archeological sites, some of which are potentially eligible for inclusion in the NRHP.

The Base also owns over 250 historic buildings, several that are individually eligible for inclusion on the NRHP and most of which are located in one of three NRHP-eligible historic districts. Area A also contains Huffman Prairie Flying Field, a National Historic Landmark and a unit of Dayton Aviation Heritage National Historical Park (WPAFB 2006a). The *Integrated Cultural Resources Management Plan* (ICRMP) for WPAFB (2011c), prepared in concurrence with the SHPO, indicates no properties listed in or eligible for the NRHP exist within the on-Base APE. The SHPO concurred (concurrence letter dated October 28, 2011, included in Appendix A) that inventory is sufficient relative to the present study.

No on-Base buildings or structures were identified as eligible for inclusion in the NRHP within the on-Base project areas based on a review of the ICRMP for WPAFB. Six previously recorded structures were identified within the off-Base APE for this project, as described below.

Off-Base

The off-Base APE was determined and selected based on potential changes in traffic flow as a result of the Proposed Action and includes properties that front the following roadways: Kauffman Avenue, South Central Avenue, West Dayton Drive, South Broad Street, residential areas off South Broad Street, and the Oakhill Avenue area (**Figure 3-1**). These roadways comprise the off-Base transportation corridor that would likely result from the Proposed Action. As a cooperating agency, the FHWA concurs with the off-Base APE.

Should the FHWA (a cooperating agency), ODOT (cooperating agency participation requested), or local government agencies eventually conduct new construction or other impacts beyond the presently defined off-Base APE, NHPA Section 106 consideration would be a separate undertaking coordinated by the appropriate lead Federal agency.

The off-Base APE as defined here reflects that beyond those limits (**Figure 3-1**) there are no reasonably foreseeable specific impact areas linked with borrow-pit type activities (for obtaining fill), off-site impacts for disposal of debris or fill, or other project-related impacts.

A *Phase I History/Architecture Survey and Archaeological Disturbance Study* was conducted for this EIS during March and April 2011 (HDC 2011). Properties within the APE were reviewed for above-ground resources, and an archaeological disturbance survey was completed to identify undisturbed areas that would need further archaeological study (**Appendix E**). The survey is published as a separate report and will be included in the WPAFB Administrative Record. In total, 113 buildings and structures within the off-Base APE (**Figure 3-1**) were evaluated in March - April 2011 for eligibility for the NRHP. Some of these buildings and structures had been evaluated prior to 2011 due to non-AF associated Section 106 studies. Based on the evaluation and prior evaluation information, it was recommended that none of the buildings within the APE were eligible for the listing in the NRHP due to lack of integrity and/or historical significance.

In addition to the above-ground resources, an archaeological disturbance study was conducted to evaluate the existing ground disturbance within the APE that may have the potential for intact archaeological deposits. During a field survey of the APE, the majority of the APE was found to be profoundly disturbed, with evidence of cutting, filling, paving, ditching, and berming. As a result of the archaeological disturbance study, no archaeological resources were identified within the APE.

During the 2011 field survey of the APE, two areas of potentially undisturbed soil were identified. However, indications of dark/discolored soils identified on an historical aerial photograph dismissed one of these areas as being most likely disturbed by cutting and filling. A Phase I archaeological survey was conducted of the remaining potentially undisturbed portions of an area referenced as Area E, located along the east side of South Central Street within a community park named Central Park. Archival research suggested that this area was vacant or agricultural land historically and was developed into a park in the 1920s.

The Central Park area was investigated by excavating 14 shovel test units (STU) at 50-foot intervals. Three of the STU locations showed disturbance below the sod layer and were not fully excavated. Complete excavations of the remaining 11 STUs were conducted. While Area E was determined to be largely intact, no cultural resources were found from the Phase I archaeology survey. No further archaeological work was recommended for the APE.

No Traditional Cultural Properties (TCPs), as defined by 32 CFR 800.16, were found in the APE. The USAF contacted Native American tribal leaders from the following tribes via a letter dated July 21, 2011 (see **Appendix A**) to request comments regarding the Proposed Action: Keweenaw Bay Indian Community, Sac and Fox of the Mississippi in Iowa, Saginaw Chippewa Indian Tribe, and the United Keetoowah Band of Cherokee Indians in Oklahoma. In general, sites containing rock art, midden deposits, or areas that would potentially be traditional collecting or spiritual areas can be considered sensitive. TCPs can be extremely difficult to identify and can include locations where a community has traditionally carried out economic, artistic, or other cultural practices important in maintaining its identity.

Tribal leaders from the United Keetoowah Band of Cherokee Indians in Oklahoma, the Keweenaw Bay Indian Community, and the Sac and Fox of the Mississippi in Iowa, responded to having no objection to the project and/or no properties of interest regarding religious or cultural sites being documented within the project areas. Correspondence from these Native American tribes is presented in **Appendix A**.

In summary, the off-Base area does not contain any buildings, structures, or landscapes listed or determined eligible for the NRHP. The off-Base area also does not contain any previously documented or newly identified archaeological sites. The SHPO concurred with the findings and recommendations of this study on October 28, 2011 (letter included in **Appendix A**).

3.8 Socioeconomics

3.8.1 Definition of the Resource

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

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

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

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

socioeconomic impact analysis study was conducted. The report is presented in **Appendix F** and is discussed below.

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

3.8.2 Existing Conditions

On-Base

Population – WPAFB is the largest base in the Air Force with over 27,000 personnel serving in 116 different units. Military personnel at WPAFB serving in the Air Force, Air National Guard/Reserves, Navy, Army, and Coast Guard account for approximately 8,500 persons. Civilian personnel at WPAFB serving in roles such as contract civilians and private businesses account for approximately 18,800 persons (WPAFB 2009).

Employment – WPAFB provides a major source of employment in the five-county area. In addition, WPAFB awards numerous contracts every year to local businesses. For fiscal year (FY) 09, the total number of jobs provided by WPAFB was 27,406 (WPAFB 2009). This number includes military active duty, trainees and reservists, DoD civilians, and other civilians, such as contractors. The number of indirect jobs supported by the Base, such as restaurants, dry cleaners, and others is estimated at 33,090. The total economic impact to the local Dayton community was $5.1 billion.

Education – The Fairborn school district provides public education services for school-age children of parents employed at WPAFB.

Community Resources and Services – WPAFB offers numerous community resources such as a bank, bakery-deli, flowers, ice cream, barber/beauty shop, laundry/dry cleaning facility, all of which are located within the commissary at the Kittyhawk Center. The USAF Medical Center at WPAFB services primary deployment platforms and contains a teaching hospital. In addition to these resources, recreational facilities such as the Aero Club, a bowling alley, an arts/crafts center, golf courses, recreational lakes, and sports/fitness complexes exist at WPAFB (WPAFB 2009).

Off-Base

Population – WPAFB is located 10 miles outside of Dayton, Ohio. The city of Dayton has a population of 155,781 and the Dayton-Springfield, Ohio Metropolitan Statistical Area (MSA) has a population of 839,359 (Bureau of Census American Community Survey 2005-2009). An MSA is defined by the U.S. Census Bureau as a core area with a large population nucleus (at least 50,000) and the adjoining communities that have a high degree of economic and social integration within that core (Bureau of Census 2000b).

The Dayton-Springfield MSA includes the counties of Greene, Montgomery, Miami, and Clark. For the purposes of documenting the overall impacts of the Proposed Action on the region, the MSA is considered the region of influence (ROI) around WPAFB (Bureau of Census 2000a). The current project would have specific, localized impacts on areas directly impacted by the redirection of SR 444 traffic necessary to accommodate the increase in Base security afforded by the closure of a portion of SR 444. For this reason, the city of Fairborn and the census tracts nearest the project study area have also been evaluated in this discussion.

The city of Fairborn has a population of 32,352 (in 2010). Of this, 15,539 persons are located in Census tracts 2003, 2004, 2005, and 2007; tracts having residences adjacent or in close proximity to the redirected route as a result of closing a portion of SR 444. Another 1,832 persons are located in tract 2803, which consists of WPAFB Area A and a small undeveloped area to the northeast. Children under the age of 5 years constitute approximately 8 percent of this total, and children ages 5 to 14 years constitute an additional 12 percent of the population in these tracts. Census tracts 2005 and 2007 have the greatest numbers of children of the five tracts at 1,144 and 896 children at or below 14 years of age, respectively. The 2010 Census estimated approximately 2,334 children age 14 and under for Census tracts along the SR 444 redirected route (Kauffman Avenue, Central Avenue, Dayton Drive).

Employment – Some of the key industries in the Dayton, Ohio, economy include services, trade (wholesale and retail), government, and manufacturing. In FY 06, the finance and insurance industries employed 14,595 employees and jobs provided by the government totaled 37,298 (DACC 2010).

Table 3-6 lists the industry of employment for residents around WPAFB, the Dayton-Springfield MSA, and the state of Ohio in 2000. A large portion of residents in the Dayton-Springfield MSA are employed in education, health and social services, retail trade, or manufacturing; a lower percentage are employed in agriculture, forestry, fishing and hunting, and mining.

The unemployment rate for the Dayton-Springfield MSA in July 2010 was 11.2 percent, slightly higher than the statewide average of 10.3 percent (DACC 2010). The 2010 unemployment rate in the MSA around WPAFB and within Greene County was 9.6 percent, slightly lower than the state average of 10.2 percent.

Residents living in Fairborn have a lower per capita income and median household income in comparison to the MSA and the state of Ohio (Bureau of Census 2000a). Fairborn also has a higher percent of persons living below the poverty level (**Figure 3-6**). By contrast, Greene County has a higher per capita income and median household income, and a lower percent of persons living below the poverty level, than either the Dayton MSA or the state of Ohio. Persons living on-Base follow the pattern set by Greene County. Several of the census tracts in the project area have noticeably lower median and per capita incomes and higher rates of poverty than the trend for the county.

Table 3-6. Employment by Industry for Residents in Dayton-Springfield MSA, Greene County, and the State of Ohio (2000)

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

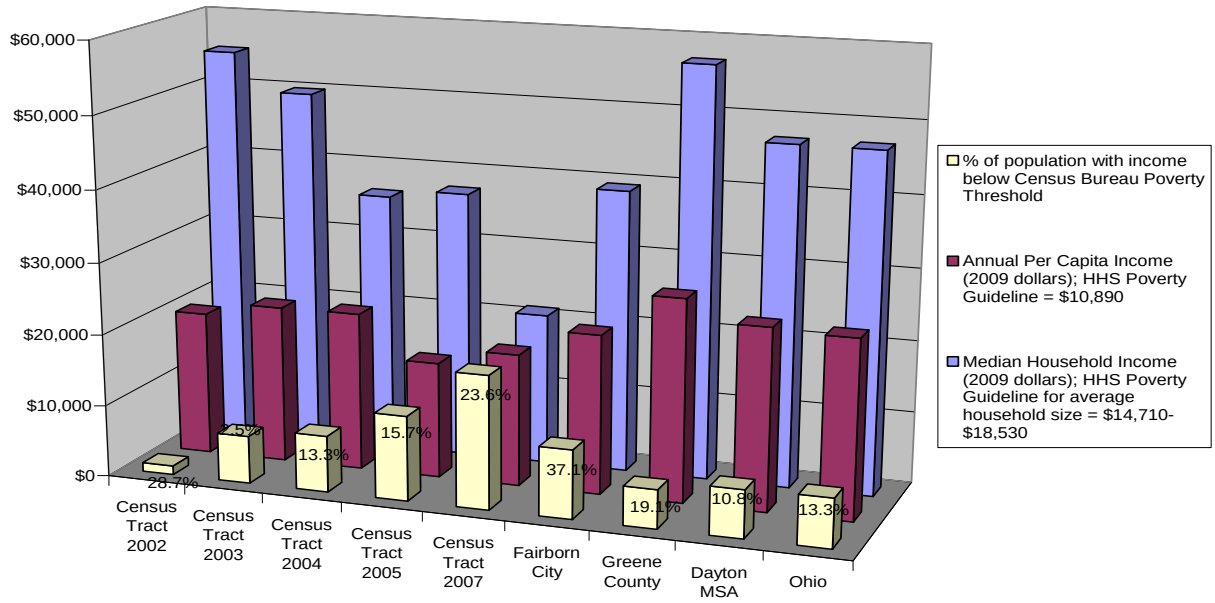
Source: Bureau of Census 2000a
MSA = Metropolitan Statistical Area

Education – The percentage of residents who have obtained a high school diploma is substantially the same in the area around WPAFB, as an average of figures for local census tracts, as in Greene County, the Dayton MSA, or Ohio, while the percentage of residents holding a bachelor's degree or higher is slightly lower on average in the project area than in the wider geographical region (**Figure 3-7***)*. There are local variations: Census tracts 2005 and 2007, located southeast of Kauffman Avenue, have slightly lower high school diploma rates and substantially lower bachelors and higher degree rates than the average.

Community Resources and Services – The Dayton region is rich in community resources providing recreational and cultural opportunities for its residents. Of particular note with respect to the current project area are the network of interconnected bikeways and the commitment to maintaining park facilities. The Wright Brothers-Huffman Prairie/Kauffman Avenue bikeway travels parallel to Kauffman Avenue through the project area and west beyond Wright State University. A connection to the Mad River Trail and thus the city of Dayton is planned for the future. Central Park, which is the location of the

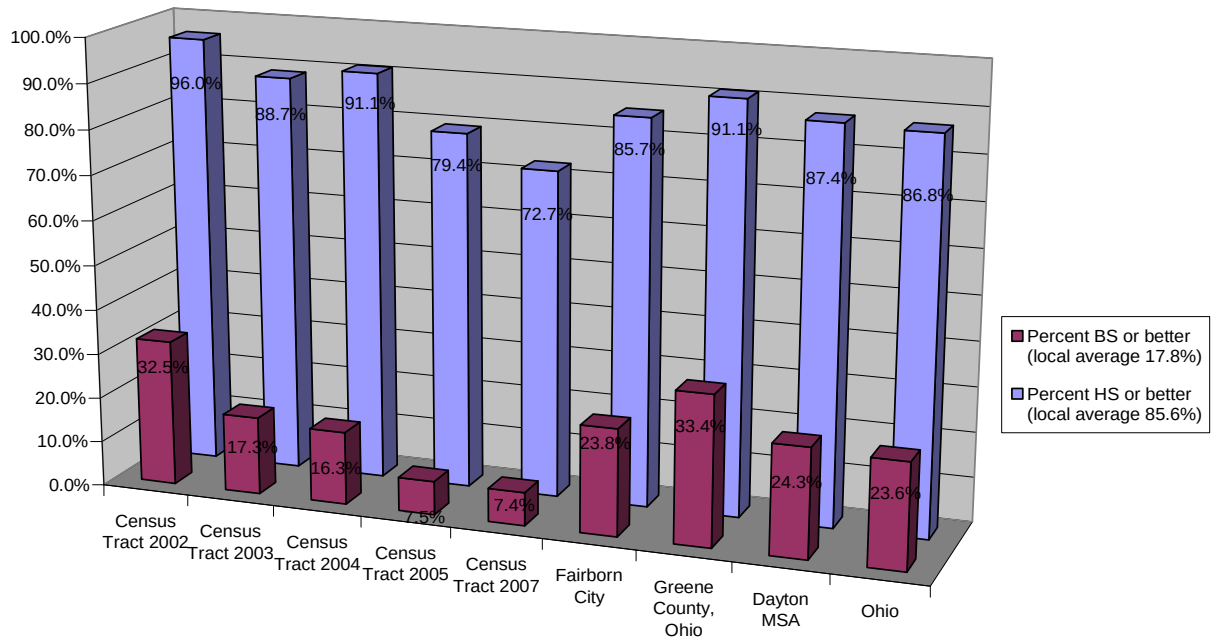
Fairborn YMCA, is located on Central Avenue across from the eastern end of the Kauffman Avenue bikeway within the project area.

Figure 3-6. Income and Poverty Level of Residents in the Project Area and Surrounding Geographic Region



In the Dayton region, cities generally provide their own emergency response and safety services, as does Fairborn. Fairborn's proximity to the Base has led to a mutual aid agreement between the WPAFB and Fairborn emergency response units. Fairborn emergency medical technician squads routinely transport patients to the Wright-Patterson Medical Center for treatment.

Figure 3-7. Educational Attainment of the Residents in the Project Area and Surrounding Geographic Region



3.9 Environmental Justice

3.9.1 Definition of the Resource

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

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

The CEQ guidelines do not specifically state the percentage of households with income below the poverty level that is considered meaningful in the case of low-income populations. In addition, the American Community Survey and the Census Bureau define the poverty level by the Census Bureau Poverty Thresholds, which differ somewhat from the HHS Poverty Guidelines used by FHWA. Therefore, three comparisons were used to identify portions of the affected area where median or per capita income approached the HHS Poverty Guidelines and where the percentage of the population with income below the Census Bureau Poverty Thresholds was meaningfully greater than in the larger geographical area. These areas were identified as having low-income populations.

3.9.2 Existing Conditions

A screening analysis using U.S. Census Bureau's Census 2010 racial information and American Community Survey (ACS) 2005-2009 economic information catalogued by census tract was used to identify low-income and minority populations living within the affected area around WPAFB. For purposes of the evaluation, Census Tract 2002 (ACS) was considered equivalent to Census Tract 2803 (Census 2010). The on-Base and off-Base project areas were included in Census Tracts 2001.02 (commercial and residential), 2001.04 (commercial only), 2803 (previously referred to as Tract 2002), 2004, 2005, and 2007. Since Tract 2001.04 includes areas of commercial development, this tract is omitted from further discussion.

On-Base

Census Tract 2803 represents the on-Base population. Tract 2803 has a higher percentage of females of child-bearing age (15 to 44 years) and lower percentage of individuals 65 and older and 75 and older than the larger comparison geographies selected for this study. **Figure 3-6** presents median household income, annual per capita income, and the percentage of population with income below Census Bureau Poverty Thresholds, respectively, for the affected area. Tract 2803 also has a lower percentage of older adults (0.6 percent), a higher percentage of minorities (25.2 percent), and a higher percentage of Hispanic residents (7.5 percent) (**Figure 3-8**) than the average for the affected area of any of the larger comparison geographies selected for this study. Tract 2803 also has a higher percentage of children under 5 years of age as compared to the larger comparison geographies selected for this study.

Off-Base

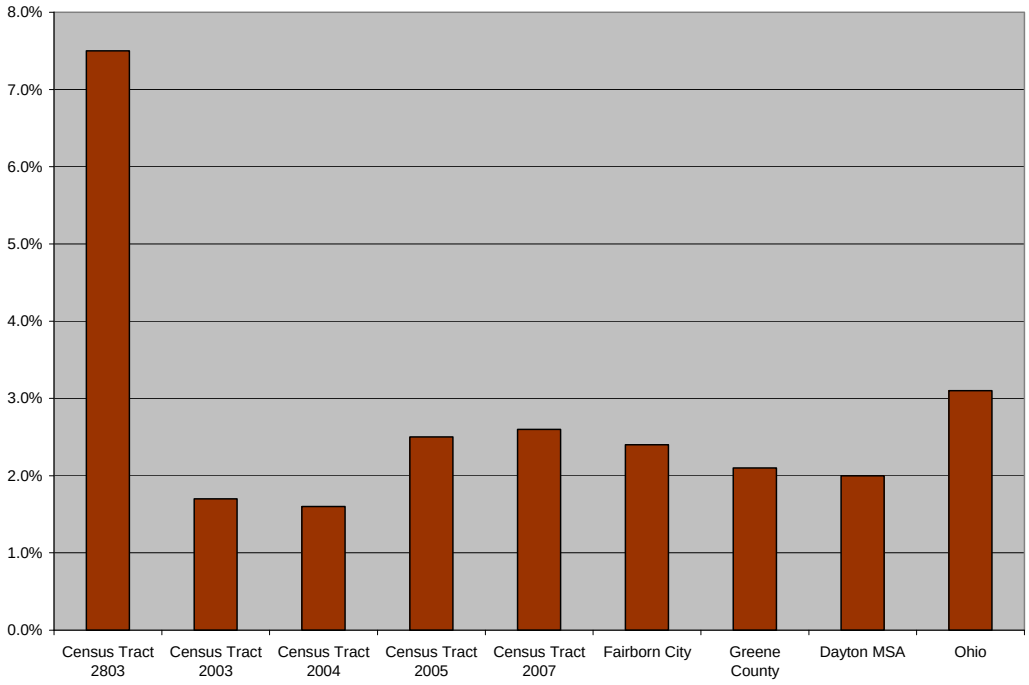
Census Tracts 2001.02, 2005, and 2007 were identified as having low-income or minority populations and are briefly described below.

Census Tract 2001.02, which includes the area west of Area A and a majority of the Wright State University area, was found to have a somewhat higher portion of black or African-American residents (18.6 percent) and a higher percentage of the population with income below the Census Bureau Poverty Thresholds (28.7 percent) than the average for the affected area (averages of 7.9 percent and 17.8 percent, respectively) of any of the larger comparison geographies selected for this study (**Figures 3-6** and **3-9**).

Census Tract 2005, which is located east of Kauffman Avenue and Central Avenue, has a somewhat higher percentage of the population with income below the Census Bureau Poverty Thresholds (23.6 percent) than the average for the affected area (average of 18.4 percent) or larger geographic areas (**Figure 3-6**).

Census Tract 2007, which is located southeast of the Base along Kauffman Avenue, has a median household income just above the range for average household size in the affected area and a considerably higher percentage of the population with income below the Census Bureau Poverty Thresholds (37.1 percent) than the average for the affected area or larger geographic areas (**Figure 3-6**).

Figure 3-8. Percentage of Population Identifying as Hispanic or Latino (2010)

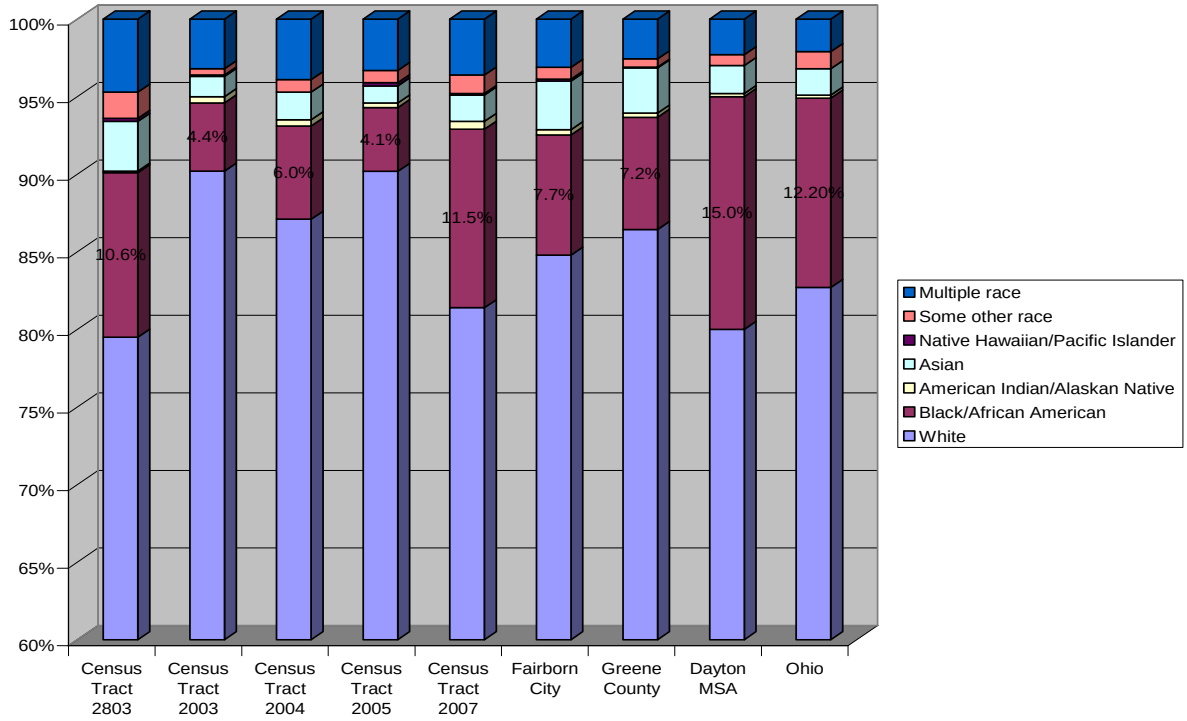


3.10 Infrastructure

3.10.1 Definition of the Resource

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

Figure 3-9. Race of Residents in the Affected Area Compared to Dayton MSA, Greene County, and the State of Ohio (2010)



Source: U.S. Census Bureau 2010 data.

3.10.2 Existing Conditions

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

On-Base

Utilities

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

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

Natural Gas. The natural gas at WPAFB is supplied by Vectren. The on-Base natural gas system, which is owned by WPAFB, contains over 130,000 linear ft of underground piping and 11 distribution subsystems (WPAFB 2001). Vectren owns a distribution line that goes past the Wright Memorial area.

The natural gas system is the principal heating option for housing areas and outlying areas of the Base. It feeds some individual buildings and the three satellite heating plants: Buildings 20581, 10849, and 4019 (WPAFB 2001).

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

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

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

Six wells exist in Area A and produce approximately 7.7 million gallons per day (mgd). Three water tanks are located within Area A: 250,000-gallon tank near existing Gate 15A; a 200,000-gallon tank near the East Ramp; and a 150,000-gallon tank near the West Ramp (WPAFB 2001). WPAFB utilizes approximately 3.2 million gallons of drinking water per day.

The Prairie Trace golf course along Skeel Avenue uses water from two non-potable wells for irrigation. Twin Base Golf Course also uses non-potable water from an inactive Wright Field well for irrigation. The commissary in the Kittyhawk Center uses water from non-potable wells for use in their hot water heating systems (WPAFB 2001).

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

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

The Gate 1A project area is located within the Area A well field protection area, which is comprised of two sets of water wells. One of these wells serves as a backup and as an alternate source; water can be purchased from the City of Fairborn for an emergency water supply. Surface water from the Mad River is a second potential alternate water source for Area A (WPAFB 2007d).

Communications. The communications system at WPAFB provides support to the 445 Airlift Wing (AW) and its associate units. The communications system consists of telephone, local computer systems, long-haul communications, and land mobile radio systems (WPAFB 2001). There are over 100 miles of communication cable ducts on Base (WPAFB 2001). WPAFB's communications and information utility infrastructure is in good condition (WPAFB 2001).

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

Pollution Prevention

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

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

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

Solid Waste

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

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

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

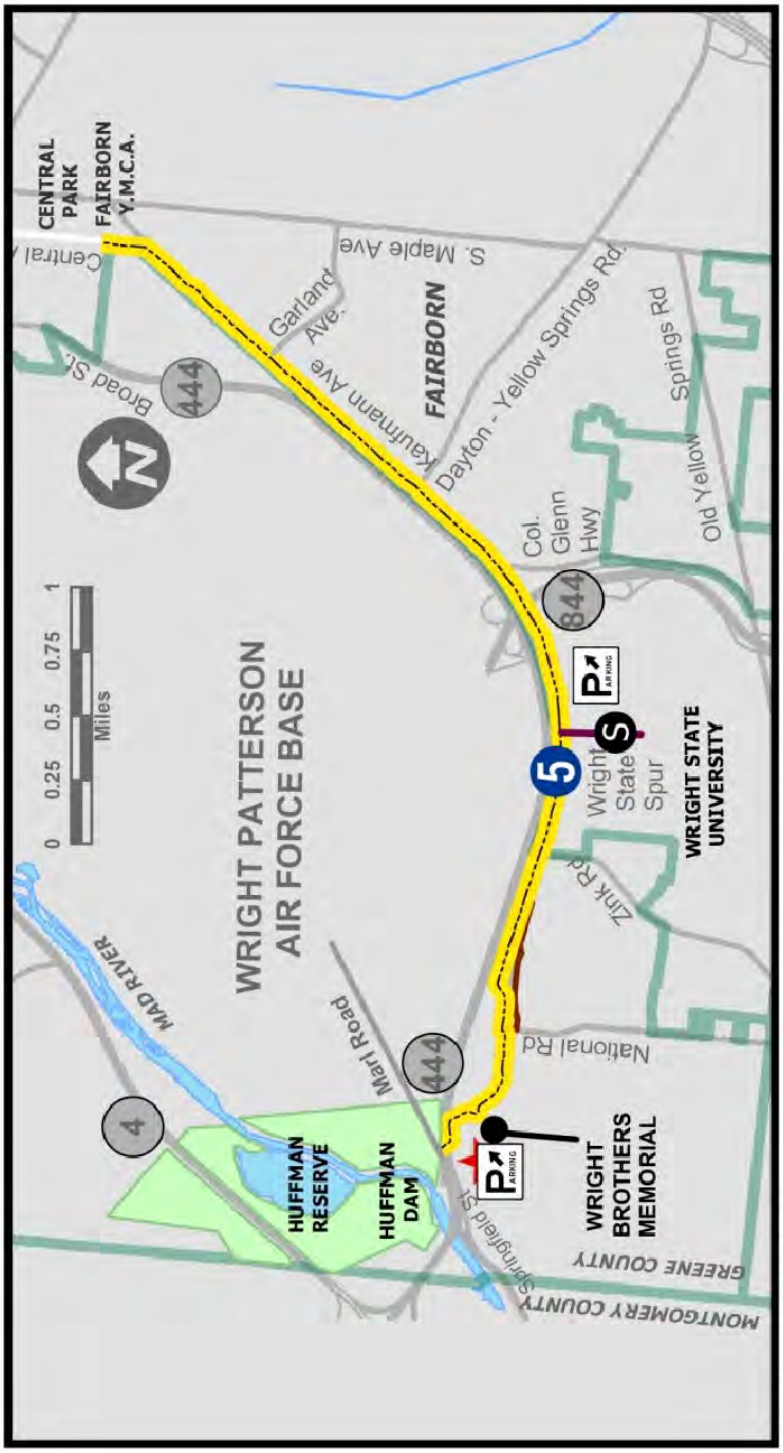
Sanitary Sewer and Wastewater Systems

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

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

Off-Base

In addition to vehicle traffic, the Wright Brothers Huffman Prairie Bikeway is a 4.3-mile bike trail that exists between SR 444 and Kauffman Avenue (**Figure 3-10**). Starting at Central Avenue and ending at Marl Road near the Huffman Dam, this trail is part of the state-wide Buckeye Trail. The trail is an approximate 12-ft wide urban trail linking downtown Fairborn with the Wright Brothers Memorial Park. The trail also provides a connection from Fairborn to Wright State University. Future plans call for extending this trail across SR 444 to Huffman Prairie Flying Field and to the Huffman Reserve. The link will eventually connect this trail system to the system of existing trails in Montgomery Country (Park District 2011). The bikeway has involved the Base in route planning and has allowed Base personnel and their dependents access to the trail and park system throughout Greene County and the Miami Valley (WPAFB 2001).



Source: Greene County Park District

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Cincinnati, OH	5/26/11	--	JIS	SB	CH	s-140401.0801-5/11-w

WRIGHT-PATTERSON AIR FORCE BASE, OHIO

Figure 3-10
Wright Brothers
Huffman Prairie Bikeway

Utilities

Utilities and infrastructure surrounding WPAFB is similar to that as on-Base infrastructure. Electrical power is provided by Dayton Power & Light and natural gas is serviced by Vectren.

Sanitary Sewer and Wastewater Systems

Water and sewer in the area of WPAFB is serviced by Fairborn Water and Sewer Division and the Montgomery County Sanitary Sewer District.

3.11 Health and Safety

3.11.1 Definition of the Resource

Health and safety issues associated with the transportation improvements primarily include worker safety and public safety during construction activities. Worker safety concerns during construction activities would involve hazards associated with physical hazards such as heavy equipment, construction vehicles, traffic maintenance, and power tools.

A safe environment is one in which there is no, or an optimally reduced, potential for death, serious bodily injury or illness, or property damage; or the public has little access to the construction activities associated with the Proposed Action.

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

Munitions and Explosive Safety

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

Construction and Demolition Safety

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

3.11.2 Existing Conditions

On-Base

Fire Hazards and Public Safety

The Fire Department at WPAFB provides fire, crash, rescue, and structural fire protection at the Base. The 445 AW abides by a general safety policy relating to the performance of all activities at the Base. Individuals, supervisors, managers, and commanders are expected to give full support to safety efforts and safety awareness. Strict compliance with established safety standards is expected.

Munitions and Explosives Safety

The project areas are not located within any ESZs (WPAFB 2011d). However, Gate 26A is the incoming point for all WPAFB munitions for both inbound and outbound shipments.

Construction and Demolition Safety

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

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

Off-Base

Fire Hazards and Public Safety

The Fairborn Fire Department and the Fairborn Police Department provide fire, crash, and rescue services and provide a safe and secure environment to all persons in the City of Fairborn and outlying area. The

Fairborn Fire Department has the following four station locations: Fire Station #1, 495 N. Broad Street; Fire Station #2, 2200 Commerce Center Boulevard; Fire Station #3, 1000 Yellow-Springs Fairfield Road; and Fire Station #4, 444 W. Funderburg Road. Response districts adjacent to WPAFB include Fire Stations #1 and #4. There are five Fairborn Police Department Districts and Districts 1, 3, and 4 provide service to the following off-Base areas adjacent to WPAFB:

- District 1 – includes property within the city limits west of Maple Avenue between North Broad Street and the Kauffman extension, west of North Broad Street from Sandhill Road to North Maple Avenue, and west from the Kauffman extension between South Maple Avenue and Powell Avenue.

- District 3 – includes all property within the city corporate limits of Garland Avenue at Ironwood Drive, Garland extension, and an imaginary line between the two streets, east of Ironwood Drive from Garland Avenue to West Funderburg Road, east of Kathy Drive, Triumph Drive, to Old Yellow-Springs Road.

- District 4 – includes all property within the city corporate limits south of Garland Avenue between Ironwood Drive and Kauffman Avenue west of Ironwood Drive from Garland Avenue to West Funderburg Road, west of Kathy Drive, Triumph Drive to Old Yellow Springs Road.

3.12 Hazardous Materials/Waste, Stored Fuels, Toxic Substances, and ERP

3.12.1 Definition of the Resource

AFPD 32-70, *Environmental Quality*, establishes the policy that the USAF is committed to:

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

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

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

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

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

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

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

3.12.2 Existing Conditions

On-Base

Hazardous Materials

AFI 32-7086, *Hazardous Materials Management*, establishes procedures and standards that govern management of hazardous materials throughout the USAF. It applies to all USAF personnel who authorize, procure, issue, use, or dispose of hazardous materials, and to those who manage, monitor, or track any of those activities. A privately contracted hazardous material pharmacy (HAZMART) is located in Building 30089. The HAZMART ensures that only the smallest quantities of hazardous materials necessary to accomplish the mission are purchased and used (WPAFB 2001).

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

Hazardous Waste

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

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

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

Stored Fuels

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

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

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

USTs are subject to Federal regulations implementing the RCRA contained in 40 CFR Part 280. The State of Ohio regulates USTs under Ohio Administrative Code (OAC) 1301:7-9. ASTs are regulated under the Federal Oil Pollution Prevention and Response Regulation and the WPAFB SPCC Plan.

According to the WPAFB General Plan, there are no UST or ASTs located within the immediate area of the project areas.

Toxic Substances

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

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

The 88 ABW/CEA has developed standard contract specifications for the removal and disposal of ACM. These specifications incorporate all applicable USEPA, OSHA, and USDOT requirements. The Ohio Department of Health (ODH) must license contractors, and all asbestos-abatement work must be done under the onsite supervision of an ODH-designated “competent person.” Work area monitoring for airborne asbestos fibers is accomplished by an industrial hygienist certified by the American Board of Industrial Hygiene. Industrial hygienists must also be certified by the ODH. Laboratory analyses of air samples and of bulk samples must be accomplished in a certified and accredited laboratory.

Non-friable ACM can be disposed of in a sanitary landfill. Friable asbestos must be disposed of in a USEPA-approved landfill. ACM-abatement contractors are responsible for obtaining all required permits from regulatory agencies and for OEPA and ODH notification requirements (WPAFB 2001). WPAFB has implemented an Asbestos Management Plan to minimize risk from friable ACM in buildings where the material remains. Additional sampling is usually required in buildings scheduled for renovation or demolition (WPAFB 2001).

Complete asbestos surveys would be required for all ECFs and associated structures prior to demolition and renovation activities.

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

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

More than 95 percent of WPAFB facilities were constructed prior to 1980 and contain LBP. Lead concentrations are generally low with the exception of paints used on outdoor structures such as water towers. The HUD action level is 5,000 ppm. However, even when concentrations are below this, OSHA Lead Construction Standard (29 CFR 1926.62) must be followed. All workers performing lead abatement or removal or any other lead disturbance are required to have a lead workers license issued by the ODH. Licensing is not required if the contract involves mechanical demolition. Contractors containerize LBP wastes which are turned in to the 88 ABW/CEAN for disposal. Bioenvironmental engineering samples and monitors all in-house projects involving LBP (WPAFB 2001).

No LBP surveys have been conducted for any ECFs or associated buildings. As such, it is assumed that lead exists in all buildings until sampled and tested.

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

fungicides, herbicides, and rodenticides are handled, applied, and disposed of consistent with the state requirements and FIFRA.

Chlordane, an organochlorine compound, was used as a pesticide and sold in the U.S. until 1983. Chlordane was used as an insecticide on crops and citrus and was used on lawns and domestic gardens as well as was used as a method of termite control. Chlordane was likely used on the former Pine Estates and Green Acres Base housing lawns located at SR 444 and Schlatter Road and SR 444 and Estabrook Road (**Figure 2-3**). The USEPA's opinion regarding chlordane is that "the pesticide is a listed commercial chemical product that becomes hazardous waste when discarded or intended to be discarded. The Agency did not intend to cover those cases when the chemical is released into the environment as a result of use.

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

Environmental Restoration Program

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

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

The only ERP sites in the project areas are OU2, OU4, and OU7 (WPAFB 2007c). OU2 consists of three spill sites, one burial site, a long-term coal storage area, a temporary a coal storage pile, a coal and chemical storage area, and a coal storage area at Building 89. OU4 is a collection of four former landfills

and a drum storage area. OU7 comprises three landfill pits associated with Landfill 9 (LF9). **Figure 3-4** indicates the locations of ERP sites within the vicinity of the project areas.

The Gate 15A project area is located within OU4. LF6 is located adjacent and west of the proposed Gate 15A project area. LF6 currently consists of a pasture. LF6, covering 7 acres, operated from 1949 to 1952 as a trench and cover operation for general refuse and may have accepted hazardous waste (WPAFB 1998). A preliminary assessment, site investigation, and Remedial Investigation (RI) was performed at LF6 from 1988 until 1995 with results concluding that the carcinogenic risk and non-carcinogenic hazard posed by contaminants in soil were within the USEPA-accepted range for exposure; however, long-term groundwater monitoring was performed under the BMP. LF6 was capped and a USEPA ROD was designated to LF6 in 1998. The *Final Land Use Control Plan* indicates land use classifications and land use for all ERP sites at WPAFB (WPAFB 2006b). The land use control (LUC) for LF6 states no digging, building, construction, etc. or otherwise disturbing landfill covers.

The Gate 26A project area is located within OU2 and OU7. LF9 is in OU7 and is located outside the main Base boundary fence. LF9 is approximately 2,700 ft north of the Gate 26A proposed project area and consists of an open area surrounded by woods and used occasionally for recreational hunting. LF9 contained three pits with one of the pits (Pit C) being the disposal area. The other pits were sand and gravel pits. Pit C operated between 1962 and 1964 as a trench and cover operation. Because the landfill received wastes from the entire Base, it potentially contained hazardous waste. A preliminary assessment, site investigation, and RI was performed at LF9 from 1988 until 1996, with results concluding that chemical contamination at the site was not significant enough to present a risk to human health or the environment under the assumed scenarios of exposure pathways and receptors (WPAFB 1998). LF9 was capped and a USEPA ROD was designated to LF9 in 1998 (WPAFB 2007c). The LUC for LF9 states no digging, building, construction, etc. or otherwise disturbing landfill cover (WPAFB 2006b).

Burial Site 1 (BS1) is in OU2, which is located adjacent to the Gate 26A proposed project area (**Figure 3-4**). BS1 contained two possible pits where sludge from fuel storage tanks may have been buried. BS1 operated from 1966 to 1971. A preliminary assessment, site investigation, and RI were performed at BS1 from 1988 until 1995. During the RI, very low levels of VOCs, semi-volatile VOCs, pesticides and metals were identified. Based on the results of the RI, the contamination identified at this site was not sufficient to warrant remedial action and a USEPA ROD was designated to BS1 in 1996 (WPAFB 2007c).

Current land use on BS1 is a grassy open area located across from a flight line and near the City of Fairborn recreational facilities. BS1 has an allowable land use of digging, construction, and other soil disturbances after approval by 88th ABW Environmental Quality Section of the Environmental Branch in the Asset Management Division, Civil Engineering Directorate (CEANQ) (WPAFB 2006b).

The Long-Term Coal Storage Area (LTCSA) is also part of OU2 and is located within the proposed Gate 26A project area. Coal storage activities at this site began in 1953 and ended in 1988 when the coal inventory was depleted. The site is currently a grassy area and was used in 1995 for a staging and treatment site for a soil remediation project as part of the UST program. This site was the focus of an investigation beginning in 1991 with low levels of VOCs, pesticides, and metals detected. Based on the results of the investigation, the contamination identified at this site was not sufficient to warrant remedial action and a USEPA ROD was designated to LTCSA in 1996 (WPAFB 1996).

Any activity that may disturb ERP sites should be coordinated with the Base ERP Program Manager in the CEANQ.

Off-Base

Hazardous Materials/Hazardous Waste

An environmental contamination assessment was conducted to evaluate potential environmental contamination impacts within 1 mile of the off-Base area of concern. The off-Base area of concern is presented in **Figure 3-1**. The assessment was completed by reviewing available information on past and present activities of hazardous material significance within the area of concern. This included obtaining information about present and former land use of the off-Base area of concern.

An environmental database search report was completed by Environmental Data Resources, Inc. (EDR) on July 28, 2011, which included a search of public databases that maintain a range of information regarding land use activities, Superfund sites, reported tank spills, or leaks, and licensed users and generators of hazardous materials and wastes (EDR 2011). The EDR database search is published as a separate report and will be included in the WPAFB Administrative Record (**Appendix G**).

As part of the EDR database report, a search distance of 1 mile from the off-Base area of concern was used for NPL (Superfund) sites and RCRA Corrective Action Sites (CORRACTS). A 0.5-mile search distance was used for Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) sites; RCRA Treatment, Storage, and Disposal (TSD) sites; leaking underground storage tank (LUST) sites; state Voluntary Cleanup Program sites; and landfills. A 0.25-mile search distance was used for UST sites, ASTs, and listed RCRA hazardous waste generators. A 0.125-mile search distance was used for USEPA's Emergency Response Notification System sites.

The EDR database report identified a number of sites within the specified search distances. These sites include the off-Base area of concern. The sites were evaluated to determine whether they could potentially be impacted by potential off-Base construction activities. The sites were evaluated based on:

- The nature of the documented or potential contamination;
- The media/pathway impacted by the documented or potential contamination;

- The hydraulic relationship of the site to the proposed construction impact area (i.e., up or downgradient with respect to surface water and groundwater flow direction; and
- Proximity to the potential construction impact area.

A total of 160 listings were identified within the search radius. Some sites were contained on multiple databases and some sites included database information regarding WPAFB. Due to substantial WPAFB documents accessed as part of this EIS and presented in Section 3.12.2 for on-Base existing conditions, those sites identified in the EDR report are excluded from discussion (EDR report pages 3 to 99). In addition, due to the volume of all sites identified within the EDR report, only those sites located within the off-Base area of concern corridor are discussed. It was determined that 12 regulated sites are located within the off-Base area of concern; the Map ID corresponds to the location of the site on a corridor study map provided by EDR (**Figure 3-11**). A brief description of the database and a discussion of the identified sites is presented below.

RCRIS – Conditionally Exempt Small Quantity Generator Database

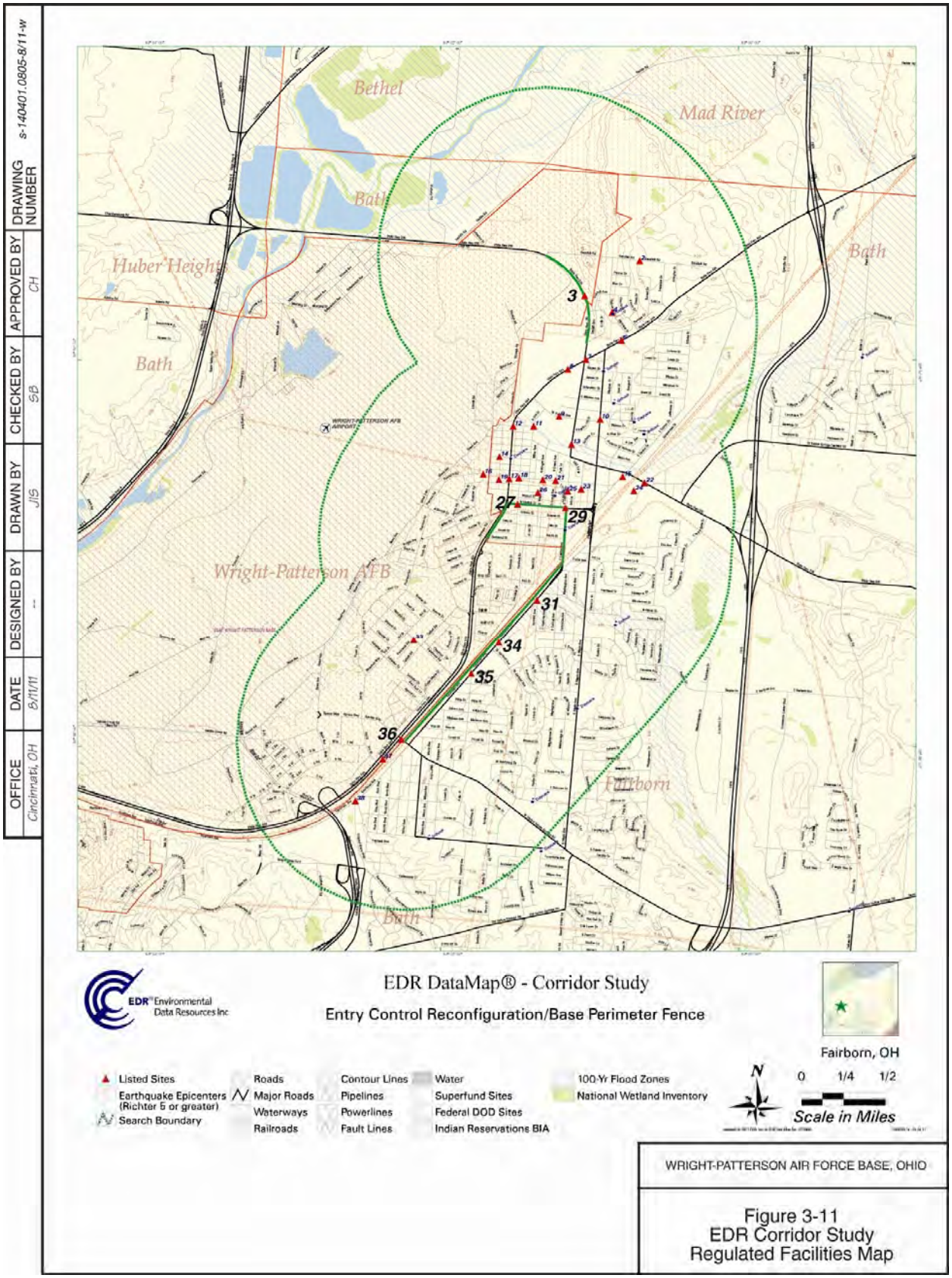
The Resource Conservation and Recovery Act Information System (RCRIS) database is a registry of sites which generate, transport, store, treat and/or dispose of hazardous waste. Conditionally Exempt Small Quantity Generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month. Four sites within the off-Base area of concern are identified in the RCRIS-CESQG database. The sites are listed below.

Map ID	Facility	Address	Status
3	Fairborn Buick	1105 N. Central Ave	No outstanding violations
31	Capitol Cleaners	1204 Kauffman Ave	No violations found
31	BP Oil Co	1184 Kauffman Ave	No violations found
34	Ziebart Tidycar	1448 Kauffman Ave	No outstanding violations

RCRIS – Large and Small Quantity Hazardous Waste Generators and Hazardous Waste Transporter Database

The RCRIS Large and Small Quantity Hazardous Waste Generators and Hazardous Waste Transporter (TR) database is a registry of sites which generate and/or transport hazardous waste. Two sites contained within the off-Base area of concern are identified in the RCRIS-Small Quantity Hazardous Waste Generators database. These sites are listed below.

Map ID	Facility	Address	Status
31	Skyway One Hour Cleaners	1174 Kauffman Ave	No violations found
36	BP Facility #22793	1040 E Dayton Yellow Springs	No violations found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DRAWING NUMBER
s-140401.0805-8/11-w
Bethel
Mad River
Bath
Huber Heights
Bath
Bath
Wright-Patterson AFB
Fairborn
Bath
3
27
29
31
34
35
36
EDR DataMap® - Corridor Study
Entry Control Reconfiguration/Base Perimeter Fence
EDR Environmental Data Resources Inc
Fairborn, OH
Listed Sites
Earthquake Epicenters (Richter 5 or greater)
Search Boundary
Roads
Major Roads
Waterways
Railroads
Contour Lines
Pipelines
Powerlines
Fault Lines
Water
Superfund Sites
Federal DOD Sites
Indian Reservations BIA
100-Yr Flood Zones
National Wetland Inventory
N
0 1/4 1/2
Scale in Miles
WRIGHT-PATTERSON AIR FORCE BASE, OHIO
Figure 3-11
EDR Corridor Study
Regulated Facilities Map

Ohio – Division of Environmental Response and Revitalization

The Ohio Division of Environmental Response and Revitalization (DERR) oversees investigation and cleanup of contaminated sites including federal facilities. DERR responds to and oversees clean up of emergency releases and spills to the environment and provide assistance to companies and communities that clean up and reuse Brownfield sites.

The DERR database is an index of sites for which OEPA maintains files. It includes sites with known or suspected contamination, but a site's inclusion in the database does not mean that it is now or has ever been contaminated. One facility contained in the Ohio DERR database is identified within the off-Base area of concern. The site is listed below.

Map ID	Facility	Address	Program
3	Fairborn Buick	1105 N Central Ave	Site Assessment

AST/UST Database

The AST/UST database is a registry of regulated ASTs/USTs. USTs are regulated under Subtitle I of RCRA and are registered with the state department responsible for administering the UST program. Not all ASTs/USTs require notification and registration due to size and use provisions of applicable state regulations. Seven UST sites are identified within the off-Base area of concern. These sites are listed below.

Map ID	Facility	Address	Status
27	Morningstar Chrysler Plymouth	500 W Dayton Road	Removed in 1990: • Size and Contents Not Reported
29	Kwik Trip	2 E Dayton	In Use Since 1985: • Three 10,000-gallon Gasoline Removed in 1996 • 550-gallon Used Oil
29	Marathon	10 W Dayton Dr	In Use Since 1985: • Three 10,000-gallon Gasoline
31	BP Oil Co #09679	1184 Kauffman Ave	Removed in 2000: • 500-gallon Used Oil • Three 10,000-gallon Gasoline
31	Clark	1020 Kauffman Ave	In Use Since 1989: • Two 12,000-gallon Gasoline
35	Louie R. Gregg	1550 Kauffman Ave	Removed in 1992: • Size and Contents Not Reported
36	444 Exxon	3830 SR 444	In Use Since 1991: • 1,000-gallon Gasoline • 4,000-gallon Gasoline • Two 6,000-gallon Gasoline • 1,000-gallon Diesel

LUST Database

The LUST database is a registry of leaking underground storage tank incidents. Seven LUST sites are identified within the off-Base area of concern. These sites are listed below.

Map ID	Facility	Address	Status
27	Morningstar Chrysler Plymouth	500 W Dayton Road	• NFA
29	Kwik Trip	2 E Dayton	• NFA • Inactive/Release Disproved
29	Marathon	10 W Dayton Dr	• Inactive/Release Disproved
31	BP Oil Co #09679	1184 Kauffman Ave	• Active/Tier 2 Investigation Ongoing
31	Clark	1020 Kauffman Ave	• NFA • Active/Suspected Release/Source Identified
35	Louie R. Gregg	1550 Kauffman Ave	• NFA
36	444 Exxon	3830 SR 444	• Active/Tier 1 Investigation Ongoing • Active/Possible Incident Reported

NFA: No Further Action

The sites with a status of No Further Action (NFA) are considered historical environmental concerns since these sites have already been addressed by the Ohio Bureau of Underground Storage Tank Regulations (BUSTR) and have received an NFA. The sites with an active status are regulated by BUSTR and are under BUSTRs regulatory reporting requirements. Under BUSTR regulations, environmental sampling, investigation, and clean-up of a LUST is only required to be conducted by the "owner" as defined in OAC 1301:7-9-2.

SPILLS Database

The SPILLS database is a registry of reported releases of oil, hazardous, and non-hazardous substances. The database contains information from spill and emergency response reports provided by state and local authorities and the ODOT. Two sites within the off-Base area of concern are listed on the SPILLS database. These are listed below.

Map ID	Facility	Address	Status
27	Morningstar Chrysler Plymouth	500 W Dayton Road	Oil Spill Date: 1996
31	Clark	1020 Kauffman Ave	Gasoline Spill Date: 2008

No additional information is available in the EDR database regarding these spill sites.

3.13 Traffic and Transportation

The environmental analysis includes consideration of the existing roadway and circulation system in the WPAFB area. Parking considerations are also included in the analysis.

3.13.1 Definition of Resource

Transportation can be defined as the movement of people and goods from one place to another. Because this project focuses on changes to roadways, the definition of this resource focuses primarily on roadway transportation over pedestrian, bicycle, rail, water or airborne transportation. Several primary goals of the Federal and municipal roadway transportation systems include safety, utility in terms both of convenience and of efficient motion, and the support of economic activity and growth within and between urban areas and states. The pavement, signs and signals, guardrails, bridges and other components of a transportation system all contribute to the overall experience of appropriate and effective transportation.

3.13.2 Existing Conditions

Transportation System

On-Base

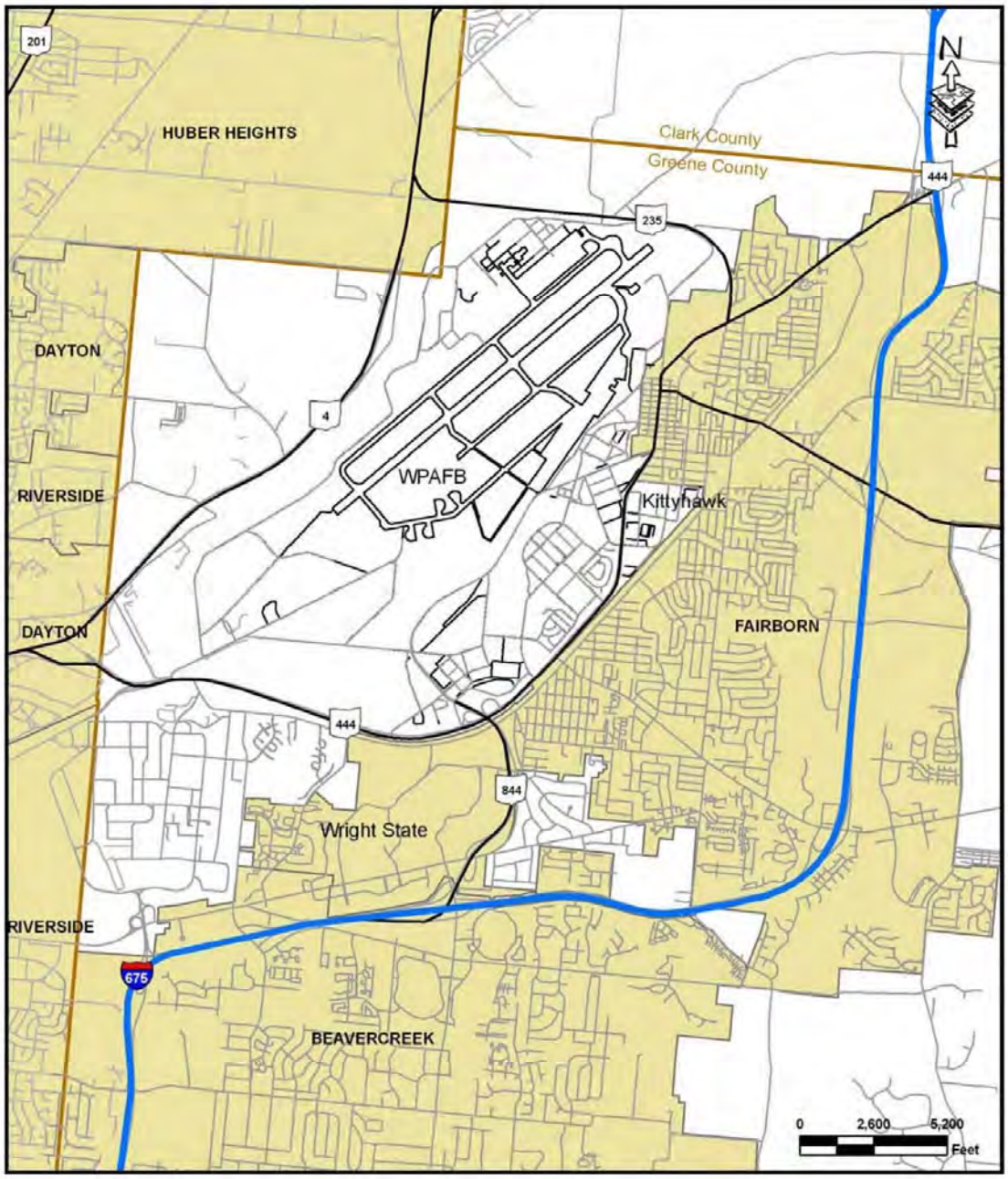
The Base is circled by a network of transportation facilities that provide ground access to the installation (**Figure 3-12**). These facilities include SR 4, SR 844, SR 444, and SR 235, which all border the installation and are classified as principal urban arterials that are included on the FHWA National Highway System. These arterials connect the Base to Interstates 675, 75, and 70, providing the installation with critical surface transportation access in all directions.

SR 444 bisects the Base creating a barrier between Wright Field and Paterson Field (WPAFB 2001). SR 844 provides a route from Gate 15A to I-675, which is located east of the Base. I-675 provides direct access to I-70, which is approximately 9 miles to the north; U.S. 35, which is approximately 5 miles to the south; and I-75, which is approximately 15 miles to the southwest (WPAFB 2001). SR 235 provides access from Gate 26A to SR 4 and I-70 (WPAFB 2001). Traffic enters Area B through Gates 1B from Springfield Street, 19B from National Road, and 22B off of I-675.

The study area for this project includes Area A of the WPAFB installation. Much of the on-Base street network in Area A is concentrated adjacent to SR 444 and provides access and traffic circulation to a number of land uses present in that area, including residential, commercial, industrial, and medical uses.

Off-Base

The roadway transportation system that surrounds and provides access to and from WPAFB is comprised of Federal, state and local roadways, some built specifically as access for the Base. This system falls within the region of the Miami Valley Regional Planning Commission (MVRPC). The MVRPC is responsible for developing, implementing and monitoring a variety of transportation plans designed to support and strengthen the region. The off-Base project areas is also part of several regional plans, including the Fairborn Thoroughfare Plan (Fairborn 2003), the Fairborn Downtown Business District Revitalization Plan, the WSU Master Plan, and the multiple planned regional bikeways documents by MVRPC on its 2011 edition Miami Valley Bikeways Guide Map.



OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Cincinnati, OH	6/6/11	--	JIS	SB	CH	s-140401.0801-6/11-w

WRIGHT-PATTERSON AIR FORCE BASE, OHIO

Figure 3-12
Major Traffic Routes to WPAFB

The *Fairborn Thoroughfare Plan* (Fairborn 2003) identifies the principles of the City's transportation-related decisions, provides classifications for the roadways, and outlines road improvement plans and recommendations, including:

- Dayton Drive, between Broad Street (SR 444) and Central Avenue: recommended eliminating parking completely along this length to allow this section to function as a four-lane minor arterial; and suggested a five-lane configuration for the westbound approach to SR 444.

- Central Avenue, south of Dayton Drive to Kauffman Avenue: recommended widening through-lanes to 12 ft to match the rest of the corridor; and, noted that the widened roadway section between Dayton Drive and Kauffman Avenue would tend to increase traffic flow.

- Kauffman Avenue, between Central Avenue and Dayton-Yellow Springs Road: identified that some curb cuts into the shopping plaza may be eliminated by implementing access management techniques; and suggested improving the left-turn sight distance problems at Dayton-Yellow Springs Road.

Access Management (AM) is defined by the FHWA as "the proactive management of vehicular access points to land parcels adjacent to all manner of roadways. Good AM promotes safe and efficient use of the transportation network. AM encompasses a set of techniques that state and local governments can use to control access to highways, major arterials, and other roadways and include such techniques as access and driveway spacing, safe turning lanes, median treatments, and right-of-way management." Studies have shown that implementing AM provides the following major benefits to transportation systems: increased roadway capacity, reduced crashes, and shortened travel time for motorists.

Parking

Area A currently serves the following land uses:

- Air Force Materiel Command Headquarters (Buildings 262, 266);
- Office, research, and communication facilities;
- Residential facilities (Brick Quarters, Temporary Lodging Facilities);
- Hope Hotel, which serves as a regional meeting facility;
- Prairie Trace Golf Course;
- WPAFB Medical Center (Building 830); and
- National Air and Space Intelligence Center (Buildings 856, 828, 829).

Due to the high density of office space located within Area A, the area contains large parking facilities that provide approximately 4,350 spaces. Occupancy rate is estimated at 90 percent during peak operating hours. Area A can be accessed from four existing locations:

- Primary ECF at Gate 12A – 2,490 parking spaces;
- Secondary ECF at Gate 15A – 1,860 parking spaces;
- Limited use (commercial vehicle) ECF at Gate 16A. This gate also serves as the public access to Huffman Prairie Flying Field, Twin Base Golf Course, and Rod and Gun Club; and

- Limited use (pedestrian) ECF at the southwest corner of the Air Force Materiel Command headquarters (Buildings 262, 266).

The northern part of Area A primarily contains airfield operations, residential, office, medical, commercial, and warehousing facilities that serve the 445th AW and the 88th ABW. The Kittyhawk Center includes recreational facilities and other commercial uses, and is currently separated from Area A by SR 444. The Kittyhawk Center is adjacent to residential land use in the city of Fairborn. Access to the Kittyhawk Center is possible at three locations:

- Secondary ECF at Gate 1A – 5,200 parking spaces
- Secondary ECF at Gate 26A – 1,000 parking spaces
- Primary ECF at Gate 38A (Kittyhawk Center) – 2,500 parking spaces

Parking occupancy is estimated at 60 percent within the Kittyhawk Center and is highly variable by time of day and month of the year. Parking occupancy within the balance of Area A is estimated at 80 percent.

Traffic Generation and Circulation

Traffic volume data within the project area was collected to evaluate the existing traffic patterns near WPAFB as part of the *Areas A and C Entry Control Traffic Study, Wright-Patterson AFB,* March 2009, LJB Inc. (Area C was a former designation at WPAFB and is now included as part of the Area A designation). Details of the traffic analysis conducted as part of this EIS is presented in **Appendix H**. Volume data was collected in the form of AM and PM peak hour manual turning movement counts at 25 intersections. Automatic traffic recorders were also used to collect average daily traffic (ADT) and peak hour volumes at selected locations. Comparing the different forms of available data listed below validated the existing traffic data:

- Manual turn count data;
- Data from automatic traffic recorders;
- Origin-destination data; and
- Historical data (2003).

An origin-destination (OD) analysis was also completed within the project area to document the existing travel patterns to and from WPAFB. The OD analysis was conducted on July 26, 2006, from 6 AM to 6 PM to capture trips throughout the AM, Midday, and PM peak periods. The OD analysis was limited to SR 444 between Dayton Drive to SR 844. These survey stations were located where roadways intersected the OD analysis boundary (or external cordon line). The OD analysis area was not expanded to include Gates 16A and 26A since redistribution of traffic from these locations is expected to be minimal as a result of future end state.

The OD study was performed using a license plate survey where partial license plate numbers, vehicle data, and time of passage were recorded at the various survey stations. This method was considered to be

the least intrusive method to document traffic patterns. According to the SDDCTEA Pamphlet, a sample size of 30 percent of entering traffic during the peak period is desirable for an OD study. More than 10,200 vehicles were recorded entering and exiting the survey area at the 12 study locations during the AM and PM peak periods. Results of the matching process show 37 percent and 53 percent of total traffic were matched through the study area in the AM and PM peak period, respectively. The minimal threshold of 30 percent matching, as established by the SDDCTEA Pamphlet 55-15 has been exceeded during both peak periods.

Hazardous Materials Transportation

The Federal Motor Carrier Safety Administration maintains hazardous materials routing information for motor carriers. Their current list of designated preferred and restricted routes (updated as of 2008) does not include SR 444, nor any routes in this region of Ohio. The Public Utilities Commission of Ohio is responsible for specifying routes that hazardous materials carriers must follow in Ohio. Commercial motor vehicles carrying hazardous materials shall operate over routes that do not go through or near heavily populated areas, narrow streets, or alleys, except where the motor carrier determines that such routes are necessary due to reasonable circumstances including emergency conditions or to reach loading or unloading points or facilities for food.

4.0 ENVIRONMENTAL CONSEQUENCES

This section presents an evaluation of the environmental impacts that might result from implementing the Proposed Action, Alternative A, or the No Action Alternative.

The specific criteria for evaluating impacts and assumptions for the analyses are presented under each resource area. Evaluation criteria for most potential impacts were obtained from standard criteria; Federal, state, or local agency guidelines and requirements; and/or legislative criteria. Proposed environmental commitments to reduce potential impacts are included for each resource area, as appropriate, and these commitments are further summarized in Section 5.0.

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

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

Impacts are defined as follows:

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

4.1 Land Use

4.1.1 Evaluation Criteria

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

- Inconsistency or noncompliance with existing land use plans or policies;
- Precluded the viability of existing land use;
- Precluded continued use or occupation of an area;
- Incompatibility with adjacent land use to the extent that public health or safety is threatened; or

- Conflict with planning criteria established to ensure the safety and protection of human life and property.

4.1.2 Proposed Action

On-Base

Land use in Area A is mixed between administrative, housing, industrial, medical, outdoor recreation, airfield and aircraft maintenance and operations, community commercial, and open space. Generally, the proposed improvements would be constructed on, along, or near existing transportation facilities. While some of the proposed upgrades to the ECFs would require conversion of minor amounts of land (primarily open space) to transportation use, these improvements would not change or otherwise affect the adjacent existing land uses. Proposed activities would be consistent with the WPAFB General Plan.

Short-term and minor adverse impacts and long-term beneficial impacts to land use on-Base are anticipated as described below.

On-site land uses may be subject to short-term minor impacts due to interim relocation of existing facilities, demolition, construction, and infrastructure redevelopment. These effects would be localized, and occur when demolition or construction activities occur at immediately adjacent facilities (e.g., Gates 1A, 15A, and 26A), and would extend for the duration of those activities. Occupants of on-site buildings adjacent to areas scheduled for demolition or construction would be subject to temporary or intermittent impacts. Additionally, there would be on-site inconveniences from modified parking and pedestrian patterns, and from increases in background noise.

The Proposed Action would have no long-term adverse impacts to land use on-Base because activities are consistent with the present use for WPAFB. The proposed activities are similar in use and function as the current ECFs and no adverse operational impacts are anticipated. There would be minor internal changes to the use of land on-Base. Minor long-term beneficial impacts to land use would result from a more cohesive setting on Base (i.e., incorporating the Kittyhawk facilities inside Area A would result in greater access and reduced traffic through the brick quarters).

Off-Base

As a result of the Proposed Action, three streets (Greene Street, Ohio Street, and South Street) would be converted into cul-de-sac streets along SR 444. Minor short-term adverse impacts to these roadways would be expected as a result of the Proposed Action. However, land use in this or the surrounding area would not change over the long term. In addition, as a result of the Proposed Action, the following existing streets would experience increased vehicular traffic from the re-directed traffic route: Kauffman Avenue, South Central Avenue, West Dayton Drive, and South Broad Street. The Proposed Action would not substantially change the existing view shed. Impacts to visual resources are generally associated with cultural resources impacts and are discussed under Section 4.7.

4.1.3 Alternative A

On-Base

Similar to the Proposed Action, this alternative would not change or otherwise affect existing adjacent land use. Short-term and minor adverse impacts and long-term beneficial impacts to land use on-Base are anticipated as described above for the Proposed Action.

Off-Base

Similar to the Proposed Action, no short- or long-term adverse impacts to land use in surrounding areas are anticipated under this alternative.

The Proposed Action would not substantially change the existing view shed. Impacts to visual resources are generally associated with cultural resources and are discussed under Section 4.7.

4.1.4 No Action

Under the No Action Alternative, the existing nine ECFs would remain in place and no reconfiguration or improvements would be made to gates in Area A, and the Kittyhawk Center would remain separate from Area A. Thus, there would be no impact to land use.

4.2 Air Quality

4.2.1 Evaluation Criteria

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

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

As mentioned in Section 3.2, the area including WPAFB is classified as a moderate maintenance area for O_3, designated as moderate nonattainment for $PM_{2.5}$, and is designated as an unclassified/attainment area for all other criteria pollutants.

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

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

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

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

The *de minimis* threshold emission rates were established by the USEPA in the General Conformity Rule to focus analysis requirements on those Federal actions with the potential to have "significant" air quality impacts. **Table 4-1** presents these thresholds, by regulated pollutant. These *de minimis* thresholds are similar, in most cases, to the definitions for major stationary sources of criteria and precursors to criteria pollutants under the CAA's New Source Review (NSR) Program (CAA Title I). As shown in **Table 4-1**, *de minimis* thresholds vary depending on the severity of the nonattainment area classification.

Table 4-1. Conformity *de minimis* Emission Thresholds

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

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

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

4.2.2 Proposed Action

Stationary Sources and New Source Review

Local and regional pollutant impacts resulting from direct and indirect emissions from stationary emission sources under the Proposed Action are addressed through Federal and state permitting program requirements under NSR regulations (40 CFR 51 and 52). As noted previously, WPAFB has appropriate permits in place and has met all applicable permitting requirements and conditions for existing stationary devices. No new or modified stationary sources are anticipated as part of the Proposed Action with the exception of comfort heating equipment and/or emergency generators, in the newly constructed guardhouses. This equipment may be new or relocated from an original guardhouse that is demolished. WPAFB may be required to obtain proper air permits for such equipment under OAC Rules 3745-31 and 3745-77 prior to installation depending on the type and size of the equipment.

WPAFB may be required to obtain a permit-by-rule and modify the existing Title V operating permit to incorporate these sources on the insignificant activity list. Additionally, general contractors performing road and sidewalk demolition and construction might bring portable crushing equipment and/or concrete/asphalt batch plants onsite for use during certain project phases of the Proposed Action. Such equipment remains under ownership and operational control of the general contractor and are considered separate sources from WPAFB for air permitting purposes according to USEPA policy (USEPA 1996). The general contractor is required to obtain proper air permits under OAC Rule 3745-31, provide proper notification to the OEPA for relocating the portable equipment within the state of Ohio, and operate the equipment in accordance with the terms and conditions of the permit at all times while on WPAFB property.

National Emissions Standards for Hazardous Air Pollutants

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

- 40 CFR 63 Subpart GG, Aerospace NESHAP;
- 40 CFR 63 Subpart DDDDD, Industrial, Commercial, Institutional Boilers (Boiler Maximum Achievable Control Technology [MACT]);
- 40 CFR 63 Subpart ZZZZ, Reciprocating Internal Combustion Engines (RICE MACT); and
- 40 CFR 61 Subpart M, Asbestos Remediation.

Fugitive Dust Regulations

OAC Rule 3745-15-07 declares dust escaped from any source that causes damage to property to be a public nuisance. Pursuant to OAC Rule 3745-17-08(A)(2) and OAC Rule 3745-17-07(B)(11e), the OEPA Director may require any source that causes or contributes to such a nuisance to submit and implement a control plan that employs reasonably available control measures to prevent fugitive dust from becoming airborne.

Based on a review of the proposed work scope of activities, it has been determined that the potential sources of $PM_{2.5}$, SO_2, NO_x and VOC pollutant emissions associated with the Proposed Action would be from (1) construction/demolition activities associated with the Proposed Action; and (2) motor vehicle emissions associated with construction worker commuting and concrete/asphalt truck deliveries.

Under the Proposed Action, three major construction phases were identified that cannot commence simultaneously due to the requirement that Base security must be maintained at a high level and disruptions to Base activities must be minimized. For the purposes of this analysis, the construction commencement dates for the major phases include 2014 for Gate 1A, 2016 for Gate 26A, and an out year for Gate 15A activities. The scope of the analysis was limited to those operations or activities that result in emissions that would be directly or indirectly attributable to the implementation of the Proposed Action**.** The emissions calculations and *de minimis* threshold comparisons are collectively presented in the Air Conformity Analysis provided in **Appendix B**.

Greenhouse Gases

GHG emissions from the Proposed Action have been quantified to the extent feasible in this EIS for information and comparison purposes.

As previously indicated, the CEQ guidance indicates the reference point of 25,000 metric tons of direct CO_2 equivalent (CO_2-e) GHG emissions provides agencies with a useful indicator. GHG emissions were estimated using CO_2 off-road equipment emission factors spread over 2-year intervals. For example, construction activities under the Proposed Action for Gate 1A were estimated for a given year; Gate 15A construction activities were estimated 2 years after Gate 1A; and so on. In order to calculate CO_2-e emissions, the combined total CO_2 emissions for all construction years under the Proposed Action were estimated and reported in **Appendix B** at approximately 10,227 metric tons. The combined total CO_2-e total emissions for all construction years under the Proposed Action was then estimated at approximately 10,261 metric tons (11,313 long tons) of GHG emissions. In summary, the GHG emissions fall below the

25,000 metric ton per year indicator. Therefore, based on this analysis, a short-term and minor adverse impact to GHGs under the Proposed Action would be expected.

On-Base

Construction Activities

Short-term and minor adverse impacts are expected during construction activities under the Proposed Action. The Proposed Action consists of three groups of construction projects associated with the three ECFs identified for reconfiguration under the Proposed Action. These projects address the requirements for reconfiguring the existing nine ECFs in Area A and relocating the base perimeter fence across SR 444, making Area A contiguous with the Kittyhawk Center.

The construction projects would generate particulate (PM_{10} and $PM_{2.5}$) emissions as fugitive dust from movement of construction equipment (e.g., concrete delivery trucks and waste hauling), earth movement (grading and paving), and demolition (buildings and sidewalks/pavement). Fugitive dust emissions would occur during each construction phase. Because the emissions are estimated to be small and there is some uncertainty regarding precisely when they would occur, they were all conservatively assumed to occur within the same calendar year for a specific construction phase in this EIS. Fugitive dust emissions for various construction activities were calculated using emissions factors and assumptions published in USEPA's AP-42 Sections 11.9 and 11.19 dated July 1998 and Section 13.2 dated October 2006 (USEPA 1998, 2006).

Construction operations would also result in emissions of criteria pollutants as combustion products from construction equipment as well as evaporative emissions from architectural coatings. These emissions would be of a temporary nature. The coating emissions were estimated using paint specifications and material balance calculations. For the construction equipment combustion products, the emissions factors and estimates were generated based on guidance provided in Air Emission Factor Guide for Air Force Mobile Sources (AFCEE 2009).

Specific information describing the types of construction equipment required for a specific task, the hours the equipment is operated, and the operating conditions vary widely from project to project. For purposes of this analysis, these parameters were estimated using established methodologies for construction and experience with similar types of construction projects. The construction emissions are presented in **Table 4-2** and include onsite fugitive roadway emission from the concrete/asphalt delivery trucks associated with the Proposed Action project activities.

Table 4-2. Temporary Construction Emissions Associated with the Proposed Action and Alternative A*

Air Pollutant Emissions Source	NO_x Emissions (tpy)	VOC Emissions (tpy)	SO_2 Emissions (tpy)	$PM_{2.5}$ Emissions (tpy)
Proposed Action Gate 1A Construction				
Gate 1A Demolition and Relocation	8.70	0.72	0.66	0.53
New State Route 144 (curb and gutter)	8.94	0.69	0.68	0.55
Schuster Road Widening	4.25	0.35	0.32	0.27
Oak Street Intersection	4.13	0.31	0.32	0.26
Skeel Avenue at Wright Improvements	7.11	0.58	0.54	0.44
Gate 39A Demolition	0.91	0.06	0.07	0.05
Construction Commuter & Truck Deliveries	0.26	0.17	0.01	0.01
Total Temporary Emissions Gate 1A	34.30	2.88	2.60	2.11
Proposed Action Gate 15A Construction				
Gate 15A Reconfiguration	7.23	0.70	0.55	0.45
Ogden Road Access	7.48	0.53	0.58	0.46
Davis-Monthan Intersection	6.80	0.51	0.52	0.42
State Route 444 Connector Improvements	4.26	0.31	0.32	0.27
Skeel Avenue at Hebble Improvements	6.82	0.52	0.52	0.42
Hebble Creek Road Improvements	7.05	0.56	0.54	0.43
Access Road Improvements	5.03	0.35	0.38	0.31
Hope Hotel Access at Gate 12	7.57	0.54	0.58	0.47
Construction Commuter & Truck Deliveries	0.21	0.14	0.01	0.01
Total Temporary Emissions Gate 15A	52.45	4.16	4.00	3.24
Proposed Action Gate 26A Construction				
Gate 26A Demolition and Relocation	8.66	0.68	0.66	0.53
Loop Road Turn Lane	4.14	0.30	0.32	0.26
Construction Commuter & Truck Deliveries	0.09	0.06	0.002	0.004
Total Temporary Emissions Gate 26A	12.89	1.04	0.98	0.79

Notes: tpy = tons per year; * = Alternative A is a variation of the Proposed Action and would have similar impacts/emissions as the Proposed Action.

The information presented in **Table 4-2** shows the cumulative NO_x, VOC, CO, SO_2, PM_{10} and $PM_{2.5}$ emissions projected for a construction year under the Proposed Action at WPAFB. As shown in **Table 4-2**, the Proposed Action would not result in any annual emissions above conformity *de minimis* limits listed in 40 CFR 93.153 (b). Because the emissions expected from the Proposed Action would not exceed *de minimis* levels, the General Conformity Rule does not apply and the Proposed Action can be deemed to be in conformity with the Ohio SIP. **Appendix B** details the emissions factors, calculations, and estimates of construction, and motor vehicle emissions for the Proposed Action.

Directly Related Motor Vehicle Operations

Calculations of air pollutant emissions from privately owned vehicles (POVs) used for construction worker commuting were based from assumptions on the vehicle miles traveled, vehicle category or classification (e.g., light-duty gasoline vehicle), average vehicle speed measured in mph, average vehicle occupancy rate, and USEPA-approved pollutant emission factors. Emissions factors from USEPA's mobile source emission model, MOBILE6, were used to estimate emissions from motor vehicles as reported in tables listed in Air Emission Factor Guide for Air Force Mobile Sources (AFCEE 2009). No change with Base staffing levels is anticipated as a result the Proposed Action. Therefore, no impact of Base employee POV or government-owned vehicles (GOVs) are included.

Mobile source emissions were also estimated for the concrete/asphalt delivery trucks for each project based on the estimated amount of new pavement required for that project and assumptions regarding load size and length of trip. Emission factors listed in Air Emission Factor Guide for Air Force Mobile Sources (AFCEE 2009) were used to estimate criteria pollutant emissions.

Environmental Commitments - Short-term construction impacts will be mitigated through the use of proper control measures, including routine maintenance of all construction equipment, regular maintenance of the emission control devices on all construction equipment, and covering/wetting exposed soils to reduce fugitive dust during construction. Dust will be managed according to the requirements of ODOT's Construction and Material Specifications (C&MS). The C&MS is a set of specifications devised to promote uniform construction practices throughout the state of Ohio. The contractor will be required to submit a Construction Management Plan including plans to control impacts to air quality during construction. More detailed air quality mitigation will be prepared during the conceptual design phase of the projects.

As per the OAC Rule 3745-15-07 requirement, construction activities under the Proposed Action will comply with these regulations, which specify that there shall be no dust impacts off-site sufficient to cause a nuisance, and the OEPA director may require any source that causes or contributes to such a nuisance to submit and implement a control plan that employs reasonably available control measures to prevent fugitive dust from becoming airborne.

More detailed air quality commitments will be prepared during the conceptual design phase of the project.

Off-Base

Indirectly Related Motor Vehicle Operations

Calculations were performed for air pollutant emissions from POVs due the closure of a portion of SR 444. The SR 444 closure would cause traffic to be rerouted along an approximate 5.75-mile route following existing streets bypassing the Kittyhawk Center. The route would take traffic east on Dayton Drive, then south on Central Avenue with a merge onto Kauffman Avenue, then ending at Dayton-Yellow

Springs Road where the access back to SR 444 would remain intact. Because the total amount of traffic would not change as a result of this new rerouting, the emissions associated with the vehicular traffic are not included with the Air Conformity Analysis presented in **Table 4-2**.

However, a separate air emission analysis was conducted to assess the impact that the new traffic pattern might have on the existing streets over time using projected traffic count data. This analysis is detailed in **Appendix B** and shows that impact from the rerouted traffic would not adversely affect the ability of Greene County to maintain and improve air quality and demonstrate air conformity.

According to 40 CFR 81 Subpart D, no Class I visibility areas are located within 6.2 miles of WPAFB. The closest Federal Class I area is Mammoth Cave National Park in Kentucky, 199 miles to the south. Therefore, air emissions from the Proposed Action would not affect any Class I area.

The maximum Proposed Action-related emissions are below all General Conformity *de minimis* thresholds and all result from temporary construction activities that cease to be emitted following completion of the project. As a result of the Proposed Action, there would be negligible short-term adverse impacts and no long-term impacts to air quality.

4.2.3 Alternative A

This Alternative is a variation in design of the closure of SR 444 and includes less demolition and construction of existing gates but still includes rerouting existing traffic shown in **Table 4-2**. Therefore, Alternative A would have less of an impact during the temporary construction phase; however, the long-term air quality impacts under this alternative would be the same as the Proposed Action due to using the same re-routed traffic pattern. As shown in **Table 4-2**, Alternative A would not result in any annual emissions above conformity *de minimis* limits listed in 40 CFR 93.153 (b). Because the emissions expected from the alternative would not exceed *de minimis* levels, the General Conformity Rule does not apply and Alternative A can be deemed to be in conformity with the Ohio SIP.

4.2.4 No Action Alternative

Under the No Action Alternative, the existing nine ECFs would remain in place and no reconfiguration or improvements would be made to gates in Area A, and the Kittyhawk Center would remain separate from Area A. Thus, there would be no impact on air quality.

4.3 Noise

4.3.1 Evaluation Criteria

Noise impact analyses typically evaluate potential changes to existing noise environments that would result from implementation of a proposed action. Potential changes in the noise environment can be beneficial (i.e., if they reduce the number of sensitive receptors exposed to unacceptable noise levels), negligible (i.e., if the total area exposed to unacceptable noise levels is essentially unchanged), or adverse

(i.e., if they result in increased noise exposure to unacceptable noise levels). Projected noise impacts were evaluated quantitatively for the Proposed Action, Alternative A, and No Action for the design year used in the traffic study.

4.3.2 Proposed Action

On-Base

The project area (WPAFB Area A) is located within current operations noise contours defined as the "less than 65 dB" and "65 to 70 dB".

Construction of the Proposed Action would generate short-term minor adverse impacts on ambient noise levels in and near the project area. The use of heavy equipment including bulldozers, graders, backhoes, excavators, and dump trucks would generate noise that could affect construction workers. Construction equipment typically emits noise in the range of 86 to 94 dB, with heavy duty trucks generating a noise level of approximately 90 dBA (very loud) at 50 ft for example. Attenuation to 65 dBA (moderately loud) would occur at a distance of approximately 800 to 1,000 ft depending on climatic conditions, topography, vegetation, and manmade barriers.

Construction workers would use hearing protection and follow OSHA standards and procedures. On-site workers in nearby facilities would experience short-term, intermittent muffled noise during the workday. On-Base personnel in the vicinity of the Gate 1A project area may experience some short-term, intermittent muffled noise during the workday when road improvements are under construction, particularly in the area of the Schuster Road intersection with Talbott Road, and the intersection of realigned Spruce Way with Redbud Lane. This would also be the case in the off-Base neighborhood near the intersection of SR 235 and Circle Drive, located east of the Gate 26A project area (**Figure 7, Appendix C**), and for the residential area across SR 444 from Gate 12A (**Figure 9, Appendix C**). While this intermittent, temporary exposure could be a nuisance, it would not be expected to pose a threat to hearing.

Once construction of the ECFs and related roadway approaches is complete, noise associated with construction activities would cease. As a result of the Proposed Action, no long-term adverse noise impacts would be expected. In addition, under the Proposed Action, a beneficial effect would be expected to on-Base residential/recreational areas resulting from less traffic at fewer ECF locations.

Environmental Commitments – The following are proposed environmental commitments under the Proposed Action:

- Limit operation of heavy equipment and other noisy procedures to daylight hours whenever possible;
- Install and maintain effective mufflers on equipment;

- Locate equipment and vehicle staging areas as far from noise sensitive areas as possible; and
- Limit unnecessary idling of equipment.

Off-Base

Construction of the Proposed Action would generate short-term minor adverse impacts on ambient noise levels in and near the project area. The use of heavy equipment including bulldozers, graders, backhoes, excavators, and dump trucks would generate noise that could affect construction workers. Businesses and residences in the vicinity of the off-Base project area may experience some short-term, intermittent muffled noise during the workday when road improvements are under construction, particularly in the area of the off-Base neighborhood near SR 235 and Circle Drive located east of the Gate 26A project area, and for the residential area across SR 444 at Gate 12A. While this intermittent, temporary exposure could be a nuisance, it would not be expected to pose a threat to hearing.

Traffic Noise Screening

The ODOT policy memorandum *Standard Procedure for Analysis and Abatement of Highway Traffic Noise* effective June 14, 2011, defines procedures for conducting noise impact analyses and assessing mitigation measures for highway projects in the State of Ohio. The guidance provided in this memorandum was issued under the authority of FHWA Policy memorandum *Highway Traffic Noise: Analyses and Abatement: Policy and Guidance* (January 2011), and Title 23 CFR Section 772 *Procedures for Abatement of Highway Traffic Noise and Construction Noise*.

A traffic noise screening was conducted in April 2011 to document existing and future potential traffic noise conditions along the off-Base redirected route resulting from the closure of SR 444. Field measurements were conducted during two measurement sessions over a 2-day period during April 2011. Manual traffic counts were conducted on sections of Kauffman Avenue, Central Avenue, and Dayton Drive. Traffic counts were performed during AM and PM peak hours to obtain values for use in calculating a traffic noise model (TNM).

Representative receptor locations were selected to measure traffic noise impacts for noise sensitive land uses in the study area and included residential developments, a location on the Huffman Prairie Bikeway, and a community park named Central Park. The traffic noise study analyzed existing (year 2010) and future (year 2032) traffic noise impacts from seven noise sensitive properties located within 500 ft from the study area's outside travel lane edge. Sensitive noise receptor locations are listed in **Table 4-3** and shown on **Figure 3-3**. A 500 ft boundary was selected and used in accordance with the *Standard Procedure for Analysis and Abatement of Highway Traffic Noise* guidance.

Table 4-3. Traffic Noise Model Summary

Location of Representative Receiver	TNM Name	Existing 2010 No Build (dBA)	No Build 2032 (dBA)	Build 2032 (dBA)
1662 Kauffman Avenue	1	63.7	64.2	65.4
417 Madison Street	2	59.4	59.8	64.8
Huffman Prairie Bikeway	3	59.3	59.7	65.3
110 Lindberg Drive	4	61.0	61.4	66.1
Central park	5	58.4	58.6	63.3
112 Dayton Drive	6	54.2	54.4	61.0
315 Dayton Drive	7	54.5	55.0	60.1

Notes: TNM = Traffic Noise Model; dBA = A-weighted sound level measurement; **Bold** = predicted noise level greater than 60 dBA threshold

As presented in **Table 4-3**, the Existing (year) 2010 No Build represents the current condition of SR 444, where off-Base traffic travels through the Kittyhawk area. The existing condition is the baseline prediction and is compared to the future No Build 2032 and Build 2032 conditions to assess the potential for traffic noise impacts resulting from the Proposed Action. Both the No Build and Build scenarios represent conditions in the study area in the projected design year of 2032, where SR 444 continues to travel through the Kittyhawk area in the No Build and where SR 444 is closed to traffic in the Build condition. In the Build scenario, SR 444 traffic is diverted through the study area, thus moving traffic closer to adjacent noise sensitive land uses.

The traffic noise study determined that two of seven screened off-Base locations currently experience noise levels above 60 dBA (value bold in **Table 4-3**), the level at which ODOT would require further evaluation. In the 2032 No Build scenario, the same two locations exceed the 60 dBA threshold. All locations exceed the 60 dBA threshold in the 2032 Build scenario.

The proposed closure of SR 444 would result in increased traffic to off-Base streets designated for the re-directed SR 444, including Dayton-Yellow Springs Road, Kauffman Avenue, Central Avenue, Dayton Drive, and Broad Street. Much of the land adjacent to or near these streets is zoned residential, and is noise sensitive. It is anticipated that if SR 444 is closed and traffic diverts to other streets in the study area, additional traffic noise studies would be required to more accurately access traffic noise impacts that would result from the Proposed Action. The Traffic Noise Screening Report is included in **Appendix C**.

It is expected that noise generated from construction activities (i.e., heavy truck traffic to and from the project areas) as a result of the Proposed Action would contribute to the existing traffic noise levels in the project area. Construction operations would adhere to local construction noise ordinances (i.e., Fairborn, Ohio ordinance ORD 48-07 - Excessive Vehicle Noise). This short-term increase in noise would typically occur during daytime hours. Possible measures that could be implemented to minimize construction noise impacts include limiting operation of heavy equipment to daylight hours; installing and maintaining effective mufflers on equipment; locating equipment and vehicle staging areas as far from noise sensitive areas as possible; and limiting unnecessary idling of equipment.

Under the Proposed Action, moderate long-term adverse impacts to noise are expected in the off-Base project area as a result of diverted/increased traffic travelling on the following roadways: Dayton-Yellow Springs Road, Kauffman Avenue, Central Avenue, Dayton Drive, and Broad Street. Land adjacent to or near these roadways is residential and noise sensitive. Based on the traffic noise screening, Kauffman Avenue and Lindberg Drive currently experience noise levels above 60 dBA (level at which ODOT would require further noise evaluation) and would continue to experience noise levels above 60 dBA in the No Build year 2032. The traffic noise screening indicated that all receiver locations screened (**Table 4-3**) would exceed 60 dBA under the Proposed Action Build scenario. As such, the businesses and residences located in the vicinity of these off-Base roads would experience increased traffic noise as a result of closing a segment of SR 444. Construction noise will be managed per ODOT's C&MS.

4.3.3 Alternative A

On-Base

Much of the anticipated noise impacts generated under Alternative A would be a result of ECF construction activities. Transportation improvements proposed under Alternative A would be similar to the Proposed Action. One difference is that no construction is proposed in the vicinity of the Schuster Road intersection with Talbott Road, or the intersection of re-aligned Spruce Way with Redbud Lane (**Figure 8, Appendix C**); therefore, these areas are not expected to be impacted by construction noise.

Off-Base

The off-Base transportation noise impacts of Alternative A would be similar to the Proposed Action, as SR 444 would be re-directed in either case. Construction-related noise impacts also would be similar.

4.3.4 No Action

Under the No Action Alternative, the existing nine ECFs would remain in place and no reconfiguration or improvements would be made to gates in Area A, and the Kittyhawk Center would remain separate from Area A. Thus, there would be no noise impacts.

4.4 Geology and Soils

4.4.1 Evaluation Criteria

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

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

- Identification and description of resources that could potentially be affected;
- Examination of a proposed action and the potential impacts this action may have on the resource;

- Assessment of the level of potential impacts; and
- Provision of mitigation measures in the event that potentially adverse impacts are identified.

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

The Proposed Action, Alternative A, or the No Action Alternative would result in an adverse impact if:

- Regional geology were affected;
- Soils classified as prime and unique farmland were affected;
- Soils affected were considered unsuitable for development; and
- Building construction was incompatible with the seismic risk status of the project area.

4.4.2 Proposed Action

On-Base

Surface soil within the project area is composed primarily of silt to clayey loams; as a result, there would be a continuous potential for erosion. As a result of the construction activities, there would be short-term minor adverse impacts to soils during site preparation and excavation activities. Impacts would be minimized through implementation of erosion and siltation controls.

The Proposed Action would have negligible to minor long-term adverse impacts on local geology at the site, but would not affect regional geology. Long-term negligible, adverse impacts to soils would occur from the proposed project. No adverse impacts to natural hazards would result from the proposed project. There would be no impacts to prime or unique farmlands since none are located in the immediate area.

Construction Impacts – The proposed project would affect local geology. The impacts to surficial, and possibly bedrock geology, (depending on extent of excavation necessary and the exact depth of bedrock in the project area) would result from the site preparation and covering of geologic features. However, there would be no adverse impacts to regional geologic features or mineral sources; therefore, long-term effects to geology would be considered negligible to minor.

There are no known voids, fissures, underground streams, or unusual geological conditions at the site that would be affected by, or impede, the construction of the proposed ECF structures.

Construction activities are not expected to have an adverse effect on the site's pre-existing geologic conditions. Subsurface engineering studies would be undertaken in advance of final design and construction to ensure that sound building practices are implemented.

Most of the impacts to existing soil conditions would occur during project construction. Although minimal excavation would be required, it is not expected to result in excessive disruption or displacement

of soils. Some of the excavated soil on the ECF sites would be redistributed as fill. Soil types, characteristics, and conditions are not expected to pose a major constraint to the construction of the proposed project.

Construction activities under the Proposed Action are not expected to have an adverse effect on the site's pre-existing seismic conditions. The proposed project is unlikely to trigger local seismic events, but could be impacted by such events.

Environmental Commitments - Implementation of the following standard measures under the Proposed Action would result in negligible impacts to soils as a result of construction.

- Soil suitability will be determined and appropriate building foundation specifications will be developed.
- A detailed erosion and sedimentation control plan will be developed prior to construction, based on the requirements of the SWPPP.
- Measures to be taken would include minimizing areas of disturbance, provision of silt barriers, and landscaping of unimproved areas.
- Landscaping should follow construction as soon as practicable.

Off-Base

Soils within the off-Base project areas are composed of similar soils as those existing on-Base. The Proposed Action does not involve directly impacting off-Base soils. However, potential road-widening and improvements could occur resulting from the Proposed Action. Therefore, off-Base roadway improvements would result in short-term and minor adverse impacts to soils during roadway improvement preparation and excavation activities. Impacts would be minimized through implementation of erosion and siltation controls.

The Proposed Action would have negligible to minor long-term adverse impacts on local off-Base geology, but would not affect regional geology. Long-term, negligible, adverse impacts to off-Base soils would occur from the proposed project. No adverse impacts to natural hazards would result from the proposed project. There would be no impacts to prime or unique farmlands since none are located in the immediate area.

4.4.3 Alternative A

On-Base and off-Base impacts to soils and local geology under this alternative would be similar to the Proposed Action.

4.4.4 No Action

Under the No Action Alternative, the existing nine ECFs would remain in place and no reconfiguration or improvements would be made to gates in Area A, and the Kittyhawk Center would remain separate from Area A. Thus, there would be no impact to geology or soils.

4.5 Water Resources

4.5.1 Evaluation Criteria

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

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

4.5.2 Proposed Action

On-Base

Groundwater and Surface Water

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

Under the Proposed Action, approximately 300 linear ft of an unnamed tributary of Hebble Creek would be impacted due to realignment of Skeel Avenue in the Gate 15A project area. The stream is expected to be regulated as a “water of the United States,” and impacts would likely require a permit from the USACE under Section 404 of the CWA, and a Section 401 water quality certification from the OEPA. Environmental commitment measures for unavoidable impacts would likely be required.

The proposed project would impact the streams and stormwater conveyances within and outside the project area during construction by increased siltation. Based on the nature of flowing water, the siltation effects would be temporary.

Under the Proposed Action, the placement of additional impervious paved surfaces on the Base would be constructed. While this would slightly increase stormwater runoff, no post construction stormwater management would be expected.

Since the proposed construction activities would disturb over 1 acre of land, coverage under a NPDES general stormwater permit for construction activities would be required. The NOI to use the general permit must be submitted to the Base Asset Management Division by the construction contractor. The Base would review and submit the NOI at least 21 days prior to soil disturbance. The contractor would prepare a site-specific SWPPP that would address erosion control measures and best management practices and maintenance and inspection procedures that would be followed. The SWPPP would also address procedures to be followed in the event of a release of a petroleum product or hazardous substance.

Considering the magnitude of the surface water resources and the accompanying proposed environmental commitment measures under the CWA permits, the resulting impacts would be expected to be minor and long-term.

Floodplains

According to EO 11988, *Floodplain Management*, any new construction in the regulatory floodplain must: apply accepted flood protection to reduce the risk of flood-associated damages; minimize the impacts of floods on human safety, health, and welfare; and restore and preserve the natural and beneficial values served by floodplains. A portion of the Gate 15A project area is located within the 100-year floodplain.

As part of the IICEP process for this EIS, WPAFB requested input from MCD on the Proposed Action. MCD has stipulated that since Gate 15A is located in the 100-year floodplain, development would be subject to building restrictions set forth by MCD. A copy of the correspondence with MCD is provided in **Appendix A**.

Off-Base

Groundwater and Surface Water

Similar to on-Base groundwater and surface water, off-Base roadway improvements that could occur as a result of the Proposed Action would impact streams and stormwater conveyances within and outside the roadway improvement project areas during construction by increased siltation. Based on the nature of flowing water, the siltation effects would be temporary. In addition, consideration would be given to potential impacts in the areas of the City of Fairborn's backup well fields. The City of Fairborn maintains an endorsed Drinking Water Source Protection Plan that assists public water suppliers with protecting these drinking water backup sources from contamination. Negligible adverse impacts to the backup well fields and the city's endorsed plan are expected as a result of the Proposed Action.

Floodplains

All off-Base roadways within the area of influence are located outside the designated floodplain with the exception of a small segment of Kauffman Avenue (**Figure 3-5b**). Improvements to Kauffman Avenue as a result of the Proposed Action are unknown to date. However, it is noted that the Kauffman Avenue

roadway, right-of-way property, and an active railroad all exist in close proximity to this area. Impacts to the floodplain of the Mad River would be expected to be short-term and negligible to the floodplain of the Mad River under the Proposed Action.

Environmental Commitments – The following is a summary of proposed measures to minimize impacts to surface water or groundwater under the Proposed Action. These environmental commitments implemented on-Base to minimize surface water, groundwater, and/or floodplains impacts would lessen the likelihood that off-Base environmental commitments would be necessary.

- WPAFB will implement erosion and sediment control practices, such as sediment trapping, filtering, and other BMPs, as individual projects are constructed. Storm water management plans will also be prepared on a project-by-project basis to address long-term runoff and pollutant discharge.

- WPAFB will prepare a SWPPP to include time frames when soil would be re-stabilized after being disturbed, the type of stabilization to be used, record of weekly storm events inspections, and maintenance necessary to keep BMPs employed until the site reaches 70 percent stabilization. The SWPPP will address BMPs employed to control erosion and sediment loss at the project sites. Minimum BMPs or Best Pollution Practices to be used will include a construction site entrance, silt fencing, storm drain protection, straw mulching, and reseeding of bare surfaces as soon as possible.

- Post-project BMPs may include the use of permeable pavers and bio-retention areas such as rain-gardens. Use of these BMPs would result in either a decrease in permeable surface areas, or preclude net increases in impermeable surface areas with additional developments, and would allow for greater infiltration of rain into the soil and consequently reduce stormwater runoff and pollution potential.

- As required by law, on-site stormwater management controls will be provided to limit the amount of storm runoff leaving the site during a storm event and to reduce the amount of contaminants in that runoff. Stormwater quantity and quality management practices required by WPAFB will ensure no increase in post-development runoff peak flow and would mitigate the impacts of increased stormwater runoff on the combined sewer system.

- Any fill material to be placed within the project area that occurs below the spillway elevation of 835.0 ft must have prior written approval from the MCD.

4.5.3 Alternative A

On-Base

This alternative would involve impacting a portion of the unnamed tributary to Hebble Creek. Stream impacts would likely require a permit from the USACE under Section 404 of the CWA and a Section 401 water quality certification from the OEPA. Mitigation for unavoidable impacts would likely be required. Similar to the Proposed Action, coverage under a NPDES general stormwater permit for construction activities would be required and a site specific SWPPP would be necessary. The resulting adverse

impacts on surface water resources would be expected to be minor and long-term. Impacts to the floodplain would be similar to that as the Proposed Action.

Off-Base

Impacts to off-Base groundwater, surface water, and floodplains would be similar to the Proposed Action.

4.5.4 No Action

Under the No Action Alternative, the existing nine ECFs would remain in place and no reconfiguration or improvements would be made to gates in Area A, and the Kittyhawk Center would remain separate from Area A. Thus, there would be no impact on surface water, groundwater, or floodplains.

4.6 Biological Resources

This section describes the potential environmental consequences associated with biological resources (vegetation, wildlife, threatened and endangered species, and wetlands) as a result of implementing the Proposed Action, Alternative A, and the No Action Alternative.

4.6.1 Evaluation Criteria

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

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

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

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

4.6.2 Proposed Action

On-Base

Vegetation

Vegetation within the proposed project area surrounding Gates 1A, 15A, and 26A consists primarily of previously disturbed vegetation and areas of isolated trees. Portions of this vegetation would be disturbed

and removed during site preparation for the Proposed Action. Adverse impacts would be minor due to the types of vegetation and its common occurrence on Base.

Under the Proposed Action, approximately 300 linear feet of vegetation adjacent to the unnamed tributary of Hebble Creek would be removed for the reconfiguration of Skeel Avenue (north of Communications Boulevard) within the Gate 15A project area. Vegetation in this area consists of mowed/maintained right-of-way on the north side and a narrow line of scattered trees and bush honeysuckle on the south side of the creek. Neither side of Hebble Creek currently acts as riparian buffer with regard to stormwater runoff or high water events. Removed vegetation in this area as a result of the Proposed Action would be replaced with native, non-invasive vegetative plantings and any disturbance on either the creek or riparian zones would require a USACE 404/401 permit which would follow permit requirements with regard to sediment and erosion control.

As a result of the Proposed Action, there would be no noticeable increase in stormwater runoff during construction and given the current pattern of vegetation, post-construction conditions based on stormwater runoff or high water events would be expected to be similar to pre-construction conditions.

Vegetation within the project area is located adjacent to existing roadways, buildings, and/or pavement; therefore, no fragmentation of large habitat areas would occur. Short-term minor adverse impacts to vegetation would occur as part of construction activities, including soil disturbances.

Affected areas would be mulched and revegetated with native plants following the construction and demolition period to prevent nonnative, invasive plant growth. Short-term, localized effects on vegetation could be expected in proximity to the construction and demolition sites. Therefore, negligible adverse effects on vegetation would be expected as a result of the implementation of the Proposed Action.

Wildlife

Potential habitats that would be impacted by the Proposed Action include woodlots, roadside habitat, and maintained turf. These habitats provide foraging and roosting areas for a wide variety of common wildlife species. Woodlots, roadside habitat, and maintained turf are widely available across the Base and would provide nearby refuges for displaced wildlife. Therefore, short-term adverse impacts from the destruction of these habitat types would be negligible for terrestrial wildlife.

Potential adverse effects on wildlife are also a function of noise produced by operations. Predictors of wildlife response include prior experience with existing and similar operations, stage in the breeding cycle, activity or context, age, and sex composition. Previous experience with similar operations is the most important of these indicators. The maximum sound level projected for the WPAFB operations under the Proposed Action would be the same or less than current conditions. Therefore, no adverse effects on wildlife would be expected to result from operations under the Proposed Action.

Impacts to narrow forested vegetation surrounding the unnamed tributary of Hebble Creek would remove part of a potential travel corridor that is likely used for a variety of wildlife. Habitat destruction from fill or culvert placement in the unnamed tributary of Hebble Creek would be a permanent long-term impact on aquatic wildlife. Motile aquatic species would likely find refuge upstream or downstream of the potentially impacted area. Sessile species would be unable to avoid impacts and would suffer mortality. These habitat alterations would likely result in localized decrease in the amount and diversity of the species present in the stream on a short-term basis.

Threatened and Endangered Species

Designated potential habitat areas for the Indiana bat are located within the proposed alignment for the new access road in the Gate 26A area. Approximately one third of the designated habitat area would be impacted as a result of the Proposed Action. As specified in the WPAFB INRMP, coordination with WPAFB's Natural Resources Manager is required for activities or projects requiring tree removal in forested areas or small woodlots, and/or the removal of suitable Indiana bat roosting trees possibly encountered during projects (WPAFB 2007a). The INRMP prohibits cutting potential roosting trees during nesting season in order to avoid incidental take of roosting bats. The USFWS has confirmed that the seasonal cutting restrictions would avoid impact to this species in the project area. The nesting season is between April 1 and September 30 (USFWS 2008).

Approximately 300 linear ft of a narrow, forested vegetative corridor surrounding the unnamed tributary (Stream 1) of Hebble Creek would be removed and a portion of Stream 1 would be converted to underground culverts. The loss of stream habitat could potentially have a short-term impact on foraging activity. Additionally, only one potential summer roost tree was encountered along this corridor which would be cut outside of the nesting season. Impacts would be considered negligible and short-term. No long-term adverse impacts are anticipated for the Indiana bat. Potential impacts would be minimized by implementing tree cutting in accordance with the WPAFB INRMP.

A designated potential habitat area for the bald eagle is also located within the proposed alignment for the new access road in the Gate 26A project area. Approximately one third of the designated habitat area would be impacted in this location. To protect and promote habitat for the bald eagle, the Base manages riparian forests that protect existing tall, large-diameter trees, and promotes growth in stands where they are lacking (WPAFB 2007a). Trees within this habitat area were observed to be 8-inch diameter and approximately 4 ft height, and would not be expected to provide optimal habitat for the bald eagle. No known sightings of the bald eagle have been reported in the project area. No short- or long-term impacts to the bald eagle would be expected.

There is no potential habitat for the eastern massassauga rattlesnake within the on-Base project areas. This Federal candidate species is usually found in wet areas including wet prairies, marshes, and low-lying areas adjacent to higher ground for foraging.

As part of the IICEP process, WPAFB requested concurrence from the USFWS regarding the Proposed Action. The USFWS responded in a letter dated October 28, 2011 that the proposed project would have no effect on the bald eagle, clubshell, rayed bean, and snuffbox and may affect, is not likely to adversely affect the Indiana bat and EMR. Therefore, the Proposed Action would have no adverse affect on on-Base threatened and endangered species. Copies of correspondence with USFWS are provided in **Appendix A**.

Wetlands/Jurisdictional Waters

No wetlands occur within the on-Base portion of the proposed project area. Under the Proposed Action, approximately 300 linear ft of a narrow, forested vegetative corridor surrounding Stream 1 would be removed and portions of the stream would be converted to underground culverts for the reconfiguration of Skeel Avenue (north of Communications Boulevard) within the Gate 15A project area. No direct or indirect impacts are anticipated for Stream 2 or Stream 3.

Environmental Commitments – Proposed environmental commitments under the Proposed Action include avoiding known locations of special-status species. Appropriate measures will be applied if future facility operations would disturb these areas. The following is a summary of proposed environmental commitments under the Proposed Action:

- Maintain large green space to provide for wildlife habitat and movement corridors.
- Re-vegetate areas of removed or damaged vegetation, as a result of construction activities, to mitigate impacts to terrestrial biota.
- Remove non-native and invasive vegetation and replace with native species on a project by project basis. To the extent practical, WPAFB will implement measures to avoid impacts to larger tree specimens native to the surrounding area. More detailed planting plans and tree save measures will be prepared with individual projects.
- Restore disturbed areas as part of construction activities and replace with similar vegetative species after completion of construction activities.
- Implement mitigation under the CWA Sections 404 and 401 permit requirements for stream impacts, such as riparian corridor mitigation, which would compensate for the loss of vegetation within this corridor.

Off-Base

Vegetation

Under the Proposed Action, potential impacts to off-Base vegetation would be minor since vegetation consists of previously disturbed grassy areas. As part of relocating the base perimeter fence, the off-Base roadways would potentially require widening and/or turn-lanes would be required to accommodate increased traffic. Although short-term minor adverse impacts to vegetation would occur as part of construction activities including soil disturbances, mitigation and restoration would be implemented to

prevent long-term impacts to vegetation.

Wildlife

Potential off-Base habitats that would be impacted by the Proposed Action include roadside habitat and maintained turf. These habitats provide foraging and roosting areas for a wide variety of wildlife species. Roadside habitat and maintained turf are widely available on the Base and would provide nearby refuges for displaced wildlife. Therefore, short-term impacts from the destruction of these habitat types would be minimal for terrestrial wildlife.

Threatened and Endangered Species

There is no known potential habitat or known occurrences of the Indiana bat, bald eagle, eastern massassauga rattlesnake, or any other federally- or state-listed rare species within the off-Base area of influence. No short- or long-term adverse impacts are anticipated for any threatened or endangered species. The USFWS concurred that the proposed project would have no effect on the bald eagle, clubshell, rayed bean, and snuffbox and may affect, is not likely to adversely affect the Indiana bat and EMR. Therefore, the Proposed Action would have no adverse affect on off-site threatened and endangered species. Copies of correspondence with USFWS are provided in **Appendix A**.

Wetlands/Jurisdictional Waters

There are no wetlands occurring on the off-Base area of influence. Stream 2 and Stream 3 flow westward under Kauffman Avenue and ultimately onto the Base. There are no anticipated direct or indirect adverse impacts to either.

4.6.3 Alternative A

On-Base

Vegetation

Alternative A would involve enclosing the Kittyhawk Center within Area A by extending the base perimeter fencing to include the Kittyhawk Center. Alternative A does not include gate improvements thus the vegetative corridor noted within the Gate 15A project area would not be impacted under this alternative. The vegetation associated with Alternative A consists of previously disturbed vegetation such as maintained turf and right-of-ways and areas of isolated trees. Portions of this vegetation would be disturbed and removed during site preparation for extending the fence, but impacts would be minor due to the types of vegetation and its common occurrence on-Base. Disturbed areas as part of construction activities would be restored and replaced with similar vegetative species after completion of construction activities.

Wildlife

Potential habitats that would be impacted by Alternative A consist of previously disturbed vegetation such as maintained turf and right-of-ways and areas of isolated trees. These habitats provide foraging and

roosting areas for a wide variety of common wildlife species. These habitats are widely available across the Base and would provide nearby refuges for displaced wildlife. Therefore, short-term impacts from the destruction of these habitat types would be minimal for terrestrial wildlife and no long-term impacts are anticipated.

Threatened and Endangered Species

There is no known potential habitat or known occurrences of the Indiana bat, bald eagle, or any other federally- or state-listed rare species within the Alternative A impact area. Thus no short- or long-term impacts are anticipated for any threatened or endangered species.

Wetlands/Jurisdictional Waters

There are no wetlands or other jurisdictional waters occurring within the Alternative A project area. No direct, indirect, or cumulative impacts are anticipated.

Off-Base

Impacts to off-Base vegetation, wildlife, threatened and endangered species, and wetlands/jurisdictional waters under Alternative A would be similar to that as impacts resulting from the Proposed Action.

4.6.4 No Action

Under the No Action Alternative, the existing nine ECFs would remain in place and no reconfiguration or improvements would be made to gates in Area A, and the Kittyhawk Center would remain separate from Area A. Thus, there would be no impact to biological resources.

4.7 Cultural Resources

4.7.1 Evaluation Criteria

The following is the assessment of effects. Adverse impacts on cultural resources might include: physically altering, damaging, or destroying all or part of a resource; altering characteristics of the surrounding environment that contribute to the resource's significance; introducing visual or audible elements that are out of character with the property or alter its setting; neglecting the resource to the extent that it deteriorates or is destroyed; or the sale, transfer, or lease of the property out of agency ownership (or control) without adequate legally enforceable restrictions or conditions to ensure preservation of the property's historic significance.

4.7.2 Proposed Action

The most relevant impacts on cultural resources under the Proposed Action would be related to the direct impacts from ground-disturbing activities. Other relevant factors include noise, pollution, and vibration from increased traffic flow and its effects on properties in proximity to the Proposed Action. The foremost factor affecting the definition of the APE for the Proposed Action in terms of effects to historic properties is realignment of traffic flow through the affected area. Having evaluated the possible effects

the Proposed Action might have on potential cultural resources, an APE was established and a cultural resources survey (HDC 2011) was conducted of the areas. There are no known potential prehistoric or historic site locations in the areas where ground-disturbing activities are planned for either on-Base or off-Base APEs. The on-Base and off-Base APEs are not considered to have a high sensitivity for cultural resources. Furthermore, the APEs have suffered heavy disturbance in the past. There is no potential for degradation of the setting from noise and visual intrusion related to the proposed construction activities or operations, nor is there a potential for structural damage from noise and low-frequency vibrations associated with the construction activities or operations.

On-Base

Based on the findings of the on-Base cultural resources inventory, there are no known archaeological sites or historic properties in the vicinity of the on-Base APE (WPAFB 2006a). Therefore, WPAFB proposed a finding of no historic properties affected per 36CFR§800.4(d)(1). WPAFB requested input from the SHPO regarding concurrence on findings of no effect to off-Base historic properties as a result of the Proposed Action in a letter dated October 20, 2011 (**Appendix A**). The SHPO responded in a letter dated October 28, 2011 (**Appendix A**), indicating concurrence with the finding that the proposed entry control reconfiguration will not affect historic properties.

Off-Base

No NRHP-eligible archaeological sites or historic properties were identified in the off-Base APE (HDC 2011). Since no NRHP listed or eligible properties exist within the vicinity of the off-Base APE, the Proposed Action would not affect off-Base cultural resources. Any potential off-Base cultural resources impacts, which could be the result of any future off-Base transportation improvements instituted in response to the Proposed Action, would be determined by FHWA/ODOT in a separate NEPA documentation and Section 106 consultation.

4.7.3 Alternative A

Anticipated on-Base and off-Base effects to cultural resources under this alternative would be identical to the Proposed Action.

4.7.4 No Action

Under the No Action Alternative, the existing nine ECFs would remain in place and no reconfiguration or improvements would be made to gates in Area A, and the Kittyhawk Center would remain separate from Area A. Thus, there would be no impact to cultural resources.

4.8 Socioeconomics

4.8.1 Evaluation Criteria

The Proposed Action includes construction and demolition projects associated with the ECFs. The level of construction expenditure impacts is assessed in terms of direct effects on the local economy and related

effects on other socioeconomic resources (e.g., housing, community resources). The magnitude of potential impacts can vary greatly, depending on the location of a proposed action. For example, implementation of an action that creates 10 employment positions might be unnoticed in an urban area, but might have adverse impacts in a rural region. If potential socioeconomic changes were to result in substantial shifts in population trends or in adverse effects on regional spending and earning patterns, they would be considered adverse.

This section identifies potential economic and social impacts that might result from the Proposed Action, Alternative A, and the No Action Alternative. The methodology for the economic impact assessment is based on the Economic Impact Forecast System (EIFS) developed by the DoD in the 1970s to efficiently identify and address the regional economic effects of proposed military actions (EIFS 2001). EIFS provides a standardized system to quantify the impact of military actions, and to compare various options or alternatives in a standard, non-arbitrary approach.

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

EIFS works well to evaluate impacts on a regional basis, but is not an appropriate tool for evaluating the impacts of a specific military action on a sub-regional basis. The proposed project has immediate physical impacts on a portion of the city of Fairborn, with the potential to result in greater adverse impacts to the immediate project area when considered in the scale of the local economy and social environment that might be lost if evaluated only as a part of regional effects. Because data were not available to perform a quantitative analysis in most cases, the local impacts of the project were evaluated using available studies, planning documents, and professional estimates.

The Proposed Action at WPAFB would have an adverse impact with respect to the socioeconomic conditions in the surrounding MSA or in the immediate vicinity of the SR 444 redirection route if it would:

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

As part of this EIS, a socioeconomic impact analysis study was conducted. The report is presented in **Appendix F** with findings discussed below.

4.8.2 Proposed Action

On-Base

While the Proposed Action would be expected to have a short-term beneficial impact on employment and on the local tax base, these impacts would be negligible and occur primarily during the construction phase of the project.

Off-Base

The long-term impacts of the Proposed Action are likely to be beneficial on a regional scale: improved security on-Base is likely to result in greater safety for the general public in the vicinity of the Base, and the improvement in storage capacity of the entry gate facilities is likely to result in decreased traffic delays outside the gates during times of heightened security.

On a local basis, the Proposed Action is expected to contribute to a long-term positive impact on the viability of the downtown Fairborn business district. Businesses located along streets travelled as a result of closing SR 444 (Kauffman Avenue, S. Central Avenue, W. Dayton Drive, S. Broad Street) would likely experience an increase in vehicular traffic and therefore potential increased commercial growth as a result of increased traffic and visibility.

The Proposed Action is expected to result in a long-term and minor adverse impact to residential property values for homes located along streets travelled as a result of closing SR 444. Anticipated increases in traffic delays and congestion, and related increases in noise and air pollutants as a result of directing traffic along a route not designed for the projected volumes would be expected from closing SR 444.

The total amount of traffic rerouted as a result of the Proposed Action is not expected to change and air pollutant emissions associated with traffic would remain the same. Therefore, a negligible adverse impact on the short and long-term health of the children living within the off-Base area of influence would be expected.

Because SR 444 is part of the National Highway System (NHS), procedures defined at 23 CFR 470 Subpart A must be followed to make a change to the route. Under this regulation, ODOT, in consultation with responsible local officials (i.e., Greene County Engineer's Office, City of Fairborn, Miami Valley Planning Commission), is responsible for proposing to the FHWA all official actions regarding the designation or revision of SR 444.

4.8.3 Alternative A

Anticipated on- and off-Base effects on socioeconomics under this alternative would be similar to the Proposed Action.

4.8.4 No Action

Under the No Action Alternative, the existing nine ECFs would remain in place and no reconfiguration or improvements would be made to gates in Area A, and the Kittyhawk Center would remain separate from Area A. Thus, there would be no impact on socioeconomics.

4.9 Environmental Justice

4.9.1 Evaluation Criteria

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

As part of this EIS, a socioeconomic impact analysis study was conducted which included an analysis of environmental justice concerns. The report is presented in **Appendix F** and findings are discussed below.

4.9.2 Proposed Action

On-Base

To comply with EO 12898, ethnicity and poverty status in the study area have been examined and compared to area, regional, and state statistics to determine if minority or low-income groups could be disproportionately affected by the Proposed Action. The population on the Base is represented by Census tract 2803, which has a higher percentage of minority and Hispanic residents than is typical for the project area. The Proposed Action is expected to improve on-Base security and safety. Other changes anticipated by the Proposed Action, including traffic flow and volumes, and access in and around the Base, would be shared equally among all Base residents, and therefore do not reflect a disproportionate negative impact on minority or low-income populations. Therefore, there is no environmental justice impact on-Base.

Off-Base

Residents within Census tracts 2005 and 2007 have some combination of a lower per capita income, a lower median household income, or a higher percentage of residents living below the poverty level than area, county or state averages (Bureau of Census 2000a). The percentage of minority residents is somewhat higher than county, or state averages in these Census tracts.

Traffic effects off-Base may include delays at area intersections and congestion on the redirected SR 444, safety concerns for motorists crossing the Norfolk Southern rail tracks on the redirected route and safety concerns for pedestrians and bicyclists on the Wright Brothers-Huffman Prairie/Kauffman Avenue Bikeway. These effects would be shared equally among all area commuters and along all points of the redirected route. Potential off-Base environmental justice impacts as a result of the Proposed Action

would be determined by FHWA/ODOT in separate NEPA documentation for any future off-Base transportation improvements.

4.9.3 Alternative A

Alternative A would not differ substantially from the Proposed Action in its impacts to the population on- and off-Base and, therefore, also would have no disproportionate negative impacts on minority or low-income populations.

4.9.4 No Action

Under the No Action Alternative, the existing nine ECFs would remain in place and no reconfiguration or improvements would be made to gates in Area A, and the Kittyhawk Center would remain separate from Area A. Thus, there would be no impact on environmental justice.

4.10 Infrastructure

4.10.1 Evaluation Criteria

Impacts on infrastructure are evaluated for their potential to disrupt or improve existing levels of service and additional needs for energy and water consumption, and sanitary sewer systems. Infrastructure impacts might arise from energy needs created by either direct or indirect workforce and population changes related to Base activities.

The Proposed Action would result in an adverse impact to utilities or services if the project required more than the existing infrastructure could provide, or required services in conflict with adopted plans and policies for the area.

4.10.2 Proposed Action

On-Base

While short-term adverse impacts to utilities and services are anticipated under the Proposed Action, beneficial impacts to utilities and services are anticipated over the long term.

Solid wastes generated through project implementation are likely to affect solid waste management and short-term negligible-to-minor adverse impacts would be expected as a result of the proposed project. These impacts are temporary in nature. The Proposed Action would primarily involve the demolition and replacement of obsolete or inefficient structures. The volume of solid wastes generated as a result of the Proposed Action is expected to be minor compared to the solid waste currently generated in Greene County. The construction debris associated with the Proposed Action would not result in exceeding the capacity of any landfill, or the violation of any permit for any landfill.

Solid wastes would consist largely of building deconstruction materials, and/or associated with new construction by-products, such as concrete, blocks, bricks, wooden framing, and metals. Contractors

would recycle construction materials to the greatest extent possible, and would dispose of non-recyclable construction debris at one or more of the permitted Greene County landfills. For demolition and construction, on-site generators would be available to provide back-up power for any high-power demanding equipment. Demand during temporary/planned outages is expected to be met, and impacts would be negligible.

No activities or change in operations have been identified that would have an adverse effect on facilities and services. Existing services such as emergency response, fire, police, and other services would continue to be able to serve WPAFB. The new facilities planned under the Proposed Action would not result in a substantial increase in electric power demand.

Environmental Commitments – Proposed measures under the Proposed Action will include recycling construction-related debris and implementing office recycling programs in accordance with EO 13101: *Greening the Government through Waste Prevention, Recycling, and Federal Acquisition*.

Off-Base

Additional studies would occur during project planning and design for utility and other infrastructure needs. WPAFB would coordinate with the appropriate utilities to identify daily demand, peak demand, and supply.

4.10.3 Alternative A

Anticipated on-Base and off-Base effects on infrastructure under Alternative A would be similar to the Proposed Action.

4.10.4 No Action

Under the No Action Alternative, the existing nine ECFs would remain in place and no reconfiguration or improvements would be made to gates in Area A, and the Kittyhawk Center would remain separate from Area A. As a result, there would be no adverse impacts to on-Base infrastructure.

4.11 Health and Safety

4.11.1 Evaluation Criteria

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

USAF regulations and procedures promote a safe work environment and guard against hazards to the public. WPAFB programs and day-to-day operations are accomplished according to applicable USAF Federal and state health and safety standards.

4.11.2 Proposed Action

On-Base

Minor adverse impacts would be expected. However, construction workers conducting the ECF and roadway construction would be responsible for complying with standard operating procedures and applicable health and safety regulations. Implementation of the Proposed Action would slightly increase the short-term risk associated with construction contractors performing work at WPAFB during the normal workday because of the increase in construction activities. Contractors would be required to establish and maintain safety programs.

Projects associated with the Proposed Action would not pose a safety risk to Base personnel or to activities at the Base. Proposed construction activities would enable WPAFB to conduct and meet mission requirements in a safe operating environment. All applicable health and safety regulations would be followed during construction activities. Prior to soil excavation to construct the proposed ECFs and related street improvements, digging clearances would be obtained from Base Civil Engineering and Base Utilities to avoid involvement with buried utilities.

Impacts to health and safety of nearby personnel would be minimized by clearly identifying the construction zone and prohibiting access to unauthorized individuals. Use of cranes and other high profile equipment would require a “spotter” when operating near overhead hazards. To minimize vehicle accidents, construction personnel would direct heavy vehicles entering and exiting a construction site.

Off-Base

Under the Proposed Action, increased vehicular and pedestrian traffic would traverse the existing railroad tracks at the intersection of SR 444 and Kauffman Avenue due to SR 444 being closed as a public thoroughfare. As a result of this anticipated increased traffic, safety of those travelling across the railroad tracks would be interpreted as an adverse impact.

4.11.3 Alternative A

Anticipated on-Base and off-Base effects on health and safety under Alternative A would be similar to the Proposed Action.

4.11.4 No Action

Under the No Action Alternative, the existing nine ECFs would remain in place and no reconfiguration or improvements would be made to gates in Area A, and the Kittyhawk Center would remain separate from Area A. The continued non-compliancy of the USAF anti-terrorism standards would have a negative effect on health and safety of employees, residents, and visitors of the Base.

4.12 Hazardous Materials/Waste, Stored Fuels, Toxic Substances, and ERP

4.12.1 Evaluation Criteria

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

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

4.12.2 Proposed Action

On-Base

The project areas are located within three ERP sites (OU2, OU4, and OU7); however, the project areas are not physically located on any landfills or burial sites within the ERP sites. The Gate 15A project area is located adjacent and east of LF6, within OU4. Disturbance associated with Gate 15A construction activities is expected to be limited to surface or near surface soils and is not expected to disturb soils within the limits of LF6, which consists of clean landfill cap materials.

Minor and short-term adverse impacts due to soil disturbances could occur during proposed construction activities under the Proposed Action. However, since only near surface soils would be expected to be affected, no long-term impacts would be anticipated. The LUC for LF6 states no digging, building, construction, etc. or otherwise disturbing landfill covers. Any activity that may disturb ERP sites should be coordinated with the Base ERP Program Manager in 88th ABW CEAN.

The Gate 26A project area is located within OU2 and OU7. LF9 is located within OU7; however, it is located outside the Base installation boundary and is not considered within the Gate 26A Proposed Action vicinity. BS1 is located within OU2 and is adjacent to the Gate 26A project area. Minor and short-term adverse impacts from soil disturbances could occur during construction activities. However, since only near surface soils would be expected to be affected, no long-term adverse impacts would be anticipated. The LUC for LF9 states no digging, building, construction, etc. or otherwise disturbing landfill cover and BS1 has an allowable land use of digging, construction or other soil disturbances after approval by CE and Environmental Management Division personnel. As such, any activity that may disturb ERP sites should be coordinated with the Base ERP Program Manager in 88th ABW CEAN.

Products containing hazardous materials or substances such as fuels, oils and lubricants would be procured and used during deconstruction and construction activities. It is anticipated that the quantity of such hazardous materials used would be minimal, resulting in negligible to minor adverse effects. Accidental spills could occur as a result of the construction. A spill could potentially result in adverse effects on wildlife, soils, water, and vegetation. However, the amount of hazardous materials at construction sites would be limited and the equipment necessary to quickly contain any spill would be present when refueling. Contractors would be responsible for the management of hazardous materials and wastes.

Under the Proposed Action, it is anticipated that procurement of products containing hazardous materials would be comparable with existing conditions. Therefore, it is estimated that hazardous material procurement would remain comparable to the baseline condition.

It is anticipated that the volume, type, classifications, and sources of hazardous wastes associated with the Proposed Action would be similar in nature with the baseline condition waste streams. Hazardous waste would be handled, stored, transported, disposed of, or recycled in accordance with the WPAFB Hazardous Waste Management Plan.

Petroleum based products such as fuel, oils, and lubricants are stored on Base in ASTs and USTs. Since there are no USTs or ASTs located within the proposed project area, implementation of the Proposed Action would have no adverse impact on stored fuels.

Off-Base

Federal and state regulatory databases were reviewed to identify properties within the off-Base area of concern where regulatory investigations have occurred. A total of 12 sites were identified as occurring within the off-Base area of concern (some facilities are included on multiple databases) and included 6 RCRIS, 1 DERR, 7 LUSTs, and 2 SPILLS. Based on the information provided in the EDR report, all of the facilities except two (BP Oil #09679 and 444 Exxon), have either received a NFA determination from the Ohio BUSTR and/or the sites have no outstanding violations/environmental concern. Some residual contamination at the LUST NFA sites could remain and have the potential for exposure during construction activities within the off-Base area of concern. In addition, contamination could exist at the active LUST facilities (BP #09679 and 444 Exxon) where on-going soil and/or groundwater investigations are being conducted under the direction of BUSTR. As such, minor adverse impact to off-Base properties within the area of concern is expected with regard to the two active LUST sites.

4.12.3 Alternative A

Anticipated on-Base and off-Base effects on hazardous materials/hazardous waste under Alternative A would be similar to the Proposed Action.

4.12.4 No Action

Under the No Action Alternative, the existing nine ECFs would remain in place and no reconfiguration or improvements would be made to gates in Area A, and the Kittyhawk Center would remain separate from Area A. Thus, there would be no impacts to hazardous materials/waste, stored fuels, toxic substances, or ERP sites.

4.13 Traffic and Transportation

This section describes the potential environmental consequences associated with traffic circulation and volumes, as a result of implementing the Proposed Action, Alternative A, or the No Action Alternative at WPAFB.

4.13.1 Evaluation Criteria

Transportation is defined as the movement of people and goods from one place to another. Because the project focuses on changes to roadways, the definition of this resource focuses primarily on roadway transportation over pedestrian, bicycle, rail, water or airborne transportation.

The Proposed Action would result in a significant transportation impact if it resulted in a substantial increase in traffic generation, a substantial increase in the use of the connecting street systems or mass transit, or if on-site parking demand would not be met by projected supply.

In the area where detailed traffic data was collected and analysis performed, evaluation is based on Level of Service (LOS) at each intersection. Year 2032 was identified as the design year in the study. Under American Association of State Highway and Transportation Officials (AASHTO) criteria, a design year traffic volume of at least 20 years in the future is recommended to avoid under-design of capacity improvements. **Table 4-4** describes each signalized intersection LOS by average control delay per vehicle and its characteristics. LOS is reported for the average intersection conditions.

Because the proposed project is located in an urban area, LOS D would be considered an acceptable LOS. Therefore, a change in LOS as a result of the project to an LOS E or F would be considered significant.

In the area where no detailed traffic data are available, a qualitative evaluation would determine the appearance of significant effects of the project.

4.13.2 Proposed Action

Under ODOT guidance and Federal regulations, the Proposed Action is considered a Type I project. Type I projects consist of Federal and/or state funded highway projects that involve the construction of a highway on a new location, or involve a substantial change in either the horizontal or vertical alignment of an existing highway, or increase the number of through lanes on an existing highway, and therefore increase capacity resulting in additional traffic volumes. In this case, the increase in traffic volumes is

expected to result from the action of closing SR 444, resulting in additional traffic along the city streets within the study area.

Table 4-4. Signalized Intersection Level of Service Descriptions

Level of Service	Average Control Delay Per Vehicle (sec)	Characteristics
A	≤ 10	Very low delay. Occurs when progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all.
B	> 10 and ≤ 20	Occurs with good progression and/or short cycle lengths. More vehicles stop than for LOS A.
C	> 20 and ≤ 35	Higher delays result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear in this level. Significant numbers of vehicles stop although many still pass through the intersection without stopping.
D	> 35 and ≤ 55	Longer delays may result from unfavorable progression, long cycle lengths and/or high volume to capacity (v/c) ratios. Many vehicles stop and the proportion of vehicles not stopping declines.
E	> 55 and ≤ 80	Considered to be the limit of acceptable delay, these high delay values generally indicate poor progression, long cycle lengths and high v/c ratios. Individual cycle failures are frequent occurrences.
F	> 80	Considered to be unacceptable to most drivers, this condition often occurs with over-saturation.

On-Base

Construction Impacts – Temporary demolition and construction-related activities associated with implementation of the Proposed Action are anticipated to produce short- and long-term adverse impacts on traffic generation, traffic volume, and street use. Demolition of existing ECFs and construction of new ECFs would temporarily close access to the gate being demolished and/or constructed. On-Base traffic would be diverted to other ECFs for on-Base access. As a result of diverted traffic, traffic volumes and alternative street use would increase to other locations as traffic would flow to the nearest ECF for entry into the Base.

Operational Impacts – On-Base operations would face short-term minor adverse impacts as a result of increased traffic generation and elevated traffic volumes. The Proposed Action does not include any plans to increase the WPAFB workforce.

Improvements to the operation of ECFs under the Proposed Action are expected to reduce delays and provide additional vehicle storage at the ECFs, and therefore reduce the potential for traffic that is attempting to enter the Base from queuing onto local streets and disrupting on street traffic. Therefore, under the Proposed Action, the proposed improvements at the ECFs are expected to have a long-term beneficial effect on the areas in the vicinity of the ECFs.

Off-Base

Future Traffic Volumes

Improvements to transportation facilities often affect traffic volumes on the surrounding street network, so prediction of future traffic volumes is important to assess the effect of the proposed changes on that network. The traffic volumes collected during peak periods within the traffic analysis area were reassigned to the roadway network for each alternative, using information obtained from the origin-destination study and traffic data collection tasks. The revised traffic volumes were used to evaluate the capacity at critical intersections on the revised roadway network within WPAFB and on the local- and state-maintained roadways.

The proposed closure of SR 444 that bisects Area A from the Kittyhawk Center is predicted to increase traffic on the off-Base street network due to traffic being diverted from SR 444 at the Kittyhawk Center onto local city streets to reach a destination. This closure would cause existing transportation patterns and circulation to change. In addition, construction-related traffic travelling to the on-Base construction project areas would also cause an alteration to physical transportation patterns and circulation.

Under the Proposed Action, the Gate 1A relocation and reconfiguration is predicted to increase volumes at nearby intersections as off-Base traffic would need to travel further to access an available gate (Gates 1A, 15A, and 26A). The intersections of Dayton-Yellow Springs Road with Kauffman Avenue and Central Avenue with Dayton Drive are expected to experience a reduction in service to LOS F during both AM and PM peak hours. The increased intersection delay is predicted for the design year, 2032. Year 2032 was selected as the design year so that project designs would not be obsolete by the time of construction. Funding for off-Base street improvements has not been secured or pursued. In the interim period (between years 2011 and 2032) it is anticipated that the city of Fairborn and partner agencies would implement intersection capacity improvements as a result of the need to reroute SR 444 over local streets.

The output from the traffic capacity analyses is summarized below in **Table 4-5,** which contains the LOS and delay (in seconds per vehicle) for the selected intersections. The No Action Alternative condition for Years 2010 and 2032 as well as the Proposed Action condition for Year 2032 are provided.

As shown in **Table 4-5**, vehicle delays would increase and LOS would decrease both in AM and PM peak hours at the listed intersections for the current capacity condition (2010) and the future capacity condition (2032). And, at these intersections under current conditions, implementation of the Proposed Action would significantly contribute to an increase in delays and decrease in LOS at all intersections except at the Gate 1A/SR 444 intersection for both AM and PM peak hours. The significant delays projected at these intersections would increase the potential for vehicle accidents but decrease the average speed, and therefore the severity at which accidents are likely to occur.

Table 4-5. Traffic Capacity Analysis Summary – AM Peak Hour and PM Peak Hour

Intersection	Operation	LOS / Delay (seconds/vehicle)*		
		2010 No Action	2032 No Action	2032 Proposed Action
AM Peak Hour				
Dayton-Yellow Springs Road & Kauffman Avenue	Signalized	B / 17.6	C / 29.3	F / 141.9
Dayton-Yellow Springs & State Route 444	Signalized	B / 14.6	C / 22.3	Free Flow
Dayton Drive & Central Avenue	Signalized	B / 14.3	C / 23.3	F / 84.8
Gate 1A & State Route 444	Signalized	C / 28.0	D / 33.6	C / 21.0
PM Peak Hour				
Dayton-Yellow Springs Road & Kauffman Avenue	Signalized	B / 19.6	C / 31.3	F / 180.8
Dayton-Yellow Springs & State Route 444	Signalized	B / 13.8	C / 24.2	Free Flow
Dayton Drive & Central Avenue	Signalized	B / 17.5	C / 25.0	F / 163.2
Gate 1A & State Route 444	Signalized	B / 18.4	C / 29.0	C / 26.8

Notes: * LOS = Level of Service / Average vehicle delay (seconds per vehicle); B = >10 and ≤20 seconds delay; C = ≥20 and ≤35 seconds delay; D = >35 and ≤55 seconds delay; E = >55 and ≤80 seconds delay; F = >80 seconds delay.

4.13.3 Alternative A

Anticipated on-Base and off-Base effects on transportation under this alternative would be similar to the Proposed Action.

4.13.4 No Action

Under the No Action Alternative, the existing nine ECFs would remain in place and no reconfiguration or improvements would be made to gates in Area A, and the Kittyhwak Center would remain separate from Area A. The existing capacity issues and resulting delays at ECFs would not be addressed and would continue to increase during periods of increased security levels when vehicle inspections become more time-consuming and vehicle delays increase as a result. The No Action alternative would also not address existing ATFP issues. Thus, it is anticipated that the No Action Alternative would result in long-term minor to moderate adverse impacts on the traffic in and around WPAFB.

5.0 ENVIRONMENTAL COMMITMENTS SUMMARY

Mitigation of a specific adverse impact could be implemented in a number of ways. Mitigation is most often taken in the context of repairing, rehabilitating, or restoring the area impacted by an action. The initial form of mitigation sought is avoidance of impacts by not performing an action or a particular part of an action. Mitigation may also take the form of minimizing an impact by minimizing the action, either in degree or magnitude. The reduction or elimination of impacts over time through the preservation and maintenance of remaining resources is also considered mitigation.

WPAFB places a strong emphasis on avoidance, minimization, and mitigation of impacts resulting from a proposed project. This section summarizes those environmental commitments suggested for each resource area described in Chapters 3 and 4.

Environmental commitments have been developed to minimize short- and long-term impacts to the Proposed Action. No commitments are proposed for the No Action Alternative and environmental commitments for Alternative A would be similar to those under the Proposed Action. Environmental commitments for any potential impacts to the human and physical environment are contained in **Table 5-1.**

Table 5-1. Environmental Commitments Summary

Resource Area	Environmental Commitments under Proposed Action
Land Use	No environmental commitments
Air Quality	• Routine maintenance of construction equipment • Regular maintenance of emission control devices on construction equipment • Cover/wet exposed soil to reduce fugitive dust
Noise	• Limit operation of heavy equipment and other noisy procedures to daylight hours • Install/maintain effective mufflers on construction equipment • Locate construction equipment and vehicle staging areas as far from noise sensitive areas as possible • Limit unnecessary equipment idling
Geology and Soils	• Determine soil suitability and appropriate building foundation specifications • Develop detailed erosion and sedimentation control plan prior to construction, based on requirements of the WPAFB Stormwater Pollution Prevention Plan (SWPPP) • Minimize areas of disturbance - use silt barriers and landscape unimproved areas

Resource Area	Environmental Commitments under Proposed Action
Water Resources	• Implement erosion and sediment control practices such as sediment trapping and filtering • Develop storm water management plan on a project-by-project basis to address long-term runoff and pollutant discharge • Prepare a SWPPP including time frames, type of stabilization to be used, record of weekly storm event inspections, and maintenance necessary to keep best management practices employed during stabilization • Use silt fencing, storm drain protection, straw mulching, and reseed bare surfaces • Any fill material to be placed within the project area that occurs below the spillway elevation of 835 ft must have prior written approval from the MCD.
Biological Resources	• Maintain large green space • Re-vegetate areas of removed or damaged vegetation • Remove non-native and invasive vegetation and replace with native species on a project-by-project basis • Restore disturbed areas and replace with similar vegetation species after completion of construction activities • Obtain Clean Water Act Sections 404 and 401 permits as required to mitigate riparian corridors and compensate for loss of vegetation
Cultural Resources	No environmental commitments
Socioeconomics	No environmental commitments
Environmental Justice	No environmental commitments
Infrastructure	• Recycle construction-related debris • Implement office recycling programs
Health and Safety	No environmental commitments
Hazardous Materials/Waste, Stored Fuels, and ERP	No environmental commitments
Traffic and Transportation	• Prepare construction schedules for distribution to WPAFB employees prior to proposed activities • Provide specific construction routes to contractors to minimize conflicts with routine vehicular traffic • Schedule and route construction truck traffic to minimize impacts on local traffic • Contractors operate under limited parking availability and use shifts starting 30 minutes prior to peak employee traffic

6.0 CUMULATIVE IMPACTS AND ENVIRONMENTAL CONSIDERATIONS

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

6.1 Cumulative Impacts

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

On-Base

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

West Ramp Facilities Renovations to Support C-17 Aircraft:

Convert Sprinklers to Wet Pipe in Buildings F/34007, F/34016, and F/34015 – Proposed activities consist of converting existing sprinkler system from pre-action to wet pipe in Area A.

Construct Composites Workroom in Building F/34026 – Proposed project in Area A consists of modifying the interior of existing shop facility (F34026) by (1) installing a prefabricated clean room with a self-contained heating, ventilation, and air conditioning system; (2) providing lighting, power and oil-free dry nitrogen; and (3) providing a 12-ft by 12-ft roll-up door.

Renovate Building F/34066 – This project proposes to renovate existing Facility 34066 in Area A, a former munitions shop, for assembly of replaceable countermeasure flare kits. Proposed activities include replacing doors and install low slope curbs at rolling doors; installing and replacing various lights and lighting fixtures; replacing explosion-proof receptacles; cleaning and painting restrooms and office area; and replacing a rain gutter.

Maintain Finishes at Wing Headquarters in Building F/34010 – Proposed project in Area A includes replacing carpet and repainting walls.

Maintain Finishes at Wing Headquarters in Building F/34012 – Proposed project in Area A includes replacing carpet.

Repair Roof in Building F/34024 – Proposed project in Area A includes replacing the roof with standing seam metal roof including cross supports onto existing rafters; and installing underground drains for downspouts, including surface drains to divert rainwater.

Runway Replacement – Proposed plans include replacing the primary runway, extending the secondary runway, and expanding easements associated with glide-slope corridor. These runways replacement and runway extension activities would occur in the vicinity of proposed Gate 26A within Area A.

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

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

Information Technology Center – Proposed new construction project in Area B located west of the AFIT campus.

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

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

Off-Base

The project study area, as part of the city of Fairborn, is part of several regional economic development plans. These include the following:

Wright State University Master Plan – Proposed additional vehicular entry and exit points from campus, including two located on Kauffman Avenue. Also proposes that the campus pedestrian/bikeway loop safely and conveniently connect with adjacent public pedestrian systems, such as the Kauffman Avenue/Wright Brothers-Huffman Prairie bikeway located along Kauffman Avenue on the north side of the campus.

Calamityville Tactical Laboratory – Wright State University's National Center for Medical Readiness initiative is a training and research facility focusing on improving interactions between the civilian and military medical communities and traditional disaster first responses.

Regional Bikeway – Proposed connection of existing bikeway along Kauffman Avenue/Wright Brothers-Huffman Prairie to existing Mad River Trail bikeway, thus connecting Wright State University and Fairborn to downtown Dayton. In addition, the north end of this bikeway is proposed to connect to an existing bikeway on Xenia Drive that connects to a shared-roadway bike route travelling northeast. Also, included in bikeways expansion plans are routes travelling east on Dayton-Yellow Springs Road, Garland Avenue and north from Dayton Drive through Fairborn to SR 235.

The Proposed Action would contribute to cumulative effects on the transportation system around the Base. The on-Base transportation would benefit from the Proposed Action, with increased capacity, safety, and efficiencies at the proposed ECF upgrades. However, the off-Base transportation system would experience increased delay and LOS. It is anticipated that the local governmental agencies would conduct upgrades of these traffic intersections within the next 20 years, as part of normal planning.

6.2 Unavoidable Adverse Effects

Unavoidable adverse impacts would result from implementation of the Proposed Action or Alternative A.

Geology and Soils. Under either the Proposed Action or Alternative A, construction activities such as grading, excavating, and re-contouring of the soil as part of pavement work, would result in soil disturbance. Implementation of BMPs during construction would limit potential impacts resulting from construction activities. Standard erosion control would also reduce potential impacts related to these characteristics.

Biological Resources. Site grading associated with construction activities would remove minimal vegetation and associated small animal life occupying and utilizing affected areas. The affected sites are already heavily disturbed and do not presently provide suitable habitat for many species. Vegetation species types are common to the Base and the disturbed areas would be reseeded and landscaped.

There would be an unavoidable loss of Stream 1 vegetative corridor and aquatic habitat from the realignment of SR 844 in the Gate 15A project area (**Figure 3-1, Appendix D**). This impact is considered unavoidable in light of the purpose of this realignment and the areas available for the speed reduction curve necessary for improving Base security. Environmental commitments will be developed as part of coordination with resource agencies when more detailed design plans are available.

Noise. Minor and temporary adverse impacts from noise would slightly affect passersby and nearby workers. The increase in noise primarily would be due to construction and excavation equipment. Construction noise would only exist during working hours and would end at the completion of the operation. A nominal change in noise may be noticed once the proposed actions are implemented as traffic patterns adapt to the closure of SR 444 at the Kittyhawk Center and new ECF locations are opened.

Energy. The use of nonrenewable resources is an unavoidable occurrence, although this use is negligible compared with total use of energy. The Proposed Action or Alternative A would require the use of fossil fuels, a non-renewable natural resource. Energy supplies, although relatively small, would be committed to the Proposed Action or Alternative A.

Traffic and Transportation. Temporary and minor increases in traffic would occur during construction. Once each relocated gate is constructed and roadway improvements are implemented, traffic patterns should adjust so that the increased volume flows more smoothly. The anticipated increase in vehicular traffic traversing the railroad tracks at the intersection of SR 444 and Kauffman Avenue is considered unavoidable. Possible implementation measures or upgrades to the existing crossing signals that would increase the safety of vehicular and pedestrian traffic crossing the tracks include installation of safer railroad crossing signals (i.e., bells, gates, lights).

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

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

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

For this project, natural resources and aspects of the human environment will be affected. The long-term benefits of the proposed project (security, safety, and traffic flow into and on the installation) would occur at the expense of short-term impacts in the surrounding vicinities. As documented in Section 1.0, the Proposed Action addresses reconfiguring ECFs in Area A to meet current ATFP standards. These short-term effects would occur at varying intensities during the period of construction, and would include localized noise and air pollution, as well as potential increased sedimentation and erosion. However, these impacts are temporary and proper controls would be utilized to prevent these impacts from having a lasting effect on the environment. Thus, short-term impacts and use of resources is consistent with the long-term function and safety of WPAFB.

Short-term gains to the respective local economies would occur in varying degrees as local companies and workers are hired and local businesses provide services and supplies during the construction of new ECFs and required infrastructure.

6.4 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 or Alternative A, should either be implemented.

The irreversible environmental changes that would result from implementation of the Proposed Action or Alternative A involve the consumption of material resources, energy resources, land, biological habitat, stream corridor, and human resources. The use of these resources is considered to be permanent.

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

Material Resources. Material resources used for the Proposed Action or Alternative A include building materials (for construction of facilities), concrete and asphalt (for roads), and various material supplies (for infrastructure). Most of the materials that would be consumed are not in short supply and would not limit other un-related construction activities.

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

Biological Habitat. The Proposed Action improvements would include the loss of approximately 300 linear ft of vegetation adjacent to the unnamed tributary of Hebble Creek in order for the realignment of SR 844 at the proposed improved Gate 15A project area. While impacts to these habitats would be offset by mitigation, they represent an irretrievable commitment of resources.

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

The Proposed Action or Alternative A would not result in a major impact associated with the irreversible or irretrievable commitment of resources.

The No Action Alternative assumes that no changes would occur. Therefore, this alternative would not result in any impact associated with the irreversible or irretrievable commitment of resources.

7.0 LIST OF PREPARERS

The following individuals assisted in the preparation of or provided background information for this EIS:

Stephanie Burns
Shaw Environmental & Infrastructure, Inc.
NEPA Specialist
M.P.A. Environmental Management
B.S. Natural Resources and Environmental Science
Years of Experience: 15

James Denier
Shaw Environmental & Infrastructure, Inc.
Sr. NEPA Specialist
M.B.A. Business Management
B.A. Biological Sciences
Years of Experience: 30

Cynthia Hassan
Shaw Environmental & Infrastructure, Inc.
Sr. NEPA Specialist
M.P.H. Epidemiology
B.S. Medical Technology
Years of Experience: 28

Landon McKinney
Shaw Environmental & Infrastructure, Inc.
Project Manager
Natural Resources and Wetlands
M.S. Biological Sciences
M.S. Biological Sciences
Years of Experience: 34

Randy Patrick
Shaw Environmental & Infrastructure, Inc.
Air Quality
B.S. Chemical Engineering
M.S. Chemical Engineering
Years of Experience: 33

Gregory Plamondon
Shaw Environmental & Infrastructure, Inc.
Geology, Soils, Water Resources,
Installation Restoration Program
Bachelor of Engineering, Hydrology
Years of Experience: 21

Timothy Rust
Shaw Environmental & Infrastructure, Inc.
Air Quality
B.S. Electrical Engineering
Years of Experience: 17

William Scoville
Shaw Environmental & Infrastructure, Inc.
Senior Review, Project Manager
M.S. Civil Engineering
B.S. Earth and Engineering Sciences
Years of Experience: 25

Maria Burkett
Hardlines Design Company
Architectural Historian
Master of Historic Preservation
B.A. Historic Preservation and History
Years of Experience: 6

Patrick Bennett
Hardlines Design Company
Archaeologist
Years of Experience: 33

Andy Sewell
Hardlines Design Company
Principal Investigator
M.S. Industrial Archaeology
B.A. Anthropology
Years of Experience: 13

Roy A. Hampton
Hardlines Design Company
Senior Historian
M.A. Art History/Architectural History
B.A. History
Years of Experience: 17

Jennifer Miller
LJB, Inc.
Environmental Scientist
B.S. Chemistry/Psychology
Years of Experience: 21

Nicole Clune
LJB, Inc.
NEPA Specialist/ Project Manager
B.S. Civil Engineering
Years of Experience: 17

Scott Knebel
LJB, Inc.
Principal
B.S. Civil Engineering
Years of Experience: 19

Mark Vonder Embse
Federal Highway Administration
Major Projects Engineer
B.S. Civil Engineering
M.S, Civil Engineering
Years of Experience: 25

Noel F. Mehlo, Jr.
Federal Highway Administration
Ohio Division Office
Environmental Program Manager
B.S. Natural Resources in Soil Science
Years of Experience: 14

8.0 LIST OF PERSONS CONTACTED

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

Name	Role	Affiliation
JoLynn Anderson	Planning & Real Estate	88 ABW/CEAOR
Treva Bashore	ERP Program Manager	88 ABW/CEANQ
Karen Beason	EIAP Manager	88 ABW/CEAOR
Doug Boney	Engineering Technician	City of Fairborn
Johnathan Buffalo	Director of Historic Preservation	Sac and Fox Tribe of the Mississippi in Iowa
Chris Chosa	Tribal Historic Preservation Office	Keweenaw Bay Indian Community
Justin Cook	History Reviews Manager	Ohio Historic Preservation Office
Melanie Cota	Threatened and Endangered Species	U.S. Fish and Wildlife Service
William (Marty) Curtis	Weapons Safety Manager	88 ABW/SEW
Mark Epstein	Resource Protection and Review	Ohio Historic Preservation Office
Roxanne Farrier	Floodplain Issues	Miami Conservancy District
Pat Higgins	Community Development Director	City of Fairborn
Mary Knapp	Threatened and Endangered Species	U.S. Fish and Wildlife Services
Lisa LaRue	Tribal Historic Preservation Officer	United Keetoowah Band of Cherokee Indians in Oklahoma
Deborah McDonnell	City Manager	City of Fairborn
Mike Riley	Fire Chief	City of Fairborn
Jim Sawyer	City Engineer	City of Fairborn
Jerry Shofner	Planning & Real Estate	88 ABW/CEAOR
Don Spang	Executive Director	Miami Valley Regional Planning Commission
Robert Sowers	Public Administrative Services Director	City of Fairborn
Fred Tito	Design Manager	88 ABW/Patterson Field Section of the Project Management Branch in the Program Division, Civil Engineering Directorate (CEPMP)
Chris Tumbusch	Storage Tank Data	88 ABW/CEANQ
Darryn Warner	Natural Resources Program Manager	88 ABW/CEANQ

Debbie Woischke	Natural Resources	Ohio Department of Natural Resources; Division of Natural Areas & Reserves; Columbus, Ohio
Paul Woodruff	Cultural Resources Program Manager	88 ABW/CEANQ

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WPAFB 2008a — WPAFB, 2008a. Installation HAZMAT Management Program Plan. July 2008.

WPAFB 2008b — WPAFB, 2008b. Hazardous Waste Management Plan. April 2008.

WPAFB 2008c — WPAFB, 2008c. Spill Prevention Control and Countermeasure Plan. February 2008.

WPAFB 2009 — WPAFB, 2009. Economic Impact Analysis, 2009.

WPAFB 2011a — WPAFB, 2011a. Final Environmental Assessment of the 445th Airlift Wing Conversion from C-5 to C-17 Aircraft at Wright-Patterson Air Force Base, Ohio. January 2011.

WPAFB 2011b — WPAFB, 2011b. Storm Water Pollution Prevention Plan. September 2011.

WPAFB 2011c — WPAFB, 2011c. Integrated Cultural Resources Management Plan. October 2011.

WPAFB 2011d — Personal communication between Mr. William (Marty) Curtis (88 ABW/SEW) and Ms. Stephanie Burns concerning munitions and explosives safety zones. May 2011.

Appendix A

Interagency and Intergovernmental Coordination for Environmental Planning Correspondence

Note: **The *Public Scoping Summary Report* has been published separately from the Draft EIS and will be available in the WPAFB Administrative Record (copy included on cd in front pocket of three-ring binder).**

Cooperating Agency Coordination Letters:

1. **DoD – Department of the Air Force Request – 14Mar11**
2. **Federal Highway Administration Response – 18Apr11**

DEPARTMENT OF THE AIR FORCE

WASHINGTON DC

OFFICE OF THE ASSISTANT SECRETARY

MAR 1 4 2011

SAF/IEI
1665 Air Force Pentagon
Washington, DC 20330-1665

Ms. Laura S. Leffler
Federal Highways Administration
200 North High Street, Room 328
Columbus, OH 43215

Dear Ms. Leffler:

The Air Force requests your formal participation in the preparation of an Air Force Environmental Impact Statement (EIS) to assess the reconfiguration of traffic entry control into Area A and extending the base perimeter fence at Wright-Patterson Air Force Base, Ohio. This request is in accordance with the President's Council on Environmental Quality (CEQ) National Environmental Policy Act (NEPA) Regulations CFR § 1501.6 *Cooperating Agencies*.

As the lead agency for this EIS, the Air Force requests you participate in various portions of the EIS development as required. Specifically, the Air Force asks for the FHWA to support as a Cooperating Agency by:

a. Participating in the scoping process

b. Assuming responsibility, upon request by the Air Force, for developing information and preparing analyses on issues for which the FHWA has special expertise; and

c. Making staff support available to enhance interdisciplinary review capability. The installation point of contact will be Ms. Karen Beason, WPAFB NEPA Manager (88 ABW/CEAOR), (937) 257-5899.

Please respond in writing to this request. If you or your staff have any questions regarding this letter, the points of contact are Maj JJ Loschinskey, SAF/IEI, (703) 695-5730 and Mr. Jack Bush, HQ USAF/A7CIB, (703) 604-5264.

Sincerely,

Kathleen I. Ferguson

KATHLEEN I. FERGUSON, P.E.
Deputy Assistant Secretary of the Air Force
(Installations)

cc:
SAF/IEE
SAF/GCN
HQ USAF/A7C
HQ AFMC/A7PX
88 ABW/CEAOR

RECEIVED FHWA
MAR 25 11
OHIO DIVISION

U.S. Department
of Transportation
**Federal Highway
Administration**

Ohio Division

200 North High Street
Room 328
Columbus, OH 43215
614-280-6896
614-280-6876 fax

April 18, 2011

In Reply Refer To:
HEO-OH

Kathleen I. Ferguson, P.E.
Deputy Assistant Secretary of the Air Force
SAF/IEI
1665 Air Force Pentagon
Washington, DC 20330-1665

Dear Ms. Ferguson:

In a letter dated March 14, the Department of the Air Force requested our participation as a cooperating agency in the preparation of an Environmental Impact Statement (EIS). You propose to assess the reconfiguration of traffic entry control into Area A at Wright-Patterson Air Force Base. Our staff has been involved in preliminary technical discussions and stakeholder meetings due to the potential use of Federal-aid highway funds for roadway improvements associated with changes in access to the base. We accept your invitation to serve as a cooperating agency in support of your decision-making process, and look forward to continued work with your staff at Wright-Patterson Air Force Base.

If you have any questions or comments, please contact Mark L. Vonder Embse, Major Projects Engineer, at (614) 280-6854, or mark.vonderembse@dot.gov.

Sincerely,

Mark L. Vonder Embse

For: Laura S. Leffler
Division Administrator

ecc: ODOT (Larry Hoffman, Keith Smith, Jay Hamilton)
Dave Snyder, Noel Mehlo

File (GRE WPAFB)

Miami Conservancy District Consultation Letters:

1. **WPAFB Request – 26May11**
2. **MCD Response – 08Sep11**

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

26 May 2011

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

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

Dear Mr. Rinehart:

Wright-Patterson Air Force Base (WPAFB) is preparing an Environmental Impact Statement (EIS) to evaluate the environmental impacts of the proposed reconfiguration and relocation of entry control gates in Area A at WPAFB. There are nine existing entry control facilities (ECFs) / gates located in Area A at WPAFB that are proposed to be reconfigured and relocated, resulting in three strategically-placed gates (Gate 1A, Gate 15A, Gate 26A). In the current configuration, the ECFs do not meet the security requirements of the Air Force's Anti-Terrorism / Force Protection (ATFP) standards. In addition, the Kittyhawk Center at WPAFB remains a separate entity from Area A, being bisected by State Route (SR) 444, which does not meet the ATFP standards for required building standoff distances in this area.

By reconfiguring and relocating the ECFs and closing a section of SR 444, which would effectively enclose the Kittyhawk Center within Area A, the ECFs and closure of a portion of SR 444 would meet the ATFP security requirements. WPAFB has initiated an EIS for this project in accordance with the requirements of the National Environmental Policy Act of 1969. The purpose of this letter is to notify you of this proposal and request your evaluation of potential impacts of this project on the Miami Conservancy District.

Construction activities under the Proposed Action would include construction of a new perimeter fence along SR 444 at the Kittyhawk Center, demolition of several existing ECFs, and construction of three strategically-placed ECFs. The following table further describes the disposition of the nine existing gates in Area A at WPAFB:

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Gate No.	Current Purpose / Location	Proposed Action	Result of Proposed Action
1A	Secondary ECF / SR 444 and Wright Avenue	Relocate / Reconfigure Gate 1A to approximate vicinity of SR 444 and Redwood Street intersection	Close. Demolish gate and approach pavement. Access to public cemetery will remain.
8A	Limited Use / SR 844 and Schuster Avenue	None	Reopen and unmanned. No access to secured base.
9A	Secondary ECF / SR 444 and Estabrook Road	None	Remain open and unmanned. No access to secured base.
12A	Primary ECF (Visitor Center) / SR 444 and Chidlaw Road	None	Close. Ceremonial openings only. Access to Hope Hotel and Lot 1A will remain.
15A	Secondary ECF / SR 844	Reconfigure Gate 15A as a 24-hour Gate to be located in its current vicinity. Roadway to be extended past Communications Boulevard.	Construction of a new reconfigured gate.
16A	Commercial Vehicle Inspection / SR 444 and Communications Boulevard	None – The commercial vehicle inspection area would be relocated to the new configured Gate 26A to just north of SR 235 and Circle Drive.	Remain open and unmanned. No access to secured base.
26A	Secondary ECF / SR 235 at 445th AW Area	Reconfigure and Relocate from its existing location north of SR 235 / Loop Road to just north of the SR 235 and Circle Drive intersection.	Close. Demolish gate and approach movement.
38A	Kittyhawk Center ECF / SR 444 and Redwood Street	None	Remain open and unmanned.
39A	Limited Use / SR 444 and Redwood Street	None. New Gate 1A relocated to just north of existing Gate 39A at Redwood Street.	Demolish gate and approach pavement.

Under the No Action Alternative, the existing nine ECFs would remain in place and no reconfiguration or improvements would be made to gates in Area A. Gates 1A, 15A, and 26A would remain as is and would not be upgraded or reconfigured, nor would they meet DoD security requirements under the ATFP standards. SR 444 would remain open as a public roadway between Area A and the Kittyhawk Center and the Kittyhawk Center would remain bisected from Area A.

The geographic location of the proposed project area is Greene County, in Sections 1, 11, 12, and 26 (**Figure 1**). The area of the proposed reconfiguration and relocation of ECFs and SR 444 is located in the south portion of Area A.

The following is a summary of each proposed action:

- ***Gate 1A*** – Relocate along SR 444 at the Redwood Street intersection (**Figure 2**). Public traffic traversing south along SR 444 would be prohibited to continue through the Kittyhawk Center and would be diverted to Wright Avenue at this gate.

- ***Gate 15A*** – Relocate west of its existing location to a location just west of Communications Boulevard / Kuglics Boulevard and Skeel Avenue (**Figure 3**). The approaching roadway to the relocated gate would be realigned.

- ***Gate 26A*** – Relocate south of its existing location to a location just north of the intersection of SR 235 and Circle Drive (**Figure 4**).

- ***Base Perimeter Fence Relocation*** – Relocate to extend across SR 444 north along the east side of SR 444 to tie into the existing perimeter fence just north of existing Gate 9A. Perimeter fence would be constructed across SR 444 at Redwood Street at the proposed Gate 1A location and tie into existing fence on west side of SR 444 (**Figure 5**).

Given that demolition / construction activities would be limited to areas of previous disturbance and the areas are not located in a floodplain, no impacts to floodplains are anticipated.

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

Sincerely

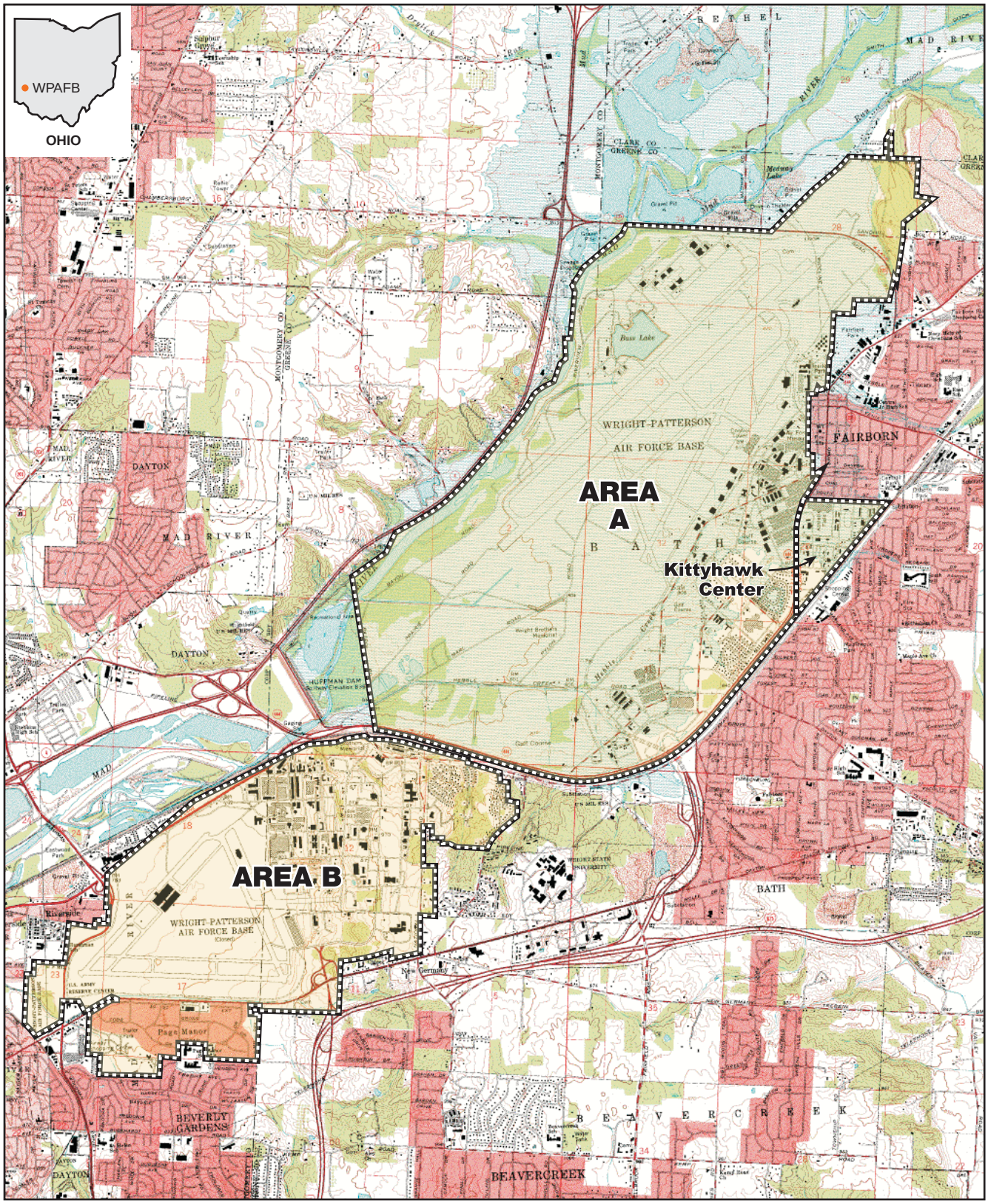
Darryn M. Warner

Darryn Warner
Environmental Quality Section
Asset Management Division

cc: Karen Beason (88 ABW/CEAOR, WPAFB)
William Scoville (Shaw Environmental & Infrastructure. Inc.)

Enclosures: USGS Quadrangle Map
GIS Figures

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Cincinnati, OH	12/1/10	--	JIS	SB	CH	s-140401.0602-12/10-w



N

0 .5 1 mile

WRIGHT-PATTERSON AIR FORCE BASE, OHIO

Figure 1
Areas A & B at WPAFB
and Surrounding Area

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Cincinnati, OH	12/1/10	--	MSN	SB	BS	140401.0602-01.MXD

Map Document: (C:\CAD-GIS\Acad 2011\140401.0602\140401.0602-01.mxd)
4/19/2011 -- 1:42:08 PM

Legend

- Proposed Gate Location
- Proposed Gate Closure/Existing Gate
- Installation Boundary
- Area of Potential Effect
- Proposed Alignment
- Houses Removed
- Proposed Guard Shack
- Proposed Road Closure/Remove Pavement

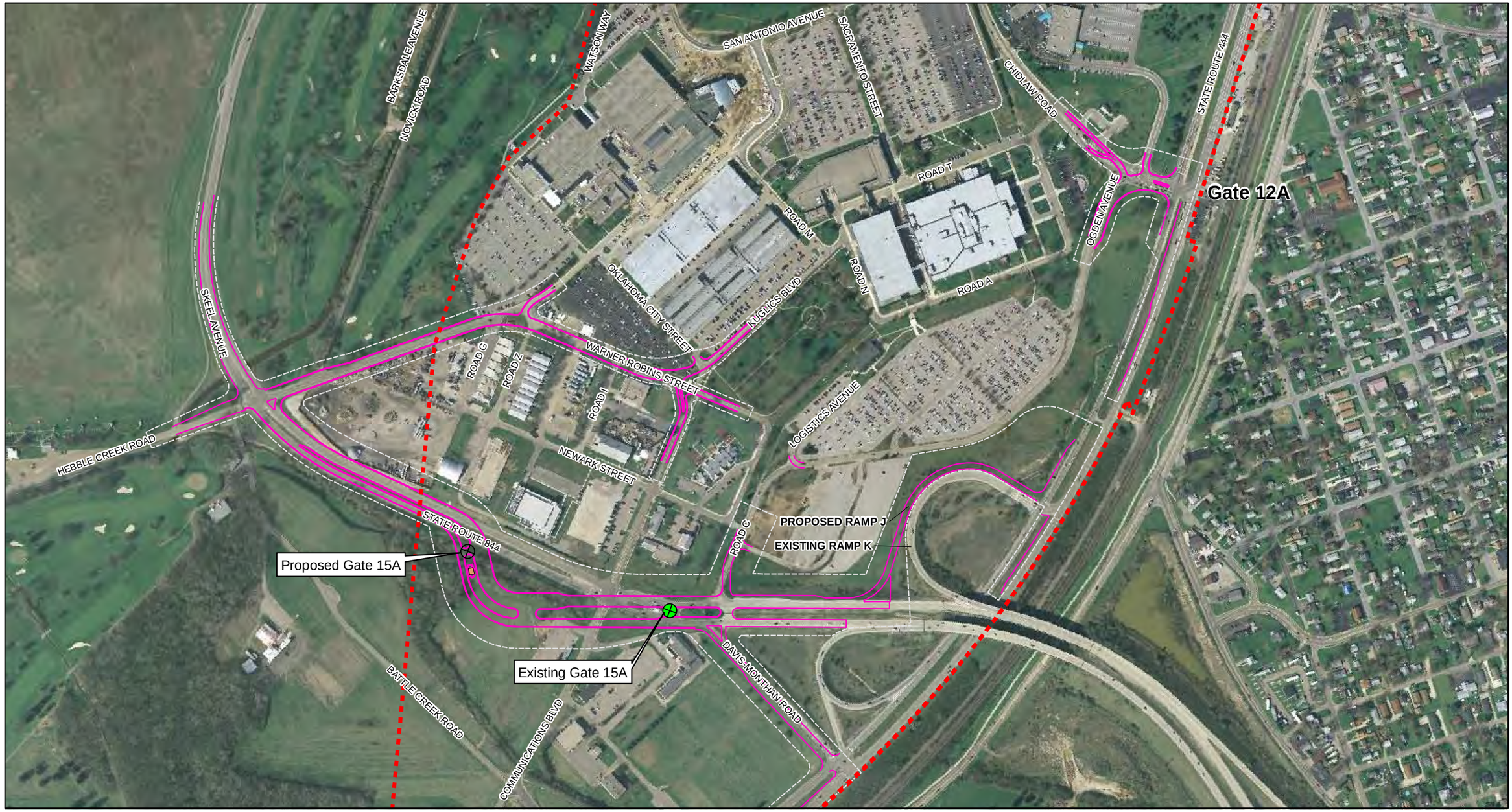
N

0 330 660 1,320 Feet

WRIGHT-PATTERSON AIR FORCE BASE, OHIO

Figure 2
Existing and Proposed Gate 1A Locations

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Cincinnati, OH	12/2/10	--	MSN	SB	BS	140401.0602-02.MXD



Legend

- Proposed Gate Location
- Proposed Gate Closure/Existing Gate
- Area of Potential Effect
- Proposed Alignment
- Installation Boundary
- Proposed Guard Shack

N

0 265 530 1,060 Feet

WRIGHT-PATTERSON AIR FORCE BASE, OHIO

Figure 3
Existing and Proposed Gate 15A Locations

Map Document: (C:\CAD-GIS\Acad 2011\140401.0602\140401.0602-02.mxd)
4/19/2011 -- 1:44:07 PM

Legend

- Proposed Gate Location
- Area of Potential Effect
- Proposed Alignment
- Installation Boundary
- Proposed Guard Shack

N

0 137.5 275 550 Feet

WRIGHT-PATTERSON AIR FORCE BASE, OHIO

Figure 4
Existing and Proposed Gate 26A Locations

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Cincinnati, OH	12/1/10	--	MSN	SB	BS	140401.0602-03.MXD

Map Document: (C:\CAD-GIS\Acad 2011\140401.0602\140401.0602-03.mxd)
4/19/2011 -- 2:06:50 PM

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Cincinnati, OH	12/9/10	--	MSN	SB	BS	140401.0602-04(1)

Legend:

Existing Fence

Proposed Fence Extension

Notes:

1. Approximate location of base perimeter fence to extend across State Route 444, North along east border of SR444.
2. Base perimeter fence to tie into existing fence (approximate location).
3. Base perimeter fence across State Route 444 at Redwood Street.
4. Tie into main base fence on west side of State Route 444.

SCALE IN FEET

0 500 1,000 2,000

WRIGHT-PATTERSON
AIR FORCE BASE,
OHIO

Figure 5
Proposed Base Perimeter Fence Relocation

M. Najar - 140401.0602-04.dwg - Tuesday, 4/19/11 - 1:51 PM

MIAMI CONSERVANCY DISTRICT

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

GENERAL MANAGER
Janet M. Bly

September 8, 2011

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

Re: Huffman Retarding Basin, WPAFB, Proposed Reconfiguration & Relocation of Entry Control Gates

Dear Mr. Warner:

We have reviewed the proposed changes to the entry control gates in Area A at WPAFB.

As most of the proposed project is located within the Huffman Retarding Basin all development would be subject to those building restrictions as set forth by the Miami Conservancy District (MCD).

Based on our review it appears the proposed project will have little impact on the retarding basin, however, if fill material is to be placed anywhere on the property below the spillway elevation of 835.0 prior written approval must be obtained from MCD.

Thank you for the opportunity to review the project and if you have any further questions please contact me at (937) 223-1278, ext. 3230.

Very truly yours,

Roxanne H. Farrier
Property Administrator

cc: Kurt Rinehart

File: WPAFB

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

U.S. Fish & Wildlife Service Consultation Letters:

1. **WPAFB Request – 26May11, 13Oct11, 28Oct11**
2. **USFWS Response – 20Oct11, 28Oct11**

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

26 May 2011

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

Dr. Mary Knapp
U.S. Fish and Wildlife Service
6950 Americana Parkway, Suite H
Reynoldsburg, OH 43068-4127

Dear Dr. Knapp:

Wright-Patterson Air Force Base (WPAFB) is seeking informal consultation with the U.S. Fish and Wildlife Service in compliance with Section 7 of the Endangered Species Act regarding the proposed reconfiguration and relocation of entry control facilities (ECFs) / gates and base perimeter fence relocation in Area A. The current configurations of the ECFs do not meet the Department of Defense (DoD) security requirements under the Anti-Terrorism/Force Protection (ATFP) standards.

WPAFB has initiated an Environmental Impact Statement (EIS) for this project in accordance with the requirements of the National Environmental Policy Act of 1969. The proposed location for this project is shown on the enclosed maps. Construction activities under the Proposed Action would be limited to demolition and construction of ECFs and guard shacks in previously-disturbed areas at WPAFB, and construction of a new perimeter fence along State Route (SR) 444 at the Kittyhawk Center. The following table describes the disposition of the nine existing gates in Area A at WPAFB:

Gate No.	Current Purpose / Location	Proposed Action	Result of Proposed Action
1A	Secondary ECF / SR 444 and Wright Avenue	Relocate / Reconfigure Gate 1A to approximate vicinity of SR 444 and Redwood Street intersection	Close. Demolish gate and approach pavement. Access to public cemetery will remain.
8A	Limited Use / SR 844 and Schuster Avenue	None	Reopen and unmanned. No access to secured base.
9A	Secondary ECF / SR 444 and Estabrook Road	None	Remain open and unmanned. No access to secured base.
12A	Primary ECF (Visitor Center) / SR 444 and Chidlaw Road	None	Close. Ceremonial openings only. Access to Hope Hotel and Lot 1A will remain.

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Gate No.	Current Purpose / Location	Proposed Action	Result of Proposed Action
15A	Secondary ECF / SR 844	Reconfigure Gate 15A as a 24-hour Gate to be located in its current vicinity. Roadway to be extended past Communications Boulevard.	Construction of a new reconfigured gate.
16A	Commercial Vehicle Inspection / SR 444 and Communications Boulevard	None – The commercial vehicle inspection area would be relocated to the new configured Gate 26A to just north of SR 235 and Circle Drive.	Remain open and unmanned. No access to secured base.
26A	Secondary ECF / SR 235 at 445th AW Area	Reconfigure and Relocate from its existing location north of SR 235 / Loop Road to just north of the SR 235 and Circle Drive intersection.	Close. Demolish gate and approach movement.
38A	Kittyhawk Center ECF / SR 444 and Redwood Street	None	Remain open and unmanned.
39A	Limited Use / SR 444 and Redwood Street	None. New Gate 1A relocated to just north of existing Gate 39A at Redwood Street.	Demolish gate and approach pavement.

Under the No Action Alternative, the existing nine ECFs would remain in place and no reconfiguration or improvements would be made to gates in Area A. Gates 1A, 15A, and 26A would remain as is and would not be upgraded or reconfigured, nor would they meet the DoD security requirements under the ATFP standards. SR 444 would remain open as a public roadway between Area A and the Kittyhawk Center and the Kittyhawk Center would remain bisected from Area A.

The geographic location of the proposed project area is Greene County, in Sections 1, 11, 12, and 26 (**Figure 1**). The area of the proposed reconfiguration and relocation of ECFs and SR 444 is located in the south portion of Area A. The following is a summary of each proposed action:

- ***Gate 1A*** –Relocate along SR 444 at the Redwood Street intersection (**Figure 2**). Public traffic traversing south along SR 444 would be prohibited to continue through the Kittyhawk Center and would be diverted to Wright Avenue at this gate.

- ***Gate 15A*** – Relocate west of its existing location to a location just west of Communications Boulevard / Kuglics Boulevard and Skeel Avenue (**Figure 3**). The approaching roadway to the relocated gate would be realigned.

- ***Gate 26A*** – Relocate south of its existing location to a location just north of the intersection of SR 235 and Circle Drive (**Figure 4**).

- ***Base Perimeter Fence Relocation*** – Relocate to extend across SR 444 north along the east side of SR 444 to tie into the existing perimeter fence just north of existing Gate 9A. Perimeter fence would be constructed across SR 444 at Redwood Street at the proposed Gate 1A location and tie into existing fence on west side of SR 444 (**Figure 5**).

Thank you for your consideration. Please return your comments to me at the above address. If you have any questions, please contact me at (937) 257-4857 or by email at Darryn.Warner@wpafb.af.mil.

Sincerely

Darryn M. Warner

Darryn Warner
Environmental Quality Section
Asset Management Division

cc: Karen Beason (88 ABW/CEAOR, WPAFB)
William Scoville (Shaw Environmental & Infrastructure. Inc.)

Enclosures: USGS Quadrangle Map
GIS Figures

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

13 October 2011

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

Ms. Melanie Cota
Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
4625 Morse Road, Suite 104
Columbus, OH 43230

RE: Informal Section 7 Consultation
Proposed Entry Control Facility and Base Perimeter Fence Relocation
Wright-Patterson AFB, Ohio

Dear Ms. Cota:

The U.S. Air Force (USAF) is seeking informal consultation with the U.S. Fish and Wildlife Service (USFWS) in compliance with Section 7 of the Endangered Species Act regarding the proposed reconfiguration and relocation of entry control facilities (ECFs)/gates and base perimeter fence relocation in Area A at Wright-Patterson Air Force Base (WPAFB). The current configurations of the ECFs do not meet the Department of Defense (DoD) security requirements under the Anti-Terrorism/Force Protection (ATFP) standards.

Project History

An environmental assessment (EA) was initiated in 2009 for the action of reconfiguring and relocating gates and base perimeter fencing at WPAFB. The findings of the EA identified that an Environmental Impact Statement (EIS) was necessary for the proposed reconfiguration and relocation of the same gates and base perimeter fence.

The geographic location of the proposed project area is Greene County, in Sections 1, 11, 12, and 26 (**Figure 1**). The area of the proposed reconfiguration and relocation of ECFs and State Route (SR) 444 is located in Area A at WPAFB.

2009 Consultation – WPAFB initiated Section 7 informal consultation with the USFWS in December 2009 as part of the EA to reconfigure and relocate gates/base perimeter fence. The USFWS responded in a letter dated February 22, 2010, indicating the proposed project lies within the range of the following species (recommendations for preservation of potential habitat were noted by the USFWS) (letters attached include December 2009, February 2010, and May 2011 letters):

- Indiana bat (*Myotis sodalis*) Federally-listed endangered species – if the proposed site contains trees or associated habitats exhibiting characteristics (i.e., dead/live trees with peeling or exfoliating bark, split tree trunk and/or branches, or cavities, stream corridors, riparian areas, upland woodlots providing forage sites), the USFWS recommends the habitat and surrounding trees be saved wherever possible. If the trees must be cut, further coordination with the USFWS office is requested to determine if surveys are warranted.

- Eastern massasauga (*Sistrurus catenatus*) docile rattlesnake Federal candidate– at a minimum, project evaluations should contain delineations of whether or not eastern massasauga rattlesnake (EMR) habitat occurs within project boundaries. If suitable habitat is present, recommend surveys for the EMR be conducted to determine the presence or probable absence of the EMR in the vicinity of the proposed project.

- Snuffbox (*Epioblasma triquetra*) Federally-listed endangered freshwater mussel – if the proposed project directly or indirectly impacts habitat types (swift currents of riffles and shoals over gravel and sand with occasional cobble and boulders), recommend a survey be conducted to determine the presence or probable absence of the snuffbox in the vicinity of the proposed project.

USFWS Visit and Surveys – The USFWS conducted a site visit of the proposed project area at WPAFB in March 2010 that could be potentially impacted as a result of reconfiguring/relocating ECFs and the base perimeter fence. During this visit, it was noted that there were no roosting trees present in the Gate 15A project area and minimal impact would be expected due to isolated trees in this area. In addition, no issues for the Indiana bat or bald eagle were noted in the Gate 26A project area as were no suitable foraging trees noted.

In addition to the site visit conducted by the USFWS, Mr. Jeff Davis, an Ohio Department of Natural Resources EMR surveyor for Southwest Ohio, conducted several windshield surveys of the Gate 26A project area during 2010 and determined that the Gate 26A area was disturbed to the point that it would not provide suitable EMR habitat. Mr. Davis' email correspondence with WPAFB and the USFWS is attached.

EIS Survey – As part of the EIS, a survey of the project area was conducted by our EIS contractor (Shaw Environmental & Infrastructure, Inc.) in March 2011 with findings presented in a Natural Resources report. The report describes natural resources i.e., vegetation, wildlife, threatened and endangered species, wetlands, other jurisdictional waters of the United States, and floodplain concerns within or adjacent to the proposed project areas. This report is included as an appendix to the EIS and describes natural resources present within the project area and potential impacts, if any. No Indiana bat potential summer roost habitat was noted in the Gate 1A project area. One potential summer roost habitat tree was noted along a tree-lined corridor of the unnamed tributary of Hebble Creek in the Gate 15A project area; however, no long-term effects would be expected based on the number of trees to be cut and the availability of other potential roost trees in the vicinity. And trees in the Gate 26A project area do not represent a locally rare, unique, or high quality vegetative community; and were noted to be 8 to 10 inches in diameter at breast height and have taken on an open or old growth pattern and, thus, are not expected to provide suitable habitat for the bald eagle. Further, no Indiana bat potential summer roost habitat was noted in this area.

Proposed Construction Activities in EIS

The Proposed Action (preferred alternative) evaluated in the EIS would involve consolidating the existing nine gates at WPAFB into three gates (Gate 1A, 15A, and 26A) and closing a segment of State Route (SR) 444 that currently bisects the WPAFB Kittyhawk Center from Area A of the Base. Gates 1A and 26A would be relocated and designed to allow for ATFP improvement and greater traffic flow. Gate 15A would be expanded and redesigned to current ATFP guidelines and to manage expected increases in traffic flow.

- *Gate 1A* – Under the Proposed Action, Gate 1A would be designed as a new gate and relocated north of existing Gate 39A at the intersection of Redwood Street and SR 444. Existing Gate 39A would be permanently closed and demolished. New Gate 1A would include implementation of a final restricting denial barrier that would utilize the SR 444 roadway with the addition of low speed curves to aid in management of threat speeds at the checkpoint (**Figure 2**).

- *Gate 15A* – Under the Proposed Action, Gate 15A would be located in the vicinity of its current location at SR 844 and Davis Monthan Road. The new alignment would extend past Communications Boulevard and would add two horizontal curves to aid in management of threat speeds approaching and leaving the Base. Access from Gate 15A to Communications Boulevard would be permanently closed, as would access from Gate 15A to Kuglics Boulevard (**Figure 3**). A new ramp, Ramp J, would be constructed to parallel existing Ramp K. Access to Odgen Avenue through Gate 12A would be closed. Under the Proposed Action, the following improvements would be made as a result of reconfiguring Gate 15A: construction of a new Ramp J; extend northbound left-turn lane at the SR 444 and Davis Monthan Road intersection; construct a northbound left-turn lane at the intersection of SR 444 and the SR 844 northbound exit ramp; construct dual left-turn lanes at the Gate 12A/Ogden Road and SR 444 intersection; improvements to the Hebble Creek Road and Warner Robbins Street intersection; and improvements to the Hebble Creek Road and Skeel Avenue intersection.

- *Gate 26A* – Under the Proposed Action, Gate 26A would be relocated and reconfigured from its current location to a location north of the Circle Drive and SR 235 intersection (**Figure 4**). Gate 26A would serve as the new commercial vehicle inspection gate and a 14-stall parking area would be constructed outside the perimeter base fence to allow trucks to idle while waiting inspection.

- *Base Perimeter Fence Relocation* – Under the Proposed Action, the base perimeter fence would be relocated to extend across SR 444 north of Dayton Yellow Springs Road and along the east border of SR 444 up to the existing Kittyhawk Center fence. The perimeter fence would also be relocated across SR 444 north of existing Gate 39A at Redwood Street and tie into the main fence on the west side of SR 444. This action would close a segment of SR 444 as a public roadway that currently bisects the Kittyhawk Center from Area A of the Base. The Federal government owns the land underlying the section of SR 444 proposed for closure; in 1932, the U.S. War Department granted Ohio a permit to establish a road at this location, but retained the right to close it at any time. **Figure 5** presents the proposed relocation of the base perimeter fence.

To address the change in local traffic as a result of closing the applicable segment of SR 444, the Ohio Department of Transportation (ODOT) in conjunction with the Federal Highway Administration (FHWA), the city of Fairborn and/or other jurisdictional stakeholders, would develop transportation solutions that provide for the safe and efficient movement of users in the area. Any action alternatives developed to address the travel changes would be in accordance with FHWA National Environmental Policy Act (NEPA) guidelines and would be detailed in a separate and independent NEPA document. As cooperating agencies, the FHWA/ODOT have agreed to address any future, off-Base projects directly associated with the SR 444 project. The FHWA/ODOT NEPA document would tier off of WPAFB's EIS and would perform a separate Section 7 informal consultation with the USFWS.

Potential Impacts Under the Proposed Action

- *Gate 1A* – Vegetation within the proposed Gate 1A project area consists primarily of previously disturbed vegetation. Portions of vegetation would be disturbed and removed during site preparation for the Proposed Action. Impacts would be minor due to the types of vegetation and its common occurrence on Base. Affected areas would be mulched and revegetated with native plants following the construction and demolition period to prevent nonnative, invasive plant growth.

- *Gate 15A* – Approximately 300 linear feet of narrow, forested vegetative corridor along the unnamed tributary to Hebble Creek would be removed for the reconfiguration of Skeel Avenue as part of the Gate 15A Proposed Action. A portion of this corridor would be removed and converted to underground culverts. Vegetation in this area consists of mowed/maintained right-of-way on the north side and a

narrow line of scattered trees and bush honeysuckle on the south side of the creek. Neither side of Hebble Creek acts as riparian buffer with regard to stormwater runoff or high water events. As a positive impact, removed vegetation would be replaced with native, non-invasive vegetative plantings and any disturbance on either the creek or riparian zones would require a U.S. Army Corps of Engineers (USACE) 404/401 permit and would follow permit requirements for sediment and erosion control.

Impacts to narrow forested vegetation surrounding the unnamed tributary of Hebble Creek would include the removal of part of a potential travel corridor likely used by a variety of wildlife. Habitat destruction from fill or culvert placement in the unnamed tributary of Hebble Creek would be a permanent impact on aquatic wildlife. Motile aquatic species would likely find refuge upstream or downstream of the potentially impacted area. Sessile species would be unable to avoid impacts and would suffer mortality. These habitat alterations would likely result in localized decrease in the amount and diversity of the species present in the stream on a short-term basis.

- *Gate 26A* – Based on the March 2010 site visit conducted by the USFWS, there are no issues for the Indiana bat or bald eagle and no suitable trees with exfoliating bark for roosting exist within the Gate 26A project area; however, potential foraging exists in this area.

In recent correspondence, the USFWS brought to the attention of WPAFB the possibility that the rayed bean, a proposed endangered species, may exist within the project areas. To date, no surveys have been conducted on Base for the presence or likely absence of this species.

Environmental Consequences

The attached table has been extracted from the Preliminary Draft EIS and presents anticipated on- and off-Base impacts as a result of the Proposed Action, Alternative A, and the No Action alternative. The Proposed Action is the USAF's preferred alternative, as described above; Alternative A involves closing a segment of SR 444; and the No Action alternative involves no actions resulting in the existing nine gates at WPAFB remaining in place and no reconfiguration or improvements being made. Several stand-alone reports were prepared as part of the EIS and were used in determining impacts.

Environmental Commitments

WPAFB places a strong emphasis on avoidance, minimization, and mitigation of impacts resulting from a proposed project. Environmental commitments have been developed to minimize impacts to the Proposed Action. The following is a summary of proposed environmental commitments to avoid and/or minimize potential impacts:

- Large green spaces (i.e., in the vicinity of the Gate 15A and Gate 26A proposed project areas) will be maintained in order to provide for wildlife habitat and movement corridors.

- Vegetative areas removed or damaged as a result of construction activities in all project areas will be re-vegetated to mitigate impacts to terrestrial biota.

- Non-native and invasive vegetation will be removed and replaced with native, non-invasive species on a project by project basis. WPAFB will implement measures to avoid impacts to larger tree specimens native to the surrounding area. Detailed planting plans and tree save measures will be prepared with individual projects.

- Disturbed areas will be restoredby means of planting similar vegetative species in all project areas after construction activities are complete.

- Mitigation under the Clean Water Act Sections 404 and 401 permit requirements for potential stream impacts will include riparian corridor mitigation, which will compensate for possible loss of vegetation in the Gate 15A project area.

Please return your comments to me at the above address. If you have any questions, please contact me at (937) 257-4857 or by email at Darryn.Warner@wpafb.af.mil.

Sincerely,

Darryn M. Warner

Darryn Warner
Environmental Quality Section
Asset Management Division

cc: Karen Beason (88 ABW/CEAOR, WPAFB)
William Scoville (Shaw Environmental & Infrastructure, Inc.)

Attachments:
Table, Comparison of Environmental Consequences
Previous Correspondence
USGS Quadrangle Map
GIS Figures

Comparison of Environmental Consequences

Affected Environmental Issue	Proposed Action (Preferred Alternative)	Alternative A (Base Perimeter Fence Relocation)	No Action
Biological Resources			
Vegetation			
On-Base	Short-Term: Minor adverse impact during construction activities due to removal of common vegetation. Positive impact from removal of invasive vegetation. Long-Term: Negligible impact from vegetation removal as no rare vegetation would be affected. Environmental commitments would involve replanting with similar, non-invasive vegetation.	Short-Term: Minor adverse impacts during construction activities due to removal of common vegetation at Gates 9A and 38A due to extending the base perimeter fence across SR 444. Positive impact from removal of invasive vegetation. Long-Term: Similar to Proposed Action.	
Off-Base	Short-Term: Minor adverse impact to vegetation from construction activities disturbing soil. Long-Term: Similar to short-term.	Short-Term: Similar to Proposed Action. Long-Term: Similar to Proposed Action.	Short-Term: No impact. Long-Term: No impact.
Wildlife			
On-Base	Short-Term: Negligible adverse impact as no unusual or high quality habitat would be affected. Long-Term: Similar to short-term.	Short-Term: Similar to Proposed Action. Long-Term: Similar to Proposed Action.	
Off-Base	Short-Term: Negligible adverse impact as no unusual or high quality habitat would be affected. Long-Term: Similar to short-term.	Short-Term: Similar to Proposed Action. Long-Term: Similar to Proposed Action.	

Affected Environmental Issue	Proposed Action (Preferred Alternative)	Alternative A (Base Perimeter Fence Relocation)	No Action
Biological Resources (continued) Threatened and Endangered Species On-Base	Short-Term: Negligible impact on low quality habitat of Indiana bat and bald eagle; impacts would be minimized by implementing tree cutting in accordance with the Integrated Natural Resources Management Plan (INRMP). Long-Term: Negligible impact from loss of potential designated habitat areas for Indiana bat and bald eagle; impacts would be minimized by implementing tree cutting in accordance with the INRMP.	Short-Term: Similar to Proposed Action. Long-Term: Similar to Proposed Action.	Short-Term: No impact. Long-Term: No impact.
Off-Base	Short-Term: No impact; there are no known or potential designated habitat areas. Long-Term: Similar to short-term.	Short-Term: Similar to Proposed Action. Long-Term: Similar to Proposed Action.	
Wetlands On-Base	Short-Term: No impact because no wetlands are located within the project areas. Long-Term: No impact.	Short-Term: Similar to Proposed Action. Long-Term: No impact.	Short-Term: No impact. Long-Term: No impact.
Off-Base	Short-Term: No impact because no wetlands are located within the area of influence. Long-Term: No impact.	Short-Term: No impact. Long-Term: No impact.	

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

22 December 2009

88 ABW/CEVO
1450 Littrell Road
Wright-Patterson Air Force Base OH 45433-5209

Dr. Mary Knapp
U.S. Fish and Wildlife Service
Ecological Services
6950 Americana Parkway Suite H
Reynoldsburg, Ohio 43068-4132

Dear Dr. Knapp

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 regarding the proposed reconfiguration of entry control systems in Areas A and C of Wright-Patterson Air Force Base (WPAFB). The base is located in Greene County, adjacent to the city of Fairborn, Ohio. The proposed location for this project is shown on the enclosed maps. WPAFB has initiated an Environmental Assessment (EA) for this project in accordance with the requirements of the National Environmental Policy Act of 1969 (NEPA).

The entry control reconfiguration is needed to bring Areas A and C of WPAFB into compliance with the revised anti-terrorism policies and procedures. The base has explored potential solutions that could be implemented to improve security, safety and traffic flow on and near WPAFB.

Specifically, this project proposes the following:

- reconfiguration of gates 1C, 12A, 15A, 16A, and 26C;
- closures of gates 8C, 9A, 38C, and 39C;
- associated on-base roadway improvements; and
- relocation of SR 444 between gate 1C and gate 9A.

Threatened and endangered species known to exist within the vicinity of the base include the Indiana bat (*Myotis sodalis*), eastern massasauga rattlesnake (*Sistrurus c. catenatus*), clubshell mussel (*Pleurobema clava*) and blazing star stem borer moth (*Papaipema beeriana*). There are no known natural resources (i.e. woodland, prairie, wetlands, ponds, streams) in the immediate vicinity of this proposed site.

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Thank you for your consideration. Please return your comments to me at the above address at your earliest convenience. If you have any questions about the project, or need any clarifications, please do not hesitate to contact Karen Beason at (937) 257-5899 or Karen.Beason@wpafb.af.mil.

Sincerely

Jan Ferguson

JAN E. FERGUSON
Chief, Operations Branch
Environmental Management Division

Attachments
1. Location Map
2. Project Area Map

cc:
Patrick Sage (LJB, via email)

United States Department of the Interior

FISH AND WILDLIFE SERVICE

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

February 22, 2010

Karen Beason
88 ABW/CEVO
1450 Littrell Road, Building 22
Wright-Patterson AFB, OH, 45433

TAILS: 2009-TA-0280

Re: Reconfiguration of Entry Gate Control Systems in Area A and C, Greene County, OH

Dear Ms. Beason:

This is in response to your December 22, 2009 letter requesting information we may have regarding the occurrence or possible occurrence of federally listed threatened or endangered species within the vicinity of the proposed project located within the Wright-Patterson Air Force Base in Greene County, Ohio. We understand this project is proposing to reconfigure the entry control system gates in Areas A and C within WPAFB. According to your letter, the project involves reconfiguration of gates 1C, 12A, 15A, 16A, and 26C and closure of gates 8C, 9A, 38C and 39C. We understand the proposed project also involves the relocation of SR 444 between gate 1C and gate 9A and associated on-base roadway improvements. The Service requested additional information on the proposed project in a phone call to you on January 6, 2010 however; we have yet to receive any additional information on the proposed project plans at this time. No information was given as to proposed impacts to streams or wetlands.

There are no Federal wildlife refuges, wilderness areas, or Critical Habitat within the vicinity of this site.

The Service recommends that proposed developments avoid and minimize water quality impacts and impacts to high quality fish and wildlife habitat, such as forests, streams, and wetlands. Best construction techniques should be used to minimize erosion, in particular, on slopes. Additionally, natural buffers around streams and wetlands should be preserved to enhance beneficial functions. If streams or wetlands will be impacted, the Corps of Engineers should be contacted for possible need of a Section 404 permit. We support and recommend mitigation activities that reduce the likelihood of invasive plant spread and encourage native plant colonization. Prevention of non-native, invasive plant establishment is critical in maintaining high quality habitats. All disturbed areas should be mulched and revegetated with native woody and herbaceous species.

The proposed project lies within the range of the **Indiana bat** (*Myotis sodalis*), a federally listed endangered species. Since first listed as endangered in 1967, their population has declined by nearly 60%. Several factors have contributed to the decline of the Indiana bat, including the loss and degradation of suitable hibernacula, human disturbance during hibernation, pesticides, and the loss and degradation of forested habitat, particularly stands of large, mature trees. Fragmentation of forest habitat may also contribute to declines. During winter, Indiana bats hibernate in caves and abandoned mines. Summer habitat requirements for the species are not well defined but the following are considered important:

(1) dead or live trees and snags with peeling or exfoliating bark, split tree trunk and/or branches, or cavities, which may be used as maternity roost areas;
(2) live trees (such as shagbark hickory and oaks) which have exfoliating bark;
(3) stream corridors, riparian areas, and upland woodlots which provide forage sites.

We understand that survey work in 2000 and 2007 detected Indiana bats within WPAFB. The Service is concerned with the close proximity of the proposed project and any potential impacts to this species and/or its habitat. No information was given as to any on-site suitable habitat or project plans to impact potential habitat. Should the proposed site contain trees or associated habitats exhibiting any of the characteristics listed above, we recommend that the habitat and surrounding trees be saved wherever possible. If the trees must be cut, further coordination with this office is requested to determine if surveys are warranted. Any survey should be designed and conducted in coordination with the Endangered Species Coordinator for this office.

The project lies within the range of the **eastern massasauga** (*Sistrurus catenatus catenatus*), a docile rattlesnake that is declining throughout its national range and is currently a Federal Candidate species. The snake is currently listed as endangered by the State of Ohio. Your proactive efforts to conserve this species now may help avoid the need to list the species under the Endangered Species Act in the future. Due to their reclusive nature, we encourage early project coordination to avoid potential impacts to massasaugas and their habitat. At a minimum, project evaluations should contain delineations of whether or not massasauga habitat occurs within project boundaries.

The massasauga is often found in or near wet areas, including wetlands, wet prairie, or nearby woodland or shrub edge habitat. This often includes dry goldenrod meadows with a mosaic of early successional woody species such as dogwood or multiflora rose. Wet habitat and nearby dry edges are utilized by the snakes, especially during the spring and fall. Dry upland areas up to 1.5 miles away are utilized during the summer, if available. For additional information on the eastern massasauga, including project management ideas, please visit the following website: http://www.fws.gov/midwest/Endangered/lists/candidat.html or contact this office directly.

The eastern massasauga is known to be present within the WPAFB. We understand that eastern massasaugas have been previously reported from the Prime BEEF Training Area (PBTA) and Twin Base Golf Course (TBGC) and that surveys conducted within the PBTA captured massasaugas in 1993. We understand that surveys in 2009 did not detect eastern massasaugas in their historical locations at WPAFB. Multi-year survey efforts will be needed to determine probable absence of this species. The Service is concerned with the close proximity of the proposed project and any potential impacts to this species and/or its habitat. If suitable habitat is present, we recommend that surveys for this species be conducted to determine the presence or probable absence of the eastern massasauga in the vicinity of the proposed site.

The proposed project lies within the range of the **snuffbox** (*Epioblasma triquetra*), a Federal freshwater mussel species of concern and an Ohio endangered species and the **clubshell** (*Pleurobema clava*), a federally listed endangered freshwater mussel. These mussels occur in swift currents of riffles and shoals over gravel and sand with occasional cobble and boulders. These mussels are potentially present in the Little Miami River. Should the proposed project directly or indirectly impact any of the habitat types described above, we recommend that a survey be conducted to determine the presence or probable absence of these mussels in the vicinity of the proposed site.

These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), the Endangered Species Act of 1973 (ESA), as amended, and are consistent with the intent of the National Environmental Policy Act of 1969 and the U. S. Fish and Wildlife Service's Mitigation Policy. This letter provides technical assistance only and does not serve as a completed ESA section 7 consultation document.

If you have questions, or if you would like to set up a site visit, please contact Melanie Cota at extension 15 in this office or by email at Melanie_Cota@fws.gov or visit our website at http://www.fws.gov/midwest/Ohio.

Sincerely,

Mary Knapp

Mary Knapp, Ph.D.
Field Supervisor

cc: ODNR, DOW, SCEA Unit, Columbus, OH

Burns, Stephanie A

From: Jeff Davis [anura@fuse.net]
Sent: Tuesday, April 13, 2010 1:03 PM
To: Warner, Darryn M Civ USAF AFMC 88 ABW/CEANQ
Subject: WPAFB Gate Reconfiguration Project
Attachments: pic16549.gif; ecblank.gif

Darryn,

USFWS did not request that I send a letter. Melanie was happy with what my Email had to say regarding the gate reconfiguration. It's pasted below.

Melanie,

I looked at the field where the gate is going in at Wright Patt. I looked
at it every time I drove past it last year, not because it looked good, but because I felt
that the topography made it look like once upon a time there would have been EMRs in it.
That field is mowed and it was mowed all last summer), there are no shrubs (ie. dogwoods),
and it is so disturbed that I feel very confident in saying that it doesn't provide suitable
EMR habitat.
If you would like me to walk it, I can do so, but it is so devoid of cover, I'd be surprised
if I even saw a garter snake.

Jeff

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

26 May 2011

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

Dr. Mary Knapp
U.S. Fish and Wildlife Service
6950 Americana Parkway, Suite H
Reynoldsburg, OH 43068-4127

Dear Dr. Knapp:

Wright-Patterson Air Force Base (WPAFB) is seeking informal consultation with the U.S. Fish and Wildlife Service in compliance with Section 7 of the Endangered Species Act regarding the proposed reconfiguration and relocation of entry control facilities (ECFs) / gates and base perimeter fence relocation in Area A. The current configurations of the ECFs do not meet the Department of Defense (DoD) security requirements under the Anti-Terrorism/Force Protection (ATFP) standards.

WPAFB has initiated an Environmental Impact Statement (EIS) for this project in accordance with the requirements of the National Environmental Policy Act of 1969. The proposed location for this project is shown on the enclosed maps. Construction activities under the Proposed Action would be limited to demolition and construction of ECFs and guard shacks in previously-disturbed areas at WPAFB, and construction of a new perimeter fence along State Route (SR) 444 at the Kittyhawk Center. The following table describes the disposition of the nine existing gates in Area A at WPAFB:

Gate No.	Current Purpose / Location	Proposed Action	Result of Proposed Action
1A	Secondary ECF / SR 444 and Wright Avenue	Relocate / Reconfigure Gate 1A to approximate vicinity of SR 444 and Redwood Street intersection	Close. Demolish gate and approach pavement. Access to public cemetery will remain.
8A	Limited Use / SR 844 and Schuster Avenue	None	Reopen and unmanned. No access to secured base.
9A	Secondary ECF / SR 444 and Estabrook Road	None	Remain open and unmanned. No access to secured base.
12A	Primary ECF (Visitor Center) / SR 444 and Chidlaw Road	None	Close. Ceremonial openings only. Access to Hope Hotel and Lot 1A will remain.

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Gate No.	Current Purpose / Location	Proposed Action	Result of Proposed Action
15A	Secondary ECF / SR 844	Reconfigure Gate 15A as a 24-hour Gate to be located in its current vicinity. Roadway to be extended past Communications Boulevard.	Construction of a new reconfigured gate.
16A	Commercial Vehicle Inspection / SR 444 and Communications Boulevard	None – The commercial vehicle inspection area would be relocated to the new configured Gate 26A to just north of SR 235 and Circle Drive.	Remain open and unmanned. No access to secured base.
26A	Secondary ECF / SR 235 at 445th AW Area	Reconfigure and Relocate from its existing location north of SR 235 / Loop Road to just north of the SR 235 and Circle Drive intersection.	Close. Demolish gate and approach movement.
38A	Kittyhawk Center ECF / SR 444 and Redwood Street	None	Remain open and unmanned.
39A	Limited Use / SR 444 and Redwood Street	None. New Gate 1A relocated to just north of existing Gate 39A at Redwood Street.	Demolish gate and approach pavement.

Under the No Action Alternative, the existing nine ECFs would remain in place and no reconfiguration or improvements would be made to gates in Area A. Gates 1A, 15A, and 26A would remain as is and would not be upgraded or reconfigured, nor would they meet the DoD security requirements under the ATFP standards. SR 444 would remain open as a public roadway between Area A and the Kittyhawk Center and the Kittyhawk Center would remain bisected from Area A.

The geographic location of the proposed project area is Greene County, in Sections 1, 11, 12, and 26 (**Figure 1**). The area of the proposed reconfiguration and relocation of ECFs and SR 444 is located in the south portion of Area A. The following is a summary of each proposed action:

- ***Gate 1A*** –Relocate along SR 444 at the Redwood Street intersection (**Figure 2**). Public traffic traversing south along SR 444 would be prohibited to continue through the Kittyhawk Center and would be diverted to Wright Avenue at this gate.

- ***Gate 15A*** – Relocate west of its existing location to a location just west of Communications Boulevard / Kuglics Boulevard and Skeel Avenue (**Figure 3**). The approaching roadway to the relocated gate would be realigned.

- ***Gate 26A*** – Relocate south of its existing location to a location just north of the intersection of SR 235 and Circle Drive (**Figure 4**).

- ***Base Perimeter Fence Relocation*** – Relocate to extend across SR 444 north along the east side of SR 444 to tie into the existing perimeter fence just north of existing Gate 9A. Perimeter fence would be constructed across SR 444 at Redwood Street at the proposed Gate 1A location and tie into existing fence on west side of SR 444 (**Figure 5**).

Thank you for your consideration. Please return your comments to me at the above address. If you have any questions, please contact me at (937) 257-4857 or by email at Darryn.Warner@wpafb.af.mil.

Sincerely

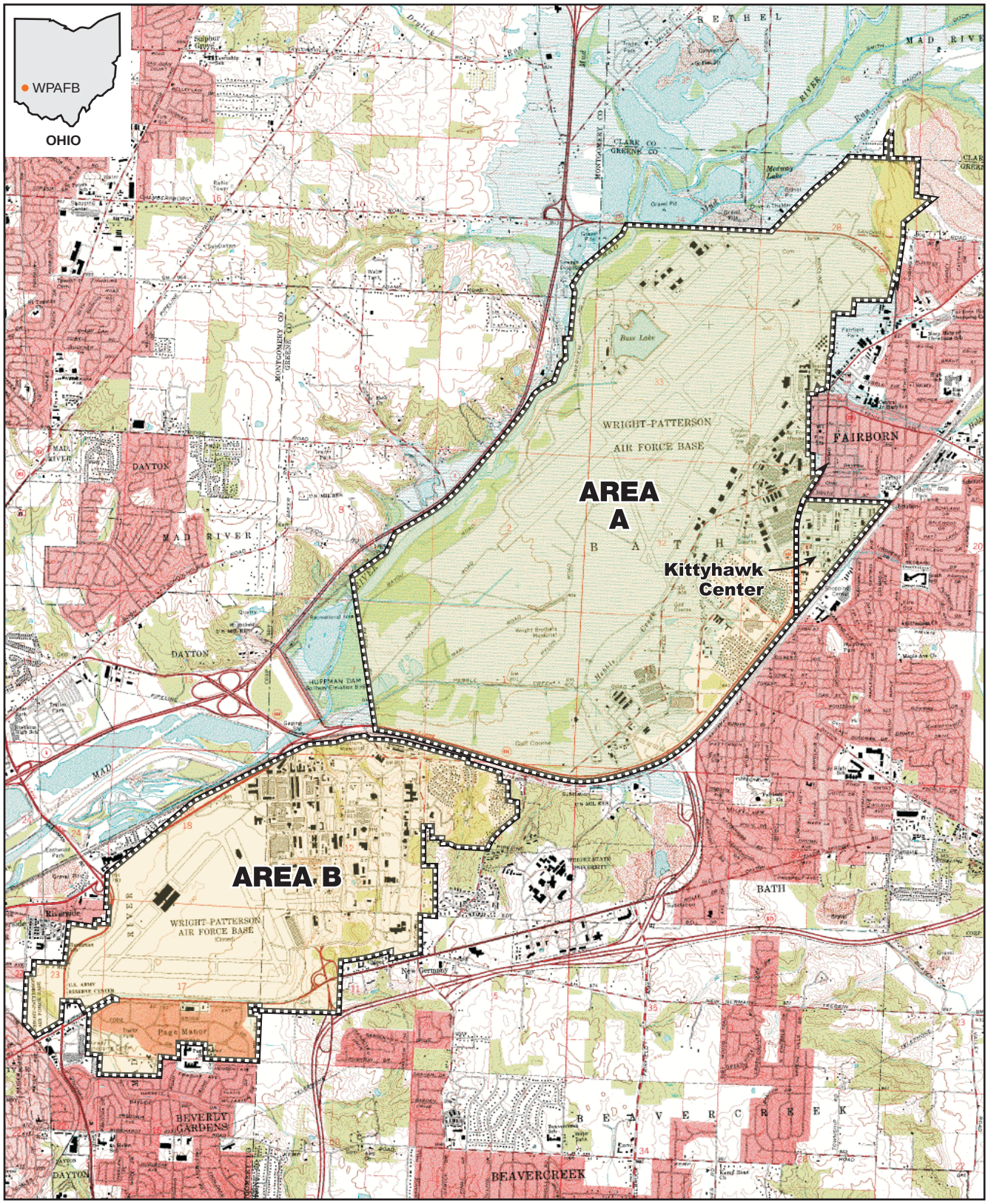
Darryn M. Warner

Darryn Warner
Environmental Quality Section
Asset Management Division

cc: Karen Beason (88 ABW/CEAOR, WPAFB)
William Scoville (Shaw Environmental & Infrastructure. Inc.)

Enclosures: USGS Quadrangle Map
GIS Figures

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Cincinnati, OH	12/1/10	--	JIS	SB	CH	s-140401.0602-12/10-w



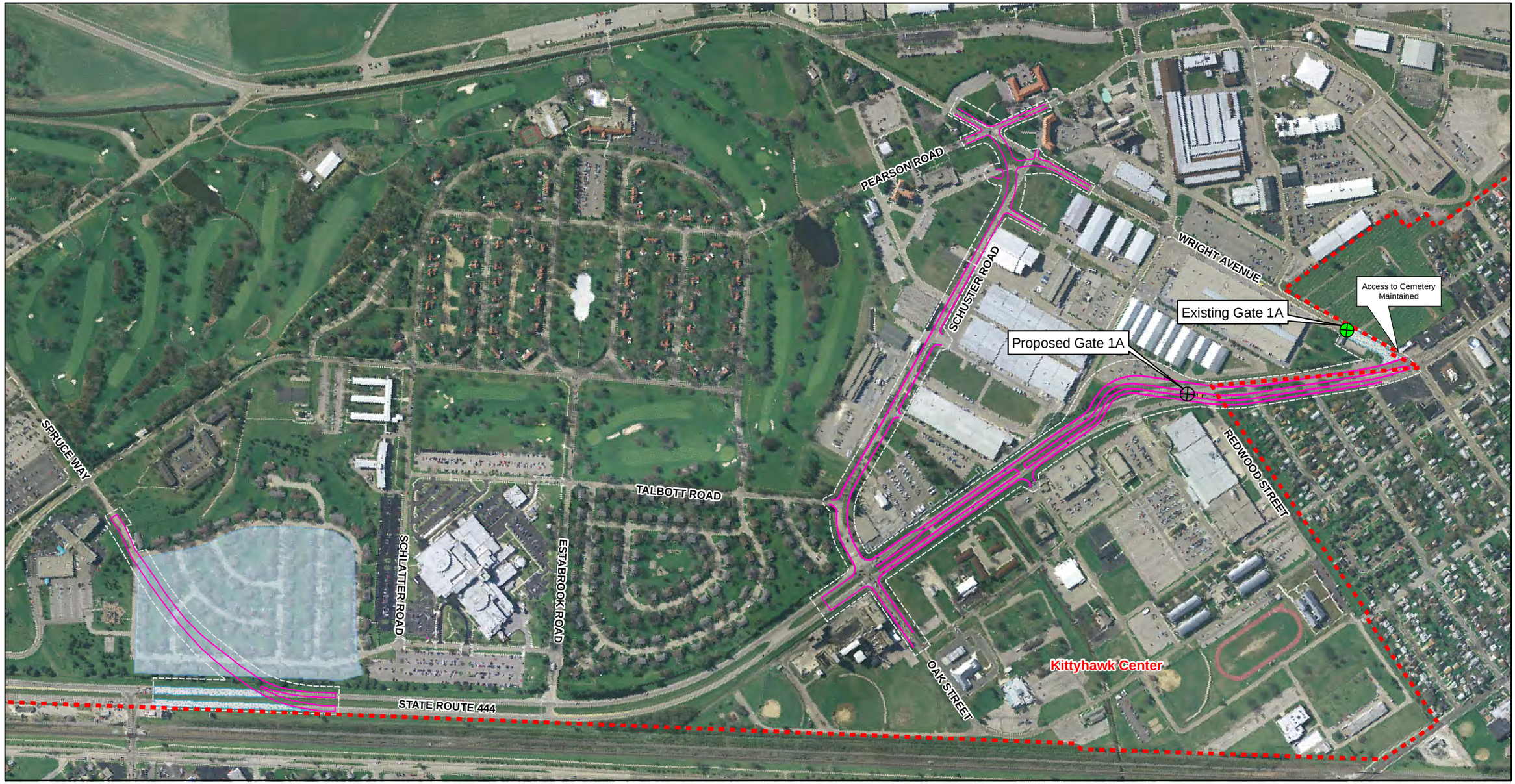
N

0 .5 1 mile

WRIGHT-PATTERSON AIR FORCE BASE, OHIO

Figure 1
Areas A & B at WPAFB
and Surrounding Area

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Cincinnati, OH	12/1/10	--	MSN	SB	BS	140401.0602-01.MXD



Legend

- Proposed Gate Location
- Proposed Gate Closure/Existing Gate
- Installation Boundary
- Area of Potential Effect
- Proposed Alignment
- Houses Removed
- Proposed Guard Shack
- Proposed Road Closure/Remove Pavement

N

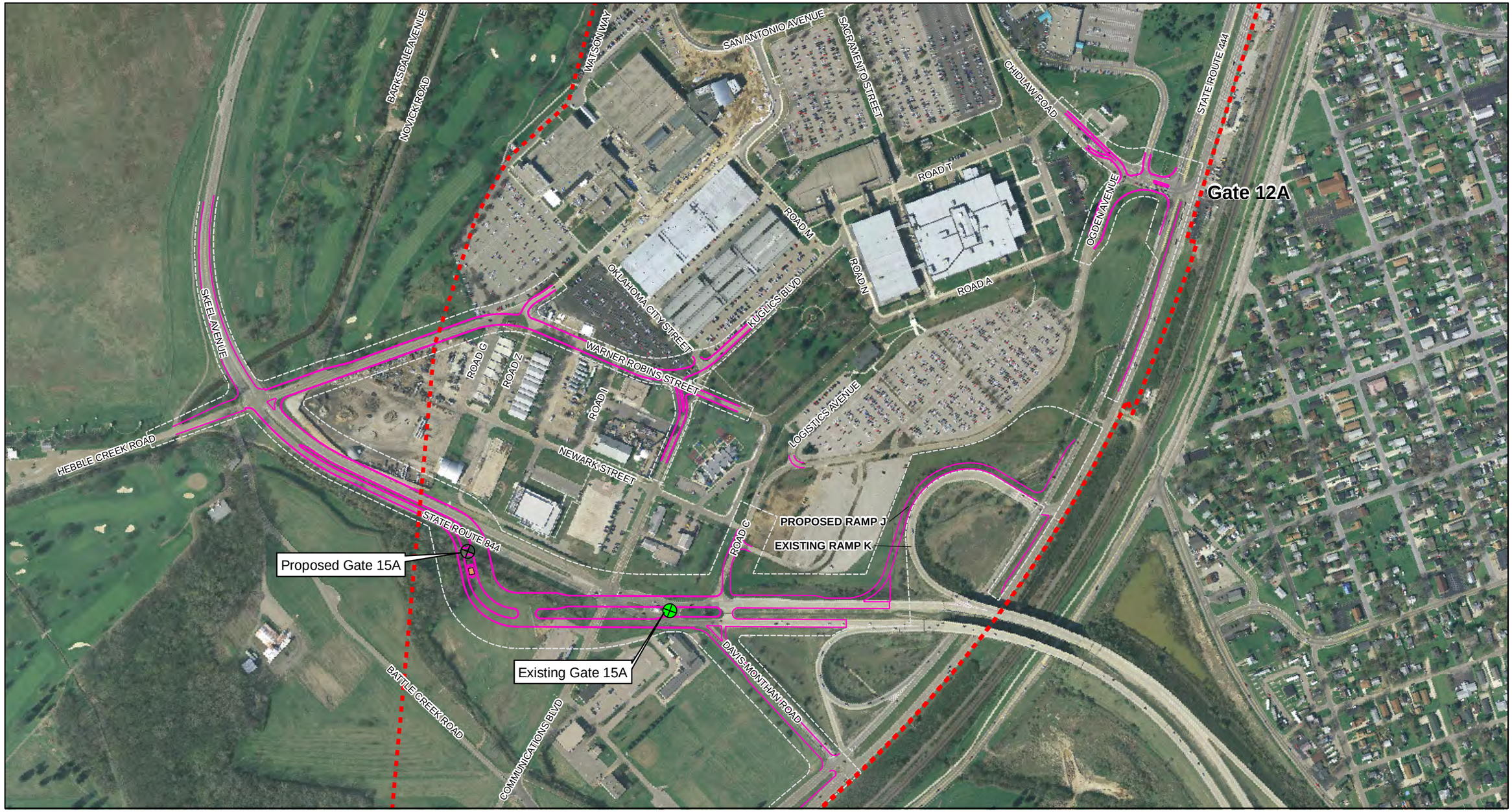
0 330 660 1,320 Feet

WRIGHT-PATTERSON AIR FORCE BASE, OHIO

Figure 2
Existing and Proposed Gate 1A Locations

Map Document: (C:\CAD-GIS\Acad 2011\140401.0602\140401.0602-01.mxd)
4/19/2011 -- 1:42:08 PM

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Cincinnati, OH	12/2/10	--	MSN	SB	BS	140401.0602-02.MXD



Legend

- Proposed Gate Location
- Proposed Gate Closure/Existing Gate
- Area of Potential Effect
- Proposed Alignment
- Installation Boundary
- Proposed Guard Shack

N

0 265 530 1,060 Feet

WRIGHT-PATTERSON AIR FORCE BASE, OHIO

Figure 3
Existing and Proposed Gate 15A Locations

Map Document: (C:\CAD-GIS\Acad 2011\140401.0602\140401.0602-02.mxd)
4/19/2011 -- 1:44:07 PM

Legend

- Proposed Gate Location
- Area of Potential Effect
- Proposed Alignment
- Installation Boundary
- Proposed Guard Shack

N

0 137.5 275 550 Feet

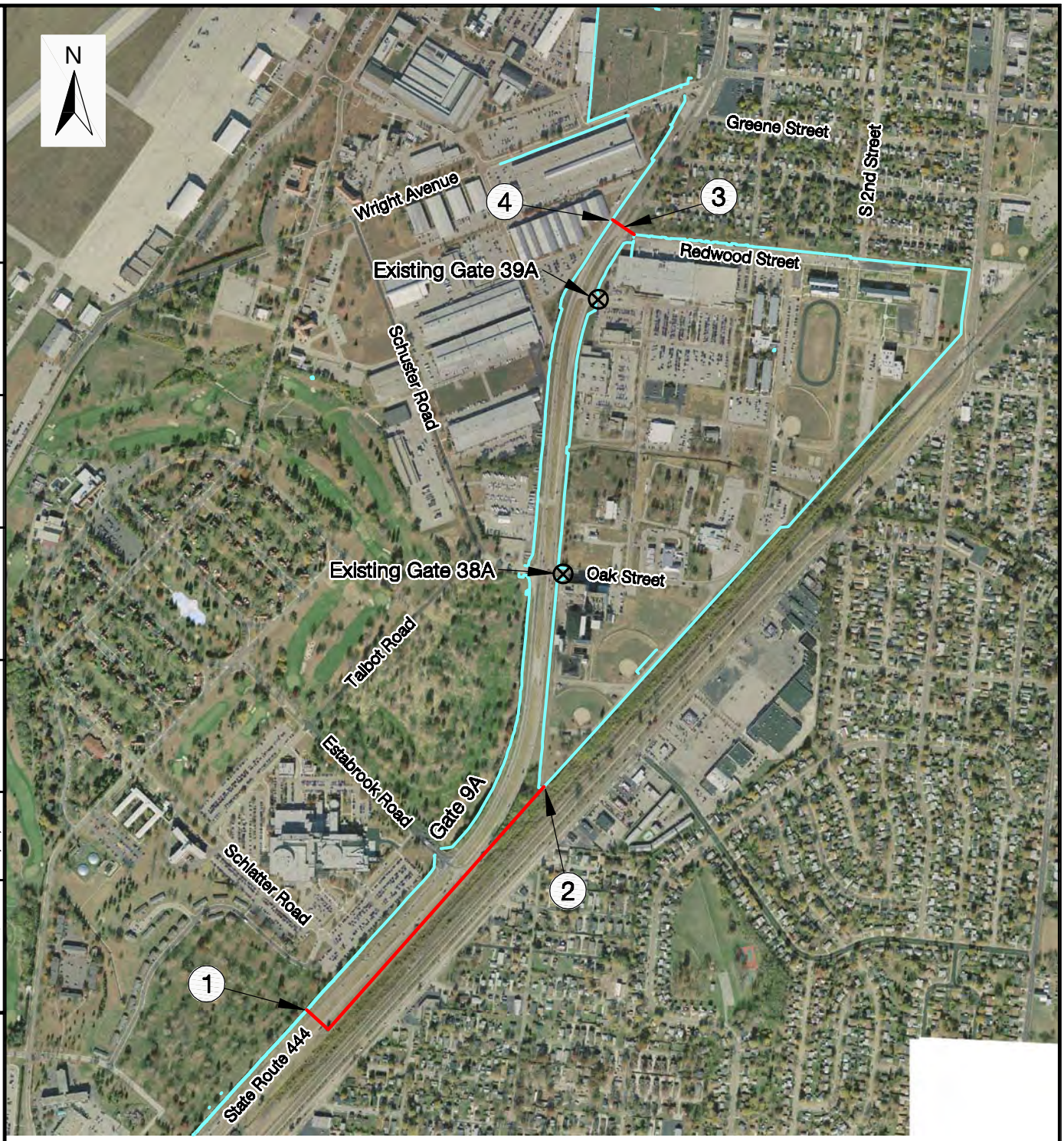
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

Figure 4
Existing and Proposed Gate 26A Locations

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Cincinnati, OH	12/1/10	--	MSN	SB	BS	140401.0602-03.MXD

Map Document: (C:\CAD-GIS\Acad 2011\140401.0602\140401.0602-03.mxd)
4/19/2011 -- 2:06:50 PM

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Cincinnati, OH	12/9/10	--	MSN	SB	BS	140401.0602-04(2)



Legend:

Existing Fence

Proposed Fence Extension

Notes:

1. Approximate location of base perimeter fence to extend across State Route 444, North along east border of SR444.
2. Base perimeter fence to tie into existing fence (approximate location).
3. Base perimeter fence across State Route 444 at Redwood Street.
4. Tie into main base fence on west side of State Route 444.

SCALE IN FEET

0 500 1,000 2,000

WRIGHT-PATTERSON
AIR FORCE BASE,
OHIO

Figure 5
Proposed Base Perimeter
Fence Relocation

M. Najar - 140401.0602-04.dwg - Thursday, 7/21/11 - 10:00 AM

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

28 October 2011

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

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

Subject: Informal Section 7 Consultation
Reconfiguration and Relocation of Entry Control Facilities and State Route 444
in Area A, Wright-Patterson AFB, Greene County Ohio

Dear Dr. Knapp

On May 26, 2011, and October 13, 2011, Wright-Patterson Air Force Base (WPAFB) corresponded with the U.S. Fish and Wildlife Service (USFWS) regarding the occurrence or possible occurrence of federally listed threatened or endangered species within the vicinity of the proposed reconfiguration and relocation of entry control facilities (ECFs)/gates and base perimeter fence relocation in Area A at Wright-Patterson Air Force Base (WPAFB). The current configurations of the ECFs do not meet the Department of Defense (DoD) security requirements under the Anti-Terrorism/Force Protection (ATFP) standards. In conjunction with the preparation of an Environmental Impact Statement (EIS) for the proposed construction activities, technical comments were received from the USFWS in a letter dated October 20, 2011 (TAILS: 03E15000-2012-TA-0057). By way of this letter, WPAFB is seeking to conclude Section 7 consultation for the proposed project based on the preferred alternative. The USFWS identified the following species to be in the range of the proposed construction activities:

1. Bald Eagle (*Haliaeetus leucocephalus*), Protected by the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act
2. Indiana bat *(Myotis sodalist)*, a federally endangered species
3. Eastern massasauga rattlesnake *(Sistrurus catenatus)*, a federal candidate species
4. Clubshell mussel *(Pleurobema clava)*, a federally endangered species
5. Snuffbox mussel *(Epioblasma triquetra)*, a species proposed for listing as federally endangered
6. Rayed Bean mussel (*Villosa fabalis*), a species proposed for listing as federally endangered

Proposed Project

The Proposed Action, which is WPAFB's preferred alternative, would involve consolidating nine of the existing gates at WPAFB into three gates (Gate 1A, 15A, and 26A) and closing a segment of SR 444 that currently bisects the WPAFB Kittyhawk Center from Area A of the Base. The second alternative evaluated in the EIS (Alternative A) would involve closure of SR 444 and installation of base perimeter fencing only, with no gate realignments. The third alternative evaluated in the EIS is the "No Action" alternative, which involves no actions resulting in the existing nine gates at WPAFB remaining in place and no reconfiguration or improvements being made.

A traffic study was conducted in 2009 [report dated March 30, 2009] and is included as part of the EIS. Findings indicated the closure of SR 444 between Dayton-Yellow Springs Road and Dayton Drive would displace to new locations the through-traffic not entering the realigned Base gates. The traffic study assumed traffic would divert to the nearest arterial roads that connect the two ends of the closed SR 444 segment. Thus, the resulting non-Base through-traffic route, from southwest to northeast, was predicted to travel from SR 444 along Dayton-Yellow Springs Road, Kauffman Avenue, Central Avenue, and Dayton Drive and return to SR 444. This route was determined to include the most likely areas affected by the impacts indicated on Attachment 1. In a letter dated March 14, 2011 the Air Force requested that the Federal Highway Administration (FHWA) participate in the preparation of an EIS for this project. FHWA responded with a letter dated April 18, 2011 accepting participation as a cooperating agency. As a cooperating agency for the EIS, the FHWA has concurred with this off-Base traffic route.

Attachment 1 has been extracted from the Preliminary Draft EIS and presents anticipated on- and off-Base impacts as a result of the Proposed Action, Alternative A, and the No Action alternative. As the EIS is currently in preliminary draft stage, please be ensured that all six species mentioned below will be assessed in the EIS prior to it becoming final. WPAFB is requesting concurrence that the proposed preferred alternative activities required by consolidating the existing nine gates at WPAFB into three gates (Gate 1A, 15A, and 26A) and closing a segment of State Route (SR) 444 that currently bisects the WPAFB Kittyhawk Center from Area A of the Base would have no effect on or not likely to adversely affect the 6 species mentioned below.

- The bald eagle is protected by the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. The nearest bald eagle nest is over 1.5 miles from the base. While suitable habitat may be present within WPAFB, this habitat is not within the areas proposed to be impacted and the proposed project areas are not located within ½ mile of any known eagle nesting site, therefore, WPAFB has determined there will be no effect to the bald eagle.

- The Indiana bat is a federally endangered species. Mist net surveys in 2000 and 2007 detected Indiana bats within the base. Summer habitat requirements for the species are not well defined but the following are considered important:

  (1) dead or live trees and snags with peeling or exfoliating bark, split tree trunk and/or branches, or cavities, which may be used as maternity roost areas;
  (2) live trees (such as shagbark hickory and oaks) which have exfoliating bark;
  (3) stream corridors, riparian areas, and upland woodlots which provide forage sites.

  During a 17 March 2010 site visit, the USFWS identified potential foraging areas at Gate 26A (formerly named 26C) and no suitable roosting trees in the project area. A limited number of potential roost trees were identified in the field site visit and most of the proposed construction is in previously disturbed areas of the base. If any trees have to be removed as part of the construction activities, the following impact and minimization measures would be implemented. Tree clearing proposed for this project is limited and scattered throughout portions of the base. The amount of habitat proposed to be impacted (<5 acres) is limited, of lower quality, and in addition, any trees that would need to be removed would be cleared from September 30-April 1, when bats would not be present. Based on the above avoidance and minimization measures WPAFB has determined the proposed project may affect, not likely to adversely affect the Indiana bat.

- Eastern massasauga rattlesnake is a Federal candidate. The eastern massasauga is potentially present at WPAFB with records from the Warfighter Training Center (formerly Prime BEEF

Training Area) and Twin Base Golf Course (TBGC). Although the last documented record was from 1993 in the Warfighter Training Center, recent base wide survey efforts have been ongoing to try to detect the presence or probable absence of the species within the base. Eastern massasaugas use both upland and wetland habitat and these habitats differ by season. During the winter, massasaugas hibernate in low wet areas, primarily in crayfish burrows, but may use other structures. Presence of a water table near the surface is important for a suitable hibernaculum. In the summer, massasaugas use drier, open areas that contain a mix of grasses and forbs such as goldenrods and other prairie plants that may be intermixed with trees or shrubs. Adjoining lowland and upland habitat with variable elevations between are critical for the species to travel back and forth seasonally. Most of the areas proposed to be impacted for this project have been previously disturbed and do not contain suitable habitat. The only area identified in the field site visit that appeared to have some potential for the species was the field near Gate 26A. However, Mr. Jeff Davis, an Ohio Department of Natural Resources EMR surveyor for Southwest Ohio, conducted several windshield surveys of the Gate 26A project area during 2010 and determined that the Gate 26A area was disturbed to the point that it would not provide suitable EMR habitat. Although this species is potentially present on the base, no habitat is proposed to be impacted by this project and WPAFB has determined the project may affect, not likely to adversely affect the eastern massasauga.

- Clubshell is a federally listed endangered freshwater mussel. Neither the species nor the habitat exists at the proposed project areas. The clubshell inhabits areas with sand or gravel substrate and also prefers areas with riffles and runs. The clubshell is potentially present in the Little Miami River and drainages where preferred habitat exists. The Gate 15A site would impact approximately 300 linear feet of narrow, forested vegetative corridor along the unnamed, intermittent tributary to Hebble Creek which would be removed for the reconfiguration of Skeel Avenue as part of the Gate 15A Proposed Action. A portion of this corridor would be removed and converted to underground culverts. Vegetation in this area consists of mowed/maintained right-of-way on the north side and a narrow line of scattered trees and bush honeysuckle on the south side of the creek. As a positive impact, removed vegetation would be replaced with native, non-invasive vegetative plantings and any disturbance on either the creek or riparian zones would require a U.S. Army Corps of Engineers (USACE) 404/401 permit and would follow permit requirements for sediment and erosion control. Since both the unnamed tributary and Hebble Creek are intermittent streams, and the Little Miami River is not in close proximity to the project, it has been determined there would be no effect on the clubshell from the Proposed Action.

- Snuffbox is a federally-listed endangered freshwater mussel. Neither the species nor the habitat exists at the proposed project areas. The snuffbox occurs in swift currents of riffles and shoals over sand and gravel with occasional cobble and boulders. The snuffbox is known to be present in the Stillwater and Little Miami River and drainages where preferred habitat exists. The Gate 15A site would impact approximately 300 linear feet of narrow, forested vegetative corridor along the unnamed, intermittent tributary to Hebble Creek which would be removed for the reconfiguration of Skeel Avenue as part of the Gate 15A Proposed Action. A portion of this corridor would be removed and converted to underground culverts. Vegetation in this area consists of mowed/maintained right-of-way on the north side and a narrow line of scattered trees and bush honeysuckle on the south side of the creek. As a positive impact, removed vegetation would be replaced with native, non-invasive vegetative plantings and any disturbance on either the creek or riparian zones would require a U.S. Army Corps of Engineers (USACE) 404/401 permit and would follow permit requirements for sediment and erosion control. Since both the unnamed tributary and Hebble Creek are intermittent streams, and the Stillwater and Little Miami Rivers are not in close proximity to the project, it has been determined there would be no effect on the snuffbox from the Proposed Action.

- Rayed bean is a freshwater mussel, proposed for federal listing. Neither the species nor the habitat exists at the proposed project areas. The rayed bean is generally known from smaller, headwater creeks, but records exist in larger rivers. They are usually found in or near shoal or riffle areas, and in the shallow, wave-washed areas of lakes. Substrates typically include sand and gravel, and are often associated with, and buried under the roots of, vegetation, including the water will (*Justica americana*) and water milfoil (*Myriophyllum* sp.). The rayed bean is known to be present in the Great Miami River and is potentially present in perennial streams in Greene and Montgomery Counties where preferred habitat exists. The Gate 15A site would impact approximately 300 linear feet of narrow, forested vegetative corridor along the unnamed, intermittent tributary to Hebble Creek which would be removed for the reconfiguration of Skeel Avenue as part of the Gate 15A Proposed Action. A portion of this corridor would be removed and converted to underground culverts. Vegetation in this area consists of mowed/maintained right-of-way on the north side and a narrow line of scattered trees and bush honeysuckle on the south side of the creek. As a positive impact, removed vegetation would be replaced with native, non-invasive vegetative plantings and any disturbance on either the creek or riparian zones would require a U.S. Army Corps of Engineers (USACE) 404/401 permit and would follow permit requirements for sediment and erosion control. Since both the unnamed tributary and Hebble Creek are intermittent streams, and the Great Miami River is not in close proximity to the project, it has been determined there would be no effect on the rayed bean from the Proposed Action.

The EIS considers the impacts from the on-Base construction (e.g., new gates and roadways) and the off-base traffic impacts (e.g., noise, vehicle emissions, and traffic delays from closing a segment of SR 444 within the Base boundary). To address the change in local traffic as a result of closing the applicable segment of SR 444, the Ohio Department of Transportation (ODOT) in conjunction with the FHWA, the city of Fairborn and/or other jurisdictional stakeholders, would develop transportation solutions that provide for the safe and efficient movement of users in the area. Any action alternatives developed to address the travel changes would be in accordance with FHWA National Environmental Policy Act (NEPA) guidelines and would be detailed in a separate and independent NEPA document. The FHWA/ODOT NEPA document would tier off of WPAFB's EIS and would perform a separate Section 7 consultation with the USFWS.

For these reasons, we conclude that the reconfiguration and relocation of the entry control facilities (ECFs) and State Route 444 in Area A, Wright-Patterson AFB, Greene County Ohio would have no effect on the Bald Eagle, Clubshell mussel, Snuffbox mussel, and Rayed Bean mussel, and may affect, not likely to adversely affect the Indiana bat and Eastern massasauga. We request concurrence with our determinations. In the event the Preferred Alternative is not selected or changed, WPAFB would reinitiate Section 7 consultation with the USFWS.

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

Sincerely

DARRYN WARNER
Natural Resources Manager
Environmental Quality Section
Environmental Branch

Attachment:
Table, Preliminary Draft EIS Comparison of Environmental Consequences

cc:
FHWA/ODOT
Karen Beason (88 ABW/CEAOR, WPAFB)
William Scoville (Shaw Environmental & Infrastructure, Inc.)

ATTACHMENT 1 Comparison of Environmental Consequences

Affected Environmental Issue	Proposed Action (Preferred Alternative) Close 444 & Realign gates	Alternative A (Base Perimeter Fence Relocation) Close 444 only	No Action
Land Use			
On-Base	Short-Term: Minor impacts from construction activities. Occupants of on-site buildings adjacent to project areas would be subject to temporary or intermittent impacts and inconveniences from modified parking and pedestrian patterns, and from increases in background noise would be experienced.	Short-Term: Minor adverse impact to land use in the vicinity of Gates 9A and 38A; however, land use would remain consistent with the WPAFB General Plan.	
	Long-Term: Minor adverse impact to land use in the vicinity of Gates 1A, 15A and 26A, and associated proposed road widening; however, land use would remain consistent with the WPAFB General Plan.	Long-Term: Similar to short-term.	Short-Term: No impact. Long-Term: No impact.
Off-Base	Short-Term: Minor adverse impacts to Greene, Ohio, and South Streets; however, land use would not change at these locations.	Short-Term: No impact.	
	Long-Term: Same as short-term.	Long-Term: No impact.	
Air Quality			
On-Base	Short-Term: Minor adverse impact from particulate matter and engine exhaust emissions generated during construction activities.	Short-Term: Similar to Proposed Action.	
	Long-Term: Negligible impact due to decreased idling and congestion at entry control facilities (ECFs).	Long-Term: Similar to Proposed Action.	Short-Term: No impact. Long-Term: No impact.
Off-Base	Short-Term: Negligible adverse impact because total amount of area traffic not expected to change.	Short-Term: Similar to Proposed Action.	
	Long-Term: No impact.	Long-Term: No impact.	

Comparison of Environmental Consequences

Affected Environmental Issue	Proposed Action (Preferred Alternative) Close 444 & Realign gates	Alternative A (Base Perimeter Fence Relocation) Close 444 only	No Action
Noise			
On-Base	Short-Term: Minor impacts on ambient noise from construction activities; however, activities would be carried out during normal working hours and would cease upon completion of construction activities. Long-Term: Positive effect on residential/recreational areas as a result of less traffic at fewer ECF locations.	Short-Term: Similar to Proposed Action. Long-Term: Similar to Proposed Action.	Short-Term: No impact. Long-Term: No impact.
Off-Base	Short-Term: Impacts similar to on-Base ambient noise short-term impacts. Long-Term: Moderate adverse impact from increased traffic noise levels at these roadways: Dayton-Yellow Springs Road, Kauffman Avenue, Central Avenue, Dayton Drive, and Broad Street.	Short-Term: Similar to Proposed Action. Long-Term: Similar to Proposed Action.	
Geology and Soils			
On-Base	Short-Term: Minor impact to soils from construction activities. Sediment and erosion control measures would be implemented to minimize potential impacts. Long-Term: No impact.	Short-Term: Minor impact to soils from construction activities at Gates 9A and 38A, and in areas where the perimeter fence is relocated across State Route (SR) 444. Sediment and erosion control measures would be implemented to minimize potential impacts. Long-Term: No impact.	Short-Term: No impact. Long-Term: No impact.
Off-Base	Short-Term: Minor adverse impact to soil during construction activities. Impacts would be minimized through implementation of erosion and siltation controls. Long-Term: Negligible adverse impacts would occur to local geology, but regional geology would not be affected.	Short-Term: Similar to Proposed Action. Long-Term: Similar to Proposed Action.	

Comparison of Environmental Consequences

Affected Environmental Issue	Proposed Action (Preferred Alternative) Close 444 & Realign gates	Alternative A (Base Perimeter Fence Relocation) Close 444 only	No Action
Water Resources			
Groundwater			
On-Base	Short-Term: Minor adverse impact to groundwater during construction activities from construction at or near existing ECFs. Erosion and sedimentation controls would be implemented as a best management practice (BMP).	Short-Term: Similar to Proposed Action.	
	Long-Term: Minor adverse effect on groundwater would continue to occur as a result of roadway operations (i.e., rainwater/roadway debris runoff).	Long-Term: Similar to Proposed Action.	
Off-Base	Short-Term: Minor adverse impact to groundwater from increased siltation to streams and stormwater conveyances within the roadway improvement project areas during construction.	Short-Term: Similar to Proposed Action.	
	Long-Term: Minor adverse effect on groundwater would continue to occur as a result of roadway operations.	Long-Term: Similar to Proposed Action.	Short-Term: No impact. Long-Term: No impact.
Surface Water			
On-Base	Short-Term: Moderate impact to unnamed tributary of Hebble Creek in area of Gate 15A. Environmental commitments would be implemented in accordance with the Clean Water Act Section 404 and 401 permits. Other open drainages would be impacted by culvert extensions. Erosion and sedimentation controls will be implemented as a BMP.	Short-Term: Minor adverse impact to surface water during construction activities as the proposed activities would be conducted at existing ECFs. Erosion and sedimentation controls would be implemented as a BMP.	
	Long-Term: Minor adverse impact. Environmental commitments will ensure no net loss of function.	Long-Term: Minor adverse effect on surface water would continue to occur as a result of roadway operations.	

Comparison of Environmental Consequences

Affected Environmental Issue	Proposed Action (Preferred Alternative) Close 444 & Realign gates	Alternative A (Base Perimeter Fence Relocation) Close 444 only	No Action
Surface Water (continued)	Short-Term: Moderate impact to culvert extensions.	Short-Term: Similar to Proposed Action.	Short-Term: No impact.
Off-Base	Long-Term: Similar to short-term.	Long-Term: Similar to Proposed Action.	Long-Term: No impact.
Floodplains			
On-Base	Short-Term: Minor adverse impact as a portion of Gate 15A is located within the 100-year floodplain. Construction in this area would be stipulated and restricted by the Miami Conservancy District (MCD).	Short-Term: Similar to Proposed Action.	
	Long-Term: Similar to short-term.	Long-Term: Similar to short-term.	Short-Term: No impact. Long-Term: No impact.
Off-Base	Short-Term: Minor adverse impact as a small segment of Kauffman Avenue is located within the 100-year floodplain.	Short-Term: Similar to Proposed Action.	
	Long-Term: Similar to short-term.	Long-Term: Similar to Proposed Action.	

Comparison of Environmental Consequences

Affected Environmental Issue	Proposed Action (Preferred Alternative) Close 444 & Realign gates	Alternative A (Base Perimeter Fence Relocation) Close 444 only	No Action
Biological Resources			
Vegetation			
On-Base	Short-Term: Minor adverse impact during construction activities due to removal of common vegetation. Positive impact from removal of invasive vegetation.	Short-Term: Minor adverse impacts during construction activities due to removal of common vegetation at Gates 9A and 38A due to extending the base perimeter fence across SR 444. Positive impact from removal of invasive vegetation.	
	Long-Term: Negligible impact from vegetation removal as no rare vegetation would be affected. Environmental commitments would involve replanting with similar, non-invasive vegetation.	Long-Term: Similar to Proposed Action.	Short-Term: No impact. Long-Term: No impact.
Off-Base	Short-Term: Minor adverse impact to vegetation from construction activities disturbing soil.	Short-Term: Similar to Proposed Action.	
	Long-Term: Similar to short-term.	Long-Term: Similar to Proposed Action.	

Comparison of Environmental Consequences

Affected Environmental Issue	Proposed Action (Preferred Alternative) Close 444 & Realign gates	Alternative A (Base Perimeter Fence Relocation) Close 444 only	No Action
Biological Resources (continued)			
Wildlife			
On-Base	Short-Term: Negligible adverse impact as no unusual or high quality habitat would be affected. Long-Term: Similar to short-term.	Short-Term: Similar to Proposed Action. Long-Term: Similar to Proposed Action.	
Off-Base	Short-Term: Negligible adverse impact as no unusual or high quality habitat would be affected. Long-Term: Similar to short-term.	Short-Term: Similar to Proposed Action. Long-Term: Similar to Proposed Action.	
Threatened and Endangered Species			
On-Base	Short-Term: Negligible impact on low quality habitat of Indiana bat and bald eagle; impacts would be minimized by implementing tree cutting in accordance with the US Fish and Wildlife Service's (USFWS) recommended tree-clearing season. Long-Term: Negligible impact from loss of potential designated habitat areas for Indiana bat and bald eagle; impacts would be minimized by implementing tree cutting in accordance with the USFWS recommended tree-clearing season.	Short-Term: Similar to Proposed Action. Long-Term: Similar to Proposed Action.	Short-Term: No impact. Long-Term: No impact.
Off-Base	Short-Term: No impact; there are no known or potential designated habitat areas. Long-Term: Similar to short-term.	Short-Term: Similar to Proposed Action. Long-Term: Similar to Proposed Action.	

Comparison of Environmental Consequences

Affected Environmental Issue	Proposed Action (Preferred Alternative) Close 444 & Realign gates	Alternative A (Base Perimeter Fence Relocation) Close 444 only	No Action
Wetlands			
On-Base	Short-Term: No impact because no wetlands are located within the project areas. Long-Term: No impact.	Short-Term: Similar to Proposed Action. Long-Term: No impact.	Short-Term: No impact. Long-Term: No impact.
Off-Base	Short-Term: No impact because no wetlands are located within the area of influence. Long-Term: No impact.	Short-Term: No impact. Long-Term: No impact.	
Cultural Resources			
On-Base	Short-Term: Negligible impact to National Register of Historic Places (NRHP) eligible sites. Long-Term: No impact.	Short-Term: Similar to Proposed Action. Long-Term: No impact.	
Off-Base	Short-Term: Beneficial impact to Huffman Prairie Flying Field visitors as the current commercial vehicle inspection gate (Gate 16A) co-mingles with access to the Flying Field. Relocating the inspection operations to Gate 26A would reduce traffic congestion and allow ease in accessing the Flying Field. Long-Term: Similar to short-term.	Short-Term: Similar to Proposed Action. Long-Term: No impact.	Short-Term: No impact. Long-Term: No impact.
Socioeconomics			
On-Base	Short-Term: Beneficial impact on local economy from revenue generated by construction activities. Long-Term: No impact.	Short-Term: Similar to Proposed Action. Long-Term: No impact.	Short-Term: No impact. Long-Term: No impact.
Off-Base	Short-Term: Beneficial impact to viability of downtown Fairborn as traffic and visibility increase. Long-Term: Similar to short-term.	Short-Term: Similar to Proposed Action. Long-Term: Similar to Proposed Action.	

Comparison of Environmental Consequences

Affected Environmental Issue	Proposed Action (Preferred Alternative) Close 444 & Realign gates	Alternative A (Base Perimeter Fence Relocation) Close 444 only	No Action
Environmental Justice			
On-Base	Short-Term: No impact. Long-Term: No impact.	Short-Term: No impact. Long-Term: No impact.	Short-Term: No impact. Long-Term: No impact.
Off-Base	Short-Term: Unknown impacts would be determined at such time as the FHWA/ODOT makes their separate NEPA determination. Long-Term: Similar to short-term.	Short-Term: Similar to Proposed Action. Long-Term: Similar to Proposed Action.	
Infrastructure			
On-Base	Short-Term: Minor adverse impact from intermittent roadway closures during construction and to local traffic in area of gates from additional construction vehicles. Long-Term: Beneficial impact to utilities and services as efficiencies increase.	Short-Term: Similar to Proposed Action. Long-Term: Similar to Proposed Action.	Short-Term: No impact. Long-Term: No impact.
Off-Base	Short-Term: Additional studies would occur during project planning and design for utility and other infrastructure needs. Long-Term: Similar to short-term.	Short-Term: Similar to Proposed Action. Long-Term: Similar to Proposed Action.	

Comparison of Environmental Consequences

Affected Environmental Issue	Proposed Action (Preferred Alternative) Close 444 & Realign gates	Alternative A (Base Perimeter Fence Relocation) Close 444 only	No Action
Health and Safety			
On-Base	Short-Term: Minor adverse impact to workers during construction activities; impacts would be minimized by adherence to safety standards.	Short-Term: Similar to Proposed Action.	Short-Term: Negative impact to safety of employees, residents, and visitors of the Base resulting from continued non-compliancy with Air Force anti-terrorism standards.
	Long-Term: No impact.	Long-Term: Similar to Proposed Action.	Long-Term: Similar to short-term.
Off-Base	Short-Term: Moderate impact and increased risk to safety of vehicles and pedestrians traversing the railroad tracks at SR 444 and Kauffman Avenue and crossing Central Avenue to access Central Park.	Short-Term: Similar to Proposed Action.	Short-Term: No impact.
	Long-Term: Similar to short-term.	Long-Term: Similar to Proposed Action.	Long-Term: No impact.

Comparison of Environmental Consequences

Affected Environmental Issue	Proposed Action (Preferred Alternative) Close 444 & Realign gates	Alternative A (Base Perimeter Fence Relocation) Close 444 only	No Action
Hazardous Materials			
On-Base	Short-Term: Negligible impact as hazardous materials used during construction would not be expected to increase. Long-Term: No impact.	Short-Term: Similar to Proposed Action. Long-Term: No impact.	
Off-Base	Short-Term: Minor adverse impact to areas of known active Leaking Underground Storage Tank (LUST) sites. Long-Term: No impact.	Short-Term: Similar to Proposed Action. Long-Term: No impact.	
Hazardous Waste			
On-Base	Short-Term: Negligible impact as hazardous materials generated during construction would not be expected to increase. Long-Term: Similar to short-term.	Short-Term: Similar to Proposed Action. Long-Term: Similar to Proposed Action.	Short-Term: No impact. Long-Term: No impact.
Off-Base	Short-Term: Minor adverse impact to areas of known active LUST sites. Long-Term: No impact.	Short-Term: Similar to Proposed Action. Long-Term: No impact.	
Environmental Restoration Program (ERP) Sites			
On-Base	Short-Term: Negligible impact as the project areas are not located directly over any landfills or burial sites; however, any activity that may disturb ERP sites will be coordinated with the Base ERP Program Manager in CEANQ. Long-Term: Similar to short-term.	Short-Term: Similar to Proposed Action. Long-Term: Similar to Proposed Action.	

Comparison of Environmental Consequences

Affected Environmental Issue	Proposed Action (Preferred Alternative) Close 444 & Realign gates	Alternative A (Base Perimeter Fence Relocation) Close 444 only	No Action
Traffic and Transportation			
On-Base	Short-Term: Beneficial impact at ECFs as a result of improvements. Construction activities would result in a minor adverse impact on traffic generation, volume, and street use.	Short-Term: Similar to Proposed Action.	Short-Term: No impact.
	Long-Term: Similar to short-term.	Long-Term: Similar to Proposed Action.	Long-Term: Minor to moderate adverse impacts on traffic in and around WPAFB as a result of continued vehicle delays and time-consuming vehicle inspections.
Off-Base	Short-Term: Minor impact from increased volume of traffic on local street network as off-Base traffic would travel further to access available ECF. Level of Service would decrease and average vehicle delays would increase on local street networks as traffic diverts from the closure of a segment of SR 444.	Short-Term: Similar to Proposed Action.	Short-Term: No impact.
	Long-Term: Similar to short-term.	Long-Term: Similar to Proposed Action.	Long-Term: No impact.

United States Department of the Interior

FISH AND WILDLIFE SERVICE

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

October 20, 2011

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

TAILS: 03E15000-2012-TA- 0057

Re: Reconfiguration and Relocation of Entry Control Facilities (ECFs) and State Route 444 in Area A, Greene County, OH

Dear Mr. Warner:

This is in response to your May 26, 2011 and October 13, 2011 letters requesting information we may have regarding the occurrence or possible occurrence of federally listed endangered, threatened, or candidate species within the vicinity of the proposed project located within the Wright-Patterson Air Force Base (WPAFB) in Greene County, Ohio. The Fish and Wildlife Service (Service) previously commented on this project in a letter dated February 22, 2010 (TAILS: 2009-TA-0280). In addition, the Service also attended a site visit on March 17, 2010 to look at portions of the project. We understand this project is proposing to meet the Department of Defense (DoD) security requirements under the Anti-Terrorism/Force Protection standards. We understand that WPAFB has initiated an Environmental Impact Statement (EIS) and that construction activities under the proposed action would be limited to demolition and construction of ECF's and guard sharks in previously disturbed areas of WPAFB and construction of a new disposition of the nine existing gates in Area A at WPAFB. According to your information the following is proposed in Area A:

- Gate 1A- Relocate along SR 444 at the Redwood Street intersection.
- Gate 15A- Relocate west of its existing location to a location just west of Communication Boulevard/Kuglics Boulevard and Skeel Avenue.
- Gate 26A- Relocate south of its existing location to a location just north of the intersection of SR 235 and Circle Drive
- Base Perimeter Fence Relocation-Relocate to extend across SR 444 north along the east side of SR 444 to tie into existing perimeter fence just north of existing Gate 9A.

The Service recommends that proposed developments avoid and minimize water quality impacts and impacts to high quality fish and wildlife habitat, such as forests, streams, and wetlands. Best construction techniques should be used to minimize erosion, in particular, on slopes. Additionally, natural buffers around streams and wetlands should be preserved to

enhance beneficial functions. If streams or wetlands will be impacted, the Corps of Engineers should be contacted for possible need of a Section 404 permit. We support and recommend mitigation activities that reduce the likelihood of invasive plant spread and encourage native plant colonization. Prevention of non-native, invasive plant establishment is critical in maintaining high quality habitats. All disturbed areas in the project vicinity should be mulched and revegetated with native plant species.

MIGRATORY BIRD COMMENTS: The project area lies within the range of the **bald eagle** (*Haliaeetus leucocephalus*). The bald eagle has been removed from the Federal list of endangered and threatened species due to recovery. This species continues to be afforded protection by the Bald and Golden Eagle Protection Act (BGEPA, 16 U.S.C. 668-668d) and Migratory Bird Treaty Act (MBTA, 16 U.S.C. 703-712). There is currently a known active bald eagle located at Eastwood Metropark, located southwest of the base in Montgomery County; however, this nest is over 1.5 miles from the base.

We recommend that you contact the Ohio Department of Natural Resources, Division of Wildlife, (419) 898-0960, for the location(s) of the eagle nest(s) in the county. If any active nests are located within ½ mile of the project site, we recommend that work at the site be restricted from mid-January through July to allow pre-nesting activities, incubation, and raising of the young.

ENDANGERED SPECIES COMMENTS: The proposed project lies within the range of the **Indiana bat** (*Myotis sodalis*), a federally listed endangered species. Since first listed as endangered in 1967, their population has declined by nearly 60%. Several factors have contributed to the decline of the Indiana bat, including the loss and degradation of suitable hibernacula, human disturbance during hibernation, pesticides, and the loss and degradation of forested habitat, particularly stands of large, mature trees. Fragmentation of forest habitat may also contribute to declines. During winter, Indiana bats hibernate in caves and abandoned mines. Summer habitat requirements for the species are not well defined but the following are considered important:

(1) dead or live trees and snags with peeling or exfoliating bark, split tree trunk and/or branches, or cavities, which may be used as maternity roost areas;
(2) live trees (such as shagbark hickory and oaks) which have exfoliating bark;
(3) stream corridors, riparian areas, and upland woodlots which provide forage sites.

Mist net surveys in 2000 and 2007 detected Indiana bats within the base. A total of 6 female Indiana bats were captured along the Mad River corridor and its tributary, Trout Creek, indicating a potential maternity colony may exist on base. The Service recommends the riparian corridors and adjacent trees in these areas be preserved to protect this species and its habitat. Based on field review of the areas proposed for tree clearing, it appears that tree clearing proposed for this project is limited and scattered throughout portions of the base. A limited number of potential roost trees were identified in the field site visit and most of the proposed construction is in previously disturbed areas of the base. Should the proposed site contain trees or associated habitats exhibiting any of the characteristics listed above, we recommend that the habitat and surrounding trees be saved wherever possible. If the trees must be cut, further coordination with this office is requested to determine if surveys are warranted. Any survey should be designed and conducted in coordination with the Endangered Species Coordinator for this office.

The project lies within the range of the **eastern massasauga** (*Sistrurus catenatus*), a small, docile rattlesnake that is currently a Federal candidate species. Since designated as a candidate species in 1999, it has declined significantly throughout its range and populations in Ohio that were once throughout glaciated portions of the state, are now small and isolated. The species has been listed by the State of Ohio as endangered since 1996. Several factors have contributed to the decline of the species including habitat loss and fragmentation, indiscriminate killing, collection, gene pool contamination and incompatible land use practices.

Eastern massasaugas use both upland and wetland habitat and these habitats differ by season. During the winter, massasaugas hibernate in low wet areas, primarily in crayfish burrows, but may use other structures. Presence of a water table near the surface is important for a suitable hibernaculum. In the summer, massasaugas use drier, open areas that contain a mix of grasses and forbs such as goldenrods and other prairie plants that may be intermixed with trees or shrubs. Adjoining lowland and upland habitat with variable elevations between are critical for the species to travel back and forth seasonally. The eastern massasauga is potentially present at WPAFB with records from the Prime BEEF Training Area (PBTA) and Twin Base Golf Course (TBGC). Although the last documented record was from 1993 in the PBTA, recent base wide survey efforts have been ongoing to try to detect the presence or probable absence of the species within the base. Most of the areas proposed to be impacted for this project have been previously disturbed and do not contain suitable habitat. The only area identified in the field site visit that appeared to have some potential for the species was the field near Gate 26A, although we understand this area is regularly mowed and is not expected to provide suitable habitat. Should the proposed project area contain any of the habitat types or features described above, we recommend that a habitat assessment be conducted to determine if suitable habitat for the species exists within the vicinity of the proposed site. Please note that habitat assessments should only be conducted by approved eastern massasauga surveyors due to variable habitat types and cryptic nature of the species. Any habitat assessments or surveys should be coordinated with this office.

The proposed project lies within the range of the **clubshell** (*Pleurobema clava*), a federally listed endangered freshwater mussel. The clubshell inhabits areas with sand or gravel substrate and also prefers areas with riffles and runs. Should the proposed project directly or indirectly impact any of the habitat types described above, we recommend that a survey be conducted to determine the presence or probable absence of the clubshell in the vicinity of the proposed site. The clubshell is potentially present in the Little Miami River and drainages where preferred habitat exists. Any survey should be designed and conducted in coordination with the Endangered Species Coordinator for this office. Surveyors must have valid Federal and State permits to survey for federally listed mussels in Ohio.

The proposed project lies within the range of the **snuffbox** (*Epioblasma triquetra*), a freshwater mussel that is currently proposed for listing as federally endangered. The snuffbox occurs in swift currents of riffles and shoals over gravel and sand with occasional cobble and boulders. The snuffbox is known to be present in the Stillwater and Little Miami River and drainages where preferred habitat exists. Should the proposed project directly or indirectly impact any of the habitat types described above, we recommend that a survey be conducted to determine the presence or probable absence of the snuffbox in the vicinity of the proposed site. Any survey should be designed and conducted in coordination with the Endangered Species Coordinator for this office.

The proposed project lies within the range of the **rayed bean** (*Villosa fabalis*), a freshwater mussel that is currently proposed for listing as federally endangered. The rayed bean is

generally known from smaller, headwater creeks, but records exist in larger rivers. They are usually found in or near shoal or riffle areas, and in the shallow, wave-washed areas of lakes. Substrates typically include gravel and sand, and they are often associated with, and buried under the roots of, vegetation, including water willow (*Justicia americana*) and water milfoil (*Myriophyllum* sp.). The rayed bean is known to be present in the Great Miami River and is potentially present in perennial streams in Green and Montgomery County where preferred habitat exists. Should the proposed project directly or indirectly impact any of the habitat types described above, we recommend that a survey be conducted to determine the presence or probable absence of rayed bean mussels in the vicinity of the proposed site. Any survey should be designed and conducted in coordination with the Endangered Species Coordinator for this office.

These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), the Endangered Species Act of 1973 (ESA), as amended, and are consistent with the intent of the National Environmental Policy Act of 1969 and the U. S. Fish and Wildlife Service's Mitigation Policy. This letter provides technical assistance only and does not serve as a completed ESA section 7 consultation document.

If you have questions, or if you would like to set up a site visit, please contact Melanie Cota at extension 15 in this office or by email at Melanie_Cota@fws.gov or visit our website at http://www.fws.gov/midwest/Ohio.

Sincerely,

Mary Knapp

Mary Knapp, Ph.D.
Field Supervisor

cc: ODNR, DOW, SCEA Unit, Columbus, OH

United States Department of the Interior

FISH AND WILDLIFE SERVICE

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

October 28, 2011

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

TAILS: 03E15000-2012-I-0081

Re: Reconfiguration and Relocation of Entry Control Facilities (ECFs) and State Route 444 in Area A, Greene County, OH

Dear Mr. Warner:

This is in response to your October 28, 2011 letter requesting the U.S Fish & Wildlife Service (Service) concurrence on Section 7 of the Endangered Species Act that the proposed project located in within the Wright Patterson Air Force Base (WPAFB) in Greene County, Ohio will have no effect on the **bald eagle** (*Haliaeetus leucocephalus*), **clubshell** (*Pleurobema clava*), **rayed bean** (*Villosa fabalis*), and **snuffbox** (*Epioblasma triquetra*), and may affect, is not likely to adversely affect the **Indiana bat** (*Myotis sodalis*) and **eastern massasauga** (*Sistrurus catenatus*). The Service previously commented on this project in a letter dated February 22, 2010 (TAILS: 2009-TA-0280) and October 20, 2011 (TAILS: 2012-TA- 0057). In addition, the Service also attended a site visit on March 17, 2010 to look at portions of the project. We understand this project is proposing to meet the Department of Defense (DoD) security requirements under the Anti-Terrorism/Force Protection standards. We understand that WPAFB has initiated an Environmental Impact Statement (EIS) and that construction activities under the proposed action would be limited to demolition and construction of ECF's and guard sharks in previously disturbed areas of WPAFB and construction of a new disposition of the nine existing gates in Area A at WPAFB.

According to your information the following is proposed action in Area A:

- Gate 1A- Relocate along SR 444 at the Redwood Street intersection.
- Gate 15A- Relocate west of its existing location to a location just west of Communication Boulevard/Kuglics Boulevard and Skeel Avenue.
- Gate 26A- Relocate south of its existing location to a location just north of the intersection of SR 235 and Circle Drive
- Base Perimeter Fence Relocation-Relocate to extend across SR 444 north along the east side of SR 444 to tie into existing perimeter fence just north of existing Gate 9A.

The Proposed Action, which is WPAFB's preferred alternative, would involve consolidating nine of the existing gates at WPAFB into three gates (Gate 1A, 15A, and 26A) and closing a segment of SR 444 that currently bisects the WPAFB Kittyhawk Center from Area A of the Base. The second alternative evaluated in the EIS (Alternative A) would involve closure of SR 444 and installation of base perimeter fencing only, with no gate realignments. The third alternative evaluated in the EIS is the "No Action" alternative, which involves no actions resulting in the existing nine gates at WPAFB remaining in place and no reconfiguration or improvements being made. The EIS considers the impacts from the on-Base construction (e.g., new gates and roadways) and the offbase traffic impacts (e.g., noise, vehicle emissions, and traffic delays from closing a segment of SR 444 within the Base boundary). To address the change in local traffic as a result of closing the applicable segment of SR 444, the Ohio Department of Transportation (ODOT) in conjunction with the FHWA, the city of Fairborn and/or other jurisdictional stakeholders, would develop transportation solutions that provide for the safe and efficient movement of users in the area. Any action alternatives developed to address the travel changes would be in accordance with FHWA National Environmental Policy Act (NEPA) guidelines and would be detailed in a separate and independent NEPA document. We understand the FHWA/ODOT NEPA document would tier off of WPAFB's EIS and would perform a separate Section 7 consultation with the USFWS.

The Service recommends that proposed developments avoid and minimize water quality impacts and impacts to high quality fish and wildlife habitat, such as forests, streams, and wetlands. Best construction techniques should be used to minimize erosion, in particular, on slopes. Additionally, natural buffers around streams and wetlands should be preserved to enhance beneficial functions. If streams or wetlands will be impacted, the Corps of Engineers should be contacted for possible need of a Section 404 permit. We support and recommend mitigation activities that reduce the likelihood of invasive plant spread and encourage native plant colonization. Prevention of non-native, invasive plant establishment is critical in maintaining high quality habitats. All disturbed areas in the project vicinity should be mulched and revegetated with native plant species.

ENDANGERED SPECIES COMMENTS: The proposed action lies within the range of the, **bald eagle,** protected by the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act, the **clubshell mussel,** a federally listed endangered freshwater mussel, and the **snuffbox and rayed bean mussel,** currently proposed for listing as endangered species. You have determined the project will have no effect on these species. Please note that no consultation is required for no effect determinations however, the Service has no objection to these determinations.

The proposed action lies within the range of the **Indiana bat,** a federally listed endangered species. Mist net surveys in 2000 and 2007 detected Indiana bats within the base. A total of 6 female Indiana bats were captured along the Mad River corridor and its tributary, Trout Creek, indicating a potential maternity colony may exist on base. During a 17 March 2010 site visit, the Service identified a limited number of potential roost trees however most of the construction proposed is in previously disturbed areas of the base. Under the proposed action, the Gate 15A site would impact approximately 300 linear feet of narrow, forested vegetative corridor along the unnamed, intermittent tributary to Hebble Creek. However, vegetation in this area consists of mowed/maintained right-of-way on the north side and a narrow line of scattered trees and bush honeysuckle on the south side of the creek. We understand that tree clearing proposed for this project is limited and scattered throughout portions of the base. The amount of habitat proposed to be impacted is less than 5 acres, of lower quality, and in addition, any trees that would need to be removed would be cleared from September 30-April 1, when bats would

not be present. You have determined that the proposed action may affect, is not likely to adversely affect the Indiana bat based on the above avoidance and minimization measures and the Service concurs with this determination.

The proposed action lies within the range of the **eastern massasauga**, a small, docile rattlesnake that is currently a Federal candidate species. The eastern massasauga is potentially present at WPAFB with records from the Prime BEEF Training Area (PBTA) and Twin Base Golf Course (TBGC). Although the last documented record was from 1993 in the PBTA, recent base wide survey efforts have been ongoing to try to detect the presence or probable absence of the species within the base. Most of the areas proposed to be impacted for this project have been previously disturbed and do not contain suitable habitat. The only area identified in the March 17, 2010 field site visit that appeared to have some potential for the species was the field near Gate 26A, although we understand this area is regularly mowed and is not expected to provide suitable habitat for the species. Because no habitat is proposed to be impacted you have determined the proposed action may affect, is not likely to adversely affect the eastern massasauga and the Service concurs with this determination.

This concludes consultation on this action as required by section 7(a)(2) of the Endangered Species Act. Should, during the term of this action, additional information on listed or proposed species or their critical habitat become available, or if new information reveals effects of the action that were not previously considered, consultation with the Service should be reinitiated to assess whether the determinations are still valid.

These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), the Endangered Species Act of 1973 (ESA), as amended, and are consistent with the intent of the National Environmental Policy Act of 1969 and the U. S. Fish and Wildlife Service's Mitigation Policy.

If you have questions, or if you would like to set up a site visit, please contact Melanie Cota at extension 15 in this office or by email at Melanie_Cota@fws.gov or visit our website at http://www.fws.gov/midwest/Ohio.

Sincerely,

Mary Knapp

Mary Knapp, Ph.D.
Field Supervisor

cc: ODNR, DOW, SCEA Unit, Columbus, OH

Ohio Department of Natural Resources Consultation Letters:

1. **Shaw Request – 31May11**
2. **ODNR Response – 02Jun11**

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

Shaw Environmental & Infrastructure, Inc.

May 31, 2011

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

Subject: Rare Species Data Request and Informal Consultation
Environmental Impact Statement for Entry Control Reconfiguration and
Base Perimeter Fence Relocation, Area A,
Wright-Patterson Air Force Base, Ohio

Dear Ms. Woischke:

The purpose of this letter is to request information from the National Heritage Program for State and Federally-listed threatened or endangered plants and animals in the vicinity of the south portion of Area A at Wright-Patterson Air Force Base (WPAFB). WPAFB is proposing to evaluate environmental impacts of the proposed reconfiguration and relocation of entry control facilities (ECFs) / gates in Area A at WPAFB. There are nine existing ECFs / gates located in Area A at WPAFB that are proposed to be reconfigured and relocated into three strategically-placed gates (Gate 1A, Gate 15A, Gate 26A). In the current configuration, the ECFs do not meet the security requirements of the Air Force's Anti-Terrorism / Force Protection (ATFP) standards. In addition, the Kittyhawk Center remains a separate entity from Area A, being bisected by State Route (SR) 444, which does not meet the ATFP standards for required building standoff distances in this area.

We are currently preparing an Environmental Impact Statement (EIS) under contract to WPAFB. The intent of the EIS is to satisfy requirements under the National Environmental Policy Act of 1969. We are requesting the locations of known populations of rare, threatened and endangered species within a one mile radius of this project site as part of this assessment. For the Indiana bat, we are requesting information within a five-mile radius. We would also like to request informal consultation regarding possible impacts of this proposed project on species listed as threatened or endangered.

Construction activities under the Proposed Action would include construction of a new perimeter fence along SR 444 at the Kittyhawk Center, the demolition of several existing ECFs, and construction of three strategically-placed ECFs. The following table further describes the disposition of the nine existing gates in Area A at WPAFB:

Gate No.	Current Purpose / Location	Proposed Action	Result of Proposed Action
1A	Secondary ECF / SR 444 and Wright Avenue	Relocate / Reconfigure Gate 1A to approximate vicinity of SR 444 and Redwood Street intersection	Close. Demolish gate and approach pavement. Access to public cemetery will remain.
8A	Limited Use / SR 844 and Schuster Avenue	None	Reopen and unmanned. No access to secured base.
9A	Secondary ECF / SR 444 and Estabrook Road	None	Remain open and unmanned. No access to secured base.
12A	Primary ECF (Visitor Center) / SR 444 and Chidlaw Road	None	Close. Ceremonial openings only. Access to Hope Hotel and Lot 1A will remain.
15A	Secondary ECF / SR 844	Reconfigure Gate 15A as a 24-hour Gate to be located in its current vicinity. Roadway to be extended past Communications Boulevard.	Construction of a new reconfigured gate.
16A	Commercial Vehicle Inspection / SR 444 and Communications Boulevard	None – The commercial vehicle inspection area would be relocated to the new configured Gate 26A to just north of SR 235 and Circle Drive.	Remain open and unmanned. No access to secured base.
26A	Secondary ECF / SR 235 at 445th AW Area	Reconfigure and Relocate from its existing location north of SR 235 / Loop Road to just north of the SR 235 and Circle Drive intersection.	Close. Demolish gate and approach movement.
38A	Kittyhawk Center ECF / SR 444 and Redwood Street	None	Remain open and unmanned.
39A	Limited Use / SR 444 and Redwood Street	None. New Gate 1A relocated to just north of existing Gate 39A at Redwood Street.	Demolish gate and approach pavement.

Under the No Action Alternative, the existing nine ECFs would remain in place and no reconfiguration or improvements would be made to gates in Area A. Gates 1A, 15A, and 26A would remain as is and would not be upgraded or reconfigured, nor would they meet DoD security requirements under the ATFP standards. SR 444 would remain open as a public roadway between Area A and the Kittyhawk Center and the Kittyhawk Center would remain bisected from Area A.

The geographic location of the proposed project area is Greene County, in Sections 1, 11, 12, and 26 (**Figure 1**). The area of the proposed reconfiguration and relocation of ECFs and SR 444 is located in the south portion of Area A. The following is a summary of each proposed action:

- ***Gate 1A*** –Relocate along SR 444 at the Redwood Street intersection (**Figure 2**). Public traffic traversing south along SR 444 would be prohibited to continue through the Kittyhawk Center and would be diverted to Wright Avenue at this gate.

- ***Gate 15A*** – Relocate west of its existing location to a location just west of Communications Boulevard / Kuglics Boulevard and Skeel Avenue (**Figure 3**). The approaching roadway to the relocated gate would be realigned.

- ***Gate 26A*** – Relocate south of its existing location to a location just north of the intersection of SR 235 and Circle Drive (**Figure 4**).

- ***Base Perimeter Fence Relocation*** – Relocate to extend across SR 444 north along the east side of SR 444 to tie into the existing perimeter fence just north of existing Gate 9A. Perimeter fence would be constructed across SR 444 at Redwood Street at the proposed Gate 1A location and tie into existing fence on west side of SR 444 (**Figure 5**).

The form for our Data Request is attached. We would appreciate any information from your database that applies to our project area. Please let us know if you concur with the no effect determination. Please contact me at 513/782-4964 or by email at William.Scoville@shawgrp.com if you have any questions. Thank you for your consideration.

Sincerely,

SHAW ENVIRONMENTAL & INFRASTRUCTURE, INC.

William H. Scoville
DoD Program Manager

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

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

DATA REQUEST FORM

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

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

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

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

****

Date: May 31, 2011

Company name: Shaw Environmental & Infrastructure, Inc.

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

William H. Scoville, DoD Program Manager

Address: 5050 Section Avenue

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

Phone: 513/782-4964 Fax: 513/782-4663

E-mail address: william.scoville@shawgrp.com

Project Name: Environmental Impact Statement for Entry Control Reconfiguration and Base Perimeter Fence Relocation, Area A, Wright-Patterson AFB, Ohio

Project Number: _____

Project Site Address: Gates 1A, 15A, 26A, Perimeter Fence along State Route 444, Area A, Wright-Patterson Air Force Base

Project County: Greene

Project City/Township: Fairborn / Bath

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

Fairborn Quad, Sections 1, 11, 12, and 26 R.8, T.3

Description of work to be performed at the project site: Demolition/construction activities associated with converting nine existing gates into three gates (Gates 1A, 15A, and 26A), and base perimeter fence relocation in Area A at WPAFB.

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

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

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

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

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

Signature W. H. Search

Date: May 31, 2011

DNR 5203
REV 8/2010

Ohio Department of Natural Resources

JOHN R. KASICH, GOVERNOR

DAVID MUSTINE, DIRECTOR

Ohio Division of Wildlife

David B. Lane, Chief

2045 Morse Rd., Bldg. G

Columbus, OH 43229-6693

Phone: (614) 265-6300

June 2, 2011

William Scoville
Shaw Env. & Infrastructure, Inc.
5050 Section Ave.
Cincinnati, OH 45212

Dear Mr. Scoville:

I have reviewed our Biodiversity Database for the Wright Patterson Air Force Base Area A Entry Control Reconfiguration and Perimeter Fence Relocation project area, including a one mile radius, in Bath Township, Greene County, and on the Fairborn Quad. The numbers/letters on the list below correspond to the areas marked on the accompanying map. Common name, scientific name and status are given for each species.

Fairborn Quad

A. Dayton Aviation Heritage National Historical Park – National Park Service

1. *Spiranthes magnicamporum* – Great Plains Ladies'-tresses, potentially threatened
   Agalinis auriculata – Ear-leaved-foxglove, endangered
2. *Spiranthes magnicamporum* – Great Plains Ladies'-tresses, potentially threatened
3. *Bartramia longicauda* – Upland Sandpiper, threatened
4. *Carex mesochorea* – Midland Sedge, endangered
5. *Cistothorus platensis* – Sedge Wren, species of concern
   Papaipema beeriana – Beer's Noctuid, endangered

I have also performed a search for the Indiana Bat (*Myotis sodalis*, state endangered, federal endangered) within a five mile radius of the project site. The results (5 capture sites) are shown on the attached map.

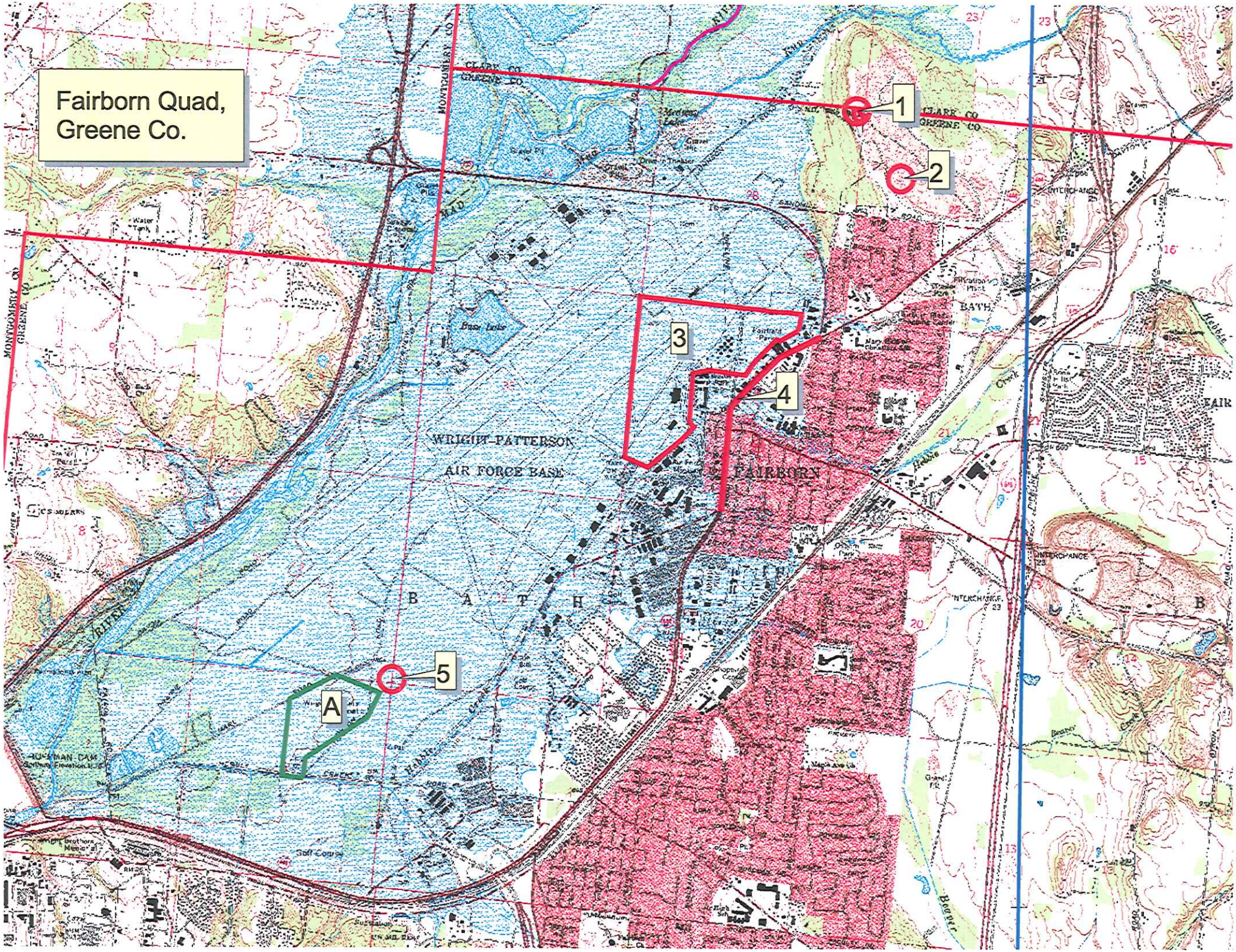
We are unaware of any unique ecological sites, geologic features, animal assemblages, scenic rivers, state wildlife areas, nature preserves, parks or forests or national wildlife refuges or forests within a one mile radius of the project area.

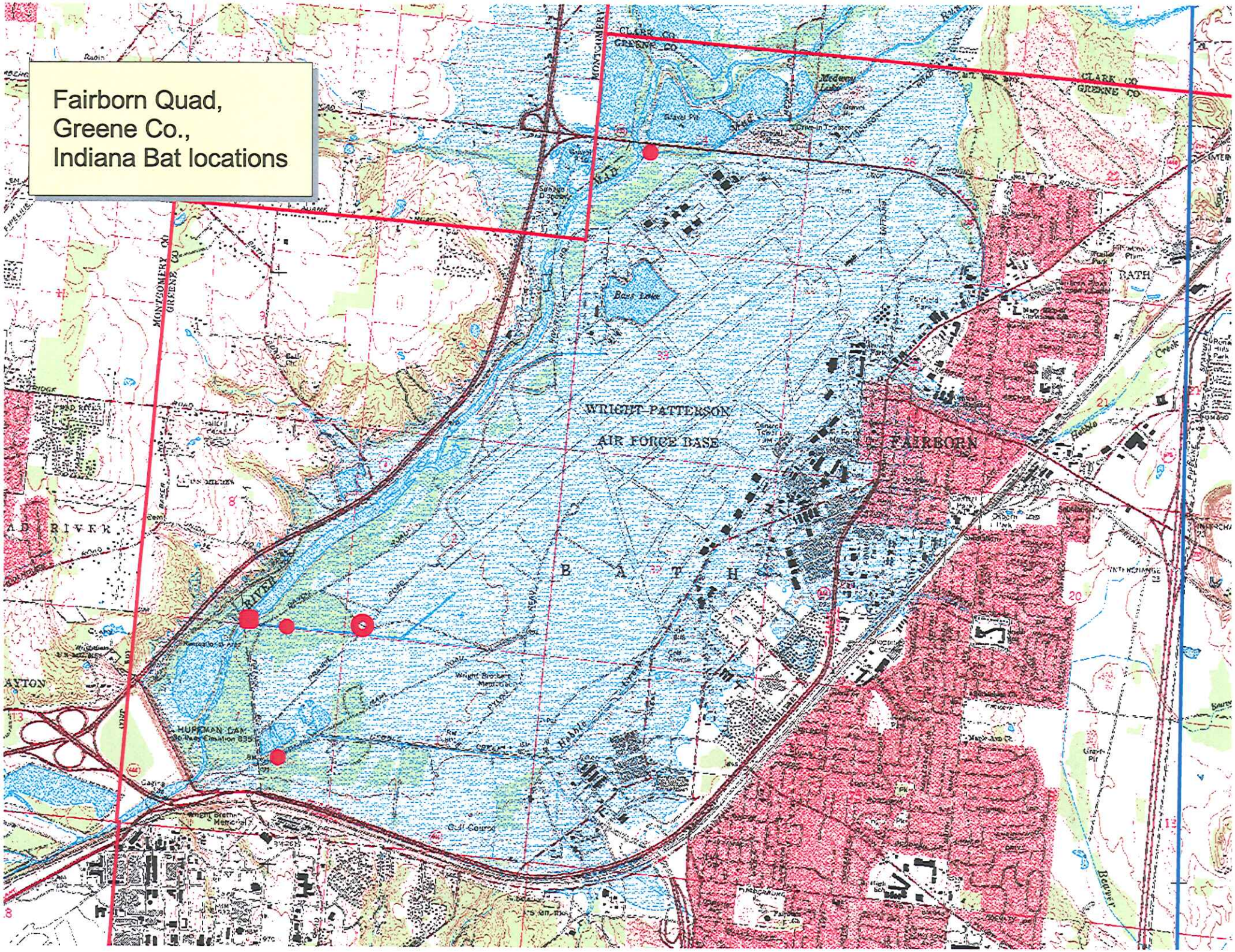
Our inventory program has not completely surveyed Ohio and relies on information supplied by many individuals and organizations. Therefore, a lack of records for any particular area is not a statement that rare species or unique features are absent from that area. Please note that although we inventory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

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

Sincerely,

Debbie Woischke, Ecological Analyst
Ohio Biodiversity Database Program


Fairborn Quad,
Greene Co.
1
2
3
4
5
A
CLARK CO
GREENE CO
MONTGOMERY CO
WRIGHT-PATTERSON
AIR FORCE BASE
FAIRBORN
BATH
INTERCHANGE
Beaver


Fairborn Quad,
Greene Co.,
Indiana Bat locations
CLARK CO
GREENE CO
MONTGOMERY CO
GREENE CO
WRIGHT-PATTERSON
AIR FORCE BASE
FAIRBORN
BATH
RIVER
Bass Lake
Golf Course
Beaver

Ohio Historic Preservation Office Consultation Letters:

1. **WPAFB Request – 15Jun11, 20Oct11**
2. **OHPO Response – 28Oct11**

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

15 June 2011

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

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

Dear Mr. Epstein

Wright-Patterson Air Force Base (WPAFB) is preparing an Environmental Impact Statement (EIS) in accordance with the requirements of the National Environmental Policy Act of 1969 (NEPA) to address control (gate and roadway issues) in Area A. On 6 January 2010 WPAFB submitted a Section 106 consultation package to your office in coordination with an EA that was being prepared for this same project (Attachment 1). That submittal addressed only historical concerns within the boundary of WPAFB. Your office concurred with our finding of no effect on historic properties, however the letter requested that the State Historic Preservation Office (SHPO) be kept informed of subsequent developments that may affect historic properties resulting from implementation of this project (Attachment 2). This current Section 106 submittal addresses properties outside of the boundary of WPAFB, within a defined Area of Potential Effects (APE). The entry control reconfiguration is needed to bring Area A of the base into compliance with revised anti-terrorism policies and procedures. The base has developed potential solutions that could be implemented to improve security, safety and traffic flow on and near WPAFB. It is our opinion that the proposed project will have No Effect on properties listed on or eligible for listing on, the National Register of Historic Places. In accordance with 36 CFR 800.11(e), we are submitting the following documentation.

Description of the undertaking. The undertaking is the same as presented to SHPO on 6 January 2010 (see Attachment 1). The only exception is that the gate designations have changed since the 2010 submittal, in that Area A and Area C have now been combined into one area with the designation of Area A. The gates designated as 1C and 26C are now known as 1A and 26A, respectively. As indicated in the previous submittal, this Undertaking proposes the following: Gate 1A would be relocated and reconfigured to the southeast of Building 2 on State Route 444. Gate 15A would be reconfigured for upgraded anti-terrorism and force protection (ATFP) measures at its present location. Gate 26A would be relocated to the east along State Route 235 and reconfigured for upgraded (ATFP) measures at its new location. Gate 8A, 9A, 38A, and 39A would be closed since State Route 444 would be enclosed by the base boundary fence, with

the closure of State Route 444 between Area A and Kittyhawk. State Route 444 will be closed between Gate 1A and 9A and the area incorporated into Wright-Patterson Air Force Base. A number of roadway improvements within the base would be undertaken. Refer to Attachment 1 for maps and indicated proposed improvements. Although these gate and roadway projects will likely be implemented as separate actions, they are driven by a common purpose and need, which is to address and resolve security issues by consolidating, relocating, and reconfiguring vehicle entry control points on the installation. Therefore, they are being addressed in a single EIS, and sent to you as a single undertaking.

Description of steps taken to identify historic properties. WPAFB analyzed and evaluated past surveys conducted on base and presented its findings as part of the Section 106 consultation submittal presented to SHPO in January of 2010, for resources inside the base within the APE (see Attachment 1). Excerpts from the preliminary draft EIS relating to cultural resources can be found as Attachment 3. WPAFB is submitting as part of the EIS for this undertaking, a survey conducted of cultural resources, encompassing areas outside the base that might be affected by the proposed undertaking. The APE for outside the base was selected based on potential changes in traffic flow as a result of the Proposed Action. The APE includes properties that front the following roadways: Kauffman Avenue, S. Central Avenue, W. Dayton Drive, S. Broad Street, residential areas off of S. Broad Street, and the Oakhill Avenue area. The survey conducted by Hardlines Design Company, located potentially historic and prehistoric archaeological sites within the APE (see Attachment 4). The *Phase I History/Architecture Survey and Archaeological Disturbance Study – Hardlines Design Company, May 16,* 2011 did not yield any properties listed, eligible for, or potentially eligible for, listing on the National Register of Historic Places, in the APE for this project. WPAFB concurs with the findings in Hardlines' survey.

Description of the undertaking's effects on historic properties. There are no properties deemed eligible or potentially eligible for the National Register of Historic Places located within the proposed project's APE. There are no known historic or prehistoric archaeological sites within or adjacent to the area encompassing the project area. Therefore, it is our opinion that the proposed project will have no effect on historic properties.

Please review the information we have provided and let us know whether you concur with the no effect determination. Should you have questions, I can be reached at 937-257-1374, or via email at paul.woodruff@wpafb.af.mil.

Sincerely

Paul Woodruff
Cultural Resources Manager
Environmental Quality Section
Environmental Branch

Attachments
1. Previous Section 106 Submittal, 6 Jan 10
2. SHPO Concurrence Letter 23 Feb 10
3. Excerpts from Preliminary draft EIS, Jun 11
4. Phase I History/Architecture Survey and Archaeological Disturbance Study, 16 May 11

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

6 January 2010

88 ABW/CEVO
1450 Littrell Road
Wright-Patterson AFB OH 45433-5209

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

Dear Mr. Epstein

Wright-Patterson Air Force Base (WPAFB) is preparing an Environmental Assessment (EA) in accordance with the requirements of the National Environmental Policy Act of 1969 (NEPA) to address control (gate and roadway issues) in Areas A and C. WPAFB is located in Greene County, adjacent to the city of Fairborn, Ohio (see attachment 1). The entry control reconfiguration is needed to bring Areas A and C of the base into compliance with revised anti-terrorism policies and procedures. The base has developed potential solutions that could be implemented to improve security, safety and traffic flow on and near WPAFB. It is our opinion that the proposed project will have No Effect on properties listed on or eligible for listing on, the National Register of Historic Places. In accordance with 36 CFR 800.11(e), we are submitting the following documentation.

Description of the undertaking. Specifically, this Undertaking proposes the following: Gate 1C would be relocated and reconfigured to the southeast of Building 2 on State Route 444. Gate 15A would be reconfigured for upgraded anti-terrorism and force protection (ATFP) measures at its present location. Gate 26C would be relocated to the east along State Route 235 and reconfigured for upgraded (ATFP) measures at its new location. Gate 8C, 9A, 38C, and 39C would be closed since State Route 444 would be enclosed by the boundary fence with the closure of State route 444 between areas A, C, and Kittyhawk areas. State Route 444 will be closed between gate 1C and 9A and the area incorporated into Wright-Patterson Air Force Base. A number of roadway improvements within the Base would be undertaken. Refer to Attachment 1 for maps and indicated proposed improvements. Although these gate and roadway projects will likely be implemented as separate actions, they are driven by a common purpose and need, which is to address and resolve security issues by consolidating, relocating, and reconfiguring vehicle entry control points on the installation. Therefore they are being addressed in a single EA, and sent to you as a single undertaking.

Printed On Recycled Paper

Description of steps taken to identify historic properties. As part of the Integrated Cultural Resources Management Plan for Wright-Patterson Air Force Base surveys have been conducted encompassing the entire base to locate historic and prehistoric archaeological sites (see ICRMP May 2006). The surveys conducted did not yield any properties eligible for or potentially eligible for, listing on the National Register of Historic Places, in the areas of potential effect for this project. Wright-Patterson Air Force Base produced the Fairfield Air Depot Cultural Landscape Report (September 28, 2000) which focused on analyzing character defining features of the district. Gate 1C is adjacent to the Fairfield Air Depot and sits at the entrance to one of the historic avenues which run through the district.

Description of the undertaking's effects on historic properties. There are no historic facilities located within the proposed project's Areas of Potential Effect. However, Gate 1C is located adjacent to the Fairfield Air Depot (FAD) Historic District. There are no known historic or prehistoric archaeological sites within or adjacent to the area encompassing the project area. All the other gates listed as being part of the project are not in or adjacent to any previously identified historic district. Gate 1C was constructed in 1974 and is not historic; however it sits at the entrance to Wright Avenue which is considered a major axis for the circulation pattern of Fairfield Air Depot. The proposed project will not change the circulation pattern within the Depot, but will cut off access to Broad Street from Wright Avenue. The new location for Gate 1C will still provide access to Broad Street, and Wright Avenue will still remain the main access for traffic in and out of the FAD district. The relocation of Gate 1C also will not affect the spatial organization of the Fairfield Air Depot since the gate itself currently sits adjacent to Building 1 only, which SHPO does not consider to be a contributing element of the historic district. Therefore, it is our opinion that the proposed project will have no effect on historic properties.

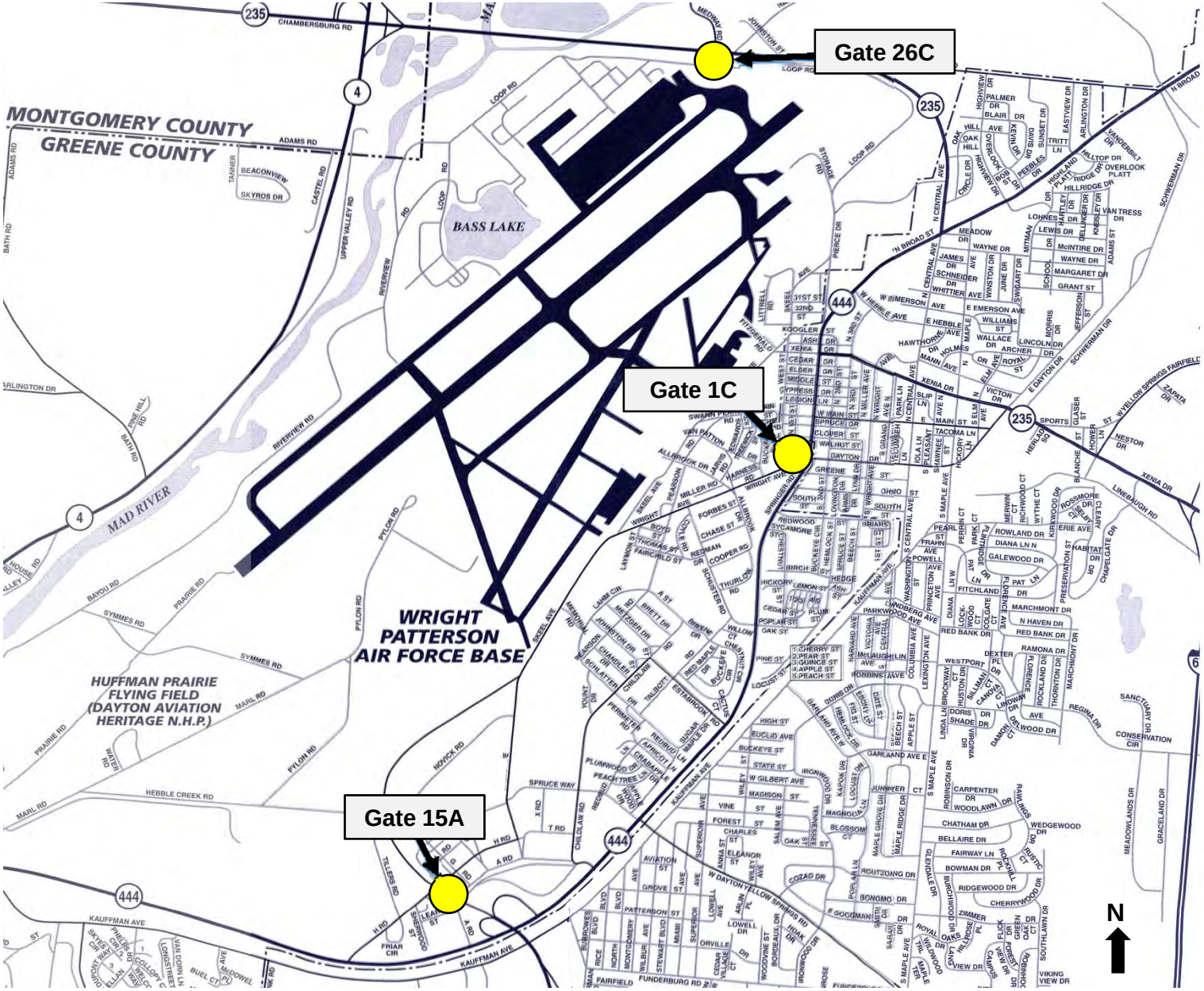
Please review the information we have provided and let us know whether you concur with the no effect determination. Should you have questions, I can be reached at 937-257-5528, or via email at paul.woodruff@wpafb.af.mil.

Sincerely

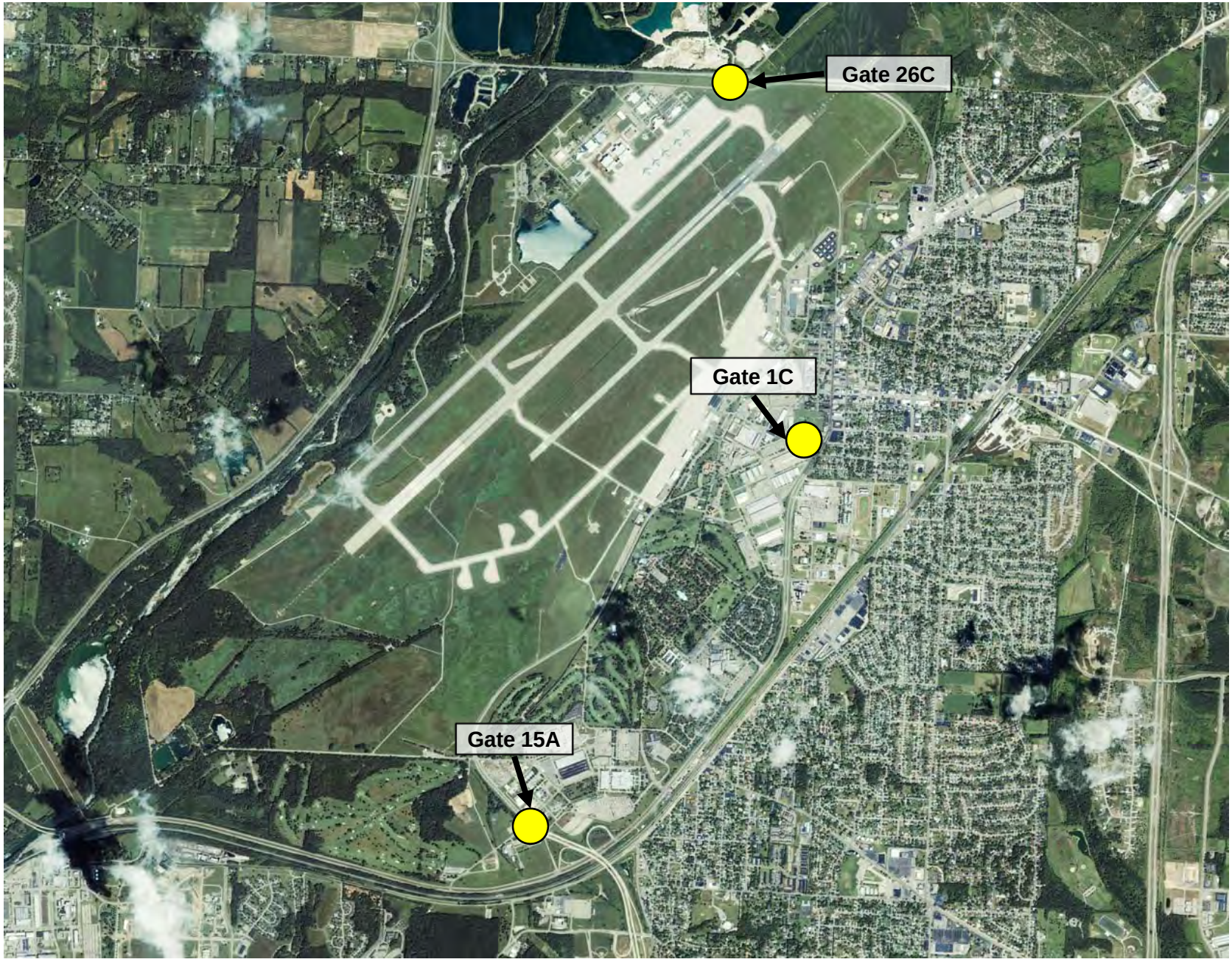
Paul Woodruff
Cultural Resources Program Manager
Operations Branch
Environmental Management Division

Attachments
1. Project Mapping
2. Background information regarding referenced gates

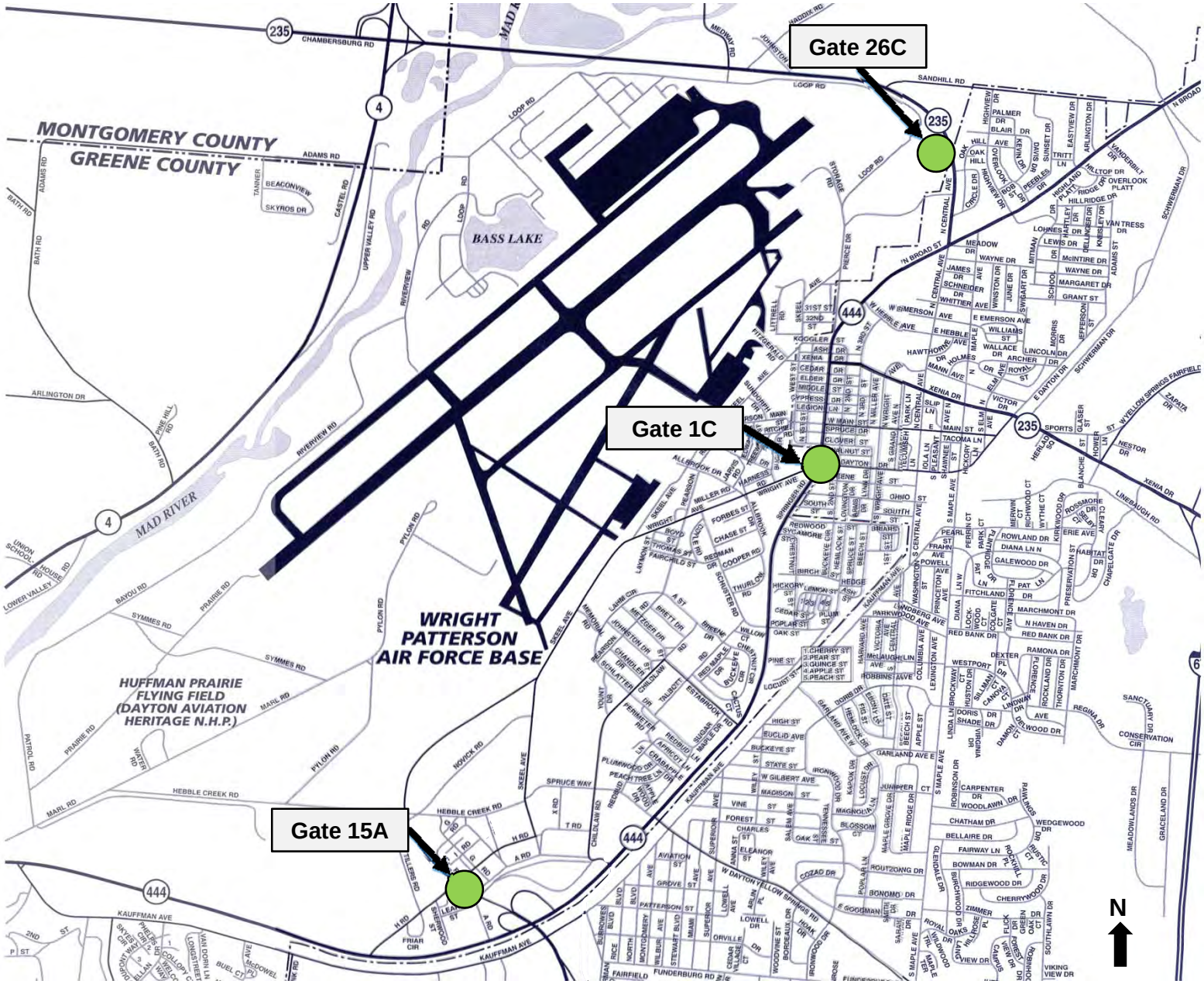
Current Gate Locations



Current Gate Locations



Final Gate Locations



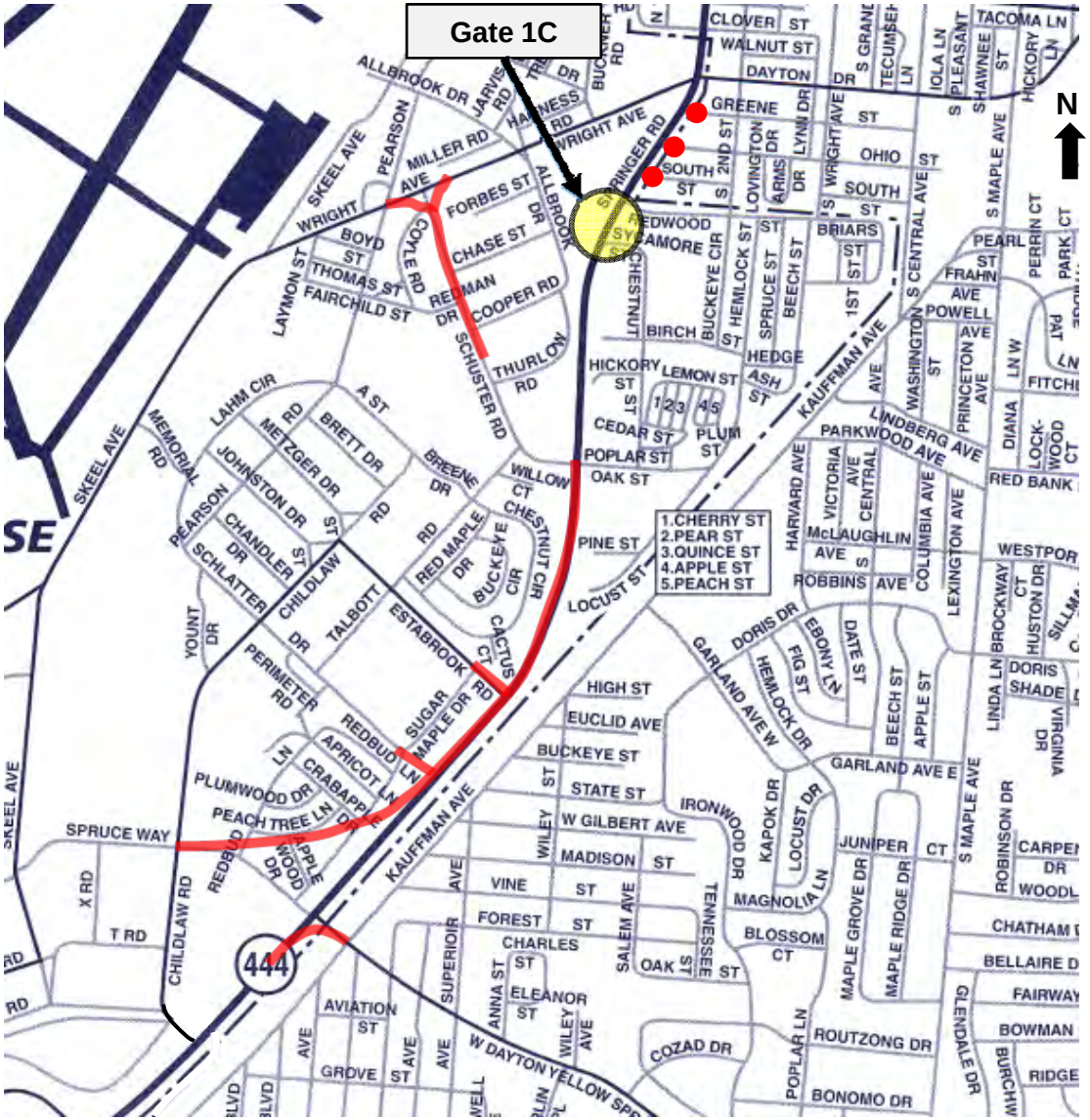
Final Gate Locations

Gate 1C Project

Serving Customer & Country

Improvements:

- Construction of new Gate 1C on existing State Route 444 beginning at the Dayton Drive intersection
- Improve base roads to provide quick and direct access between the Med Center and Kittyhawk Area
- Provide Cul de sacs at three streets intersecting the new gate road
- Improve Dayton-Yellow Springs & existing SR 444 intersection
- Provide better access to Downtown Fairborn



Gate 26C Project

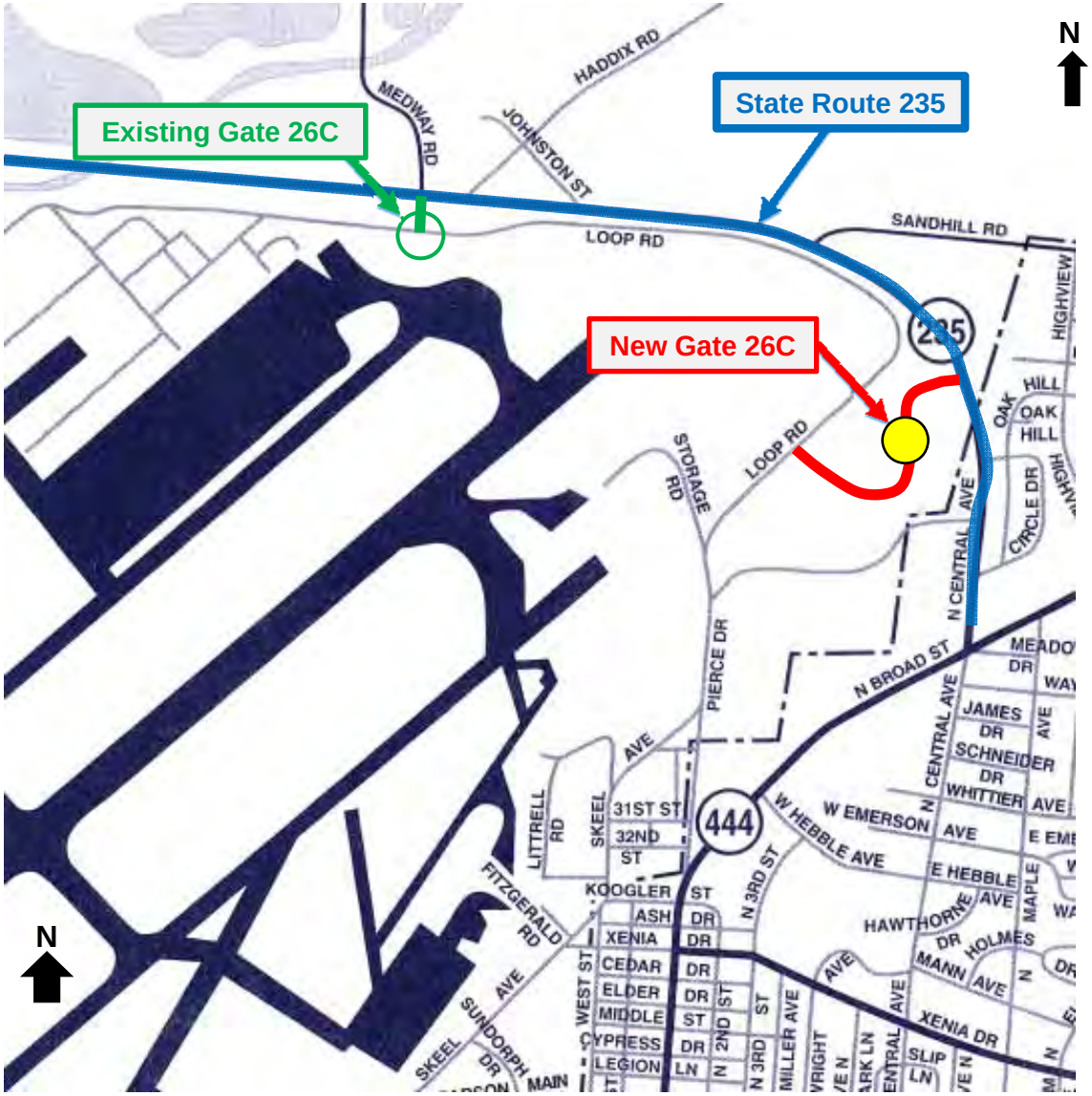
Serving Customer & Country

Legend:

- SR235
- Existing Gate 26C
- Gate 26C Project

Improvements:

- Construction of new gate east of the existing location
- Commercial vehicle inspection area moved to this gate
- Stacking area for commercial vehicles to keep back ups off of SR235



Gate 15A Project

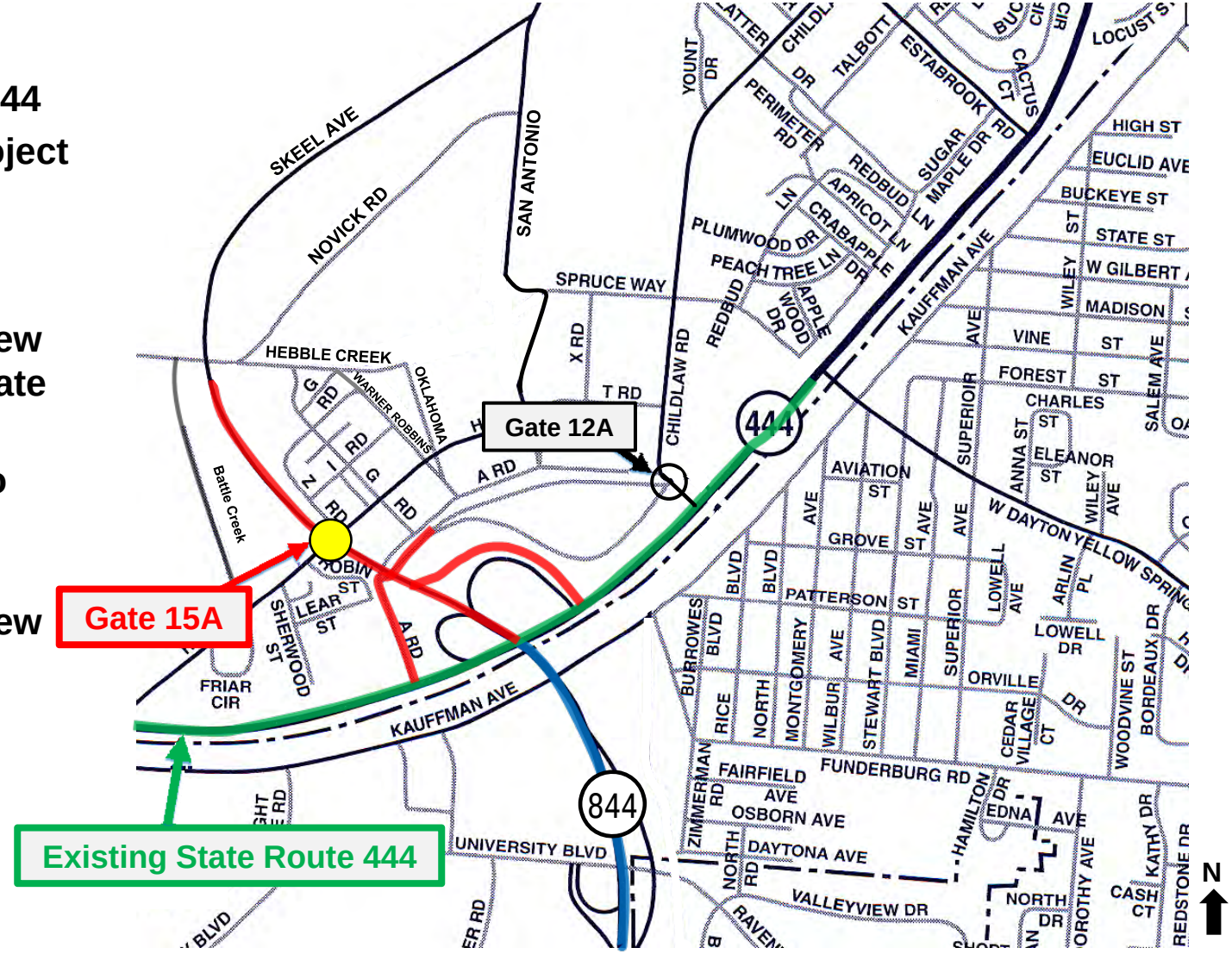
Serving Customer & Country

Legend:

- SR844
- Existing SR444
- Gate 15A Project

Improvements:

- Construction of new gate at existing Gate 15A location
- Improve access to Gate 15A from existing SR444
- Construction of new Visitor Center



Attachment 2

Background Information on the Gates

GATE 1C

BACKGROUND:

- Built: 1974 to serve northern Area C and Skeel Avenue to Area A
- 25 years since last renovation (1985)
- Throughput: 3300 vehicles/day
- Hours: 0600-1800 M-F
- Closed weekends except for special events

OPPORTUNITIES/CONSTRAINTS:

+ Convenient location for Fairborn/Enon/Xenia and SR 444 and locations north and east
+ Connector to Kittyhawk Area via SR 444
- Very limited real estate precludes incorporation of all ECF Design Guide recommendations for stacking, approach distance, vehicle pull-offs, turnarounds and post-gatehouse containment (without MILCON level revision of roadways and gatehouse)
- Proximity to SR 444 causes stacking on public roadways during rush hours
- Morning and lunch hour loads heavy due to Kittyhawk and Fairborn connection

GATE 26C

BACKGROUND:

- Built: 1960 to serve West Ramp area
- 24 years since last renovation (1986)
- Throughput: 2000 vehicles/day
- Hours: 0600-1800 M-F
- Closed weekends except for Unit Reserve functions

OPPORTUNITIES/CONSTRAINTS:

+ Good accessibility to interstates and state routes
- Limited real estate precludes incorporation of all entry control facility Design Guide recommendations for stacking (without MILCON level revision of roadways and gatehouse)
- Proximity to SR 235 causes stacking on public roadways during rush hours
- Remote location as a Commercial Vehicle Inspection gate causes excessive travel for deliveries

GATE 15A

BACKGROUND:

- Built: 1989 to serve HQ AFMC and NASIC, child development center, and Skeel Avenue to Area C
- Renovated in 2004
- Throughput: 5500 vehicles/day
- Hours: 0600-1800 M-F, closed weekends

OPPORTUNITIES/CONSTRAINTS:

+ Provides the primary high-speed access to Areas A & C from I-675 and all locations south and east of Dayton
+ Handy access for AFMC and NASIC Headquarters and Area C via Skeel Avenue
+ Available real estate allows for incorporation of most ECF Design Guide recommendations
- Proximity to SR 844 causes minor stacking on a public roadway

GATE 16A

BACKGROUND:

- Built: 2002 as unguarded, public access gate to serve Huffman Prairie Flying Field unit of national park and Twin Base golf course
- Commercial Vehicle Delivery Inspection added in 2005
- Throughput: No Count available
- Hours: 0600-2000

OPPORTUNITIES/CONSTRAINTS:

+ Provides needed public access to Huffman Prairie Flying Field
- Combination of high speed traffic on SR 444 and no turn lane causes dangerous traffic conditions for entering this gate

February 23, 2010

Paul F. Woodruff
Cultural Resources Program Manager
Operations Branch
Environmental Management Division
88 ABW / CEVO
1450 Littrell Road
Wright-Patterson Air Force Base, Ohio 45433-5209

Dear Mr. Woodruff:

Re: Entry Control Reconfiguration at Wright-Patterson Air Force Base, Ohio

This is in response to correspondence dated January 6, 2010 (received on January 11, 2010). My comments are made pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended, and the associated regulations at 36 CFR Part 800.

Wright-Patterson Air Force Base (WPAFB) proposes to relocate and/or reconfigure three entrance gates and close four others to provide upgraded anti-terrorism and force protection (ATFP) measures. Gate 1C will be relocated and reconfigured to the southeast of Building 2 on what is currently State Route 444. Gate 15A will be reconfigured for upgraded ATFP measures at its present location. Gate 26C will be relocated to the east along State Route 235 and reconfigured for upgraded ATFP measures at its new location. Gates 8C, 9A, 38C, and 39C will be closed. State Route 444 will be closed between Gates 1C and 9A and the area incorporated into Wright-Patterson Air Force Base. The Air Force requests the concurrence of the Ohio Historic Preservation Office that this project will not affect historic properties.

We have reviewed the information submitted and concur that the proposed relocation, reconfiguration, and closure of gates at WPAFB will not affect historic properties. Of the gates that will be relocated, reconfigured, or closed, only Gate 1C is or will be located near properties that are eligible for listing in the National Register of Historic Places. Gate 1C is adjacent to the Fairfield Air Depot Historic District, but the gate – which was built in 1974 – significantly post-dates the period of significance of the historic district.

We request that WPAFB keep OHPO informed of subsequent developments that may affect historic properties resulting from implementation of this project.

If you have any questions, please contact me by phone at (614) 298-2000 or by email at jcook@ohiohistory.org. Thank you for your cooperation.

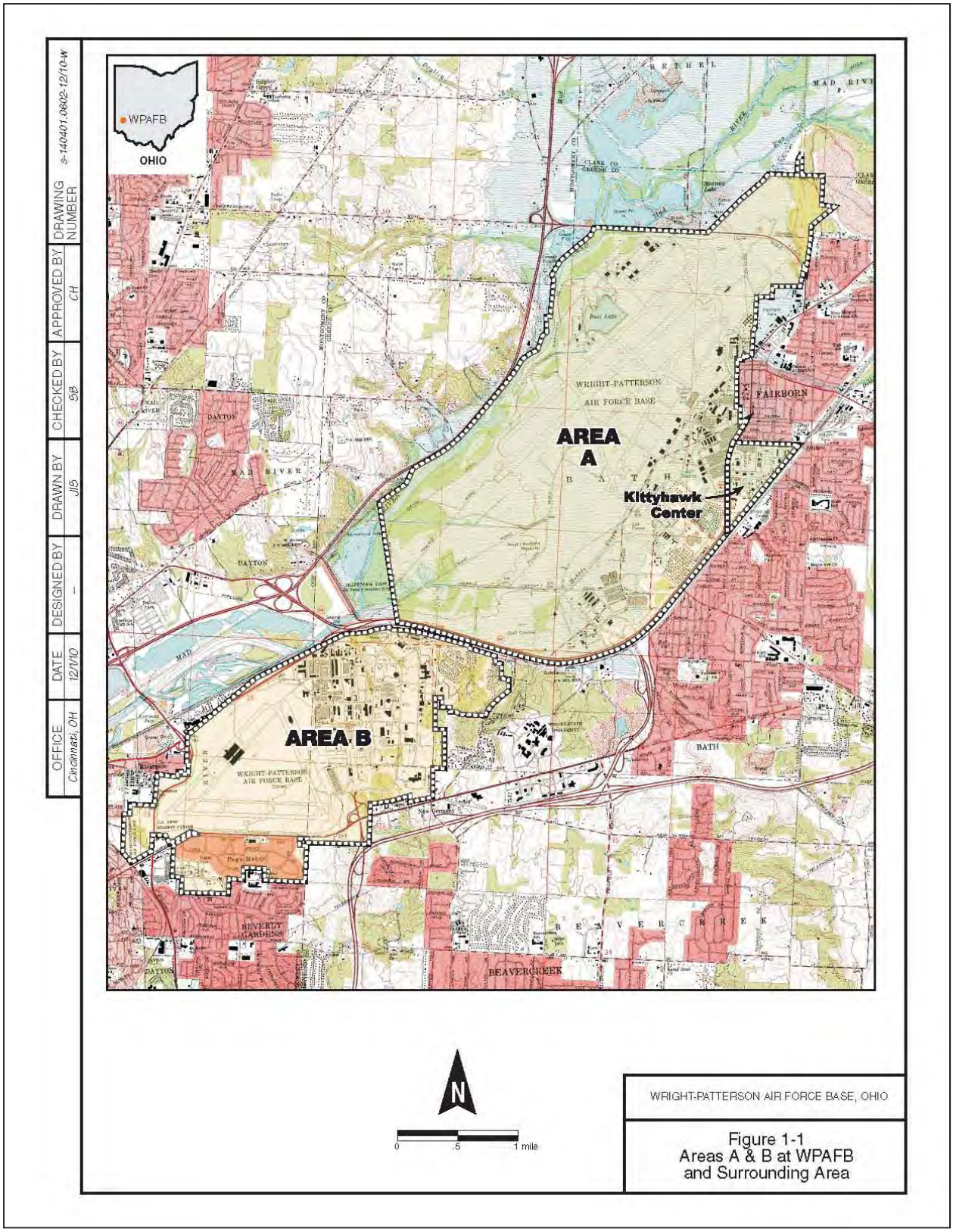
Sincerely,

Justin M. Cook

Justin M. Cook, History Reviews Manager
Resource Protection and Review

OHPO Serial # 1030355

OHIO HISTORICAL SOCIETY
Ohio Historic Preservation Office
1982 Velma Avenue, Columbus, Ohio 43211-2497 ph: 614.298.2000 fx: 614.298.2037
www.ohiohistory.org


WPAFB
OHIO
AREA A
AREA B
Kittyhawk Center
WRIGHT-PATTERSON AIR FORCE BASE
FAIRBORN
DAYTON
BATH
BEAVERCREEK
N
0
.5
1 mile
WRIGHT-PATTERSON AIR FORCE BASE, OHIO
Figure 1-1
Areas A & B at WPAFB
and Surrounding Area
DRAWING NUMBER
s-140401.0602-12/10-w
APPROVED BY
CH
CHECKED BY
SB
DRAWN BY
JIS
DESIGNED BY
DATE
12/1/10
OFFICE
Cincinnati, OH

Wildlife

Based on the wildlife community found in disturbed areas at WPAFB, it is expected that the same species would be found in adjacent off-Base areas. Construction activities that would potentially occur to off-Base roadways would include areas previously disturbed and right-of-way areas.

Threatened and Endangered Species

The Indiana bat and bald eagle have no potential habitat included within the off-Base portion of the area of influence. In July 2000, two bats were captured during a base-wide mist net survey and fitted with radio transmitters. The bats were tracked to a small maternity colony in a dead tree within a woodlot on the campus of Wright State University.

Wetlands/Jurisdictional Waters

No wetlands occur within the off-Base portion of the area of influence. Streams 2 and 3 are both culverted under Kauffman Avenue and continue off-Base and continue their flow outside the area of influence.

3.7 Cultural Resources

3.7.1 Definition of the Resource

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

Typically, cultural resources are subdivided into archaeological resources (prehistoric or historic sites where human activity has left physical evidence of that activity but no structures remain standing) or architectural resources (buildings or other structures or groups of structures, or designed landscapes that are of historic or aesthetic significance). Archaeological resources comprise areas where human activity has measurably altered the earth or deposits of physical remains are found (e.g., arrowheads and bottles).

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

The regulations implementing the NHPA (36 CFR Part 800) direct Federal agencies to consider their Section 106 responsibilities under Section 106 of the NHPA as early as possible in the NEPA process, and to plan their public participation, analysis, and review in such a way that they can meet the purposes and requirements of both statutes in a timely and efficient manner. Thus, WPAFB is obliged to consider the effects of construction for the proposed new activities on any historic properties. In doing so, WPAFB must first define the Area of Potential Effects (APE). According to 36 CFR § 800.16(d), the APE is defined as:

> *The geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The area of potential effects is influenced by the scale and nature of the undertaking and may be different for different kinds of effects cause by the undertaking.*

In accordance with Section 106 of the NHPA, determinations regarding the potential effects of an undertaking on historic properties are presented to the SHPO. WPAFB, in consultation with the SHPO, has determined that the APE for the on-Base portion of this project consists of the entire Base property, specifically those areas in and around existing and proposed new gate locations.

No on-Base buildings or structures were identified as eligible for inclusion in the NRHP within the on-Base project areas based on a review of the *Integrated Cultural Resources Management Plan* (ICRMP) for WPAFB (2006). The ICRMP was prepared in concurrence with the SHPO on January 25, 1999, and updated on May 1, 2006 (WPAFB 2006a). Six previously recorded structures were identified within the off-Base APE for this project (**Figure 3-6**), as described below.

3.7.2 Existing Conditions

On-Base

Area A of WPAFB contains multiple known prehistoric and historic archeological sites, some of which are potentially eligible for inclusion in the NRHP. The Base also owns over 250 historic buildings, several that are individually eligible for inclusion on the NRHP and most of which are located in one of three NRHP-eligible historic districts. Area A also contains Huffman Prairie Flying Field, a National Historic Landmark and a unit of Dayton Aviation Heritage National Historical Park (WPAFB 2006a). There are no properties eligible for the NRHP located within or adjacent to the on-Base APE (WPAFB 2006a).

Off-Base

A *Phase I History/Architecture Survey and Archaeological Disturbance Study* was conducted for this EIS during the months of March and April 2011 (WPAFB 2011a). Properties within the APE were reviewed for above-ground resources, and an archaeological disturbance study was completed to identify undisturbed areas that would need further archaeological testing. The study is presented in **Appendix E**.

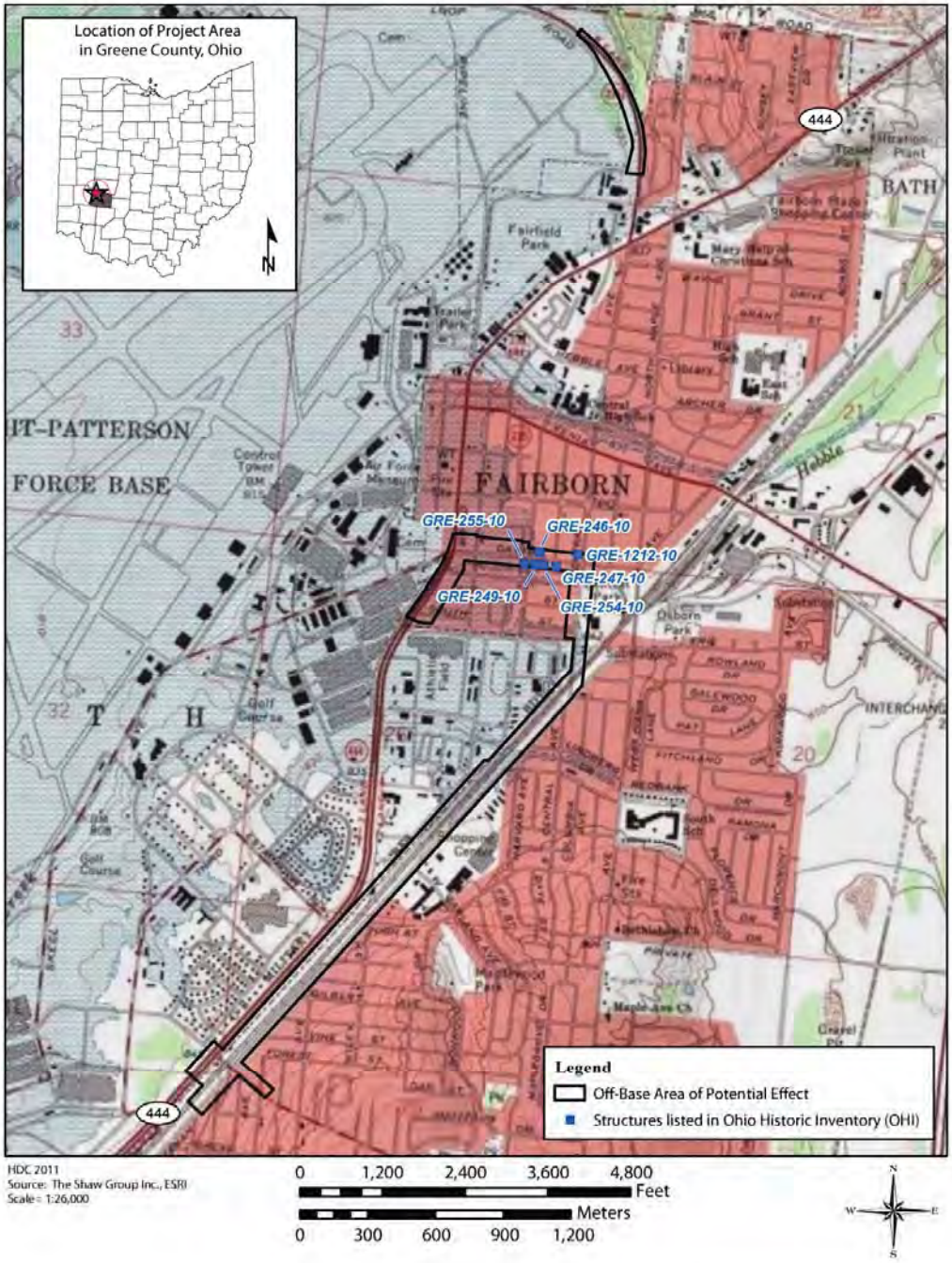
The APE was selected based on potential changes in traffic flow was a result of the Proposed Action. The APE included properties that front the following roadways: Kauffman Avenue, S. Central Avenue, W. Dayton Drive, S. Broad Street, residential areas off of S. Broad Street, and the Oakhill Avenue area (**Figure 3-6**).

The portion of the APE located off-Base contains six structures previously recorded as part of the Ohio Historic Inventory (OHI); five structures were surveyed in 1979 and no eligibility recommendations were made for these buildings (**Figure 3-6**). One structure was surveyed in 2010 for the Modernism survey conducted in Dayton. In total, 113 buildings and structures were evaluated in March and April 2011 for eligibility for the NRHP. It was recommended that none of the buildings within the APE were eligible for the listing in the NRHP due to lack of integrity and significance.

In addition, an archaeological disturbance study was conducted to evaluate the existing ground disturbance within the APE that may have the potential for intact archaeological deposits. The majority of the APE was found to be profoundly disturbed, with evidence of cutting, filling, paving, ditching, and berming. No archaeological resources were identified within the APE.

Two areas of potentially undisturbed soil were identified within the APE. However, indications of dark/discolored soils identified on an historical aerial photograph dismissed one of these areas as being most likely disturbed by cutting and filling. A Phase I archaeological survey was conducted of the remaining potentially undisturbed portions of an area referenced as Area E, located along the east side of S. Central Street within a community park named Central Park. Archival research suggested that this area was vacant or agricultural land historically and was developed into a park in the 1920s. The Central Park area was investigated by excavating 14 shovel test units (STU) at 50-foot intervals. Three of the STU locations showed disturbance below the sod layer and were not excavated. Complete excavations of the remaining 11 STUs were conducted. While Area E was determined to be largely intact, no cultural resources were found from the Phase I archaeology survey. No further archaeological work was recommended for the APE.

In summary, the off-Base area does not contain any buildings, structures, or landscapes listed or determined eligible for the NRHP. The off-Base area also does not contain any previously documented archaeological sites.



HDC 2011
Source: The Shaw Group Inc., ESRI
Scale = 1:26,000

0 1,200 2,400 3,600 4,800 Feet

0 300 600 900 1,200 Meters

N W E S

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Cincinnati, OH	5/19/11	--	JIS	SB	CH	s-140401.0801-5/11-w

WRIGHT-PATTERSON AIR FORCE BASE, OHIO

Figure 3-6
Off-Base Structures Within the Area of Potential Effect Listed in the Ohio Historic Inventory

4.6.3 Alternative A

On-Base

Vegetation

Alternative A would involve enclosing the Kittyhawk Center within Area A by extending the base perimeter fencing to include the Kittyhawk Center. The vegetation associated with Alternative A consists of previously disturbed vegetation such as maintained turf and right-of-ways and areas of isolated trees. Portions of this vegetation would be disturbed and removed during site preparation for extending the fence, but impacts would be minor due to the types of vegetation and its common occurrence on-Base. Disturbed areas as part of construction activities would be restored and replaced with similar vegetative species after completion of construction activities.

Wildlife

Potential habitats that would be impacted by Alternative A consist of previously disturbed vegetation such as maintained turf and right-of-ways and areas of isolated trees. These habitats provide foraging and roosting areas for a wide variety of common wildlife species. These habitats are widely available across the Base and would provide nearby refuges for displaced wildlife. Therefore, short-term impacts from the destruction of these habitat types would be minimal for terrestrial wildlife and no long-term impacts are anticipated.

Threatened and Endangered Species

There is no known potential habitat or known occurrences of the Indiana bat, bald eagle, or any other federally- or state-listed rare species within the Alternative A impact area. Thus no short- or long-term impacts are anticipated for any threatened or endangered species.

Wetlands/Jurisdictional Waters

There are no wetlands or other jurisdictional waters occurring within the Alternative A project area. No direct, indirect, or cumulative impacts are anticipated.

Off-Base

Impacts to off-Base vegetation, wildlife, threatened and endangered species, and wetlands/jurisdictional waters under Alternative A would be similar to that as impacts resulting from the Proposed Action.

4.6.4 No Action

Under the No Action Alternative, no biological resources would be impacted as there would be no construction to existing or proposed roadways and no disturbance to existing conditions would occur.

4.7 Cultural Resources

4.7.1 Evaluation Criteria

Adverse impacts on cultural resources might include: physically altering, damaging, or destroying all or part of a resource; altering characteristics of the surrounding environment that contribute to the resource's

significance; introducing visual or audible elements that are out of character with the property or alter its setting; neglecting the resource to the extent that it deteriorates or is destroyed; or the sell, transfer, or lease of the property out of agency ownership (or control) without adequate legally enforceable restrictions or conditions to ensure preservation of the property's historic significance.

4.7.2 Proposed Action

The most relevant impacts on cultural resources under the Proposed Action would be related to the direct impacts from ground-disturbing activities. There are no known potential prehistoric or historic site locations in the areas where ground-disturbing activities are planned. The areas are not considered to have a high sensitivity for cultural resources. Furthermore, the area has suffered heavy disturbance in the past. There is no potential for degradation of the setting from noise and visual intrusion related to the proposed construction activities or operations, nor is there a potential for structural damage from noise and low-frequency vibrations associated with the construction activities or operations.

On-Base

Area A at WPAFB contains multiple known prehistoric and historic archeological sites, some of which are potentially eligible for inclusion in the NRHP. WPAFB also contains over 250 historic buildings, some of which are individually eligible for inclusion on the NRHP, and most of which are located in a NRHP historic district. Huffman Prairie Flying Field, a National Historic Landmark and a unit of Dayton Aviation Heritage National Historical Park (WPAFB 2006a), also exists within Area A. However, there are no known archaeological sites or historic properties in the vicinity of the APE. WPAFB will initiate Section 106 consultation with the SHPO in order to confirm that no historic properties are located within the APE. Coordination correspondence with the SHPO will be provided in **Appendix A** when complete.

Mitigation Measures – As project design commences, WPAFB will continue to consult with the SHPO regarding potential impacts to identified historic properties. When applicable, specific mitigation measures will be detailed as part of the conceptual design process.

Off-Base

No NRHP-eligible above ground properties or archaeological sites were identified within the off-Base portion of the project area during a Phase I History/Architecture and Archaeological Disturbance survey performed during March and April 2011 (**Appendix E**). Since no NRHP listed or eligible properties exist in the off-Base portion of the project area, the proposed relocation, reconfiguration, and closure of gates at WPAFB would not affect off-Base historic properties.

4.7.3 Alternative A

On-Base

Anticipated effects to cultural resources under this alternative would be identical to the Proposed Action.

Off-Base

Anticipated effects to cultural resources under this alternative would be identical to the Proposed Action.

4.7.4 No Action

Cultural resources would not be impacted under the No Action Alternative.

4.8 Socioeconomics

4.8.1 Evaluation Criteria

The Proposed Action includes construction and demolition projects associated with the ECFs. The level of construction expenditure impacts is assessed in terms of direct effects on the local economy and related effects on other socioeconomic resources (e.g., housing, community resources). The magnitude of potential impacts can vary greatly, depending on the location of a proposed action. For example, implementation of an action that creates 10 employment positions might be unnoticed in an urban area, but might have adverse impacts in a rural region. If potential socioeconomic changes were to result in substantial shifts in population trends or in adverse effects on regional spending and earning patterns, they would be considered adverse.

This section identifies potential economic and social impacts that might result from the Proposed Action, Alternative A, and the No Action Alternative. The methodology for the economic impact assessment is based on the Economic Impact Forecast System (EIFS) developed by the DoD in the 1970s to efficiently identify and address the regional economic effects of proposed military actions (EIFS 2001). EIFS provides a standardized system to quantify the impact of military actions, and to compare various options or alternatives in a standard, non-arbitrary approach.

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

EIFS works well to evaluate impacts on a regional basis, but is not an appropriate tool for evaluating the impacts of a specific military action on a sub-regional basis. The proposed project has immediate physical impacts on a portion of the city of Fairborn, with the potential to result in greater adverse impacts to the immediate project area when considered in the scale of the local economy and social environment that might be lost if evaluated only as a part of regional effects. Because data were not available to perform a quantitative analysis in most cases, the local impacts of the project were evaluated using available studies, planning documents, and professional estimates.

Phase I History/Architecture Survey and Archaeological Disturbance Study for the Environmental Impact Statement for Entry Control Reconfiguration and Base Perimeter Fence Relocation, Area A, Wright-Patterson Air Force Base, Ohio

Fairborn, Greene County, Ohio

MAY 16, 2011

Hardlines Design Company

Phase I History/Architecture Survey and Archaeological Disturbance Study for the Environmental Impact Statement for Entry Control Reconfiguration and Base Perimeter Fence Relocation, Area A, Wright-Patterson Air Force Base, Ohio

Fairborn, Bath Township, Greene County, Ohio

Submitted to
Bill Scoville
Shaw Environmental and Infrastructure Inc.
5050 Section Avenue
Cincinnati, Ohio 45212-2025

Submitted by
Hardlines Design Company
4608 Indianola Avenue
Columbus, Ohio 43214
614.784.8733
www.hardlinesdesign.com

May 16, 2011

HDC 1097

ABSTRACT

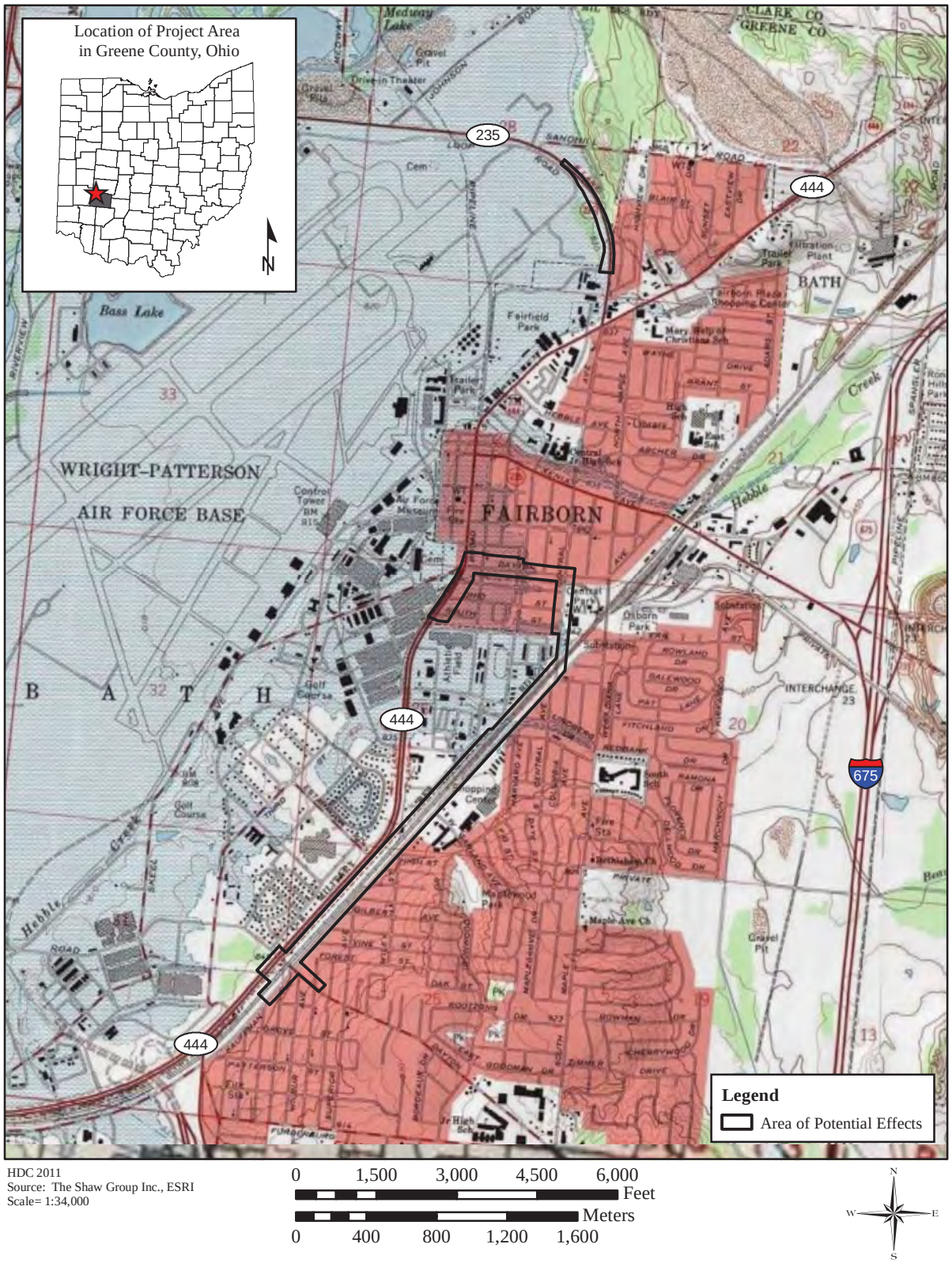
Hardlines Design Company (HDC) was contracted in October 2010 to provide cultural resources services in association with the Wright-Patterson Air Force Base (WPAFB) Environmental Impact Statement (EIS) for the State Route (SR) 444 project. WPAFB needs to reduce the number of Entry Control Facilities (ECFs) to bring the ECFs up to current United States Air Force (USAF) standards, and remove the separation between Area A and the Kittyhawk Area. To meet current needs, the USAF would reduce and consolidate the number of ECFs at WPAFB and secure the SR 444 corridor that currently divides Area A from the Kittyhawk Area. The project area is located in the city of Fairborn, Bath Township, Greene County, Ohio.

In March and April of 2011, HDC conducted a standard Phase I history/architecture survey of above-ground resources and completed an archaeological disturbance study to identify undisturbed areas that would need further archaeological testing. This work was completed because Section 106 of the National Historic Preservation Act of 1966, as amended, applies to this project, as it is federally funded.

The area of potential effects (APE) was selected based on potential changes in traffic flow as a result of the proposed action. The APE includes properties that front the following roadways: Kauffman Avenue, S. Central Avenue, W. Dayton Drive, S. Broad Street, residential areas off of S. Broad Street, and the Oakhill Avenue area.

Six buildings previously surveyed are within the APE. Five of the six buildings were surveyed in 1979, and no eligibility recommendations were made for these buildings. One building was surveyed in 2010 for the Modernism survey conducted in Dayton. HDC evaluated 113 buildings and structures for eligibility for the National Register of Historic Places (NRHP). HDC recommends that none of the buildings within the APE are eligible for the NRHP due to lack of integrity and significance.

HDC also conducted an archaeological disturbance study to evaluate the existing ground disturbance within the APE that may have potential for intact archaeological deposits. The majority of the project APE was found to be profoundly disturbed, with evidence of cutting, filling, paving, ditching, and berming. No archaeological resources were identified within the APE. Two areas of potentially undisturbed soil were found in the following areas: Area E and Area F. The 1959 aerial photograph depicting Area F shows surface discolorations that likely indicate previous soil disturbance, such as cutting and filling; therefore, only Area E was thought to contain actual undisturbed soils. HDC returned to the project area on April 29, 2011, to conduct a Phase I archaeological survey of the potentially undisturbed portions of Area E. This investigation involved excavating 14 shovel test units (STUs) at 15-meter (50-foot) intervals. Three of the STU locations showed disturbance below the sod layer and so were not excavated. HDC conducted complete excavations of the other 11 STUs. While Area E was determined to be largely intact, no cultural resources were found from the Phase I archaeology survey. No further archaeological work is recommended for the project area.

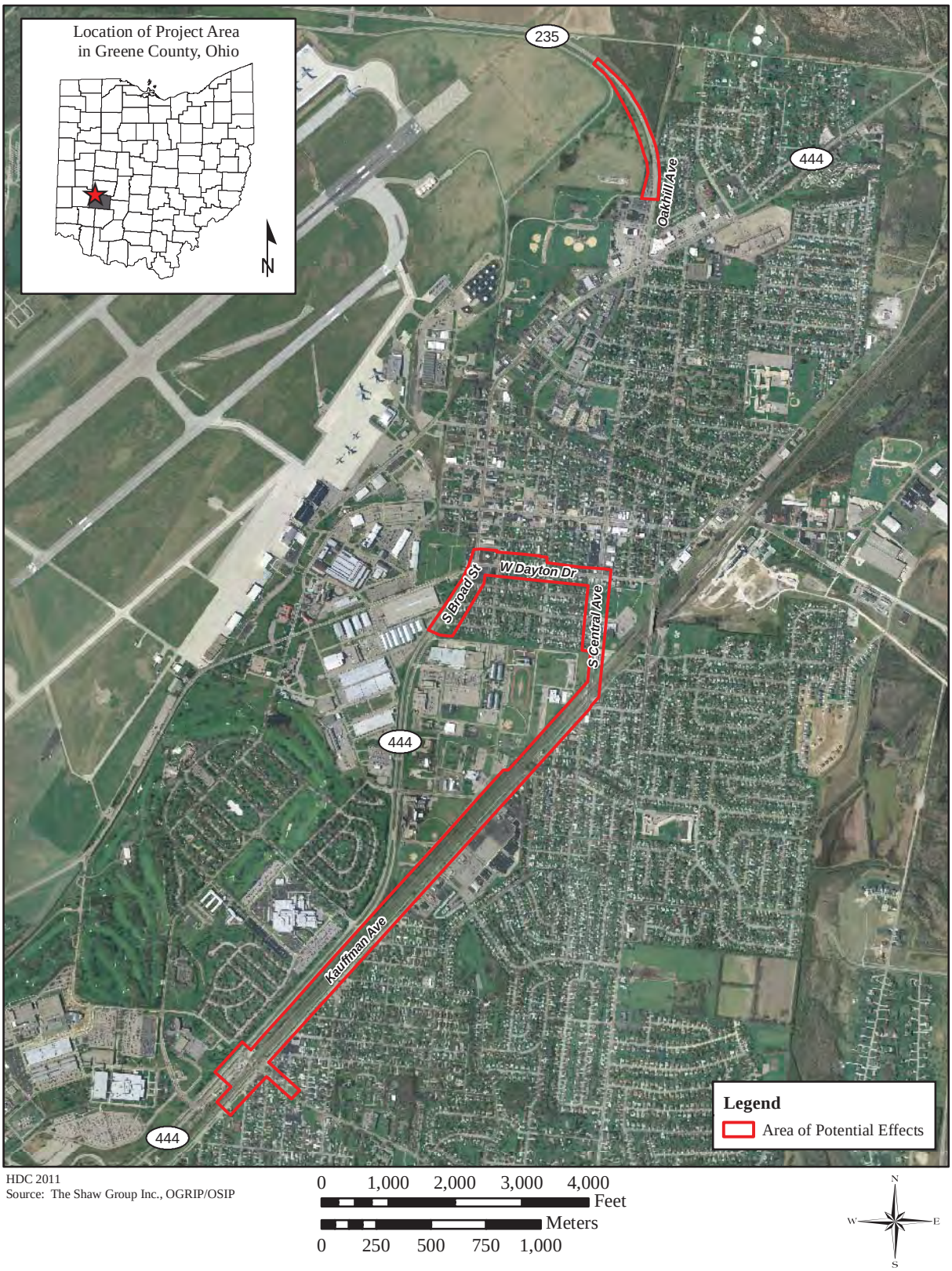


HDC 2011
Source: The Shaw Group Inc., ESRI
Scale= 1:34,000

0 1,500 3,000 4,500 6,000 Feet

0 400 800 1,200 1,600 Meters

Figure 1. APE for the SR 444 relocation depicted on the 2010 Fairborn, Ohio, 7.5-minute USGS topographic map



HDC 2011
Source: The Shaw Group Inc., OGRIP/OSIP

Figure 2. APE superimposed on a current aerial map

LITERATURE REVIEW

Introduction

A literature review was conducted by HDC staff in March 2011 to identify any previously recorded history/architecture and archaeological resources or surveys that had been conducted within the APE, and to provide information on the expected types and settings of archaeological sites in the region.

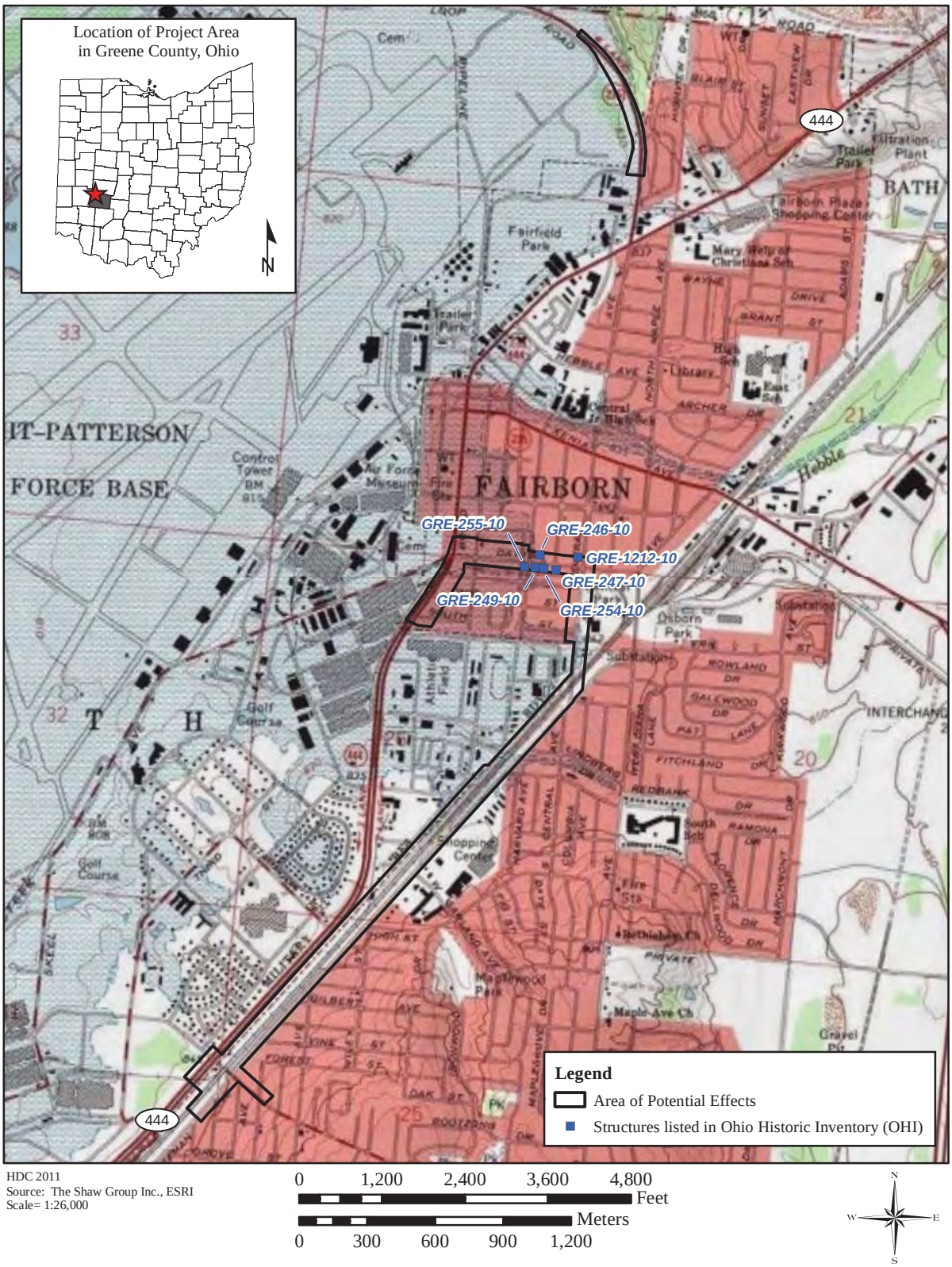
For history/architecture resources, the literature review included properties falling completely or partially within the history/architecture APE, which was defined as all properties that fronted the roads where traffic will be diverted. For the archaeological disturbance study, the literature review documented previously known archaeological resources with a 0.6-mile (1-km) search radius of the archaeological APE. The literature review included the following sources:

- Ohio Historic Preservation Office
- Ohio Archaeological Inventory (OAI) forms
- Ohio Historical Inventory (OHI) forms
- National Register of Historic Places (NRHP) files
- National Historic Landmarks lists
- Determination of Eligibility files
- Contract report files
- Cultural Resources GIS database
- *Archaeological Atlas of Ohio* (Mills 1914)
- USGS 7.5-minute and 15-minute series topographic maps
- Sanborn Fire Insurance maps
- Ohio Department of Transportation (ODOT) Historic Bridge Inventory
- ODOT Office of Aerial Engineering aerial photographs
- Cemetery records
- Certified local government (CLG) records

Previously Documented History/Architecture Resources

A literature review of records held at the Ohio Historic Preservation Office was completed for the history/architecture study area in March and April of 2011. HDC discovered six previously recorded buildings or structures in the history/architecture APE, listed below and shown in Figure 15. All six of these buildings were recorded on OHI forms; none are listed in the NRHP. Five of the OHI forms were completed in 1979 by Teresa Stebbins as part of the Fairborn Historic Structures Survey, and one was completed in 2010 as a product of the Dayton Modernism survey (Avdakov et al.). Copies of all OHI forms are provided in Appendix D.

- 104 W. Dayton Drive (GRE-247-10), 1979
- 127 W. Dayton Drive (GRE-246-10), 1979
- 128 W. Dayton Drive (GRE-254-10), 1979
- 136 W. Dayton Drive (GRE-249-10), 1979
- 200 W. Dayton Drive (GRE-255-10), 1979
- 77 S. Central Avenue (GRE-1212-10), 2010



HDC 2011
Source: The Shaw Group Inc., ESRI
Scale= 1:26,000

0 1,200 2,400 3,600 4,800 Feet

0 300 600 900 1,200 Meters

Figure 15. History/architecture APE showing properties with OHI forms

104 W. Dayton Drive
(GRE-247-10)

Queen Anne T-plan house constructed around 1900. Since the house was surveyed in 1979, it has been modified and no longer retains its original Victorian porch details and decorative window surrounds. It now has vinyl cladding, a reconstructed porch, and all new windows and doors. This house was moved to this location in the 1920s from the former town of Osborn as a result of the Huffman Dam construction.

Figure 16. 104 W. Dayton Drive, looking southwest

127 W. Dayton Drive
(GRE-246-10)

Gabled Ell house constructed around 1900. The house has been modified with new cladding, windows, doors, reconfigured porch, and several small additions. This house was moved to this location in the 1920s from the former town of Osborn as a result of the Huffman Dam construction.

Figure 17. 127 W. Dayton Drive, looking northeast

128 W. Dayton Drive (GRE-254-10)

Queen Anne T-plan house constructed around 1900. This house retains its overall form, scalloped shingles in the gabled end, gingerbread porch details, and wood window surrounds, but it has been altered with vinyl cladding, replacement windows and doors, and a rear addition. This house was moved to this location in the 1920s from the former town of Osborn as a result of the Huffman Dam construction.

Figure 18. 128 W. Dayton Drive, looking southeast

136 W. Dayton Drive (GRE-249-10)

Queen Anne T-plan house constructed around 1900. This house has been modified by vinyl cladding, replacement windows and doors, modifications made to the porch, and a rear addition. This house was moved to this location in the 1920s from the former town of Osborn as a result of the Huffman Dam construction.

Figure 19. 136 W. Dayton Drive, looking southwest

200 W. Dayton Drive (GRE-255-10)

Wood frame I-house. The building is difficult to date since it has been moved, and all original exterior materials have been replaced. A reasonable date range for this house is between 1860 and 1900. The building has a Colonial Revival style of porch, all new windows and doors, vinyl cladding, and a rear addition. This house was moved to this location in the 1920s from the former town of Osborn as a result of the Huffman Dam construction.

Figure 20. 200 W. Dayton Drive, looking southeast

77 S. Central Avenue (GRE-1212-10)

Buff-colored Roman Brick Geometric Expressionist style building constructed in 1965 as the Merchant and Mechanics Federal Savings and Loan. It is a modest example of this style, which was commonly used for savings and loans buildings in the 1960s. The building has been altered by the replacement of all windows and doors and the installation of awnings over the windows and doors.

Figure 21. 77 S. Central Avenue, looking northwest

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

20 October 2011

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

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

Dear Mr. Epstein

This is a follow up for the Section 106 Consultation letter sent to your office on June 15, 2011, and the telephone conversations of September 30 and October 3, 2011, and contains additional Information for the Wright-Patterson Air Force Base (WPAFB) determination of no historic properties affected resulting from the proposed Entry Control Facility and Base Perimeter Fence Relocation project at WPAFB. WPAFB is preparing an Environmental Impact Statement (EIS) in accordance with the requirements of the National Environmental Policy Act (NEPA) to address gate and roadway issues in Area A at WPAFB. By email dated October 3, 2011 your staff requested additional information in order to more fully review and comment on the determination of effects for the proposed project. In addition to information previously provided to your office in June 2011, this letter provides requested off-Base analysis information and potential impacts anticipated as a result of the proposed project.

Project History

The purpose of the Proposed Action is to provide security, safety, and traffic flow improvements into and on WPAFB. The Federal government owns the land underlying the section of SR 444 proposed for closure; in 1932 the U.S. War Department granted Ohio a permit to establish a road at this location, but retained the right to close it at any time. These improvements are needed at WPAFB to address the following issues, thereby achieving the Base anti-terrorism mission:

Security Issues.

1. The unsecured corridor of SR 444 that currently bisects the Base between Area A and Kittyhawk Center comes within 60 feet (ft) of buildings on WPAFB, which is less than the 82 ft safety zone minimum standoff distance from the gate to inhabited buildings defined in the Unified Facilities Code; and
2. The nine gates in Area A at WPAFB do not meet anti-terrorism force protection standards.

Safety Issues.

1. The nine existing gates in Area A create multiple high volume traffic entry points, thereby reducing traffic safety within WPAFB;
2. The existing gates are not designed for adequate vehicle stacking distance, which results in backups onto the local street network during periods of elevated security levels;

3. The existing commercial vehicle gate at Gate 16A is closed from 6:00 PM to 6:00 AM; vehicles that arrive prior to 6:00 AM typically queue on SR 444; and
4. Gate delays may impact Emergency Medical Services response time to the WPAFB Medical Center.

Traffic Flow.

1. Vehicles traveling from the Kittyhawk Center to Area A have to exit and enter through multiple gates; and
2. The current gate configuration is not designed to handle the high volume traffic that enters/exists Area A via the nine existing gates, resulting in traffic congestion in the morning, at lunch time, and at the end of the workday.

An environmental assessment (EA) was initiated in 2009 for the action of reconfiguring and relocating gates and Base perimeter fencing at WPAFB. The EA addressed on-Base actions and did not analyze potential off-Base impacts as a result of the Proposed Action. As part of the 2009 EA, Section 106 consultation was conducted with your office. The OHPO submitted a letter dated February 23, 2010 to WPAFB indicating that OHPO had reviewed the information and concurred that the proposed relocations, reconfiguration, and closure of gates at WPAFB would not adversely affect historic properties on-Base. Due to concerns about potential impacts to off-Base historic properties, your office also requested to be informed of subsequent developments that may affect historic properties resulting from the implementation of this project. A draft EA was released via public notice dated February 26, 2010.

Following production of the draft EA, WPAFB determined that an EIS was necessary for the proposed reconfiguration and relocation of the same gates and Base perimeter fence project. This EIS addresses the same on-Base Area of Potential Effect (APE) previously reviewed by the OHPO, and new off-Base APE's, and led to the current consultation with your office. WPAFB understands its responsibility for impacts resulting from its proposed action, and thus the EIS considers three alternatives (addressed below) and is in a developmental stage; however, analyses of the following affected environments potentially impacted by the Proposed Action have been considered for both on- and off-Base project areas: land use, air quality, noise, geology and soils, water resources, biological resources, cultural resources, socioeconomics, environmental justice, infrastructure, health and safety, hazardous materials/waste, and traffic and transportation.

Proposed Project

The Proposed Action (preferred alternative, the first listed in Attachment 1, Comparison of Environmental Consequences) evaluated in the EIS would involve consolidating nine of the existing gates at WPAFB into three gates (Gate 1A, 15A, and 26A) and closing a segment of SR 444 that currently bisects the WPAFB Kittyhawk Center from Area A of the Base. The second alternative evaluated in the EIS (Alternative A) would involve closure of SR 444 and installation of base perimeter fencing only, with no gate realignments. The third alternative evaluated in the EIS is the "No Action" alternative.

A traffic study was conducted in 2009 [report dated March 30, 2009] and is included as part of the EIS. Findings indicated the closure of SR 444 between Dayton-Yellow Springs Road and Dayton Drive would displace to new locations the through-traffic not entering the realigned Base gates. The traffic study assumed traffic would divert to the nearest arterial roads that connect the two ends of the closed SR 444 segment. Thus, the resulting non-Base through-traffic route, from southwest to northeast, was predicted to travel from SR 444 along Dayton-Yellow Springs Road, Kauffman Avenue, Central Avenue, and Dayton Drive and return to SR 444. The roads along this route, in addition to a segment of SR 235 near the proposed Gate 26A location, were determined to be the off-Base APE as shown in the original "Figure 2" submitted via a June 15, 2011 letter from WPAFB to OHPO (Attachment 2). This route was determined to include the most likely areas affected by the impacts indicated on Attachment 1, for the off-Base cultural resources study area. In a letter dated March 14, 2011 the Air Force requested that the Federal Highway Administration (FHWA) participate in the preparation of an EIS for this project. FHWA responded with a letter dated April 18, 2011 accepting

participation as a cooperating agency. As a cooperating agency for the EIS, the FHWA has concurred with this off-Base APE.

Environmental Consequences

Attachment 1 has been extracted from the Preliminary Draft EIS and presents anticipated on- and off-Base impacts as a result of the Proposed Action, Alternative A, and the No Action alternative. The Proposed Action is WPAFB's preferred alternative, as described above; Alternative A involves closing a segment of SR 444 with no gate realignment; and the No Action alternative involves no actions resulting in the existing nine gates at WPAFB remaining in place and no reconfiguration or improvements being made. [Several stand-alone reports were prepared as part of the EIS and in determining potential impacts. These reports will be included as appendices in the Preliminary Draft EIS (PDEIS) whose estimated draft final public release date is December 7, 2011, and includes: air quality, noise, natural resources, cultural resources, socioeconomics, and traffic.] The cultural resources survey report, *Phase I History/Architecture Survey and Archaeological Disturbance Study, 16 May 11*, *Hardlines Design Company,* submitted to your office June 15, 2011 will become the EIS' cultural resources appendix. Should the OHPO wish to examine any of the other individual reports prior to the release of the PDEIS, please notify me and WPAFB will strive to provide such at the earliest opportunity.

The EIS will document consideration of impacts from the proposed on-Base construction (e.g., new gates and roadways) and the changes to off-Base traffic (e.g., noise, vehicle emissions, and traffic delays) from closing a segment of SR 444 within the Base boundary). To address the change in local traffic as a result of closing the applicable segment of SR 444, the Ohio Department of Transportation (ODOT) in conjunction with the FHWA, the city of Fairborn and/or other jurisdictional stakeholders, would develop transportation solutions that provide for the safe and efficient movement of users in the area. Any action alternatives developed to address the travel changes would be in accordance with FHWA's NEPA guidelines and would be detailed in a separate and independent NEPA document. The FHWA/ODOT NEPA document would tier off of WPAFB's EIS and FHWA/ODOT would perform a separate Section 106 consultation with the OHPO.

As a result of the analysis of environmental consequences for the Proposed Action, WPAFB has determined, as indicated in the attached table, the Proposed Action has the following likely impacts on the off-Base APE, should the traffic pattern indicated by this study result:

- Air quality – no impact
- Noise – moderate adverse impact to properties inside the APE, from increased traffic noise levels, with negligible impact to properties beyond the APE
- Vibration – negligible impact, a moderate increase in traffic at these low speeds would have very little impact.
- Traffic and Transportation – minor impact from increased volume of traffic on the local street network as off-Base traffic would travel further to access an available gates. The level of service would also decrease and the average vehicle delays would increase on local street networks as traffic diverts from the closure of a segment of SR 444. No corrective roadwork anticipated.

Based on an analysis of environmental consequences for the Proposed Action, the APE was determined as shown in Attachment 2. This is the same figure delineating the APE that was submitted in the June 15, 2011 letter. WPAFB determined that there are no effects to historic properties, i.e. properties deemed eligible or potentially eligible for the National Register of Historic Places, within the Proposed Action's on-Base APE, and that no historic properties are affected within the Proposed Action's off-Base APE. Since no eligible properties were found within the APE, and likely effects beyond the APE are negligible, WPAFB determined that there are no historic properties affected by the Proposed Action. There are no known historic or prehistoric archaeological sites within or adjacent to the area of the Proposed Action. Therefore, it is the opinion of WPAFB that the proposed project will have no effect on historic properties.

In summary, your office previously concurred with WPAFB's finding of no effect to historic properties for the on-Base project areas. WPAFB requests the OHPO concur with its determination of no historic properties affected with regard to this project, for the off-Base project areas.

Please review the information we have provided and let us know whether you concur with the no historic properties affected determination. Should you have questions, I can be reached at (937) 257-1374 or via email at Paul.Woodruff@wpafb.af.mil.

Sincerely,

Paul Woodruff
Cultural Resources Manager
Environmental Branch

Attachments:
1. Table, Comparison of Environmental Consequences
2. Figure 2, Off-Base Area of Potential Effect

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

ATTACHMENT 1 Comparison of Environmental Consequences

Affected Environmental Issue	Proposed Action (Preferred Alternative) Close 444 & Realign gates	Alternative A (Base Perimeter Fence Relocation) Close 444 only	No Action
Land Use			
On-Base	Short-Term: Minor impacts from construction activities. Occupants of on-site buildings adjacent to project areas would be subject to temporary or intermittent impacts and inconveniences from modified parking and pedestrian patterns, and from increases in background noise would be experienced.	Short-Term: Minor adverse impact to land use in the vicinity of Gates 9A and 38A; however, land use would remain consistent with the WPAFB General Plan.	
	Long-Term: Minor adverse impact to land use in the vicinity of Gates 1A, 15A and 26A, and associated proposed road widening; however, land use would remain consistent with the WPAFB General Plan.	Long-Term: Similar to short-term.	Short-Term: No impact. Long-Term: No impact.
Off-Base	Short-Term: Minor adverse impacts to Greene, Ohio, and South Streets; however, land use would not change at these locations.	Short-Term: No impact.	
	Long-Term: Same as short-term.	Long-Term: No impact.	
Air Quality			
On-Base	Short-Term: Minor adverse impact from particulate matter and engine exhaust emissions generated during construction activities.	Short-Term: Similar to Proposed Action.	
	Long-Term: Negligible impact due to decreased idling and congestion at entry control facilities (ECFs).	Long-Term: Similar to Proposed Action.	Short-Term: No impact. Long-Term: No impact.
Off-Base	Short-Term: Negligible adverse impact because total amount of area traffic not expected to change.	Short-Term: Similar to Proposed Action.	
	Long-Term: No impact.	Long-Term: No impact.	

Comparison of Environmental Consequences

Affected Environmental Issue	Proposed Action (Preferred Alternative) Close 444 & Realign gates	Alternative A (Base Perimeter Fence Relocation) Close 444 only	No Action
Noise			
On-Base	Short-Term: Minor impacts on ambient noise from construction activities; however, activities would be carried out during normal working hours and would cease upon completion of construction activities. Long-Term: Positive effect on residential/recreational areas as a result of less traffic at fewer ECF locations.	Short-Term: Similar to Proposed Action. Long-Term: Similar to Proposed Action.	Short-Term: No impact. Long-Term: No impact.
Off-Base	Short-Term: Impacts similar to on-Base ambient noise short-term impacts. Long-Term: Moderate adverse impact from increased traffic noise levels at these roadways: Dayton-Yellow Springs Road, Kauffman Avenue, Central Avenue, Dayton Drive, and Broad Street.	Short-Term: Similar to Proposed Action. Long-Term: Similar to Proposed Action.	
Geology and Soils			
On-Base	Short-Term: Minor impact to soils from construction activities. Sediment and erosion control measures would be implemented to minimize potential impacts. Long-Term: No impact.	Short-Term: Minor impact to soils from construction activities at Gates 9A and 38A, and in areas where the perimeter fence is relocated across State Route (SR) 444. Sediment and erosion control measures would be implemented to minimize potential impacts. Long-Term: No impact.	Short-Term: No impact. Long-Term: No impact.
Off-Base	Short-Term: Minor adverse impact to soil during construction activities. Impacts would be minimized through implementation of erosion and siltation controls. Long-Term: Negligible adverse impacts would occur to local geology, but regional geology would not be affected.	Short-Term: Similar to Proposed Action. Long-Term: Similar to Proposed Action.	

Comparison of Environmental Consequences

Affected Environmental Issue	Proposed Action (Preferred Alternative) Close 444 & Realign gates	Alternative A (Base Perimeter Fence Relocation) Close 444 only	No Action
Water Resources			
Groundwater			
On-Base	Short-Term: Minor adverse impact to groundwater during construction activities from construction at or near existing ECFs. Erosion and sedimentation controls would be implemented as a best management practice (BMP).	Short-Term: Similar to Proposed Action.	
	Long-Term: Minor adverse effect on groundwater would continue to occur as a result of roadway operations (i.e., rainwater/roadway debris runoff).	Long-Term: Similar to Proposed Action.	
Off-Base	Short-Term: Minor adverse impact to groundwater from increased siltation to streams and stormwater conveyances within the roadway improvement project areas during construction.	Short-Term: Similar to Proposed Action.	
	Long-Term: Minor adverse effect on groundwater would continue to occur as a result of roadway operations.	Long-Term: Similar to Proposed Action.	Short-Term: No impact. Long-Term: No impact.
Surface Water			
On-Base	Short-Term: Moderate impact to unnamed tributary of Hebble Creek in area of Gate 15A. Environmental commitments would be implemented in accordance with the Clean Water Act Section 404 and 401 permits. Other open drainages would be impacted by culvert extensions. Erosion and sedimentation controls will be implemented as a BMP.	Short-Term: Minor adverse impact to surface water during construction activities as the proposed activities would be conducted at existing ECFs. Erosion and sedimentation controls would be implemented as a BMP.	
	Long-Term: Minor adverse impact. Environmental commitments will ensure no net loss of function.	Long-Term: Minor adverse effect on surface water would continue to occur as a result of roadway operations.	

Comparison of Environmental Consequences

Affected Environmental Issue	Proposed Action (Preferred Alternative) Close 444 & Realign gates	Alternative A (Base Perimeter Fence Relocation) Close 444 only	No Action
Surface Water (continued)	Short-Term: Moderate impact to culvert extensions.	Short-Term: Similar to Proposed Action.	Short-Term: No impact.
Off-Base	Long-Term: Similar to short-term.	Long-Term: Similar to Proposed Action.	Long-Term: No impact.
Floodplains			
On-Base	Short-Term: Minor adverse impact as a portion of Gate 15A is located within the 100-year floodplain. Construction in this area would be stipulated and restricted by the Miami Conservancy District (MCD).	Short-Term: Similar to Proposed Action.	
	Long-Term: Similar to short-term.	Long-Term: Similar to short-term.	Short-Term: No impact. Long-Term: No impact.
Off-Base	Short-Term: Minor adverse impact as a small segment of Kauffman Avenue is located within the 100-year floodplain.	Short-Term: Similar to Proposed Action.	
	Long-Term: Similar to short-term.	Long-Term: Similar to Proposed Action.	

Comparison of Environmental Consequences

Affected Environmental Issue	Proposed Action (Preferred Alternative) Close 444 & Realign gates	Alternative A (Base Perimeter Fence Relocation) Close 444 only	No Action
Biological Resources			
Vegetation			
On-Base	Short-Term: Minor adverse impact during construction activities due to removal of common vegetation. Positive impact from removal of invasive vegetation.	Short-Term: Minor adverse impacts during construction activities due to removal of common vegetation at Gates 9A and 38A due to extending the base perimeter fence across SR 444. Positive impact from removal of invasive vegetation.	
	Long-Term: Negligible impact from vegetation removal as no rare vegetation would be affected. Environmental commitments would involve replanting with similar, non-invasive vegetation.	Long-Term: Similar to Proposed Action.	Short-Term: No impact. Long-Term: No impact.
Off-Base	Short-Term: Minor adverse impact to vegetation from construction activities disturbing soil.	Short-Term: Similar to Proposed Action.	
	Long-Term: Similar to short-term.	Long-Term: Similar to Proposed Action.	

Comparison of Environmental Consequences

Affected Environmental Issue	Proposed Action (Preferred Alternative) Close 444 & Realign gates	Alternative A (Base Perimeter Fence Relocation) Close 444 only	No Action
Biological Resources (continued)			
Wildlife			
On-Base	Short-Term: Negligible adverse impact as no unusual or high quality habitat would be affected. Long-Term: Similar to short-term.	Short-Term: Similar to Proposed Action. Long-Term: Similar to Proposed Action.	
Off-Base	Short-Term: Negligible adverse impact as no unusual or high quality habitat would be affected. Long-Term: Similar to short-term.	Short-Term: Similar to Proposed Action. Long-Term: Similar to Proposed Action.	
Threatened and Endangered Species			
On-Base	Short-Term: Negligible impact on low quality habitat of Indiana bat and bald eagle; impacts would be minimized by implementing tree cutting in accordance with the US Fish and Wildlife Service's (USFWS) recommended tree-clearing season. Long-Term: Negligible impact from loss of potential designated habitat areas for Indiana bat and bald eagle; impacts would be minimized by implementing tree cutting in accordance with the USFWS recommended tree-clearing season.	Short-Term: Similar to Proposed Action. Long-Term: Similar to Proposed Action.	Short-Term: No impact. Long-Term: No impact.
Off-Base	Short-Term: No impact; there are no known or potential designated habitat areas. Long-Term: Similar to short-term.	Short-Term: Similar to Proposed Action. Long-Term: Similar to Proposed Action.	

Comparison of Environmental Consequences

Affected Environmental Issue	Proposed Action (Preferred Alternative) Close 444 & Realign gates	Alternative A (Base Perimeter Fence Relocation) Close 444 only	No Action
Wetlands			
On-Base	Short-Term: No impact because no wetlands are located within the project areas. Long-Term: No impact.	Short-Term: Similar to Proposed Action. Long-Term: No impact.	Short-Term: No impact. Long-Term: No impact.
Off-Base	Short-Term: No impact because no wetlands are located within the area of influence. Long-Term: No impact.	Short-Term: No impact. Long-Term: No impact.	
Cultural Resources			
On-Base	Short-Term: Negligible impact to National Register of Historic Places (NRHP) eligible sites. Long-Term: No impact.	Short-Term: Similar to Proposed Action. Long-Term: No impact.	
Off-Base	Short-Term: Beneficial impact to Huffman Prairie Flying Field visitors as the current commercial vehicle inspection gate (Gate 16A) co-mingles with access to the Flying Field. Relocating the inspection operations to Gate 26A would reduce traffic congestion and allow ease in accessing the Flying Field. Long-Term: Similar to short-term.	Short-Term: Similar to Proposed Action. Long-Term: No impact.	Short-Term: No impact. Long-Term: No impact.
Socioeconomics			
On-Base	Short-Term: Beneficial impact on local economy from revenue generated by construction activities. Long-Term: No impact.	Short-Term: Similar to Proposed Action. Long-Term: No impact.	Short-Term: No impact. Long-Term: No impact.
Off-Base	Short-Term: Beneficial impact to viability of downtown Fairborn as traffic and visibility increase. Long-Term: Similar to short-term.	Short-Term: Similar to Proposed Action. Long-Term: Similar to Proposed Action.	

Comparison of Environmental Consequences

Affected Environmental Issue	Proposed Action (Preferred Alternative) Close 444 & Realign gates	Alternative A (Base Perimeter Fence Relocation) Close 444 only	No Action
Environmental Justice			
On-Base	Short-Term: No impact. Long-Term: No impact.	Short-Term: No impact. Long-Term: No impact.	Short-Term: No impact. Long-Term: No impact.
Off-Base	Short-Term: Unknown impacts would be determined at such time as the FHWA/ODOT makes their separate NEPA determination. Long-Term: Similar to short-term.	Short-Term: Similar to Proposed Action. Long-Term: Similar to Proposed Action.	
Infrastructure			
On-Base	Short-Term: Minor adverse impact from intermittent roadway closures during construction and to local traffic in area of gates from additional construction vehicles. Long-Term: Beneficial impact to utilities and services as efficiencies increase.	Short-Term: Similar to Proposed Action. Long-Term: Similar to Proposed Action.	Short-Term: No impact. Long-Term: No impact.
Off-Base	Short-Term: Additional studies would occur during project planning and design for utility and other infrastructure needs. Long-Term: Similar to short-term.	Short-Term: Similar to Proposed Action. Long-Term: Similar to Proposed Action.	

Comparison of Environmental Consequences

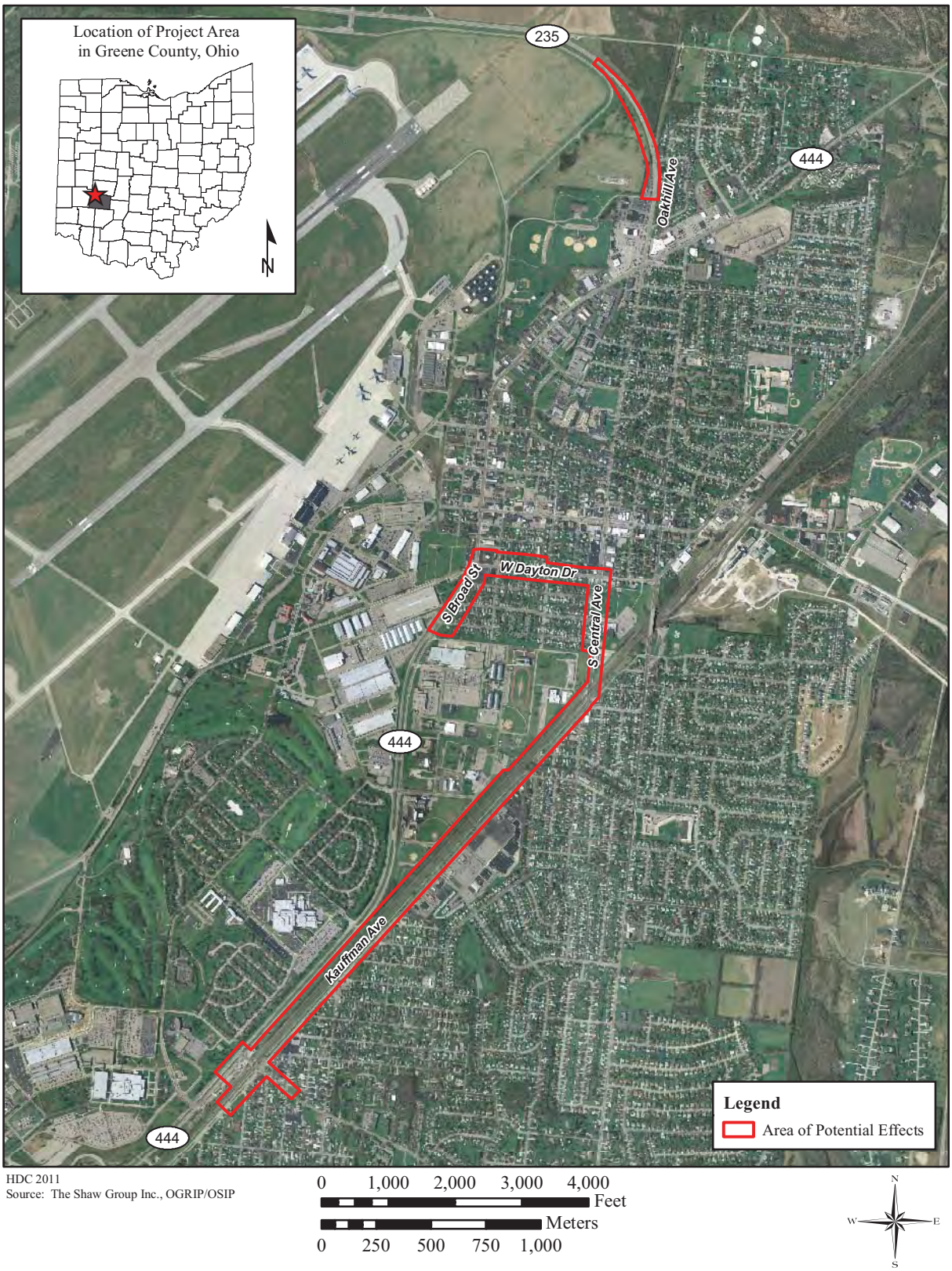
Affected Environmental Issue	Proposed Action (Preferred Alternative) Close 444 & Realign gates	Alternative A (Base Perimeter Fence Relocation) Close 444 only	No Action
Health and Safety			
On-Base	Short-Term: Minor adverse impact to workers during construction activities; impacts would be minimized by adherence to safety standards.	Short-Term: Similar to Proposed Action.	Short-Term: Negative impact to safety of employees, residents, and visitors of the Base resulting from continued non-compliancy with Air Force anti-terrorism standards.
	Long-Term: No impact.	Long-Term: Similar to Proposed Action.	Long-Term: Similar to short-term.
Off-Base	Short-Term: Moderate impact and increased risk to safety of vehicles and pedestrians traversing the railroad tracks at SR 444 and Kauffman Avenue and crossing Central Avenue to access Central Park.	Short-Term: Similar to Proposed Action.	Short-Term: No impact.
	Long-Term: Similar to short-term.	Long-Term: Similar to Proposed Action.	Long-Term: No impact.

Comparison of Environmental Consequences

Affected Environmental Issue	Proposed Action (Preferred Alternative) Close 444 & Realign gates	Alternative A (Base Perimeter Fence Relocation) Close 444 only	No Action
Hazardous Materials			
On-Base	Short-Term: Negligible impact as hazardous materials used during construction would not be expected to increase. Long-Term: No impact.	Short-Term: Similar to Proposed Action. Long-Term: No impact.	
Off-Base	Short-Term: Minor adverse impact to areas of known active Leaking Underground Storage Tank (LUST) sites. Long-Term: No impact.	Short-Term: Similar to Proposed Action. Long-Term: No impact.	
Hazardous Waste			
On-Base	Short-Term: Negligible impact as hazardous materials generated during construction would not be expected to increase. Long-Term: Similar to short-term.	Short-Term: Similar to Proposed Action. Long-Term: Similar to Proposed Action.	Short-Term: No impact. Long-Term: No impact.
Off-Base	Short-Term: Minor adverse impact to areas of known active LUST sites. Long-Term: No impact.	Short-Term: Similar to Proposed Action. Long-Term: No impact.	
Environmental Restoration Program (ERP) Sites			
On-Base	Short-Term: Negligible impact as the project areas are not located directly over any landfills or burial sites; however, any activity that may disturb ERP sites will be coordinated with the Base ERP Program Manager in CEANQ. Long-Term: Similar to short-term.	Short-Term: Similar to Proposed Action. Long-Term: Similar to Proposed Action.	

Comparison of Environmental Consequences

Affected Environmental Issue	Proposed Action (Preferred Alternative) Close 444 & Realign gates	Alternative A (Base Perimeter Fence Relocation) Close 444 only	No Action
Traffic and Transportation			
On-Base	Short-Term: Beneficial impact at ECFs as a result of improvements. Construction activities would result in a minor adverse impact on traffic generation, volume, and street use.	Short-Term: Similar to Proposed Action.	Short-Term: No impact.
	Long-Term: Similar to short-term.	Long-Term: Similar to Proposed Action.	Long-Term: Minor to moderate adverse impacts on traffic in and around WPAFB as a result of continued vehicle delays and time-consuming vehicle inspections.
Off-Base	Short-Term: Minor impact from increased volume of traffic on local street network as off-Base traffic would travel further to access available ECF. Level of Service would decrease and average vehicle delays would increase on local street networks as traffic diverts from the closure of a segment of SR 444.	Short-Term: Similar to Proposed Action.	Short-Term: No impact.
	Long-Term: Similar to short-term.	Long-Term: Similar to Proposed Action.	Long-Term: No impact.



HDC 2011
Source: The Shaw Group Inc., OGRIP/OSIP

Figure 2. APE superimposed on a current aerial map

October 28, 2011

Paul Woodruff
Cultural Resources Manager
Environmental Quality Section
Environmental Branch
88 ABW/CEANQ
1450 Littrell Road
Wright-Patterson Air Force Base, Ohio 45433-5209

Dear Mr. Woodruff:

Re: Entry Control Reconfiguration at Wright-Patterson Air Force Base, Ohio

This is in response to your letters dated June 15, 2011, and October 20, 2011, regarding the above referenced project. My comments are made pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended, and the associated regulations at 36 CFR Part 800.

Wright-Patterson Air Force Base (WPAFB) proposes to relocate and/or reconfigure three entrance gates and close four others to provide upgraded anti-terrorism and force protection (ATFP) measures. A number of associated roadway improvements within WPAFB will also be completed. As a result of these changes, State Route 444 will be closed between Gate 1A (formerly Gate 1C) and Gate 9A and the area incorporated into WPAFB.

In a February 23, 2010, letter, I concurred with your finding that the proposed entry control reconfiguration project will not affect historic properties within the base. Because I was concerned that the closing of a section of State Route 444 would result in the re-routing of traffic that may have reasonably foreseeable effects on historic properties outside of the base, I requested that "WPAFB keep OHPO informed of subsequent developments that may affect historic properties resulting from implementation of this project."

Subsequent correspondence from WPAFB acknowledges the Air Force's responsibility to consider the effects of the project on properties outside of the base. Your June 15, 2011, submission conveyed a copy of a report titled *Phase I History/Architecture Survey and Archaeological Disturbance Study for the Environmental Impact Statement for Entry Control Reconfiguration and Base Perimeter Fence Relocation, Area A, Wright-Patterson Air Force Base, Ohio* prepared by Hardlines Design Company (HDC). The report evaluates the historic significance of properties within an Area of Potential Effects (APE) outside of the base that includes properties immediately adjacent to the right-of-way of roads that traffic studies performed by the Air Force indicated comprise a likely route for vehicles navigating around the closed section of State Route 444. These roads include:

- West Dayton Drive from its intersection with South Broad Street (existing State Route 444) to its intersection with South Central Avenue
- South Central Avenue from its intersection with West Dayton Drive to its intersection with Kauffman Avenue
- Kauffman Avenue from its intersection with South Central Avenue to its intersection with West Dayton-Yellow Springs Road
- West Dayton-Yellow Springs Road from its intersection with Kauffman Avenue to its intersection with existing State Route 444

During a phone conversation on September 30, 2011, I requested additional information regarding how the APE for outside of the base was delineated because the HDC report does not contain any discussion of likely effects – such as noise, vibration or the need to widen roads – that will result from increased traffic on arterial streets in Fairborn. In response you provided a copy of a September 9, 2009, email message from Jay Hamilton of ODOT District 8 that confirms that road widening will not be required on West Dayton Street and South Central Avenue for these roads to meet the accepted standards "in low speed urban design...for arterials and collectors." Your October 20, 2011, correspondence states that effects considered in the delineation of the APE include air quality, noise, vibration and "corrective roadwork", but does not provide supporting quantitative data. It is my understanding that such data is included in individual reports contained in the Draft Environmental Impact Statement that were not submitted to OHPO. I request that copies of reports evaluating likely increases in volume of traffic on local streets and corresponding noise and vibration be submitted to OHPO to complete our files.

Based on my review of the HDC report, it is my opinion that implementation of the proposed project will not affect historic properties outside of WPAFB. My opinion regarding the effects of the project on historic properties within the base remains unchanged from what was stated in my February 23, 2010, letter. In summary, I concur with your finding that the proposed entry control reconfiguration will not affect historic properties.

OHPO looks forward to Section 106 consultation regarding the re-routing of State Route 444 in response to the proposed entry control reconfiguration and understands that the Ohio Department of Transportation will lead compliance efforts for that undertaking.

If you have any questions, please contact me by phone at (614) 298-2000 or by email at jcook@ohiohistory.org. Thank you for your cooperation.

Sincerely,

Justin M. Cook

Justin M. Cook, History Reviews Manager
Resource Protection and Review

Copy: Nancy Campbell, OHPO

Native American Tribe Consultation Letters:

1. **WPAFB Request – 21Jul11**

2. **Responses:**

Keweenaw Bay Indian Community – 01Aug11

United Keetoowah Band of Cherokee Indians in OK – 18Aug11

Sac and Fox of the Mississippi in Iowa – 07Sep11

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

21 July 2011

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

Mr. William Johnson
The Saginaw Chippewa Indian Tribe
6650 East Broadway
Mt. Pleasant, MI 48858

Dear Mr. Johnson:

Several laws have been passed for the protection of the Nation's cultural resources which specifically address Native American concerns. These include the American Indian Religious Freedom Act (AIRFA), the Native American Graves Protection and Repatriation Act (NAGPRA), the National Historic Preservation Act (NHPA), and the National Environmental Policy Act (NEPA). The Air Force (AF) recognizes not only its legal obligations, but also its ethical responsibilities when considering the effect of its actions on all properties that reflect either a common heritage or unique to a specific group. Native Americans, the first inhabitants of North America and the population with the longest tenure here, are likely to have closer associations with particular areas than most recent arrivals. Therefore, the AF is especially sensitive to their needs. Also recognized is that Native Americans have religious ties to certain areas and need access to sacred sites and objects on AF land.

Wright-Patterson Air Force Base (WPAFB) is preparing an Environmental Impact Statement (EIS) to evaluate the environmental impacts of the proposed reconfiguration and relocation of entry control gates in Area A at WPAFB. There are nine existing entry control facilities (ECFs) / gates located in Area A at WPAFB that are proposed to be reconfigured and relocated, resulting in three strategically-placed gates (Gate 1A, Gate 15A, Gate 26A). In the current configuration, the ECFs do not meet the security requirements of the Air Force's Anti-Terrorism / Force Protection (ATFP) standards. In addition, the Kittyhawk Center at WPAFB remains a separate entity from Area A, being bisected by State Route (SR) 444, which does not meet the ATFP standards for required building standoff distances in this area.

By reconfiguring and relocating the ECFs and closing a section of SR 444, which would effectively enclose the Kittyhawk Center within Area A, the ECFs and closure of a portion of SR 444 would meet the ATFP security requirements. WPAFB has initiated an EIS for this project in accordance with NEPA requirements. The purpose of this letter is to notify you of this proposal.

Construction activities under the Proposed Action would include construction of a new perimeter fence along SR 444 at the Kittyhawk Center, demolition of several existing ECFs, and construction of three strategically-placed ECFs. The following table further describes the disposition of the nine existing gates in Area A at WPAFB:

Printed On Recycled Paper

Gate No.	Current Purpose / Location	Proposed Action	Result of Proposed Action
1A	Secondary ECF / SR 444 and Wright Avenue	Relocate / Reconfigure Gate 1A to approximate vicinity of SR 444 and Redwood Street intersection	Close. Demolish gate and approach pavement. Access to public cemetery will remain.
8A	Limited Use / SR 844 and Schuster Avenue	None	Reopen and unmanned. No access to secured base.
9A	Secondary ECF / SR 444 and Estabrook Road	None	Remain open and unmanned. No access to secured base.
12A	Primary ECF (Visitor Center) / SR 444 and Chidlaw Road	None	Close. Ceremonial openings only. Access to Hope Hotel and Lot 1A will remain.
15A	Secondary ECF / SR 844	Reconfigure Gate 15A as a 24-hour Gate to be located in its current vicinity. Roadway to be extended past Communications Boulevard.	Construction of a new reconfigured gate.
16A	Commercial Vehicle Inspection / SR 444 and Communications Boulevard	None – The commercial vehicle inspection area would be relocated to the new configured Gate 26A to just north of SR 235 and Circle Drive.	Remain open and unmanned. No access to secured base.
26A	Secondary ECF / SR 235 at 445th AW Area	Reconfigure and Relocate from its existing location north of SR 235 / Loop Road to just north of the SR 235 and Circle Drive intersection.	Close. Demolish gate and approach movement.
38A	Kittyhawk Center ECF / SR 444 and Oak Street	None	Remain open and unmanned.
39A	Limited Use / SR 444 south of Redwood Street	None. New Gate 1A relocated to just north of existing Gate 39A at Redwood Street.	Demolish gate and approach pavement.

Under the No Action Alternative, the existing nine ECFs would remain in place and no reconfiguration or improvements would be made to gates in Area A. Gates 1A, 15A, and 26A would remain as is and would not be upgraded or reconfigured, nor would they meet DoD security requirements under the ATFP standards. SR 444 would remain open as a public roadway between Area A and the Kittyhawk Center and the Kittyhawk Center would remain bisected from Area A.

The geographic location of the proposed project area is Greene County, in Sections 1, 11, 12, and 26 (**Figure 1**). The area of the proposed reconfiguration and relocation of ECFs and SR 444 is located in the south portion of Area A.

The following is a summary of each proposed action:

- ***Gate 1A*** – Relocate along SR 444 at the Redwood Street intersection (**Figure 2**). Public traffic traversing south along SR 444 would be prohibited to continue through the Kittyhawk Center and would be diverted to Wright Avenue at this gate.

- ***Gate 15A*** – Relocate west of its existing location to a location just west of Communications Boulevard / Kuglics Boulevard and Skeel Avenue (**Figure 3**). The approaching roadway to the relocated gate would be realigned.

- ***Gate 26A*** – Relocate south of its existing location to a location just north of the intersection of SR 235 and Circle Drive (**Figure 4**).

- ***Base Perimeter Fence Relocation*** – Relocate to extend across SR 444 north along the east side of SR 444 to tie into the existing perimeter fence just north of existing Gate 9A. Perimeter fence would be constructed across SR 444 at Redwood Street at the proposed Gate 1A location and tie into existing fence on west side of SR 444 (**Figure 5**).

WPAFB recognizes that tribes may have an interest in actions which could affect resources which are considered significant. This interest may be of a religious nature, may involve burials, or may derive from the presence of sites or objects of cultural patrimony. We are aware that many sites and sacred places are sensitive and the information should not be shared with outside groups.

If you have any concerns in the areas described, please contact WPAFB by mail. Should you have any questions please call (937) 257-1374 or email me at paul.woodruff@wpafb.af.mil.

Sincerely,

Paul Woodruff
Cultural Resources Manager
Environmental Quality Section
Environmental Branch

Attachments:
USGS Quadrangle Map Figure 1
GIS Figures 2 through 5

cc:
Karen Beason (88 ABW/CEAOR, WPAFB)
William Scoville (Shaw Environmental & Infrastructure. Inc.)

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

21 July 2011

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

Mr. Johnathan L. Buffalo
Historical Preservation Director/NAGPRA Rep
Sac and Fox of the Mississippi in Iowa
349 Meskwaki Road
Tama, IA 52339-9634

Dear Mr. Buffalo:

Several laws have been passed for the protection of the Nation's cultural resources which specifically address Native American concerns. These include the American Indian Religious Freedom Act (AIRFA), the Native American Graves Protection and Repatriation Act (NAGPRA), the National Historic Preservation Act (NHPA), and the National Environmental Policy Act (NEPA). The Air Force (AF) recognizes not only its legal obligations, but also its ethical responsibilities when considering the effect of its actions on all properties that reflect either a common heritage or unique to a specific group. Native Americans, the first inhabitants of North America and the population with the longest tenure here, are likely to have closer associations with particular areas than most recent arrivals. Therefore, the AF is especially sensitive to their needs. Also recognized is that Native Americans have religious ties to certain areas and need access to sacred sites and objects on AF land.

Wright-Patterson Air Force Base (WPAFB) is preparing an Environmental Impact Statement (EIS) to evaluate the environmental impacts of the proposed reconfiguration and relocation of entry control gates in Area A at WPAFB. There are nine existing entry control facilities (ECFs) / gates located in Area A at WPAFB that are proposed to be reconfigured and relocated, resulting in three strategically-placed gates (Gate 1A, Gate 15A, Gate 26A). In the current configuration, the ECFs do not meet the security requirements of the Air Force's Anti-Terrorism / Force Protection (ATFP) standards. In addition, the Kittyhawk Center at WPAFB remains a separate entity from Area A, being bisected by State Route (SR) 444, which does not meet the ATFP standards for required building standoff distances in this area.

By reconfiguring and relocating the ECFs and closing a section of SR 444, which would effectively enclose the Kittyhawk Center within Area A, the ECFs and closure of a portion of SR 444 would meet the ATFP security requirements. WPAFB has initiated an EIS for this project in accordance with NEPA requirements. The purpose of this letter is to notify you of this proposal.

Construction activities under the Proposed Action would include construction of a new perimeter fence along SR 444 at the Kittyhawk Center, demolition of several existing ECFs, and construction of three strategically-placed ECFs. The following table further describes the disposition of the nine existing gates in Area A at WPAFB:

Printed On Recycled Paper

Gate No.	Current Purpose / Location	Proposed Action	Result of Proposed Action
1A	Secondary ECF / SR 444 and Wright Avenue	Relocate / Reconfigure Gate 1A to approximate vicinity of SR 444 and Redwood Street intersection	Close. Demolish gate and approach pavement. Access to public cemetery will remain.
8A	Limited Use / SR 844 and Schuster Avenue	None	Reopen and unmanned. No access to secured base.
9A	Secondary ECF / SR 444 and Estabrook Road	None	Remain open and unmanned. No access to secured base.
12A	Primary ECF (Visitor Center) / SR 444 and Chidlaw Road	None	Close. Ceremonial openings only. Access to Hope Hotel and Lot 1A will remain.
15A	Secondary ECF / SR 844	Reconfigure Gate 15A as a 24-hour Gate to be located in its current vicinity. Roadway to be extended past Communications Boulevard.	Construction of a new reconfigured gate.
16A	Commercial Vehicle Inspection / SR 444 and Communications Boulevard	None – The commercial vehicle inspection area would be relocated to the new configured Gate 26A to just north of SR 235 and Circle Drive.	Remain open and unmanned. No access to secured base.
26A	Secondary ECF / SR 235 at 445th AW Area	Reconfigure and Relocate from its existing location north of SR 235 / Loop Road to just north of the SR 235 and Circle Drive intersection.	Close. Demolish gate and approach movement.
38A	Kittyhawk Center ECF / SR 444 and Oak Street	None	Remain open and unmanned.
39A	Limited Use / SR 444 south of Redwood Street	None. New Gate 1A relocated to just north of existing Gate 39A at Redwood Street.	Demolish gate and approach pavement.

Under the No Action Alternative, the existing nine ECFs would remain in place and no reconfiguration or improvements would be made to gates in Area A. Gates 1A, 15A, and 26A would remain as is and would not be upgraded or reconfigured, nor would they meet DoD security requirements under the ATFP standards. SR 444 would remain open as a public roadway between Area A and the Kittyhawk Center and the Kittyhawk Center would remain bisected from Area A.

The geographic location of the proposed project area is Greene County, in Sections 1, 11, 12, and 26 (**Figure 1**). The area of the proposed reconfiguration and relocation of ECFs and SR 444 is located in the south portion of Area A.

The following is a summary of each proposed action:

- ***Gate 1A*** – Relocate along SR 444 at the Redwood Street intersection (**Figure 2**). Public traffic traversing south along SR 444 would be prohibited to continue through the Kittyhawk Center and would be diverted to Wright Avenue at this gate.

- ***Gate 15A*** – Relocate west of its existing location to a location just west of Communications Boulevard / Kuglics Boulevard and Skeel Avenue (**Figure 3**). The approaching roadway to the relocated gate would be realigned.

- ***Gate 26A*** – Relocate south of its existing location to a location just north of the intersection of SR 235 and Circle Drive (**Figure 4**).

- ***Base Perimeter Fence Relocation*** – Relocate to extend across SR 444 north along the east side of SR 444 to tie into the existing perimeter fence just north of existing Gate 9A. Perimeter fence would be constructed across SR 444 at Redwood Street at the proposed Gate 1A location and tie into existing fence on west side of SR 444 (**Figure 5**).

WPAFB recognizes that tribes may have an interest in actions which could affect resources which are considered significant. This interest may be of a religious nature, may involve burials, or may derive from the presence of sites or objects of cultural patrimony. We are aware that many sites and sacred places are sensitive and the information should not be shared with outside groups.

If you have any concerns in the areas described, please contact WPAFB by mail. Should you have any questions please call (937) 257-1374 or email me at paul.woodruff@wpafb.af.mil.

Sincerely,

Paul Woodruff
Cultural Resources Manager
Environmental Quality Section
Environmental Branch

Attachments:
USGS Quadrangle Map Figure 1
GIS Figures 2 through 5

cc:
Karen Beason (88 ABW/CEAOR, WPAFB)
William Scoville (Shaw Environmental & Infrastructure. Inc.)

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

21 July 2011

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

Ms. Summer Sky Cohen, Officer
Tribal Historic Preservation Office
Keweenaw Bay Indian Community
16429 Beartown Road
Baraga, MI 49908

Dear Ms. Cohen:

Several laws have been passed for the protection of the Nation's cultural resources which specifically address Native American concerns. These include the American Indian Religious Freedom Act (AIRFA), the Native American Graves Protection and Repatriation Act (NAGPRA), the National Historic Preservation Act (NHPA), and the National Environmental Policy Act (NEPA). The Air Force (AF) recognizes not only its legal obligations, but also its ethical responsibilities when considering the effect of its actions on all properties that reflect either a common heritage or unique to a specific group. Native Americans, the first inhabitants of North America and the population with the longest tenure here, are likely to have closer associations with particular areas than most recent arrivals. Therefore, the AF is especially sensitive to their needs. Also recognized is that Native Americans have religious ties to certain areas and need access to sacred sites and objects on AF land.

Wright-Patterson Air Force Base (WPAFB) is preparing an Environmental Impact Statement (EIS) to evaluate the environmental impacts of the proposed reconfiguration and relocation of entry control gates in Area A at WPAFB. There are nine existing entry control facilities (ECFs) / gates located in Area A at WPAFB that are proposed to be reconfigured and relocated, resulting in three strategically-placed gates (Gate 1A, Gate 15A, Gate 26A). In the current configuration, the ECFs do not meet the security requirements of the Air Force's Anti-Terrorism / Force Protection (ATFP) standards. In addition, the Kittyhawk Center at WPAFB remains a separate entity from Area A, being bisected by State Route (SR) 444, which does not meet the ATFP standards for required building standoff distances in this area.

By reconfiguring and relocating the ECFs and closing a section of SR 444, which would effectively enclose the Kittyhawk Center within Area A, the ECFs and closure of a portion of SR 444 would meet the ATFP security requirements. WPAFB has initiated an EIS for this project in accordance with NEPA requirements. The purpose of this letter is to notify you of this proposal.

Construction activities under the Proposed Action would include construction of a new perimeter fence along SR 444 at the Kittyhawk Center, demolition of several existing ECFs, and construction of three strategically-placed ECFs. The following table further describes the disposition of the nine existing gates in Area A at WPAFB:

Printed On Recycled Paper

Gate No.	Current Purpose / Location	Proposed Action	Result of Proposed Action
1A	Secondary ECF / SR 444 and Wright Avenue	Relocate / Reconfigure Gate 1A to approximate vicinity of SR 444 and Redwood Street intersection	Close. Demolish gate and approach pavement. Access to public cemetery will remain.
8A	Limited Use / SR 844 and Schuster Avenue	None	Reopen and unmanned. No access to secured base.
9A	Secondary ECF / SR 444 and Estabrook Road	None	Remain open and unmanned. No access to secured base.
12A	Primary ECF (Visitor Center) / SR 444 and Chidlaw Road	None	Close. Ceremonial openings only. Access to Hope Hotel and Lot 1A will remain.
15A	Secondary ECF / SR 844	Reconfigure Gate 15A as a 24-hour Gate to be located in its current vicinity. Roadway to be extended past Communications Boulevard.	Construction of a new reconfigured gate.
16A	Commercial Vehicle Inspection / SR 444 and Communications Boulevard	None – The commercial vehicle inspection area would be relocated to the new configured Gate 26A to just north of SR 235 and Circle Drive.	Remain open and unmanned. No access to secured base.
26A	Secondary ECF / SR 235 at 445th AW Area	Reconfigure and Relocate from its existing location north of SR 235 / Loop Road to just north of the SR 235 and Circle Drive intersection.	Close. Demolish gate and approach movement.
38A	Kittyhawk Center ECF / SR 444 and Oak Street	None	Remain open and unmanned.
39A	Limited Use / SR 444 south of Redwood Street	None. New Gate 1A relocated to just north of existing Gate 39A at Redwood Street.	Demolish gate and approach pavement.

Under the No Action Alternative, the existing nine ECFs would remain in place and no reconfiguration or improvements would be made to gates in Area A. Gates 1A, 15A, and 26A would remain as is and would not be upgraded or reconfigured, nor would they meet DoD security requirements under the ATFP standards. SR 444 would remain open as a public roadway between Area A and the Kittyhawk Center and the Kittyhawk Center would remain bisected from Area A.

The geographic location of the proposed project area is Greene County, in Sections 1, 11, 12, and 26 (**Figure 1**). The area of the proposed reconfiguration and relocation of ECFs and SR 444 is located in the south portion of Area A.

The following is a summary of each proposed action:

- ***Gate 1A*** – Relocate along SR 444 at the Redwood Street intersection (**Figure 2**). Public traffic traversing south along SR 444 would be prohibited to continue through the Kittyhawk Center and would be diverted to Wright Avenue at this gate.

- ***Gate 15A*** – Relocate west of its existing location to a location just west of Communications Boulevard / Kuglics Boulevard and Skeel Avenue (**Figure 3**). The approaching roadway to the relocated gate would be realigned.

- ***Gate 26A*** – Relocate south of its existing location to a location just north of the intersection of SR 235 and Circle Drive (**Figure 4**).

- ***Base Perimeter Fence Relocation*** – Relocate to extend across SR 444 north along the east side of SR 444 to tie into the existing perimeter fence just north of existing Gate 9A. Perimeter fence would be constructed across SR 444 at Redwood Street at the proposed Gate 1A location and tie into existing fence on west side of SR 444 (**Figure 5**).

WPAFB recognizes that tribes may have an interest in actions which could affect resources which are considered significant. This interest may be of a religious nature, may involve burials, or may derive from the presence of sites or objects of cultural patrimony. We are aware that many sites and sacred places are sensitive and the information should not be shared with outside groups.

If you have any concerns in the areas described, please contact WPAFB by mail. Should you have any questions please call (937) 257-1374 or email me at paul.woodruff@wpafb.af.mil.

Sincerely,

Paul Woodruff
Cultural Resources Manager
Environmental Quality Section
Environmental Branch

Attachments:
USGS Quadrangle Map Figure 1
GIS Figures 2 through 5

cc:
Karen Beason (88 ABW/CEAOR, WPAFB)
William Scoville (Shaw Environmental & Infrastructure. Inc.)

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

21 July 2011

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

Ms. Lisa Stopp
United Keetoowah Band of Cherokee Indians in Oklahoma
PO Box 746
Tahlequah, OK 74465

Dear Ms. Stopp:

Several laws have been passed for the protection of the Nation's cultural resources which specifically address Native American concerns. These include the American Indian Religious Freedom Act (AIRFA), the Native American Graves Protection and Repatriation Act (NAGPRA), the National Historic Preservation Act (NHPA), and the National Environmental Policy Act (NEPA). The Air Force (AF) recognizes not only its legal obligations, but also its ethical responsibilities when considering the effect of its actions on all properties that reflect either a common heritage or unique to a specific group. Native Americans, the first inhabitants of North America and the population with the longest tenure here, are likely to have closer associations with particular areas than most recent arrivals. Therefore, the AF is especially sensitive to their needs. Also recognized is that Native Americans have religious ties to certain areas and need access to sacred sites and objects on AF land.

Wright-Patterson Air Force Base (WPAFB) is preparing an Environmental Impact Statement (EIS) to evaluate the environmental impacts of the proposed reconfiguration and relocation of entry control gates in Area A at WPAFB. There are nine existing entry control facilities (ECFs) / gates located in Area A at WPAFB that are proposed to be reconfigured and relocated, resulting in three strategically-placed gates (Gate 1A, Gate 15A, Gate 26A). In the current configuration, the ECFs do not meet the security requirements of the Air Force's Anti-Terrorism / Force Protection (ATFP) standards. In addition, the Kittyhawk Center at WPAFB remains a separate entity from Area A, being bisected by State Route (SR) 444, which does not meet the ATFP standards for required building standoff distances in this area.

By reconfiguring and relocating the ECFs and closing a section of SR 444, which would effectively enclose the Kittyhawk Center within Area A, the ECFs and closure of a portion of SR 444 would meet the ATFP security requirements. WPAFB has initiated an EIS for this project in accordance with NEPA requirements. The purpose of this letter is to notify you of this proposal.

Construction activities under the Proposed Action would include construction of a new perimeter fence along SR 444 at the Kittyhawk Center, demolition of several existing ECFs, and construction of three strategically-placed ECFs. The following table further describes the disposition of the nine existing gates in Area A at WPAFB:

Printed On Recycled Paper

Gate No.	Current Purpose / Location	Proposed Action	Result of Proposed Action
1A	Secondary ECF / SR 444 and Wright Avenue	Relocate / Reconfigure Gate 1A to approximate vicinity of SR 444 and Redwood Street intersection	Close. Demolish gate and approach pavement. Access to public cemetery will remain.
8A	Limited Use / SR 844 and Schuster Avenue	None	Reopen and unmanned. No access to secured base.
9A	Secondary ECF / SR 444 and Estabrook Road	None	Remain open and unmanned. No access to secured base.
12A	Primary ECF (Visitor Center) / SR 444 and Chidlaw Road	None	Close. Ceremonial openings only. Access to Hope Hotel and Lot 1A will remain.
15A	Secondary ECF / SR 844	Reconfigure Gate 15A as a 24-hour Gate to be located in its current vicinity. Roadway to be extended past Communications Boulevard.	Construction of a new reconfigured gate.
16A	Commercial Vehicle Inspection / SR 444 and Communications Boulevard	None – The commercial vehicle inspection area would be relocated to the new configured Gate 26A to just north of SR 235 and Circle Drive.	Remain open and unmanned. No access to secured base.
26A	Secondary ECF / SR 235 at 445th AW Area	Reconfigure and Relocate from its existing location north of SR 235 / Loop Road to just north of the SR 235 and Circle Drive intersection.	Close. Demolish gate and approach movement.
38A	Kittyhawk Center ECF / SR 444 and Oak Street	None	Remain open and unmanned.
39A	Limited Use / SR 444 south of Redwood Street	None. New Gate 1A relocated to just north of existing Gate 39A at Redwood Street.	Demolish gate and approach pavement.

Under the No Action Alternative, the existing nine ECFs would remain in place and no reconfiguration or improvements would be made to gates in Area A. Gates 1A, 15A, and 26A would remain as is and would not be upgraded or reconfigured, nor would they meet DoD security requirements under the ATFP standards. SR 444 would remain open as a public roadway between Area A and the Kittyhawk Center and the Kittyhawk Center would remain bisected from Area A.

The geographic location of the proposed project area is Greene County, in Sections 1, 11, 12, and 26 (**Figure 1**). The area of the proposed reconfiguration and relocation of ECFs and SR 444 is located in the south portion of Area A.

The following is a summary of each proposed action:

- ***Gate 1A*** – Relocate along SR 444 at the Redwood Street intersection (**Figure 2**). Public traffic traversing south along SR 444 would be prohibited to continue through the Kittyhawk Center and would be diverted to Wright Avenue at this gate.

- ***Gate 15A*** – Relocate west of its existing location to a location just west of Communications Boulevard / Kuglics Boulevard and Skeel Avenue (**Figure 3**). The approaching roadway to the relocated gate would be realigned.

- ***Gate 26A*** – Relocate south of its existing location to a location just north of the intersection of SR 235 and Circle Drive (**Figure 4**).

- ***Base Perimeter Fence Relocation*** – Relocate to extend across SR 444 north along the east side of SR 444 to tie into the existing perimeter fence just north of existing Gate 9A. Perimeter fence would be constructed across SR 444 at Redwood Street at the proposed Gate 1A location and tie into existing fence on west side of SR 444 (**Figure 5**).

WPAFB recognizes that tribes may have an interest in actions which could affect resources which are considered significant. This interest may be of a religious nature, may involve burials, or may derive from the presence of sites or objects of cultural patrimony. We are aware that many sites and sacred places are sensitive and the information should not be shared with outside groups.

If you have any concerns in the areas described, please contact WPAFB by mail. Should you have any questions please call (937) 257-1374 or email me at paul.woodruff@wpafb.af.mil.

Sincerely,

Paul Woodruff
Cultural Resources Manager
Environmental Quality Section
Environmental Branch

Attachments:
USGS Quadrangle Map Figure 1
GIS Figures 2 through 5

cc:
Karen Beason (88 ABW/CEAOR, WPAFB)
William Scoville (Shaw Environmental & Infrastructure. Inc.)

From: Chris Chosa
To: Woodruff, Paul F Civ USAF AFMC 88 ABW/CEANQ
Subject: Re: Reconfiguration and relocation of entry control gates in Area A at WPAFB
Date: Monday, August 01, 2011 2:29:07 PM

Dear Mr. Woodruff,

In response to your requests for comments and other interests concerning Section 106 of the National Historic Preservation Act, to the effect on historic and cultural sites within your proposed project area. The KBIC Tribal Historic Preservation Office has identified no properties of interest regarding religious or cultural sites documented at this time in you proposed location. If the scope of the work changes in any way, or if artifacts or human remains are discovered, please notify the KBIC THPO immediately so we can assist in making an appropriate determination.

Please forward any future consultation requests for review of project proposals pursuant to Section 106 of the National Historic Preservation Act to KBIC THPO, Keweenaw Bay Indian Community Tribal Historic Preservation Office or through email at cchosa@kbic-nsn.gov or jloonsfoot@kbic-nsn.gov and keep us informed of future projects as we continue our efforts to identify and document historic, archaeological, and traditional cultural sites in the area.

The KBIC THPO charges a fee of $50.00 for review of project proposals, which covers a preliminary in-house review of records for the presence of cultural sites in the proposed project area. Please submit a check for $50.00 to the KBIC THPO, 16429 Beartown Road, Baraga, Michigan 49908, if you have already done so, thank you, we appreciate your support. Fees help us cover costs of research and other consultation activities.

Thank you,

Chris Chosa
Interim THPO
Keweenaw Bay Indian Community
16429 Beartown Rd
Baraga, MI 49908
(906) 353-6623 ex. 4272

From:	Lisa Larue
To:	Woodruff, Paul F Civ USAF AFMC 88 ABW/CEANQ
Subject:	Entry Gates Area A at WPAFB
Date:	Thursday, August 18, 2011 6:22:20 PM

The United Keetoowah Band of Cherokee Indians in Oklahoma has no objection to this project. However, as always, if any human remains are inadvertently discovered, please cease work and notify us immediately.

Lisa LaRue

Acting Tribal Historic Preservation Officer

United Keetoowah Band of Cherokee Indians in Oklahoma

918-822-1952

From:	Scoville, William
To:	Burns, Stephanie A
Subject:	Native American response to Gate Realignment 444 EA
Date:	Thursday, September 08, 2011 8:37:51 AM

From: Woodruff, Paul F Civ USAF AFMC 88 ABW/CEANQ [mailto:Paul.Woodruff@wpafb.af.mil]
Sent: Wednesday, September 07, 2011 3:52 PM
To: Beason, Karen N Civ USAF AFMC 88 ABW/CEAOR
Cc: Scoville, William
Subject: Native American response to Gate Realignment 444 EA

Karen,

I talked with the Sac & Fox Tribe of the Mississippi in Iowa about this project and Mr. Buffalo stated that they had no comments on the project. I have a call into the last tribe, the Saginaw & Chippewa Indian Tribe of Michigan.

v/r,
Paul F. Woodruff, Architect
Cultural Resources Manager
Environmental Quality Section
88 Civil Engineer Directorate
Wright-Patterson AFB OH

(937) 257-1374

Appendix B

Clean Air Act – General Conformity Analysis

EXECUTIVE SUMMARY

Agencies: U.S. Air Force (USAF), Wright-Patterson Air Force Base (WPAFB), Ohio

Designation: Clean Air Act General Conformity Analysis

Affected Location: WPAFB, Ohio

Proposed Action: Area A Entry Control Reconfiguration and Base Perimeter Fence Relocation

Abstract: WPAFB is proposing to implement solutions to improve security, safety, and traffic flow into and on the Base by reducing and consolidating the number of Entry Control Facilities (ECFs) and securing the State Route (SR) 444 corridor that currently bisects Area A from the Kittyhawk Center. WPAFB proposes to reconfigure the existing nine ECFs in Area A and relocate the base perimeter fence across SR 444 making Area A contiguous with the Kittyhawk Center. Gates and fence section affected by the reconfiguration and relocation would include: Gates 1A, 8A, 9A, 12A, 15A, 16A, 26A, 38A, 39A, and the perimeter fence north of Dayton-Yellow Springs Road and along the east border of SR 444 adjacent to the Kittyhawk Center. The Proposed Action would provide the necessary base infrastructure modifications to enable the security environment at WPAFB to comply with the revised USAF anti-terrorism standards as defined by the Military Surface Deployment and Distribution Command Transportation Engineering Agency (SDDCTEA) Pamphlet 55-15, dated 2006 and the United Facilities Criteria (UFC 4-010-01) Department of Defense (DoD) Minimum Anti-terrorism Standards for Buildings.

The Proposed Action at WPAFB would be located in the Dayton-Springfield Metropolitan Area, which is currently designated as a "maintenance" area for attainment with the National Ambient Air Quality Standard (NAAQS) for ozone (O_3; both 1-hour and 8-hour standards) (OEPA 2010a-c). In addition, the area is classified for very fine particulate matter ($PM_{2.5}$) as attainment with the 24-hour standard and nonattainment for the annual standard (OEPA 2010a-c).

The USEPA recently proposed new NAAQS for several criteria pollutants including O_3 (March 2008), lead (Pb; November 2008), nitrogen dioxide (NO_2; February 2010), and sulfur dioxide (SO_2; June 2010) (USEPA 2008a, b);(USEPA 2010a, c). The USEPA and Ohio EPA have not yet completed effective designations for these pollutants as of the date of this conformity applicability analysis (OEPA 2010a-c). Redesignation of the Dayton-Springfield Metropolitan Area as nonattainment for any of these standards during the execution of the Proposed Actions has no statutory impact on this Conformity Analysis because Section 6 of 176.c of the CAAA states that Conformity does not take effect until one year after the effective date of a nonattainment designation (40 CFR 93.153(k)).

Based upon the conformity applicability criteria requirements, and the current attainment status of the areas affected by WPAFB operations, this conformity analysis focuses upon potential air emissions of O_3 precursors, [i.e., volatile organic compounds (VOCs) and nitrogen oxides (NO_x)], $PM_{2.5}$ direct emissions, and $PM_{2.5}$ precursors (i.e. SO_2 and NO_x). This analysis does not address the pollutants for which affected areas are in "attainment" – sulfur

oxides (SO_x), nitrogen dioxide (NO_2), carbon monoxide (CO), fine particulate matter (PM_{10}), and lead (Pb).

Emissions of VOC, NO_x, $PM_{2.5}$, and SO_2 in the vicinity of WPAFB (Metropolitan Dayton Intrastate Air Quality Control Region [AQCR]) are all not expected to interfere with the Ohio SIP maintenance plans as a result of the Proposed Action.

The conformity analysis completed for this project concluded that the Proposed Action at WPAFB will not be required to conduct a conformity determination under the requirements of the Federal Conformity Rule. Emissions estimates attached to this analysis predict that emission levels for all criteria pollutants for any calendar year of the proposed project would fall below the 100 tons per year *de minimis* thresholds of VOC, NO_x, $PM_{2.5}$, and SO_2 for triggering a formal Conformity determination, as defined in 40 CFR 93.153(b). The General Conformity Regional Significance threshold no longer applies because it was deleted in the new Federal General Conformity rules promulgated on April 4, 2010 (USEPA 2010b).

Conformity Analysis:

After careful and thorough consideration of the facts contained herein, and following consideration of the views of those agencies having jurisdiction by law or special expertise with respect to air quality impacts and the SIP, the project proponent finds that the proposed Federal actions are consistent with the objectives as set forth in Section 176(c) of the Clean Air Act (CAA), as amended, and its implementing regulation, 40 CFR Part 93, Subpart B, Determining Conformity of General Federal Actions to State and Local Implementation Plans, and said actions conform to the applicable SIP in accordance with the law.

The conformity analysis is based upon the total direct and indirect emissions associated with the proposed entry control reconfiguration and base perimeter fence relocation in Area A at WPAFB. Future transportation activity levels and commuter traffic associated with WPAFB addressed by this action may differ from those analyzed in this conformity analysis. If the Proposed Action is changed so that there would be a change in the total direct and indirect emissions reported in this analysis, a new conformity analysis would be performed.

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B.1 Introduction

The Clean Air Act Amendments (CAAA) of 1990 require Federal agencies to ensure that their actions conform to the applicable State Implementation Plan (SIP). The SIP is a U.S. Environmental Protection Agency (USEPA)-approved plan developed by state or local agencies. It provides for implementation, maintenance, and enforcement of the National Ambient Air Quality Standards (NAAQS). The SIP includes emission limitations, rules, schedules, and specific control measures to attain and maintain the NAAQS. Conformity to a SIP, as defined in the Clean Air Act (CAA), means conforming to the SIP's purpose of reducing the severity and number of violations of the NAAQS to achieve attainment of such standards.

As a Federal agency and proponent of a "Federal Action," the U.S. Air Force (USAF) must complete a conformity analysis to determine whether the entry control reconfiguration and base perimeter fence relocation in Area A and associated regulated pollutant emissions at WPAFB would conform to the Ohio SIP. This project includes reconfiguring the existing nine Entry Control Facilities (ECFs) in Area A and relocating the base perimeter fence across SR 444 making Area A contiguous with the Kittyhawk Center. Gates and fence section affected by the reconfiguration and relocation would include: Gates 1A, 8A, 9A, 12A, 15A, 16A, 26A, 38A, 39A, and the perimeter fence north of Dayton-Yellow Springs Road and along the east border of SR 444 adjacent to the Kittyhawk Center. Gates 1A, 15A, and 26A would be reconfigured and/or relocated to provide primary access to the secured Base. Gates 8A, 9A, 16A, and 38A would continue to operate as unmanned gates with no access to the secured Base. Gate 12A would be closed except for ceremonial openings only and Gate 39A will be demolished and permanently closed. All elements of the Proposed Action could affect areas covered by the SIP, so a conformity analysis is required.

B.1.1 Background

The CAA and CAAA were passed by Congress and corresponding rules were promulgated by USEPA because it has been determined that certain pollutants have the potential to cause an adverse effect on public health and the environment when certain concentrations are exceeded in ambient air. In order to control and regulate these "criteria pollutants" and better maintain healthful air, NAAQS were established for seven criteria pollutants. These pollutants include carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), respirable particulate matter [including particulate matter equal to or less than 10 microns in diameter (PM_{10}) and particulate matter equal to or less than 2.5 microns in diameter ($PM_{2.5}$)], sulfur oxides (SO_x), and lead (Pb). Ozone is not typically emitted directly from emission sources, but rather is formed in the atmosphere by photochemical reactions involving

sunlight and other emitted pollutants, or "ozone precursors." These ozone precursors consist primarily of nitrogen oxides (NO_x) and volatile organic compounds (VOCs), which are emitted directly from a wide range of stationary and mobile sources. Therefore, O_3 concentrations in the atmosphere are controlled through limiting the emissions of NO_x and VOCs. $PM_{2.5}$ can be emitted from emission sources directly as very fine dust and/or liquid mist or formed secondarily in the atmosphere as condensable particulate matter typically forming nitrate and sulfate compounds. Precursors of condensable $PM_{2.5}$ can include SO_2, NO_x, VOC, and ammonia. Secondary (indirect) emissions vary by region depending upon the predominant emission sources located there The States in developing SIP revisions must determine which precursors are considered significant for $PM_{2.5}$ formation. In the draft Ohio SIP revisions proposed on April 24, 2009, Ohio EPA included sulfur dioxide and nitrogen oxides in the definition of "$PM_{2.5}$ precursor" in Ohio Administrative Code (OAC) Rule 3745-31-01(UUUU) draft 04/24/2009.

Air quality conformity provisions first appeared in the CAA of 1977. These provisions stated that no Federal agency could engage in; support in any way; provide financial assistance for; license, permit, or approve any activity that did not conform to a SIP after approval and promulgation. Section 176(c) (42 United States Code 7506c) of the CAA, as amended in 1990, further explained conformity to an implementation plan as meaning conformity to the plan's purpose of eliminating or reducing the severity of violations of the NAAQS, and achieving timely attainment of these standards. In November 1993, USEPA promulgated regulations and requirements that clarify the applicability, procedures, and analyses necessary to ensure that Federal facilities comply with the CAA.

In establishing the Final General Conformity Rule, USEPA requires Federal agencies to evaluate a proposed Federal action and ensure that it does not:

1. Cause a new violation of a NAAQS
2. Contribute to an increase in the frequency or severity of violations of NAAQS
3. Delay the timely attainment of any NAAQS, interim progress milestones, or other milestones toward achieving compliance with the NAAQS

The General Conformity Rule requires that Federal agencies consider total direct and indirect emissions of criteria pollutants. Conformity must be shown for those pollutants (or precursors) emitted in areas designated as nonattainment for those pollutants as well as pollutants for which an area has been redesignated from nonattainment to attainment (i.e., a maintenance area).

The Conformity Rule requires that Federal agencies do a conformity applicability analysis to determine whether a formal conformity determination is required. The primary criteria used in an

applicability analysis are the *de minimis* thresholds. The total direct and indirect emissions associated with a proposed action are compared to the *de minimis* threshold levels promulgated in 40 Code of Federal Regulations (CFR), 93.153(b). **Table B-1** below presents the applicable *de minimis* thresholds under the General Conformity Rule.

Table B-1. Conformity *de minimis* Emission Thresholds

Pollutant	Status	Classification	*de minimis* Limit (tpy)
Ozone (measured as NO_x or VOCs)	Nonattainment	Extreme	10
		Severe	25
		Serious	50
		Moderate/marginal (inside ozone transport region)	50 (VOCs)/100 (NO_x)
		All others	100
	Maintenance	Inside ozone transport region	50 (VOCs)/100 (NO_x)
		Outside ozone transport region	100
Carbon Monoxide (CO)	Nonattainment/ maintenance	All	100
Particulate Matter (PM_{10})	Nonattainment/ maintenance	Serious	70
		Moderate	100
		Not applicable	100
Sulfur Dioxide (SO_2)	Nonattainment/ maintenance	Not applicable	100
Nitrogen Oxides (NO_2)	Nonattainment/ maintenance	Not applicable	100
Lead (Pb)	Nonattainment/ maintenance	All	25

Source: 40 CFR 93.153
tpy: tons per year

When applicable, another required analysis is a comparison of the Federal action's emissions to any existing SIP emission budgets that have been established specifically for the Federal facility or the affected region. If the action would cause an increase in emissions such that the established SIP emissions budgets would be exceeded, a formal conformity determination and other applicable rule requirements would apply. In the case of WPAFB, there is no facility-specific emissions budget in the Ohio SIP.

B.1.2 Purpose

The purpose of this general conformity analysis is to document the USAF's compliance with CAA requirements in accordance with 40 CFR 93 subpart B and OAC, Rule 3745-102. This conformity analysis will analyze the air quality impact of emissions of nonattainment pollutants (i.e., NO_x, VOC, $PM_{2.5}$, and SO_2) resulting from the proposed Federal action in order to determine whether the Proposed Action and Alternative will be subject to these Federal and state conformity rules.

B.1.3 Document Organization

The subsections of Section B.1 appearing above present the purpose and background for the document and describe the proposed project at WPAFB. The remainder of Section B.1 summarizes the existing air quality conditions in the region. Section B.2 of this analysis outlines the regulatory requirements of the General Conformity Rule and their relationships to this Conformity Analysis. Section B.3 details the applicability of the conformity rule to the proposed WPAFB Area A Entry Control Reconfiguration and Base Perimeter Fence Relocation project. Section B.4 provides the conformity analysis results for the Proposed Action and Alternative. Finally, the emissions estimations attached to this analysis detail the calculation methodologies and results used for this conformity analysis.

B.1.4 Existing Air Quality

Air Basins/Air Quality Control Regions

WPAFB is located in Greene and Montgomery counties, Ohio, which are in the Metropolitan Dayton Intrastate Air Quality Control Region (AQCR). The Metropolitan Dayton AQCR consists of the counties of Clark, Greene, Miami, Montgomery, Darke, and Preble.

Air quality resources in the Metropolitan Dayton AQCR are managed by the Ohio Environmental Protection Agency (OEPA), Division of Air Pollution Control (DAPC). Local permitting of stationary air emissions sources is delegated to the Regional Air Pollution Control Agency (RAPCA) in Dayton, OH. Ambient air quality for the Metropolitan Dayton Intrastate AQCR was formerly classified as a maintenance area for the 1-hour O_3 and 8-hour O_3 (1997) standards and is classified as a nonattainment area for the annual $PM_{2.5}$ NAAQS (USEPA 2005); (USEPA 2007). For the annual $PM_{2.5}$ NAAQS, OEPA has proposed redesignation to "attainment" (maintenance area) (March 2011); however, that action has no impact on this conformity analysis (OEPA 2011a). Except as noted in the following paragraph, the Metropolitan Dayton Intrastate AQCR is designated as an

unclassifiable/attainment area for all other criteria pollutants, which include SO_x, PM_{10}, CO, NO_2, and Pb.

Ambient Air Quality Attainment Designations for Affected Air Quality Control Region

The USEPA recently proposed new NAAQS standards for several criteria pollutants including O_3 (March 2008), Pb (November 2008), NO_2 (February 2010), and SO_2 (June 2010) (USEPA 2008a, b); (USEPA 2010a, c). The USEPA and OEPA have not completed area designations effective for these pollutants as of the date of this conformity applicability analysis (OEPA 2010a, b); (OEPA 2010). For the new 1-hr SO_2 NAAQS, the OEPA published a draft report in April, 2011 recommending that Greene County be designated as "unclassified" (OEPA 2011b). Redesignation of the Dayton-Springfield Metropolitan Area as nonattainment for any of these standards during the execution of the Proposed Action has no statutory impact on this Conformity Analysis. Furthermore, the recently revised General Conformity Rule included new *de minimis* thresholds for $PM_{2.5}$ and did not change the other pollutant thresholds (USEPA 2010b). This is because the General Conformity *de minimis* thresholds correspond to the CAAA Title V Major Stationary Source emissions thresholds for each nonattainment classification. The new Major Stationary Source emission threshold for "basic" nonattainment with the 8-hour O_3 standard is 100 tons per year. Therefore, assuming that the General Conformity Rule follows this precedent when updated, the General Conformity *de minimis* thresholds for NO_x, VOC, $PM_{2.5}$, and SO_2 in the Dayton-Springfield Metropolitan Area would be expected to remain at 100 tpy for the next several years.

Nonattainment Pollutants

Ozone is a secondary pollutant formed in the atmosphere by photochemical reactions of previously emitted pollutants (mainly VOCs and NO_x) and sunlight. A brown odorless gas, O_3 can cause irritation of the respiratory tract in humans and animals, and can damage vegetation. The maximum effect of the precursor emissions on O_3 formation may be many miles from the source because O_3 is a by-product of a photochemical reaction.

$PM_{2.5}$ can be emitted from emission sources directly as very fine dust and/or liquid mist or formed secondarily in the atmosphere as condensable particulate matter typically forming nitrate and sulfate compounds. Precursors of condensable $PM_{2.5}$ can include SO_2, NO_x, VOC, and ammonia. Secondary (indirect) emissions vary by region depending upon the predominant emission sources located there. Health studies have shown a significant association between exposure to fine particles and premature death from heart and lung disease. Fine particles can aggravate heart and lung diseases and have been linked to effects such as: cardiovascular symptoms; cardiac arrhythmias; heart attacks;

respiratory symptoms; asthma attacks; and bronchitis. These effects can result in increased hospital admissions, emergency room visits, absences from school or work, and restricted activity days.

State Implementation Plan

In accordance with Federal and state CAA requirements, the OEPA and all agencies responsible for CAA implementation in nonattainment areas must develop and implement a plan to reduce and maintain regulated air pollution levels that are less than the NAAQS. On April 24, 2009, OEPA completed draft amendments to several rules in OAC Rule 3745-31 and OAC Rule 3745-17-08 rules related to Federal changes affecting the implementation of $PM_{2.5}$. On December 9, 2009 and again on January 3, 2011, OEPA drafted new rules and amended several rules in OAC Rule 3745-21, OAC Rule 3745-72, and OAC Rule 3745-110 intended to assist in achieving and maintaining the NAAQS for O_3 through the control of O_3 precursors. These draft rules have not become SIP approved by the USEPA as of the completion of this applicability determination. OEPA maintains a current listing of area attainment status on its website at http://www.epa.ohio.gov/dapc/general/naaqs.aspx.

B.2 General Conformity Determination Requirements

B.2.1 Regulatory Background

USEPA has promulgated rules that establish the conformity determination criteria and procedures for Federal actions, pursuant to Section 176(c) of the CAA. The General Conformity Rule (40 CFR Part 93, Subpart B) defines the "general" conformity criteria and procedures for Federal agencies that propose to implement non-transportation projects. The OAC Rule 3745-102 contains the General Conformity Rules promulgated by the state of Ohio. These Ohio rules essentially mirror the Federal requirements of the Federal General Conformity Rule; however, the most recent revisions to the Federal General Conformity Rule that became final on April 5, 2010 (75 FR 17274) have not been incorporated into the Ohio SIP as of the date of this applicability analysis.

The General Conformity Rule applies to Federal actions in areas that are failing to meet one or more of the Federal air quality standards (designated as nonattainment areas), and/or areas that are subject to attainment maintenance plans (designated as maintenance areas). As noted in Section C.1, the Proposed Action would be located in the Metropolitan Dayton AQCR in Ohio. This AQCR has been designated a maintenance area for O_3 and non-attainment for $PM_{2.5}$. The AQCR is in attainment with NAAQS for each of the other criteria pollutants. This conformity applicability analysis will evaluate the conformity of the Proposed Action plus Alternative emissions of O_3 precursors (NO_x and VOC), direct $PM_{2.5}$, and indirect $PM_{2.5}$ precursors (SO_2 and NO_x) in the affected region. The following subsections describe the General Conformity Rule procedures and criteria, and how they specifically pertain to this conformity analysis.

B.2.2 Exemptions and Applicability

Source Exemptions

The general conformity provisions identify specific Federal actions or portions of actions that are exempt from the conformity procedural requirement, because the USEPA has deemed these actions to conform. These actions include those that must undergo thorough air quality analysis to comply with other statutory requirements; actions that would result in no emission increase or an increase in emissions that is clearly *de minimis*; or actions presumed to conform by the agency through separate rule-making actions. These exemptions include the transfer of ownership of real property under 40 CFR 93.153(c)(2)(xiv and xx), as well as leasing agreements pending environmental restoration under 40 CFR 93.153(c)(2)(xix).

The only source exemption potentially applicable to the USAF's Proposed Action for the Entry Control Reconfiguration and Base Perimeter Fence Relocation in Area A at WPAFB is the exemption for major or minor new or modified *stationary* sources, which are subject to permits under OEPA's New Source Review (NSR) program or Prevention of Significant Deterioration (PSD) program (40 CFR 93.153(d)(1)). No new or modified stationary sources included in this Proposed Action are anticipated to require a permit except for the possibility of large stand alone comfort heating systems and emergency generators that may be required at reconfigured or newly constructed guard stations.

De minimis Emission Levels

In addition to the specific source exemptions identified in the conformity rule, Federal actions might be exempt from the conformity requirements if the action meets the applicability criteria for *de minimis* emission levels. The applicability determination procedures presented in the rule include the following elements:

- Define the applicable emission sources for the Federal action
- Quantify the total direct and indirect emissions of nonattainment pollutants from these sources
- Compare these emission rates against the appropriate *de minimis* emission levels

If the total direct and indirect emissions of nonattainment pollutants reach or exceed these applicability threshold values, a Conformity Determination must be prepared by the Federal agency before undertaking the action.

The conformity rule defines direct and indirect emissions based upon the timing and location of the emissions. "Direct" emissions are those that are caused or initiated by the Federal actions, and occur at the same time and place as the action and are reasonably foreseeable. "Indirect" emissions are those that originate in the same nonattainment or maintenance area, but occur at a different time or place from the Federal action. In addition, the conformity rule limits the scope of indirect emissions to those that are *reasonably foreseeable* by the agency at the time of analysis, and those emissions that the Federal agency can practicably control and maintain control of through its continuing program responsibility.

The definitions of direct and indirect emissions do not distinguish among specific source categories; point, area, and mobile sources are given equal consideration in the conformity requirements. All substantive procedural requirements of the General Conformity Rule apply to the total of the net increases and decreases in direct and indirect emissions resulting from the action.

If the total of direct and indirect emissions from the action meet or exceed the *de minimis*, the agency must perform a conformity determination to demonstrate the positive conformity of the Federal action. The *de minimis* emission levels vary by the criteria pollutant and the severity of the region's nonattainment conditions.

Section B.3 presents the specific emission thresholds and the applicability analysis results for the USAF's Proposed Action and Alternative to reconfigure gates 1A, 8A, 9A, 12A, 15A, 16A, 26A, 38A, 39A, the perimeter fence on SR 444 at the Kittyhawk Center, and various on-base street intersections at WPAFB.

B.2.3 CAA General Conformity Criteria

If the Proposed Action is not exempt from the conformity demonstration requirements, the General Conformity Rule defines conformity and provides five basic criteria to determine whether a Federal action conforms to an applicable SIP. These criteria assess conformity based upon emission analyses and/or dispersion modeling for the nonattainment pollutants. If the Federal action meets the conformity criteria and requirements, the action is demonstrated to conform to the applicable SIP. If the action cannot meet the criteria and requirements, the agency must develop an enforceable implementation plan to mitigate effectively (e.g., completely offset) the increased emissions from the Proposed Action to meet the conformity requirements. The Federal action cannot proceed unless positive conformity can be demonstrated.

The General Conformity Rule provides the option to select any one of several criteria to analyze the conformity of the Proposed Action. Presented in 40 CFR 93.158, the criteria are primarily based upon the type of pollutant and the status of the applicable SIP. If the applicability analysis concludes that further conformity analyses are required to demonstrate positive conformity (i.e., *de minimis* thresholds are exceeded) the following conformity criteria (paraphrased below) can be used to demonstrate conformity for a proposed action in a nonattainment area:

- The total direct and indirect emissions for the Proposed Action are specifically identified and accounted for in the applicable SIP's attainment or maintenance demonstration [40 CFR 93.158(a)(1)].
- The total direct and indirect emissions of O_3 precursors are fully offset within the same nonattainment or maintenance area through a revision to the applicable SIP or a similarly enforceable measure so that there is a no net increase in emissions [40 CFR 93.158(a)(2)].

- The State has made a revision to the area's attainment or maintenance demonstration after 1990 and the State either:
  - Determines and documents that the action, together with all other emissions in the nonattainment (or maintenance) area, *would not* exceed the emissions budget specified in the applicable SIP.
  - Determines that the action, together with all other emissions in the nonattainment (or maintenance) area, *would* exceed the emissions budget specified in the applicable SIP but the State's Governor or designee for SIP actions makes a written commitment to the USEPA to demonstrate CAA conformity through specific measures and scheduled actions [40 CFR 93.158(a)(5)(i)(A & B)].
- The Federal action fully offsets its entire emissions within the same nonattainment area through a revision to the SIP or a similar measure so that there is no net increase in nonattainment pollutant emissions [40 CFR 93.158(a)(5)(iii)].
- The State has not made a revision to the approved SIP since 1990, and the total emissions from the action do not increase emissions above the baseline emissions which are either:
  - Calendar Year 1990 (CY 90) emissions or another calendar year that was the basis for the nonattainment area designation) [40 CFR 93.158(a)(5)(iv)(A)].
  - Historic activity levels and emissions calculated for future years using appropriate emission factors and methods for future years.
- Dispersion modeling analysis demonstrates that direct and indirect emissions from the Federal action will not cause or contribute to violations of Federal ambient air quality standards [40 CFR 93.158(b)].

The USEPA revised the general conformity regulation on April 5, 2010 (USEPA 2010). One of the changes to the regulation relates to the determination of regional significant action. The USEA deleted the provision of the then existing regulation (40 CFR 93.153) that requires Federal agencies to conduct conformity determinations for regional significant actions where the direct and indirect emissions of any pollutant represent 10 percent or more of a nonattainment or maintenance area's emission inventory for that pollutant. It applied even though the total direct and indirect emissions from the actions are below the *de minimis* emission levels or the actions are otherwise "presumed to conform." The OEPA is revising its general conformity rule to be consistent with the revised Federal regulation (USEPA 2010c).

B.2.4 Other State Implementation Plan Consistency Requirements

The conformity analysis must also demonstrate that total direct and indirect emissions from the Proposed Action will be consistent with the applicable SIP requirements and milestones, including:

- Reasonable further progress schedules

- Assumptions specified in the attainment or maintenance demonstration
- SIP prohibitions, numerical emissions limits, and work practice requirements

B.3 APPLICABILITY ANALYSIS

This section of the conformity analysis describes the applicability analysis of the proposed Entry Control Reconfiguration and Base Perimeter Fence Relocation in Area A project at WPAFB to the General Conformity Rule requirements.

B.3.1 Sources Included in the Conformity Analysis

In accordance with the General Conformity Rule, total direct and indirect emissions resulting from proposed Federal action includes several types of stationary and mobile sources. These emissions would occur during construction and demolition activities with the Proposed Action and Alternative. As defined by the rule and applied to the Proposed Action and Alternative at WPAFB, direct emissions would result from emissions sources not subject to air permitting. Examples of direct emissions sources include construction activities and demolition activities. Indirect pollutant emissions for the proposed project include activities that the USAF can control as part of the Federal action and include government-owned vehicles (GOVs) and privately-owned vehicles (POVs), and various military support activities at the base that control security access.

B.3.2 Sources Exempted from the Conformity Analysis

In accordance with the General Conformity Rule, an exemption applies for major or minor new or modified *stationary* sources, which are subject to permits under OEPA's NSR program or PSD program (40 CFR 93.153(d)(1)). Newly constructed guardhouses may contain comfort heating equipment and/or emergency generators that are new or relocated from an original guardhouse that is demolished. WPAFB may be required to obtain proper air permits for such equipment under OAC rules 3745-31 and 3745-77 prior to installation. WPAFB may be required to obtain a permit-by-rule and modify the existing Title V operating permit to include such small sources on the insignificant activity list. Additionally, general contractors performing road and sidewalk demolition and construction might bring portable crushing equipment and/or concrete/asphalt batch plants onsite for use during certain project phases of the Proposed Action or Alternative. Such equipment remains under ownership and operational control of the general contractor and are considered separate sources from WPAFB for air permitting purposes according to USEPA policy (USEPA 1996). The general contractor is required to obtain proper air permits under OAC rule 3745-31, provide proper notification to the OEPA for relocating the portable equipment, and operate the equipment in accordance with the terms of the permit at all times while on WPAFB property. The permitted emissions from exempt sources are not included in the Air Conformity Analysis.

B.3.3 Total Direct and Indirect Emission Calculations

The detailed estimates of the changes in nonattainment pollutant emissions that would result from implementation of the Proposed Action and Alternative at WPAFB are presented in the attachment of this Appendix. These calculations are based on temporary phased construction activities required to permanently reconfigure the ECFs for current operations at WPAFB. The reconfigured ECFs will not alter the amount of traffic entering the base and will only change the routing of existing off-base traffic or traffic flow patterns, not increase or decrease the amount. The resulting analyses indicate that the potential pollutant impacts would result from construction activities of the Proposed Action and Alternative at WPAFB and a temporary increase in construction worker commuter traffic and concrete/asphalt delivery trucks. The changes in direct and indirect VOC, NO_x, $PM_{2.5}$, and SO_2 emissions from the Proposed Action are presented below.

Construction Activities

Because base security must be maintained at a high level and disruptions to the base activities must be minimized, construction at all gates in the Proposed Action cannot be completed simultaneously. The Proposed Action construction activities have been broken up into three main phases with each phase to be conducted over a separate construction year. The first construction phase is tentatively scheduled for 2014 and includes the construction and relocation of Gate 1A and associated activities. The new Gate 1A includes the reconfiguration of the gates along SR 444 and the closure of SR 444. The second construction phase is tentatively scheduled for 2016 and includes the construction and relocation of Gate 15A and associated activities. Work on Gate 15A must start after completion of the new Gate 1A because the reconfiguration could cause major disruptions to the base traffic without a larger new Gate 1A. Additionally, the temporary closure of Gate 15A requires the use of Gate 12A in its present form to handle the traffic that normally enters the base from Highway 844. The final construction phase is tentatively scheduled for 2018 and includes construction and relocation of Gate 26A. A new commercial vehicle inspection station will be built at Gate 26A and the one located at Gate 16A will closed. Thus, construction of Gate 26A must be fully completed prior to the full closure of Gate 16A.

The construction activities would be on-base activities required for completion of each project within the confines of the project area. The portion of the construction activities that has the potential to emit air pollutants includes, but is not limited to the demolition and reconstruction of several guardhouses, grading, paving, excavating, pouring new sidewalks, removing old pavement, striping lines on pavement, and painting interior/exterior of guardhouse.

Due to the scope and nature of the Proposed Action, the construction activities identified for analysis would occur during three construction years, one for each construction phase as described earlier. PM_{10} and $PM_{2.5}$ emissions would be generated in the form of fugitive dust from earth movement, asphalt/concrete demolition, building demolition, material transfer, paving, and truck/equipment movement. All criteria pollutants would also be emitted during construction as combustion by-products from diesel-fueled construction equipment and on-base truck hauling vehicles. VOC evaporative emissions would occur due to pavement striping and building interior/exterior painting. The temporary construction worker commuter emissions and off-base concrete/asphalt truck deliveries are accounted for with the motor vehicle emissions. The complete breakdown of all activities generating emissions is listed in the attachment of this Appendix.

Table B-2 presents the estimated annual emissions of the nonattainment pollutants generated during construction activities at WPAFB. The Proposed Action is divided into three construction years (2014, 2016, 2018) while Alternative A is listed individually in its entirety. As shown, the greatest total annual pollutant emission rates for construction activities are projected to occur during CY Year 2016, which is associated with the Gate 15A relocation and the Gate 12A changes.

Table B-2. Construction Activity Emissions from Proposed Action at WPAFB

Construction Phase/Period (CY)	VOC (tpy)	NO_x (tpy)	$PM_{2.5}$ (tpy)	SO_2 (tpy)
Gate 26A / 2018	0.98	12.79	0.79	0.98
Gate 15A / 2016	4.02	52.24	3.23	4.00
Gate 1A / 2014	2.72	34.03	2.11	2.60
Alternative A / Not Defined	0.17	2.74	0.15	0.21

CY: Construction Year
tpy: tons per year

Motor Vehicle Emissions Directly Related to Proposed Action and Alternative

The permanent reconfiguration of the ECFs at WPAFB is not projected to change or alter the level of employment at the base; therefore, no changes in emissions related to civilian and military POV is anticipated. Although the vehicle activity levels will shift from one gate to another, the aggregate emission levels do not change with respect to SIP analysis. The only change in emission level associated with off-base motor vehicle emission is the result from temporary construction commuter traffic and deliveries of concrete/asphalt by heavy trucks.

Table B-3 presents estimates of motor vehicle emissions as a result of the Proposed Action and Alternative. The amount of commuter and truck traffic will vary by the required employment and material needs for each project within a construction year in addition to the varied paving schedules.

Table B-3. Motor Vehicle Emissions from Proposed Action at WPAFB

Construction Phase/Period (CY)	VOC (tpy)	NO_x (tpy)	$PM_{2.5}$ (tpy)	SO_2 (tpy)
Gate 26A /2018	0.06	0.09	0.004	0.002
Gate 15A / 2016	0.14	0.21	0.009	0.009
Gate 1A / 2014	0.17	0.26	0.011	0.006
Alternative A / Not Defined	0.01	0.01	0.000	0.000

CY: Construction Year
tpy: tons per year

Off-Base Motor Vehicle Emissions Indirectly Related to Proposed Action and Alternative

After completion of the Primary Action, the closure of a portion of SR 444 would result in the rerouting of traffic around the Kittyhawk center following existing streets. Because the amount of traffic is not increased or decreased, the total emissions associated with the change in traffic patterns will not change. Therefore, the vehicular emissions from changed off-base motor traffic patterns indirectly related to the Proposed Action and Alternative are not included in the project emissions for the Conformity Analysis. Section B.3.4 provides a brief discussion and analysis of the change to the off-base traffic patterns along the proposed new route.

Table B-4 below lists the projected total emission related to the Proposed Action and Alternative. The combined emission from construction activities and vehicle emissions are temporary and will not carry on past the completion of the Proposed Action or the Alternative.

Table B-4. Total Emissions Related to Proposed Action at WPAFB

Construction Phase/Period (CY)	VOC (tpy)	NO_x (tpy)	$PM_{2.5}$ (tpy)	SO_2 (tpy)
Gate 26A / 2018	1.04	12.88	0.80	0.98
Gate 15A / 2016	4.16	52.45	3.24	4.00
Gate 1A / 2014	2.89	34.30	2.12	2.60
Alternative A / Not Defined	0.18	2.75	0.15	0.21

CY: Construction Year
tpy: tons per year

B.3.4 Air Impact of Off-base Change to Traffic Flow Patterns

After completion of the Proposed Action, the closure of a portion of SR 444 would cause traffic to seek alternate routes. The most likely route – approximately 5.75-miles long – would take traffic east on Dayton Drive to south on Central Avenue with a merge onto Kauffman Avenue then ending at Dayton-Yellow Springs Road where the access back to SR 444 will remain intact. Because the total amount of traffic will not change as a result of this new rerouting, the emissions associated with the vehicular traffic are not included with the Air Conformity Analysis. However, a separate air emission analysis was conducted to assess the impact that the new traffic pattern might have on the existing streets over time.

The analysis used the same traffic count data from the noise study conducted with this EIS and vehicle air emission factors derived from the USEPA MOVES2010 computer program for Greene County Ohio from the baseline year 2010 and the future year 2032. The detailed calculations are presented in the attachment to this Appendix. Tables B-5 and B-6 list the results of the emission data showing a comparison between the baseline year (2010 no build), future baseline year (2032 no build), and future year (2032 build). The decrease in emissions from comparing the current baseline year to the future baseline year is attributed to fleet mileage and control efficiency gains projected by MOVES2010 that offset the increase in traffic level due to area growth projections unrelated to the Proposed Action. The increase in emissions from comparing the future baseline year to the future year is attributed to the increased traffic from the Proposed Action SR 444 closure. The future emissions are conservatively overestimated by multiplying the peak hour emissions by the total 8,760 hours in one calendar year. For an additional comparison, Table B-6 includes the 2022 projected on-road annual emission inventory of Greene County emissions submitted by OEPA to the USEPA as part of the maintenance plan supporting redesignation of $PM_{2.5}$ to attainment (OEPA 2011c) and the revised 2018 projected on-road emission inventory as part of the maintenance plan supporting redesignation of ozone to attainment (OPEA 2007).

Table B-5. Comparison of Current Baseline (No Build) Emissions to Future Baseline (No Build) Emissions for Proposed New SR 444 Route

Annualized Peak Hour Emissions	VOC (tpy)	NO_x (tpy)	$PM_{2.5}$ (tpy)	SO_2 (tpy)
2010 Current Baseline	4.34	22.11	1.05	0.27
2032 Future Baseline	0.89	3.96	0.25	0.17
Emission Difference	-3.45	-18.15	-0.80	-0.10

Table B-6. Comparison of Future (After SR 444 Closure) Emissions to Future Baseline (No Build) Emissions

Annualized Peak Hour Emissions	VOC (tpy)	NO_x (tpy)	$PM_{2.5}$ (tpy)	SO_2 (tpy)
2032 Future	2.48	11.14	0.64	0.42
2032 Future Baseline	0.89	3.96	0.25	0.17
Emission Difference	1.59	7.18	0.39	0.25
2022 On-road Greene County $PM_{2.5}$ SIP Projected Inventory	N/A	800.70	37.20	10.20
2018 On-road Greene County Revised O_3 SIP Projected Inventory	715.4	1,087.70	N/A	N/A

B.3.5 Applicability Analysis Results

WPAFB Operations

Table B-7 identifies the maximum potential annual emissions from the Proposed Action and Alternative from **Tables B-2 through B-4** above, and compares those impacts to the applicable General Conformity *de minimis* thresholds. The results of the applicability analysis indicate that total peak year direct and indirect emissions at WPAFB (i.e., the sum of construction and mobile emissions) within the Metropolitan Dayton Intrastate AQCR would *not* exceed the 100 tpy *de minimis* for any of the criteria pollutants of concern. Furthermore, the future projected emissions for off-base rerouted traffic, listed in **Table B-6** above, will not impact the projected emission inventory levels identified in the maintenance plans for ozone and $PM_{2.5}$ submitted to the USEPA by OEPA. Therefore, state and Federal General Conformity rules are not applicable, and no conformity determination is required for this Proposed Action.

Table B-7. Comparison of Nonattainment Pollutant Emissions to Conformity de minimis Thresholds for Metropolitan Dayton Intrastate Air Quality Control Region

Criteria Pollutant	Ozone Attainment Status [1]	*de minimis* Threshold (tpy)	Proposed Action and Alternative Maximum Annual Change (tpy)	% of *de minimis* Threshold
NO_x (as O_3 precursor)	Maintenance	100	53.49	53.5%
VOC	Maintenance	100	4.16	4.2%
$PM_{2.5}$	Nonattainment	100	3.28	3.3%
SO_2(as $PM_{2.5}$ precursor)	Nonattainment	100	4.07	4.1%
NO_x(as $PM_{2.5}$ precursor)	Nonattainment	100	53.49	53.5%

[1] There are no NO_x (NO_2) or SO_2 nonattainment areas. The *de minimis* threshold for NO_x and SO_2 emissions is defined by the ozone and $PM_{2.5}$ attainment statuses respectively.

tpy: tons per year

B.4 CONFORMITY ANALYSIS AND RESULTS

This section presents the conclusion of the conformity analysis for the proposed reconfiguration and consolidation of the Area A ECFs and securing the SR 444 corridor at WPAFB. The purpose of this analysis is to determine whether the USAF's Proposed Action and Alternative at WPAFB would conform to the applicable SIP, based upon the criteria established in the General Conformity Rule and promulgated in 40 CFR 93.158.

The regulatory basis and specific criteria for this analysis were presented in Section 2.0 above. This Section B.4 presents the results of the conformity analysis for the following criterion:

> *A Conformity Determination is required for each criteria pollutant or precursor where the total of direct and indirect emissions of the criteria pollutant or precursor in a nonattainment or maintenance area caused by a Federal Action would equal or exceed any of the (de minimis) rates.[40 CFR, 93.153(b)]*

This criterion is shown to be satisfied by the information presented in Section B.3, Tables B-2 through B-4 and B-7. That is, the reasonably foreseeable project emissions of NO_2, VOC, $PM_{2.5}$, and SO_2 would not exceed the General Conformity Rule *de minimis* levels. This conclusion is supported by the calculations attached to this analysis.

The closure of SR444 that is part of the Proposed Action would result in the re-routing of traffic of-base around the Kittyhawk Center via existing streets. While not required for the Conformity Applicability Determination, the emission increase associated with the proposed re-routing of traffic was estimated. **Table B-6** shows that the projected emission increase is a small fraction of the total emission levels projected for Greene County developed in the maintenance plans for ozone and $PM_{2.5}$ for redesignation of the county to attainment for each pollutant.

Based upon the conformity analyses results summarized in the previous sections, the proposed Federal action at WPAFB has been shown to meet the conformity criteria for consistency with the Ohio SIP requirements. The proposed Federal actions are therefore consistent with the objectives as set forth in Section 176(c) of the CAA, as amended, and its implementing regulation, 40 CFR Part 93, Subpart B, Determining Conformity of General Federal Actions to State and Local Implementation Plans, and said actions conform to the applicable SIP in accordance with the law.

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Emission Summary

	Total Emissions by Construction Activity								
Area Description	VOC	CO	NOx	PM	PM-10	PM-2.5	SO2	CO2	CO2e
CONSTRUCTION EMISSIONS									
Proposed Action									
Gate 26A Year 2018									
Gate 26A Demolition and Relocation	0.68	3.17	8.66	4.45	4.34	0.53	0.66	948.20	951.42
Loop Road Turn Lane	0.30	1.54	4.14	0.28	0.28	0.26	0.32	453.75	455.29
Gate 26A Year 2018 Subtotal (tpy)	0.98	4.71	12.79	4.73	4.62	0.79	0.98	1401.95	1406.71
Gate 15A Year 2016									
Gate 15A Reconfiguration	0.70	2.65	7.23	6.31	6.20	0.45	0.55	790.22	792.91
Ogden Road Access	0.53	2.76	7.48	0.66	0.65	0.46	0.58	826.13	828.93
Davis Monthan Intersection	0.51	2.51	6.80	1.04	1.02	0.42	0.52	745.41	747.95
SR 444 Connector Improvements	0.31	1.59	4.26	1.29	1.27	0.27	0.32	466.64	468.22
Skeel Avenue at Hebble Improvements	0.52	2.51	6.82	1.25	1.23	0.42	0.52	688.67	691.01
Hebble Creek Road Improvements	0.56	2.59	7.05	3.20	3.13	0.43	0.54	716.66	719.10
Access Road Improvements	0.35	1.85	5.03	0.56	0.55	0.31	0.38	509.72	511.46
Hope Hotel Access at Gate 12	0.54	2.79	7.57	1.64	1.61	0.47	0.58	757.80	760.37
Gate 15A Year 2016 Subtotal (tpy)	4.02	19.25	52.24	15.95	15.66	3.23	4.00	5501.25	5519.95
Gate 1A Year 2014									
Gate 1A Demolition and Relocation	0.72	3.18	8.70	6.17	6.06	0.53	0.66	884.47	887.48
New SR 444 (curb and gutter)	0.69	3.26	8.94	9.24	9.07	0.55	0.68	909.68	912.77
Schuster Road Widening	0.35	1.59	4.25	1.19	1.17	0.27	0.32	452.38	453.92
Oak Street Intersection	0.31	1.54	4.13	0.28	0.28	0.26	0.32	427.13	428.59
Skeel Avenue at Wright Improvements	0.58	2.61	7.11	3.68	3.59	0.44	0.54	728.70	731.17
Gate 39A Demolition	0.06	0.31	0.91	0.11	0.11	0.05	0.07	87.86	88.16
Gate 1A Year 2014 Subtotal (tpy)	2.72	12.49	34.03	20.68	20.29	2.11	2.60	3490.22	3502.08
Construction Activity Subtotal (ton)	7.72	36.46	99.07	41.37	40.57	6.13	7.57	10393.41	10428.75
VEHICLE COMMUTER AND CONCRETE/ASPHALT TRUCK DELIVERY EMISSIONS									
Proposed Action									
Gate 26A Year 2018									
Gate 26A Demolition and Relocation	0.06	0.86	0.09	0.006	0.006	0.004	0.002	93.186	93.503
Loop Road Turn Lane	0.00	0.01	0.00	0.000	0.000	0.000	0.000	1.130	1.134
Gate 26A Year 2018 Subtotal (tpy)	0.06	0.87	0.09	0.01	0.01	0.00	0.002	94.316	94.637
Gate 15A Year 2016									
Gate 15A Reconfiguration	0.06	0.83	0.09	0.006	0.006	0.004	0.002	90.991	91.300
Ogden Road Access	0.00	0.05	0.01	0.000	0.000	0.000	0.000	5.443	5.461

Emission Summary

Davis Monthan Intersection	0.01	0.21	0.02	0.001	0.001	0.001	0.001	21.994	22.069
SR 444 Connector Improvements	0.01	0.13	0.02	0.001	0.001	0.001	0.000	14.730	14.780
Skeel Avenue at Hebble Improvements	0.02	0.28	0.03	0.002	0.002	0.001	0.001	29.433	29.534
Hebble Creek Road Improvements	0.02	0.27	0.04	0.002	0.002	0.001	0.001	30.933	31.038
Access Road Improvements	0.00	0.03	0.00	0.000	0.000	0.000	0.000	3.810	3.823
Hope Hotel Access at Gate 12	0.01	0.15	0.02	0.001	0.001	0.001	0.000	17.422	17.481
Gate 15A Year 2016 Subtotal (tpy)	0.14	1.94	0.21	0.01	0.01	0.009	0.005	214.756	215.487
Gate 1A Year 2014									
Gate 1A Demolition and Relocation	0.06	0.81	0.08	0.006	0.006	0.004	0.002	88.721	89.023
New SR 444 (curb and gutter)	0.07	0.96	0.11	0.007	0.007	0.005	0.002	107.251	107.616
Schuster Road Widening	0.01	0.12	0.01	0.001	0.001	0.001	0.000	13.686	13.732
Oak Street Intersection	0.00	0.03	0.00	0.000	0.000	0.000	0.000	2.760	2.770
Skeel Avenue at Wright Improvements	0.03	0.43	0.05	0.003	0.003	0.002	0.001	48.431	48.596
Gate 39A Demolition	0.00	0.02	0.00	0.000	0.000	0.000	0.000	2.345	2.353
Gate 1A Year 2014 Subtotal (tpy)	0.17	2.37	0.26	0.02	0.02	0.011	0.006	263.195	264.090
Vehicle Emission Subtotal (ton)	0.56	7.99	0.86	0.06	0.06	0.04	0.02	881.34	884.34
Gate 26A Year 2018 Total (tpy)	1.04	5.58	12.88	4.74	4.63	0.80	0.98	1496.26	1501.35
Gate 15A Year 2016 Total (tpy)	4.16	21.20	52.45	15.97	15.67	3.24	4.00	5716.00	5735.44
Gate 1A Year 2014 Total (tpy)	2.89	14.86	34.30	20.70	20.31	2.12	2.60	3753.41	3766.17
Grand Total (ton)	**8.28**	**44.45**	**99.93**	**41.42**	**40.63**	**6.17**	**7.59**	**11274.75**	**11313.09**

	Total Emissions by Construction Activity								
Area Description	VOC	CO	NOx	PM	PM-10	PM-2.5	SO2	CO2	CO2e
CONSTRUCTION EMISSIONS									
Alternative A									
Kittyhawk Fence Construction	0.17	0.94	2.74	0.89	0.89	0.15	0.21	263.53	264.43
Construction Activity Subtotal	0.17	0.94	2.74	0.89	0.89	0.15	0.21	263.53	264.43
VEHICLE COMMUTER EMISSIONS									
Alternative A									
Kittyhawk Fence Construction	0.01	0.09	0.01	0.001	0.001	0.000	0.000	9.382	9.414
Vehicle Commuter Subtotal	0.01	0.09	0.01	0.00	0.00	0.00	0.00	9.38	9.414
Grand Total (tpy)	**0.18**	**1.03**	**2.75**	**0.89**	**0.89**	**0.15**	**0.21**	**272.92**	**273.84**

From LJB Traffic Study Data (2009), for Emission Estimation Purposes Only

Project	Cost	Pavement (ft^2)
Proposed Action		
Gate 26A Year 2018		
Gate 26A Demolition and Relocation	$5,562,100	207,325
Loop Road Turn Lane	$66,000	3,275
Gate 15A Year 2016		
Gate 15A Reconfiguration	$5,367,300	235,700
Ogden Road Access	$320,935	14,165
Davis Monthan Intersection	$1,344,625	32,315
SR 444 Connector Improvements	$838,470	54,035
Skeel Avenue at Hebble Improvements	$1,798,875	43,550
Hebble Creek Road Improvements	$1,697,355	146,550
Access Road Improvements	$207,915	18,650
Hope Hotel Access at Gate 12	$995,870	61,720
Gate 1A Year 2014		
Gate 1A Demolition and Relocation	$5,239,740	226,535
New SR 444 (curb and gutter)	$6,189,530	349,255
Schuster Road Widening	$781,700	48,800
Oak Street Intersection	$172,850	1,925
Skeel Avenue at Wright Improvements	$2,767,790	171,895
Gate 39A Demolition(1)	$150,000	10,000
Proposed Action Grand Total	$33,501,055	1,625,695
Alternative A		
Kittyhawk Fence Construction(1)	$600,000	40,000
Alternative A Grand Total	$600,000	40,000

Note (1): Assumed values, not specifically stated in LJB Study.

PE Construction Emissions

Area Description	Area		Project Duration	Emission Factor	Control Efficiency	Estimated Emissions	Estimated Emissions
	A		T	EM_{FAC}	CE	E_{lb}	E_{TON}
	A = L * W		†2	†3	†4	$E_{TON} = A * T * EM_{FAC}$	$E_{TON} = A * T * EM_{FAC}$
	(ft.²)†1	(acre)	(months)	(ton/acre/month)	(%)	(lb)	(ton)
Proposed Action							
Gate 26A Year 2018							
Gate 26A Demolition and Relocation	228,058	5.2	3	1.2	80%	7540	3.77
Loop Road Turn Lane	3,603	0.1	0.5	1.2	80%	20	0.01
Gate 15A Year 2016							
Gate 15A Reconfiguration	259,270	6.0	4	1.2	80%	11429	5.71
Ogden Road Access	15,582	0.4	2	1.2	80%	343	0.17
Davis Monthan Intersection	35,547	0.8	3	1.2	80%	1175	0.59
SR 444 Connector Improvements	59,439	1.4	3	1.2	80%	1965	0.98
Skeel Avenue at Hebble Improvements	47,905	1.1	3	1.2	80%	1584	0.79
Hebble Creek Road Improvements	161,205	3.7	3	1.2	80%	5330	2.66
Access Road Improvements	20,515	0.5	2	1.2	80%	452	0.23
Hope Hotel Access at Gate 12	67,892	1.6	3	1.2	80%	2245	1.12
Gate 1A Year 2014							
Gate 1A Demolition and Relocation	249,189	5.7	4	1.2	80%	10985	5.49
New SR 444 (curb and gutter)	384,181	8.8	4	1.2	80%	16936	8.47
Schuster Road Widening	53,680	1.2	3	1.2	80%	1775	0.89
Oak Street Intersection	2,118	0.0	1	1.2	80%	23	0.01
Skeel Avenue at Wright Improvements	189,085	4.3	3	1.2	80%	6252	3.13
Gate 39A Demolition	11,000	0.3	1	1.2	80%	121	0.06
Proposed Action Grand Total	1,788,265	41.1				68176	34.09
Alternative A							
Kittyhawk Fence Construction	44,000	1.0	3	1.2	80%	1455	0.73
Alternative A Grand Total	44,000	1.0				1455	0.73

LEGEND

†1 Note: Construction Areas based on 110% of the estimated pavement square footage for each construction project. Estimates were made from Table 2-1; Figures 2-4, 2-6, and 2-7 thru 2-11 of the DOPAA; and construction estimates for Gate 1C Option 1, Gate 15A Options 1 & 2, and Gate 26C of the Areas A and C Entry Control Traffic Study, March 30, 2009 by LJB, Inc.

†2 Note: Conservative estimate for excavation work is for one year completion of phased construction.

†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.

Diesel Equipment Engine Emissions

Equipment	Load Factor (%)	Operating Hours hours per day	HP hp	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Diesel Dozer	0.59	8	500	0.35	2.04	5.03	0.33	0.32	0.38	539
Diesel Truck	0.59	8	350	0.29	1.66	5.11	0.26	0.25	0.37	536
Diesel Roller	0.59	8	350	0.46	2.62	5.03	0.45	0.44	0.39	559
Diesel Graders	0.59	8	500	0.34	1.51	4.56	0.31	0.3	0.37	537
Diesel Excavator	0.59	8	500	0.34	1.7	4.55	0.32	0.31	0.38	541
Diesel Concrete Saw	0.59	8	50	0.64	3.98	5.3	0.66	0.64	0.41	591
Diesel Crushing/Proc. Equip.	0.43	8	350	0.45	1.91	5.77	0.36	0.35	0.38	545
Diesel Paving Equipment	0.59	8	150	0.52	2.84	5.3	0.48	0.47	0.39	556

Notes:

Emission factors from Table 3-1 of Air Emissions Factor Guide for Air Force Mobile Sources, December 2009.

Assumed Values for Operating Hours and specific HP of equipment based on engineering judgment.

Assumed each project construction phase would have a duration based on engineering judgment given the scope identified from the LJB Traffic Study (2009).

Proposed Action		**Gate 26A Demolition and Relocation**							
Equipment	Number	Duration Days	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2
Diesel Dozer	2	75	273.15	1,592.06	3,925.53	257.54	249.74	296.56	420,648.15
Diesel Truck	4	75	316.85	1,813.70	5,583.15	284.07	273.15	404.26	585,629.63
Diesel Roller	1	45	75.39	429.39	824.36	73.75	72.11	63.92	91,613.89
Diesel Graders	1	75	132.67	589.22	1,779.37	120.97	117.06	144.38	209,543.65
Diesel Excavator	2	75	265.34	1,326.72	3,550.93	249.74	241.93	296.56	422,208.99
Diesel Concrete Saw	1	14	4.66	28.99	38.60	4.81	4.66	2.99	4,304.81
Diesel Crushing/Proc. Equip.	1	45	53.75	228.14	689.19	43.00	41.81	45.39	65,097.22
Diesel Paving Equipment	1	14	11.36	62.06	115.81	10.49	10.27	8.52	12,149.63
Concrete-Asphalt Trucks	349	N/A	46.10	263.87	812.27	41.33	39.74	58.81	85,200.65
Total Emissions (lb)			**1,179.28**	**6,334.15**	**17,319.21**	**1,085.69**	**1,050.47**	**1,321.39**	**1,896,396.63**
Total Emissions (ton)			**0.59**	**3.17**	**8.66**	**0.54**	**0.53**	**0.66**	**948.20**

Proposed Action		**Loop Road Turn Lane**							
Equipment	Number	Duration Days	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2
Diesel Dozer	1	60	109.26	636.83	1,570.21	103.02	99.89	118.62	168,259.26
Diesel Truck	2	60	126.74	725.48	2,233.26	113.63	109.26	161.70	234,251.85
Diesel Roller	1	45	75.39	429.39	824.36	73.75	72.11	63.92	91,613.89
Diesel Graders	1	60	106.14	471.38	1,423.49	96.77	93.65	115.50	167,634.92
Diesel Excavator	1	60	106.14	530.69	1,420.37	99.89	96.77	118.62	168,883.60
Diesel Concrete Saw	1	14	4.66	28.99	38.60	4.81	4.66	2.99	4,304.81
Diesel Crushing/Proc. Equip.	1	45	53.75	228.14	689.19	43.00	41.81	45.39	65,097.22
Diesel Paving Equipment	1	7	5.68	31.03	57.91	5.24	5.14	4.26	6,074.81
Concrete-Asphalt Trucks	6	N/A	0.75	4.27	13.14	0.67	0.64	0.95	1,377.89
Total Emissions (lb)			**588.50**	**3,086.19**	**8,270.54**	**540.78**	**523.93**	**631.96**	**907,498.26**
Total Emissions (ton)			**0.29**	**1.54**	**4.14**	**0.27**	**0.26**	**0.32**	**453.75**

Diesel Equipment Engine Emissions

Proposed Action		Gate 15A Reconfiguration							
Equipment	Number	Duration Days	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2
Diesel Dozer	2	60	218.52	1,273.65	3,140.42	206.03	199.79	237.25	336,518.52
Diesel Truck	4	60	253.48	1,450.96	4,466.52	227.26	218.52	323.41	468,503.70
Diesel Roller	1	45	75.39	429.39	824.36	73.75	72.11	63.92	91,613.89
Diesel Graders	1	60	106.14	471.38	1,423.49	96.77	93.65	115.50	167,634.92
Diesel Excavator	2	60	212.28	1,061.38	2,840.74	199.79	193.54	237.25	337,767.20
Diesel Concrete Saw	1	14	4.66	28.99	38.60	4.81	4.66	2.99	4,304.81
Diesel Crushing/Proc. Equip.	1	45	53.75	228.14	689.19	43.00	41.81	45.39	65,097.22
Diesel Paving Equipment	1	14	11.36	62.06	115.81	10.49	10.27	8.52	12,149.63
Concrete-Asphalt Trucks	397	N/A	52.40	299.97	923.39	46.98	45.18	66.86	96,856.96
Total Emissions (lb)			**987.98**	**5,305.91**	**14,462.54**	**908.88**	**879.53**	**1,101.08**	**1,580,446.86**
Total Emissions (ton)			**0.49**	**2.65**	**7.23**	**0.45**	**0.44**	**0.55**	**790.22**

Proposed Action		Ogden Road Access							
Equipment	Number	Duration Days	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2
Diesel Dozer	2	60	218.52	1,273.65	3,140.42	206.03	199.79	237.25	336,518.52
Diesel Truck	4	60	253.48	1,450.96	4,466.52	227.26	218.52	323.41	468,503.70
Diesel Roller	1	45	75.39	429.39	824.36	73.75	72.11	63.92	91,613.89
Diesel Graders	1	60	106.14	471.38	1,423.49	96.77	93.65	115.50	167,634.92
Diesel Excavator	3	60	318.41	1,592.06	4,261.11	299.68	290.32	355.87	506,650.79
Diesel Concrete Saw	1	14	4.66	28.99	38.60	4.81	4.66	2.99	4,304.81
Diesel Crushing/Proc. Equip.	1	45	53.75	228.14	689.19	43.00	41.81	45.39	65,097.22
Diesel Paving Equipment	1	7	5.68	31.03	57.91	5.24	5.14	4.26	6,074.81
Concrete-Asphalt Trucks	24	N/A	3.17	18.12	55.79	2.84	2.73	4.04	5,851.45
Total Emissions (lb)			**1,039.20**	**5,523.72**	**14,957.40**	**959.39**	**928.72**	**1,152.62**	**1,652,250.13**
Total Emissions (ton)			**0.52**	**2.76**	**7.48**	**0.48**	**0.46**	**0.58**	**826.13**

Proposed Action		Davis Monthan Intersection							
Equipment	Number	Duration Days	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2
Diesel Dozer	2	60	218.52	1,273.65	3,140.42	206.03	199.79	237.25	336,518.52
Diesel Truck	4	60	253.48	1,450.96	4,466.52	227.26	218.52	323.41	468,503.70
Diesel Roller	1	45	75.39	429.39	824.36	73.75	72.11	63.92	91,613.89
Diesel Graders	1	60	106.14	471.38	1,423.49	96.77	93.65	115.50	167,634.92
Diesel Excavator	2	60	212.28	1,061.38	2,840.74	199.79	193.54	237.25	337,767.20
Diesel Concrete Saw	1	14	4.66	28.99	38.60	4.81	4.66	2.99	4,304.81
Diesel Crushing/Proc. Equip.	1	45	53.75	228.14	689.19	43.00	41.81	45.39	65,097.22
Diesel Paving Equipment	1	7	5.68	31.03	57.91	5.24	5.14	4.26	6,074.81
Concrete-Asphalt Trucks	54	N/A	7.20	41.21	126.87	6.46	6.21	9.19	13,307.38
Total Emissions (lb)			**937.09**	**5,016.13**	**13,608.11**	**863.11**	**835.42**	**1,039.15**	**1,490,822.46**
Total Emissions (ton)			**0.47**	**2.51**	**6.80**	**0.43**	**0.42**	**0.52**	**745.41**

Diesel Equipment Engine Emissions

Proposed Action		SR 444 Connector Improvements							
Equipment	Number	Duration Days	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2
Diesel Dozer	1	60	109.26	636.83	1,570.21	103.02	99.89	118.62	168,259.26
Diesel Truck	2	60	126.74	725.48	2,233.26	113.63	109.26	161.70	234,251.85
Diesel Roller	1	45	75.39	429.39	824.36	73.75	72.11	63.92	91,613.89
Diesel Graders	1	60	106.14	471.38	1,423.49	96.77	93.65	115.50	167,634.92
Diesel Excavator	1	60	106.14	530.69	1,420.37	99.89	96.77	118.62	168,883.60
Diesel Concrete Saw	1	30	9.99	62.12	82.72	10.30	9.99	6.40	9,224.60
Diesel Crushing/Proc. Equip.	1	45	53.75	228.14	689.19	43.00	41.81	45.39	65,097.22
Diesel Paving Equipment	1	7	5.68	31.03	57.91	5.24	5.14	4.26	6,074.81
Concrete-Asphalt Trucks	91	N/A	12.03	68.85	211.93	10.78	10.37	15.35	22,229.85
Total Emissions (lb)			**605.11**	**3,183.90**	**8,513.45**	**556.39**	**538.99**	**649.77**	**933,270.01**
Total Emissions (ton)			**0.30**	**1.59**	**4.26**	**0.28**	**0.27**	**0.32**	**466.64**

Proposed Action		Skeel Avenue at Hebble Improvements							
Equipment	Number	Duration Days	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2
Diesel Dozer	2	60	218.52	1,273.65	3,140.42	206.03	199.79	237.25	336,518.52
Diesel Truck	4	60	253.48	1,450.96	4,466.52	227.26	218.52	323.41	468,503.70
Diesel Roller	1	45	75.39	429.39	824.36	73.75	72.11	63.92	87,844.44
Diesel Graders	1	60	106.14	471.38	1,423.49	96.77	93.65	115.50	117,125.93
Diesel Excavator	2	60	212.28	1,061.38	2,840.74	199.79	193.54	237.25	234,251.85
Diesel Concrete Saw	1	7	2.33	14.50	19.30	2.40	2.33	1.49	13,664.69
Diesel Crushing/Proc. Equip.	1	45	53.75	228.14	689.19	43.00	41.81	45.39	87,844.44
Diesel Paving Equipment	1	7	5.68	31.03	57.91	5.24	5.14	4.26	13,664.69
Concrete-Asphalt Trucks	73	N/A	9.70	55.51	170.87	8.69	8.36	12.37	17,922.67
Total Emissions (lb)			**937.26**	**5,015.92**	**13,632.81**	**862.94**	**835.24**	**1,040.84**	**1,377,340.94**
Total Emissions (ton)			**0.47**	**2.51**	**6.82**	**0.43**	**0.42**	**0.52**	**688.67**

Proposed Action		Hebble Creek Road Improvements							
Equipment	Number	Duration Days	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2
Diesel Dozer	2	60	218.52	1,273.65	3,140.42	206.03	199.79	237.25	336,518.52
Diesel Truck	4	60	253.48	1,450.96	4,466.52	227.26	218.52	323.41	468,503.70
Diesel Roller	1	45	75.39	429.39	824.36	73.75	72.11	63.92	87,844.44
Diesel Graders	1	60	106.14	471.38	1,423.49	96.77	93.65	115.50	117,125.93
Diesel Excavator	2	60	212.28	1,061.38	2,840.74	199.79	193.54	237.25	234,251.85
Diesel Concrete Saw	1	7	2.33	14.50	19.30	2.40	2.33	1.49	13,664.69
Diesel Crushing/Proc. Equip.	1	45	53.75	228.14	689.19	43.00	41.81	45.39	87,844.44
Diesel Paving Equipment	1	14	11.36	62.06	115.81	10.49	10.27	8.52	27,329.38
Concrete-Asphalt Trucks	247	N/A	32.59	186.55	574.25	29.22	28.09	41.58	60,234.57
Total Emissions (lb)			**965.84**	**5,177.99**	**14,094.10**	**888.71**	**860.12**	**1,074.31**	**1,433,317.53**
Total Emissions (ton)			**0.48**	**2.59**	**7.05**	**0.44**	**0.43**	**0.54**	**716.66**

Diesel Equipment Engine Emissions

Proposed Action		Access Road Improvements							
Equipment	Number	Duration Days	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2
Diesel Dozer	2	45	163.89	955.24	2,355.32	154.52	149.84	177.94	252,388.89
Diesel Truck	4	45	190.11	1,088.22	3,349.89	170.44	163.89	242.56	351,377.78
Diesel Roller	1	30	50.26	286.26	549.57	49.17	48.07	42.61	58,562.96
Diesel Graders	1	45	79.60	353.53	1,067.62	72.58	70.24	86.63	87,844.44
Diesel Excavator	2	45	159.21	796.03	2,130.56	149.84	145.16	177.94	175,688.89
Diesel Concrete Saw	1	7	2.33	14.50	19.30	2.40	2.33	1.49	13,664.69
Diesel Crushing/Proc. Equip.	1	30	35.83	152.09	459.46	28.67	27.87	30.26	58,562.96
Diesel Paving Equipment	1	7	5.68	31.03	57.91	5.24	5.14	4.26	13,664.69
Concrete-Asphalt Trucks	31	N/A	4.16	23.83	73.35	3.73	3.59	5.31	7,693.87
Total Emissions (lb)			**691.08**	**3,700.73**	**10,062.98**	**636.60**	**616.13**	**768.99**	**1,019,449.17**
Total Emissions (ton)			**0.35**	**1.85**	**5.03**	**0.32**	**0.31**	**0.38**	**509.72**

Proposed Action		Hope Hotel Access at Gate 12							
Equipment	Number	Duration Days	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2
Diesel Dozer	2	60	218.52	1,273.65	3,140.42	206.03	199.79	237.25	336,518.52
Diesel Truck	4	60	253.48	1,450.96	4,466.52	227.26	218.52	323.41	468,503.70
Diesel Roller	1	45	75.39	429.39	824.36	73.75	72.11	63.92	87,844.44
Diesel Graders	1	60	106.14	471.38	1,423.49	96.77	93.65	115.50	117,125.93
Diesel Excavator	3	60	318.41	1,592.06	4,261.11	299.68	290.32	355.87	351,377.78
Diesel Concrete Saw	1	14	4.66	28.99	38.60	4.81	4.66	2.99	27,329.38
Diesel Crushing/Proc. Equip.	1	45	53.75	228.14	689.19	43.00	41.81	45.39	87,844.44
Diesel Paving Equipment	1	7	5.68	31.03	57.91	5.24	5.14	4.26	13,664.69
Concrete-Asphalt Trucks	104	N/A	13.74	78.62	242.03	12.31	11.84	17.52	25,386.81
Total Emissions (lb)			**1,049.77**	**5,584.22**	**15,143.64**	**968.86**	**937.83**	**1,166.11**	**1,515,595.70**
Total Emissions (ton)			**0.52**	**2.79**	**7.57**	**0.48**	**0.47**	**0.58**	**757.80**

Proposed Action		Gate 1A Demolition and Relocation							
Equipment	Number	Duration Days	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2
Diesel Dozer	2	75	273.15	1,592.06	3,925.53	257.54	249.74	296.56	420,648.15
Diesel Truck	4	75	316.85	1,813.70	5,583.15	284.07	273.15	404.26	585,629.63
Diesel Roller	1	45	75.39	429.39	824.36	73.75	72.11	63.92	87,844.44
Diesel Graders	1	75	132.67	589.22	1,779.37	120.97	117.06	144.38	146,407.41
Diesel Excavator	2	75	265.34	1,326.72	3,550.93	249.74	241.93	296.56	292,814.81
Diesel Concrete Saw	1	14	4.66	28.99	38.60	4.81	4.66	2.99	27,329.38
Diesel Crushing/Proc. Equip.	1	45	53.75	228.14	689.19	43.00	41.81	45.39	87,844.44
Diesel Paving Equipment	1	14	11.36	62.06	115.81	10.49	10.27	8.52	27,329.38
Concrete-Asphalt Trucks	381	#N/A	50.37	288.31	887.50	45.16	43.42	64.26	93,092.02
Total Emissions (lb)			**1,183.55**	**6,358.59**	**17,394.44**	**1,089.52**	**1,054.15**	**1,326.83**	**1,768,939.68**
Total Emissions (ton)			**0.59**	**3.18**	**8.70**	**0.54**	**0.53**	**0.66**	**884.47**

Diesel Equipment Engine Emissions

Proposed Action		New SR 444 (curb and gutter)							
Equipment	Number	Duration Days	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2
Diesel Dozer	2	75	273.15	1,592.06	3,925.53	257.54	249.74	296.56	420,648.15
Diesel Truck	4	75	316.85	1,813.70	5,583.15	284.07	273.15	404.26	585,629.63
Diesel Roller	1	45	75.39	429.39	824.36	73.75	72.11	63.92	87,844.44
Diesel Graders	1	75	132.67	589.22	1,779.37	120.97	117.06	144.38	146,407.41
Diesel Excavator	2	75	265.34	1,326.72	3,550.93	249.74	241.93	296.56	292,814.81
Diesel Concrete Saw	1	14	4.66	28.99	38.60	4.81	4.66	2.99	27,329.38
Diesel Crushing/Proc. Equip.	1	45	53.75	228.14	689.19	43.00	41.81	45.39	87,844.44
Diesel Paving Equipment	1	14	11.36	62.06	115.81	10.49	10.27	8.52	27,329.38
Concrete-Asphalt Trucks	588	N/A	77.64	444.44	1,368.11	69.61	66.93	99.06	143,504.81
Total Emissions (lb)			**1,210.82**	**6,514.72**	**17,875.06**	**1,113.97**	**1,077.66**	**1,361.63**	**1,819,352.47**
Total Emissions (ton)			**0.61**	**3.26**	**8.94**	**0.56**	**0.54**	**0.68**	**909.68**

Proposed Action		Schuster Road Widening							
Equipment	Number	Duration Days	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2
Diesel Dozer	1	60	109.26	636.83	1,570.21	103.02	99.89	118.62	168,259.26
Diesel Truck	2	60	126.74	725.48	2,233.26	113.63	109.26	161.70	234,251.85
Diesel Roller	1	45	75.39	429.39	824.36	73.75	72.11	63.92	87,844.44
Diesel Graders	1	60	106.14	471.38	1,423.49	96.77	93.65	115.50	117,125.93
Diesel Excavator	1	60	106.14	530.69	1,420.37	99.89	96.77	118.62	117,125.93
Diesel Concrete Saw	1	30	9.99	62.12	82.72	10.30	9.99	6.40	58,562.96
Diesel Crushing/Proc. Equip.	1	45	53.75	228.14	689.19	43.00	41.81	45.39	87,844.44
Diesel Paving Equipment	1	7	5.68	31.03	57.91	5.24	5.14	4.26	13,664.69
Concrete-Asphalt Trucks	82	N/A	10.86	62.19	191.43	9.74	9.37	13.86	20,079.34
Total Emissions (lb)			**603.95**	**3,177.24**	**8,492.95**	**555.35**	**537.98**	**648.28**	**904,758.85**
Total Emissions (ton)			**0.30**	**1.59**	**4.25**	**0.28**	**0.27**	**0.32**	**452.38**

Proposed Action		Oak Street Intersection							
Equipment	Number	Duration Days	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2
Diesel Dozer	1	60	109.26	636.83	1,570.21	103.02	99.89	118.62	168,259.26
Diesel Truck	2	60	126.74	725.48	2,233.26	113.63	109.26	161.70	234,251.85
Diesel Roller	1	45	75.39	429.39	824.36	73.75	72.11	63.92	87,844.44
Diesel Graders	1	60	106.14	471.38	1,423.49	96.77	93.65	115.50	117,125.93
Diesel Excavator	1	60	106.14	530.69	1,420.37	99.89	96.77	118.62	117,125.93
Diesel Concrete Saw	1	14	4.66	28.99	38.60	4.81	4.66	2.99	27,329.38
Diesel Crushing/Proc. Equip.	1	45	53.75	228.14	689.19	43.00	41.81	45.39	87,844.44
Diesel Paving Equipment	1	7	5.68	31.03	57.91	5.24	5.14	4.26	13,664.69
Concrete-Asphalt Trucks	3	N/A	0.45	2.55	7.85	0.40	0.38	0.57	823.32
Total Emissions (lb)			**588.20**	**3,084.47**	**8,265.25**	**540.51**	**523.67**	**631.58**	**854,269.24**
Total Emissions (ton)			**0.29**	**1.54**	**4.13**	**0.27**	**0.26**	**0.32**	**427.13**

Diesel Equipment Engine Emissions

Proposed Action		Skeel Avenue at Wright Improvements							
Equipment	Number	Duration Days	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2
Diesel Dozer	2	60	218.52	1,273.65	3,140.42	206.03	199.79	237.25	336,518.52
Diesel Truck	4	60	253.48	1,450.96	4,466.52	227.26	218.52	323.41	468,503.70
Diesel Roller	1	45	75.39	429.39	824.36	73.75	72.11	63.92	87,844.44
Diesel Graders	1	60	106.14	471.38	1,423.49	96.77	93.65	115.50	117,125.93
Diesel Excavator	2	60	212.28	1,061.38	2,840.74	199.79	193.54	237.25	234,251.85
Diesel Concrete Saw	1	14	4.66	28.99	38.60	4.81	4.66	2.99	27,329.38
Diesel Crushing/Proc. Equip.	1	45	53.75	228.14	689.19	43.00	41.81	45.39	87,844.44
Diesel Paving Equipment	1	14	11.36	62.06	115.81	10.49	10.27	8.52	27,329.38
Concrete-Asphalt Trucks	289	N/A	38.22	218.79	673.51	34.27	32.95	48.77	70,646.17
Total Emissions (lb)			**973.80**	**5,224.73**	**14,212.66**	**896.17**	**867.30**	**1,082.99**	**1,457,393.83**
Total Emissions (ton)			**0.49**	**2.61**	**7.11**	**0.45**	**0.43**	**0.54**	**728.70**

Proposed Action		Gate 39A Demolition							
Equipment	Number	Duration Days	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2
Diesel Dozer	0	30	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Diesel Truck	2	30	63.37	362.74	1,116.63	56.81	54.63	80.85	117,125.93
Diesel Roller	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Diesel Graders	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Diesel Excavator	1	30	53.07	265.34	710.19	49.95	48.39	59.31	58,562.96
Diesel Concrete Saw	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Diesel Crushing/Proc. Equip.	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Diesel Paving Equipment	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Concrete-Asphalt Trucks	0	N/A	0.02	0.10	0.31	0.02	0.02	0.02	32.53
Total Emissions (lb)			**116.46**	**628.19**	**1,827.12**	**106.78**	**103.03**	**140.19**	**175,721.42**
Total Emissions (ton)			**0.06**	**0.31**	**0.91**	**0.05**	**0.05**	**0.07**	**87.86**

Alternative A		Kittyhawk Fence Construction							
Equipment	Number	Duration Days	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2
Diesel Dozer	0	90	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Diesel Truck	2	90	190.11	1,088.22	3,349.89	170.44	163.89	242.56	351,377.78
Diesel Roller	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Diesel Graders	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Diesel Excavator	1	90	159.21	796.03	2,130.56	149.84	145.16	177.94	175,688.89
Diesel Concrete Saw	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Diesel Crushing/Proc. Equip.	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Diesel Paving Equipment	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Concrete-Asphalt Trucks	0	N/A	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Emissions (lb)			**349.32**	**1,884.25**	**5,480.44**	**320.29**	**309.05**	**420.49**	**527,066.67**
Total Emissions (ton)			**0.17**	**0.94**	**2.74**	**0.16**	**0.15**	**0.21**	**263.53**

Diesel Equipment Engine Emissions

Proposed Action **Diesel Equipment Emission Summary**

			VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2
Construction Year 2018	Gate 26A Demolition and Relocation		1,767.78	9,420.34	25,589.75	1,626.47	1,574.40	1,953.35	2,803,894.89
			0.88	4.71	12.79	0.81	0.79	0.98	1,401.95
Construction Year 2016	Gate 15A Reconfiguration		7,213.33	38,508.52	104,475.03	6,644.89	6,431.97	7,992.87	11,002,492.80
			3.61	19.25	52.24	3.32	3.22	4.00	5,501.25
Construction Year 2014	Gate 1A Demolition and Relocation		4,676.78	24,987.93	68,067.49	4,302.30	4,163.80	5,191.50	6,980,435.49
			2.34	12.49	34.03	2.15	2.08	2.60	3,490.22
Total Emissions (lb)			**13,662.37**	**72,940.76**	**198,197.30**	**12,577.79**	**12,174.17**	**15,142.69**	**20,793,726.37**
Total Emissions (ton)			**6.83**	**36.47**	**99.10**	**6.29**	**6.09**	**7.57**	**10,396.86**

Combined Alternatives **Diesel Equipment Emission Summary**

			VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2
Alternative A			349.32	1,884.25	5,480.44	320.29	309.05	420.49	527,066.67
			0.17	0.94	2.74	0.16	0.15	0.21	263.53
Total Emissions (lb)			**349.32**	**1,884.25**	**5,480.44**	**320.29**	**309.05**	**420.49**	**527,066.67**
Total Emissions (ton)			**0.17**	**0.94**	**2.74**	**0.16**	**0.15**	**0.21**	**263.53**

	k (TSP)	k (PM-10)	k (PM2.5)	sL	W	TSP Emission Factor lbs/VMT	PM-10 Emission Factor lbs/VMT	PM-2.5 Emission Factor lbs/VMT	VMT/yr
Proposed Action									
Gate 26A Year 2018									
Gate 26A Demolition and Relocation	0.011	0.0022	0.00054	8.2	25	1.80	0.36	0.09	698
Loop Road Turn Lane	0.011	0.0022	0.00054	8.2	25	1.80	0.36	0.09	11
Gate 15A Year 2016									
Gate 15A Reconfiguration	0.011	0.0022	0.00054	8.2	25	1.80	0.36	0.09	794
Ogden Road Access	0.011	0.0022	0.00054	8.2	25	1.80	0.36	0.09	48
Davis Monthan Intersection	0.011	0.0022	0.00054	8.2	25	1.80	0.36	0.09	109
SR 444 Connector Improvements	0.011	0.0022	0.00054	8.2	25	1.80	0.36	0.09	182
Skeel Avenue at Hebble Improvements	0.011	0.0022	0.00054	8.2	25	1.80	0.36	0.09	147
Hebble Creek Road Improvements	0.011	0.0022	0.00054	8.2	25	1.80	0.36	0.09	493
Access Road Improvements	0.011	0.0022	0.00054	8.2	25	1.80	0.36	0.09	63
Hope Hotel Access at Gate 12	0.011	0.0022	0.00054	8.2	25	1.80	0.36	0.09	208
Gate 1A Year 2014									
Gate 1A Demolition and Relocation	0.011	0.0022	0.00054	8.2	25	1.80	0.36	0.09	763
New SR 444 (curb and gutter)	0.011	0.0022	0.00054	8.2	25	1.80	0.36	0.09	1,176
Schuster Road Widening	0.011	0.0022	0.00054	8.2	25	1.80	0.36	0.09	164
Oak Street Intersection	0.011	0.0022	0.00054	8.2	25	1.80	0.36	0.09	6
Skeel Avenue at Wright Improvements	0.011	0.0022	0.00054	8.2	25	1.80	0.36	0.09	579
Gate 39A Demolition	0.011	0.0022	0.00054	8.2	25	1.80	0.36	0.09	0
Alternative A									
Kittyhawk Fence Construction	0.011	0.0022	0.00054	8.2	25	1.80	0.36	0.09	0

	Uncontrolled TSP Emissions		Control Efficiency	Controlled TSP Emissions	Uncontrolled PM-10 Emissions		Control Efficiency	Controlled PM-10 Emissions	Uncontrolled PM-2.5 Emissions		Control Efficiency	Controlled PM-2.5 Emissions
	(lb/yr)	(ton/yr)	(%)	(ton/yr)	(lb/yr)	(ton/yr)	(%)	(ton/yr)	(lb/yr)	(ton/yr)	(%)	(ton/yr)
Proposed Action												
Gate 26A Year 2018												
Gate 26A Demolition and Relocation	1,256	0.63	78	0.14	251	0.13	78	0.03	62	0.03	78	0.01
Loop Road Turn Lane	20	0.01	79	0.00	4	0.00	79	0.00	1	0.00	79	0.00
Gate 15A Year 2016												
Gate 15A Reconfiguration	1,428	0.71	80	0.14	286	0.14	80	0.03	70	0.04	80	0.01
Ogden Road Access	86	0.04	80	0.01	17	0.01	80	0.00	4	0.00	80	0.00
Davis Monthan Intersection	196	0.10	80	0.02	39	0.02	80	0.00	10	0.00	80	0.00
SR 444 Connector Improvements	327	0.16	80	0.03	65	0.03	80	0.01	16	0.01	80	0.00
Skeel Avenue at Hebble Improvements	264	0.13	80	0.03	53	0.03	80	0.01	13	0.01	80	0.00
Hebble Creek Road Improvements	888	0.44	80	0.09	178	0.09	80	0.02	44	0.02	80	0.00
Access Road Improvements	113	0.06	80	0.01	23	0.01	80	0.00	6	0.00	80	0.00
Hope Hotel Access at Gate 12	374	0.19	80	0.04	75	0.04	80	0.01	18	0.01	80	0.00
Gate 1A Year 2014												
Gate 1A Demolition and Relocation	1,372	0.69	80	0.14	274	0.14	80	0.03	67	0.03	80	0.01
New SR 444 (curb and gutter)	2,116	1.06	80	0.21	423	0.21	80	0.04	104	0.05	80	0.01
Schuster Road Widening	296	0.15	80	0.03	59	0.03	80	0.01	15	0.01	80	0.00
Oak Street Intersection	12	0.01	80	0.00	2	0.00	80	0.00	1	0.00	80	0.00
Skeel Avenue at Wright Improvements	1,041	0.52	80	0.10	208	0.10	80	0.02	51	0.03	80	0.01
Gate 39A Demolition	0	0.00	80	0.00	0	0.00	80	0.00	0	0.00	80	0.00
Proposed Action Grand Total	8,512	4.26		0.85	1,702	0.85		0.17	418	0.21		0.04
Alternative A												
Kittyhawk Fence Construction	0	0.00	80	0.00	0	0.00	80	0.00	0	0.00	80	0.00
Alternative A Total	0	0.00		0.00	0	0.00		0.00	0	0.00		0.00

NOTES:

Emission estimation equations from AP-42 Section 13.2.1 (11/06), Equation (2) for industrial paved roads. Variable definitions:

k = base emission factor for particle size Particulate Matter/PM30 and PM10

W = average weight (tons) of vehicles traveling the road

sL = road surface silt loading for particle size range of interest (assumed similar to a quarry).

P = number of days with at least 0.01 inches of rain (140 from Figure 13.2.1-2)

N = 365 days per year for annual emissions

Control efficiencies of 80% used for using an approved dust control plan.

Vehicle Miles Traveled (VMT) were estimated as follows:

Proposed Action	Area (ft.²)	Depth (ft)	Number of Trucks	Miles Onsite	Avg. Weight (lb.)	Hours Onsite	Miles Offsite
Gate 26A Year 2018							
Gate 26A Demolition and Relocation	207,325	0.50	349	698	50,000	349	3490
Loop Road Turn Lane	3,275	0.50	6	11	50,000	6	55
Gate 15A Year 2016							
Gate 15A Reconfiguration	235,700	0.50	397	794	50,000	397	3968
Ogden Road Access	14,165	0.50	24	48	50,000	24	238
Davis Monthan Intersection	32,315	0.50	54	109	50,000	55	544
SR 444 Connector Improvements	54,035	0.50	91	182	50,000	91	910
Skeel Avenue at Hebble Improvements	43,550	0.50	73	147	50,000	73	733
Hebble Creek Road Improvements	146,550	0.50	247	493	50,000	247	2467
Access Road Improvements	18,650	0.50	31	63	50,000	32	314
Hope Hotel Access at Gate 12	61,720	0.50	104	208	50,000	104	1039
Gate 1A Year 2014							
Gate 1A Demolition and Relocation	226,535	0.50	381	763	50,000	382	3814
New SR 444 (curb and gutter)	349,255	0.50	588	1,176	50,000	588	5880
Schuster Road Widening	48,800	0.50	82	164	50,000	82	822
Oak Street Intersection	1,925	0.50	3	6	50,000	3	32
Skeel Avenue at Wright Improvements	171,895	0.50	289	579	50,000	290	2894
Gate 39A Demolition	0	0.50	0	0	50,000	0	0
Alternative A							
Kittyhawk Fence Construction	0	0.50	0	0	50,000	0	0

Number of Trucks based on average size load of 11 cubic yards of concrete/asphalt from Oshcosh Series-S Spec Sheet

Miles based on Trucks estimated round trip distance of 10.0 miles offsite and 2 miles onsite on average

Hours Onsite based on average speed of 15 Mi/hr for 2 miles onsite average travel plus 1 hour per delivery

Depth of Concrete or Asphalt assumed to be minimum of 6 inches from the Areas A and C Entry Control Traffic Study, March 30, 2009 by LJB, Inc.

Privately-Owned Vehicle Emissions From Construction Worker Commutes Associated with ECF Project

Step 1 Estimate the Vehicle Miles Traveled (VMT) by Vehicle Class

For this analysis, we have assumed that the commuter fleet corresponding to the construction workers will reflect the passenger vehicle fleet on the roads in the vicinity of Wright-Patterson AFB and the passenger car VMT data for Green County and Montgomery County Ohio.

The following average construction worker counts have been assumed for this analysis:

Area Description	Number of Workers	Working Days
Proposed Action		
Gate 26A Year 2018		
Gate 26A Demolition and Relocation	73	90
Loop Road Turn Lane	5	15
Gate 15A Year 2016		
Gate 15A Reconfiguration	53	120
Ogden Road Access	6	60
Davis Monthan Intersection	18	90
SR 444 Connector Improvements	11	90
Skeel Avenue at Hebble Improvements	24	90
Hebble Creek Road Improvements	22	90
Access Road Improvements	4	60
Hope Hotel Access at Gate 12	13	90
Gate 1A Year 2014		
Gate 1A Demolition and Relocation	52	120
New SR 444 (curb and gutter)	61	120
Schuster Road Widening	10	90
Oak Street Intersection	7	30
Skeel Avenue at Wright Improvements	36	90
Gate 39A Demolition	6	30
Alternative A		
Kittyhawk Fence Construction	8	90
Total	**409**	

Greene and Montgomery County Passenger Vehicle VMT Mix

VClassId	VMT	Vehicle Class	Mix
1	4,168.815	LDGV	67.72%
2	367.869	LDGT1	5.98%
3	1,224.654	LDGT2	19.89%
4	372.532	LDGT3	6.05%
24	22.185	MC	0.36%
Total (mi/day)	**6,156.054**		**100.00%**

Source for VMT Mix: National Mobile Inventory Model (NMIM) county-level database of NONROAD and MOBILE6 National Emission Inventory (NEI) 2002. ftp://ftp.epa.gov/EmisInventory/2002finalnei/mobile_sector_data/onroad/county_5_of_5.zip

Assumptions Used to Estimate Mileage

1.2	Riders per vehicle
30	Miles avg. commute round trip
50%	Vehicles do daytime errands/lunch
10	Miles avg. errand/lunch round trip

The mean Hourly wage for the Construction and Extraction Occupations in Ohio for 2009 is $21.16
as reported from the US Bureau of Labor Statistics at http://www.bls.gov/oes/current/oes_oh.htm#47-0000
The number of required workers was estimated using the project cost estimate from the LJB Traffic Study (2009)
and the formula : 20% x (cost) ÷ (mean wage/hour) ÷ (working days) ÷ (8 hours/day) = worker number

Step 2 Select the Appropriate Air Pollutant Emission Factors (grams per mile) for the POV Fleet and Concrete/Asphalt Trucks

Emission Factors

Emission factors are taken from the U.S. EPA MOBIL6 emissions model, as compiled and published in
"Air Emissions Factor Guide to Air Force Mobile Sources" Air Force
Institute for Environmental Safety and Occupational Health Risk Analysis (AFIERA), December 2009.

All vehicle emissions are calculated assuming that the average commute vehicle is five years old.

Note that PM10 and PM 2.5 emission factors include both exhaust and "fugitive" emissions (paved road, brake & tire dust, etc.).

Emission Factors in g/mi from MOBILE6 Tables for 2005 Model Year Vehicles in CY2010 as Reported in AFIERA (2009).

	POV Low Altitude g/mi - 2010						
	NOx	VOC	CO	SO2	PM10	PM2.5	CO2
LDGV	0.27	0.25	3.77	0.01	0.024	0.014	368.00
LDGT1	0.32	0.27	4.24	0.01	0.024	0.014	479.40
LDGT2	0.32	0.27	4.24	0.01	0.024	0.014	479.40
LDGT3	0.52	0.41	5.14	0.01	0.024	0.014	624.50
MC	1.12	2.56	11.17	0.003	0.040	0.020	177.40
HDDV8b	5.96	0.49	3.01	0.02	0.250	0.200	1615.20

Reference: Tables 4-2 through 4-53, (AF IERA, December 2009)
Notes:
LDGT1 and LDGT2 emission factors shown above were taken from AF IERA LDGT1 (3,000 average lbs) emission factors
LDGT3 emission factors shown above were taken from AF IERA LDGT3 (7,250 average lbs) emission factors
HHDDV8b emissions factors used for off-base road emissions from concrete/asphalt delivery trucks

Privately-Owned Vehicle Emissions From Construction Worker Commutes Associated with ECF Project

Step 3 Multiply the Emission Factors Times the Annual Vehicle Miles Traveled for Each Vehicle Class

Proposed Action	**Gate 26A Demolition and Relocation**						
	Construction Commute Emissions by Vehicle Class						
	NOx	VOC	CO	SO2	PM10	PM2.5	CO2
LDGV	0.0386	0.0358	0.5394	0.0014	0.0034	0.0020	52.6508
LDGT1	0.0040	0.0034	0.0535	0.0001	0.0003	0.0002	6.0525
LDGT2	0.0134	0.0113	0.1782	0.0004	0.0010	0.0006	20.1491
LDGT3	0.0066	0.0052	0.0657	0.0001	0.0003	0.0002	7.9844
MC	0.0009	0.0019	0.0085	0.0000	0.0000	0.0000	0.1351
HDDV8b	0.0229	0.0019	0.0116	0.0001	0.0010	0.0008	6.2142
Total	**0.087**	**0.060**	**0.857**	**0.002**	**0.006**	**0.004**	**93.186**

Proposed Action	**Loop Road Turn Lane**						
	Construction Commute Emissions by Vehicle Class						
	NOx	VOC	CO	SO2	PM10	PM2.5	CO2
LDGV	0.0005	0.0004	0.0064	0.0000	0.0000	0.0000	0.6248
LDGT1	0.0000	0.0000	0.0006	0.0000	0.0000	0.0000	0.0718
LDGT2	0.0002	0.0001	0.0021	0.0000	0.0000	0.0000	0.2391
LDGT3	0.0001	0.0001	0.0008	0.0000	0.0000	0.0000	0.0947
MC	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0016
HDDV8b	0.0004	0.0000	0.0002	0.0000	0.0000	0.0000	0.0982
Total	**0.001**	**0.001**	**0.010**	**0.000**	**0.000**	**0.000**	**1.130**

Proposed Action	**Gate 15A Reconfiguration**						
	Construction Commute Emissions by Vehicle Class						
	NOx	VOC	CO	SO2	PM10	PM2.5	CO2
LDGV	0.0373	0.0345	0.5205	0.0014	0.0033	0.0019	50.8068
LDGT1	0.0039	0.0033	0.0517	0.0001	0.0003	0.0002	5.8405
LDGT2	0.0130	0.0110	0.1720	0.0004	0.0010	0.0006	19.4434
LDGT3	0.0064	0.0051	0.0634	0.0001	0.0003	0.0002	7.7047
MC	0.0008	0.0019	0.0082	0.0000	0.0000	0.0000	0.1303
HDDV8b	0.0261	0.0021	0.0132	0.0001	0.0011	0.0009	7.0647
Total	**0.087**	**0.058**	**0.829**	**0.002**	**0.006**	**0.004**	**90.991**

Privately-Owned Vehicle Emissions From Construction Worker Commutes Associated with ECF Project

Proposed Action	**Ogden Road Access**						
	Construction Commute Emissions by Vehicle Class						
	NOx	VOC	CO	SO2	PM10	PM2.5	CO2
LDGV	0.0022	0.0021	0.0311	0.0001	0.0002	0.0001	3.0380
LDGT1	0.0002	0.0002	0.0031	0.0000	0.0000	0.0000	0.3492
LDGT2	0.0008	0.0007	0.0103	0.0000	0.0001	0.0000	1.1626
LDGT3	0.0004	0.0003	0.0038	0.0000	0.0000	0.0000	0.4607
MC	0.0000	0.0001	0.0005	0.0000	0.0000	0.0000	0.0078
HDDV8b	0.0016	0.0001	0.0008	0.0000	0.0001	0.0001	0.4246
Total	**0.005**	**0.003**	**0.050**	**0.000**	**0.000**	**0.000**	**5.443**

Proposed Action	**Davis Monthan Intersection**						
	Construction Commute Emissions by Vehicle Class						
	NOx	VOC	CO	SO2	PM10	PM2.5	CO2
LDGV	0.0093	0.0086	0.1304	0.0003	0.0008	0.0005	12.7282
LDGT1	0.0010	0.0008	0.0129	0.0000	0.0001	0.0000	1.4632
LDGT2	0.0033	0.0027	0.0431	0.0001	0.0002	0.0001	4.8710
LDGT3	0.0016	0.0013	0.0159	0.0000	0.0001	0.0000	1.9302
MC	0.0002	0.0005	0.0021	0.0000	0.0000	0.0000	0.0327
HDDV8b	0.0036	0.0003	0.0018	0.0000	0.0001	0.0001	0.9686
Total	**0.019**	**0.014**	**0.206**	**0.001**	**0.001**	**0.001**	**21.994**

Proposed Action	**SR 444 Connector Improvements**						
	Construction Commute Emissions by Vehicle Class						
	NOx	VOC	CO	SO2	PM10	PM2.5	CO2
LDGV	0.0058	0.0054	0.0813	0.0002	0.0005	0.0003	7.9369
LDGT1	0.0006	0.0005	0.0081	0.0000	0.0000	0.0000	0.9124
LDGT2	0.0020	0.0017	0.0269	0.0001	0.0002	0.0001	3.0374
LDGT3	0.0010	0.0008	0.0099	0.0000	0.0000	0.0000	1.2036
MC	0.0001	0.0003	0.0013	0.0000	0.0000	0.0000	0.0204
HDDV8b	0.0060	0.0005	0.0030	0.0000	0.0003	0.0002	1.6196
Total	**0.016**	**0.009**	**0.130**	**0.000**	**0.001**	**0.001**	**14.730**

Privately-Owned Vehicle Emissions From Construction Worker Commutes Associated with ECF Project

Proposed Action	Skeel Avenue at Hebble Improvements						
	Construction Commute Emissions by Vehicle Class						
	NOx	VOC	CO	SO2	PM10	PM2.5	CO2
LDGV	0.0125	0.0116	0.1744	0.0005	0.0011	0.0006	17.0281
LDGT1	0.0013	0.0011	0.0173	0.0000	0.0001	0.0001	1.9575
LDGT2	0.0043	0.0037	0.0576	0.0001	0.0003	0.0002	6.5166
LDGT3	0.0022	0.0017	0.0213	0.0000	0.0001	0.0001	2.5823
MC	0.0003	0.0006	0.0028	0.0000	0.0000	0.0000	0.0437
HDDV8b	0.0048	0.0004	0.0024	0.0000	0.0002	0.0002	1.3053
Total	**0.025**	**0.019**	**0.276**	**0.001**	**0.002**	**0.001**	**29.433**

Proposed Action	Hebble Creek Road Improvements						
	Construction Commute Emissions by Vehicle Class						
	NOx	VOC	CO	SO2	PM10	PM2.5	CO2
LDGV	0.0118	0.0109	0.1646	0.0004	0.0010	0.0006	16.0671
LDGT1	0.0012	0.0010	0.0163	0.0000	0.0001	0.0001	1.8470
LDGT2	0.0041	0.0035	0.0544	0.0001	0.0003	0.0002	6.1488
LDGT3	0.0020	0.0016	0.0201	0.0000	0.0001	0.0001	2.4365
MC	0.0003	0.0006	0.0026	0.0000	0.0000	0.0000	0.0412
HDDV8b	0.0162	0.0013	0.0082	0.0001	0.0007	0.0005	4.3926
Total	**0.036**	**0.019**	**0.266**	**0.001**	**0.002**	**0.001**	**30.933**

Proposed Action	Access Road Improvements						
	Construction Commute Emissions by Vehicle Class						
	NOx	VOC	CO	SO2	PM10	PM2.5	CO2
LDGV	0.0014	0.0013	0.0202	0.0001	0.0001	0.0001	1.9681
LDGT1	0.0002	0.0001	0.0020	0.0000	0.0000	0.0000	0.2262
LDGT2	0.0005	0.0004	0.0067	0.0000	0.0000	0.0000	0.7532
LDGT3	0.0002	0.0002	0.0025	0.0000	0.0000	0.0000	0.2985
MC	0.0000	0.0001	0.0003	0.0000	0.0000	0.0000	0.0050
HDDV8b	0.0021	0.0002	0.0010	0.0000	0.0001	0.0001	0.5590
Total	**0.004**	**0.002**	**0.033**	**0.000**	**0.000**	**0.000**	**3.810**

Privately-Owned Vehicle Emissions From Construction Worker Commutes Associated with ECF Project

Proposed Action	**Hope Hotel Access at Gate 12**						
	Construction Commute Emissions by Vehicle Class						
	NOx	VOC	CO	SO2	PM10	PM2.5	CO2
LDGV	0.0069	0.0064	0.0966	0.0003	0.0006	0.0004	9.4269
LDGT1	0.0007	0.0006	0.0096	0.0000	0.0001	0.0000	1.0837
LDGT2	0.0024	0.0020	0.0319	0.0001	0.0002	0.0001	3.6076
LDGT3	0.0012	0.0009	0.0118	0.0000	0.0001	0.0000	1.4296
MC	0.0002	0.0003	0.0015	0.0000	0.0000	0.0000	0.0242
HDDV8b	0.0068	0.0006	0.0034	0.0000	0.0003	0.0002	1.8500
Total	**0.018**	**0.011**	**0.155**	**0.000**	**0.001**	**0.001**	**17.422**

Proposed Action	**Gate 1A Demolition and Relocation**						
	Construction Commute Emissions by Vehicle Class						
	NOx	VOC	CO	SO2	PM10	PM2.5	CO2
LDGV	0.0364	0.0337	0.5081	0.0013	0.0032	0.0019	49.5993
LDGT1	0.0038	0.0032	0.0504	0.0001	0.0003	0.0002	5.7017
LDGT2	0.0127	0.0107	0.1679	0.0004	0.0010	0.0006	18.9813
LDGT3	0.0063	0.0049	0.0619	0.0001	0.0003	0.0002	7.5216
MC	0.0008	0.0018	0.0080	0.0000	0.0000	0.0000	0.1272
HDDV8b	0.0251	0.0021	0.0127	0.0001	0.0011	0.0008	6.7900
Total	**0.085**	**0.056**	**0.809**	**0.002**	**0.006**	**0.004**	**88.721**

Proposed Action	**New SR 444 (curb and gutter)**						
	Construction Commute Emissions by Vehicle Class						
	NOx	VOC	CO	SO2	PM10	PM2.5	CO2
LDGV	0.0430	0.0398	0.6002	0.0016	0.0038	0.0022	58.5900
LDGT1	0.0045	0.0038	0.0596	0.0001	0.0003	0.0002	6.7353
LDGT2	0.0150	0.0126	0.1983	0.0005	0.0011	0.0007	22.4220
LDGT3	0.0074	0.0058	0.0731	0.0001	0.0003	0.0002	8.8850
MC	0.0009	0.0022	0.0095	0.0000	0.0000	0.0000	0.1503
HDDV8b	0.0386	0.0032	0.0195	0.0001	0.0016	0.0013	10.4684
Total	**0.109**	**0.067**	**0.960**	**0.002**	**0.007**	**0.005**	**107.251**

Privately-Owned Vehicle Emissions From Construction Worker Commutes Associated with ECF Project

Proposed Action	Schuster Road Widening						
	Construction Commute Emissions by Vehicle Class						
	NOx	VOC	CO	SO2	PM10	PM2.5	CO2
LDGV	0.0054	0.0050	0.0758	0.0002	0.0005	0.0003	7.3996
LDGT1	0.0006	0.0005	0.0075	0.0000	0.0000	0.0000	0.8506
LDGT2	0.0019	0.0016	0.0250	0.0001	0.0001	0.0001	2.8318
LDGT3	0.0009	0.0007	0.0092	0.0000	0.0000	0.0000	1.1221
MC	0.0001	0.0003	0.0012	0.0000	0.0000	0.0000	0.0190
HDDV8b	0.0054	0.0004	0.0027	0.0000	0.0002	0.0002	1.4627
Total	**0.014**	**0.009**	**0.122**	**0.000**	**0.001**	**0.001**	**13.686**

Proposed Action	Oak Street Intersection						
	Construction Commute Emissions by Vehicle Class						
	NOx	VOC	CO	SO2	PM10	PM2.5	CO2
LDGV	0.0012	0.0011	0.0168	0.0000	0.0001	0.0001	1.6362
LDGT1	0.0001	0.0001	0.0017	0.0000	0.0000	0.0000	0.1881
LDGT2	0.0004	0.0004	0.0055	0.0000	0.0000	0.0000	0.6262
LDGT3	0.0002	0.0002	0.0020	0.0000	0.0000	0.0000	0.2481
MC	0.0000	0.0001	0.0003	0.0000	0.0000	0.0000	0.0042
HDDV8b	0.0002	0.0000	0.0001	0.0000	0.0000	0.0000	0.0577
Total	**0.002**	**0.002**	**0.026**	**0.000**	**0.000**	**0.000**	**2.760**

Proposed Action	Skeel Avenue at Wright Improvements						
	Construction Commute Emissions by Vehicle Class						
	NOx	VOC	CO	SO2	PM10	PM2.5	CO2
LDGV	0.0192	0.0178	0.2684	0.0007	0.0017	0.0010	26.1999
LDGT1	0.0020	0.0017	0.0266	0.0001	0.0002	0.0001	3.0118
LDGT2	0.0067	0.0056	0.0887	0.0002	0.0005	0.0003	10.0265
LDGT3	0.0033	0.0026	0.0327	0.0001	0.0002	0.0001	3.9731
MC	0.0004	0.0010	0.0042	0.0000	0.0000	0.0000	0.0672
HDDV8b	0.0190	0.0016	0.0096	0.0001	0.0008	0.0006	5.1523
Total	**0.051**	**0.030**	**0.430**	**0.001**	**0.003**	**0.002**	**48.431**

Privately-Owned Vehicle Emissions From Construction Worker Commutes Associated with ECF Project

Proposed Action	**Gate 39A Demolition**						
	Construction Commute Emissions by Vehicle Class						
	NOx	VOC	CO	SO2	PM10	PM2.5	CO2
LDGV	0.0010	0.0010	0.0145	0.0000	0.0001	0.0001	1.4199
LDGT1	0.0001	0.0001	0.0014	0.0000	0.0000	0.0000	0.1632
LDGT2	0.0004	0.0003	0.0048	0.0000	0.0000	0.0000	0.5434
LDGT3	0.0002	0.0001	0.0018	0.0000	0.0000	0.0000	0.2153
MC	0.0000	0.0001	0.0002	0.0000	0.0000	0.0000	0.0036
HDDV8b	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.002**	**0.002**	**0.023**	**0.000**	**0.000**	**0.000**	**2.345**

Alternative A	**Kittyhawk Fence Construction**						
	Construction Commute Emissions by Vehicle Class						
	NOx	VOC	CO	SO2	PM10	PM2.5	CO2
LDGV	0.0042	0.0039	0.0582	0.0002	0.0004	0.0002	5.6796
LDGT1	0.0004	0.0004	0.0058	0.0000	0.0000	0.0000	0.6529
LDGT2	0.0015	0.0012	0.0192	0.0000	0.0001	0.0001	2.1735
LDGT3	0.0007	0.0006	0.0071	0.0000	0.0000	0.0000	0.8613
MC	0.0001	0.0002	0.0009	0.0000	0.0000	0.0000	0.0146
HDDV8b	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.007**	**0.006**	**0.091**	**0.000**	**0.001**	**0.000**	**9.382**

Total Emissions	**Proposed Action**						
		Construction Off-base Vehicle Emissions by Vehicle Class					
	NOx	VOC	CO	SO2	PM10	PM2.5	CO2
Gate 26A Year 2018	0.088	0.060	0.867	0.002	0.006	0.004	94.316
Gate 15A Year 2016	0.211	0.136	1.945	0.005	0.014	0.009	214.756
Gate 1A Year 2014	0.263	0.166	2.370	0.006	0.018	0.011	263.195
Total	**0.562**	**0.362**	**5.182**	**0.013**	**0.038**	**0.024**	**572.268**

Total Emissions	**Alternative A**						
		Construction Off-base Vehicle Emissions by Vehicle Class					
	NOx	VOC	CO	SO2	PM10	PM2.5	CO2
Alternative A	0.0069	0.0062	0.0912	0.0002	0.0005	0.0003	9.3819
Grand Total	**0.007**	**0.006**	**0.091**	**0.0002**	**0.0005**	**0.0003**	**9.3819**

Construction Surface Coating Emissions

Calculation of VOC Emissions Due to Site Surface Coating Activities (Uncontrolled).

Input Parameters and Assumptions

All paint is restricted to maximum VOC

150	g/L of VOC
0.33	lb/L of VOC
1.25	lb/gal of VOC

Proposed Action

Area	Stripe Length ft	Lane Mark Number	Stripe Area (ft^2)	Interior Area (ft^2)	Coats Number	Road Coverage (ft^2/gal)	Interior Coverage (ft^2/gal)	Max. VOC (lb)	Max. VOC (ton)
Gate 26A Year 2018									
Gate 26A Demolition and Relocation	3960	0	3300	10000	2	100	250	182.78	0.09
Loop Road Turn Lane	528	2	540	0	2	100	250	13.52	0.01
Gate 15A Year 2016									
Gate 15A Reconfiguration	14520	0	12100	10000	2	100	250	403.11	0.20
Ogden Road Access	525	4	638	0	2	100	250	15.96	0.01
Davis Monthan Intersection	3487	12	3506	0	2	100	250	87.78	0.04
SR 444 Connector Improvements	694	6	878	0	2	100	250	21.99	0.01
Skeel Avenue at Hebble Improvements	4568	0	3807	0	2	100	250	95.31	0.05
Hebble Creek Road Improvements	6479	12	5999	0	2	100	250	150.21	0.08
Access Road Improvements	664	0	553	0	2	100	250	13.85	0.01
Hope Hotel Access at Gate 12	1584	5	1570	0	2	100	250	39.31	0.02
Gate 1A Year 2014									
Gate 1A Demolition and Relocation	7554	4	6495	10000	2	100	250	262.77	0.13
New SR 444 (curb and gutter)	7554	8	6695	0	2	100	250	167.63	0.08
Schuster Road Widening	4483	7	4086	0	2	100	250	102.30	0.05
Oak Street Intersection	1523	6	1569	0	2	100	250	39.29	0.02
Skeel Avenue at Wright Improvements	8231	18	7759	0	2	100	250	194.27	0.10
Gate 39A Demolition	0	0	0	0	0	100	250	0.00	0.00
						Totals		**1790.08**	**0.90**

Alternative A

Area	Stripe Length ft	Lane Mark Number	Total Area (ft^2)	Interior Area (ft^2)	Coats Number	Paint Coverage (ft^2/gal)	Interior Coverage (ft^2/gal)	Max. VOC (lb)	Max. VOC (ton)
Kittyhawk Fence Construction	0	0	0	0	2	100	250	0.00	0.00
						Totals		**0.00**	**0.00**

Construction Surface Coating Emissions

Total VOC Emissions from Surface Coating		
Proposed Action	VOC (lb)	VOC (ton)
Gate 26A Year 2018	196.30	0.10
Gate 15A Year 2016	827.52	0.41
Gate 1A Year 2014	766.26	0.38
Total	1790.08	0.90

Total VOC Emissions from Surface Coating		
	VOC (lb)	VOC (ton)
Alternative A	0.00	0.00
Total	0.00	0.00

Resources:

Dimensions: Based on information provied in the construction cost estimate from the LJB Traffic Study (2009)

Paint Coverage Rate is from Sherwin Williams Product Data Sheet for Surface Coating for poured concrete and interior surfaces.

Step 1 Estimate the Vehicle Miles Traveled (VMT) by Vehicle Class

For this analysis, Peak Hour Traffic count data was derived from the noise study conducted by LJB, Inc. for this EIS.
The route distance was estimated from maps and diagrams provided in the LJB Traffic Study (2009)

Area Description		Direction	Distance (miles)	Total Vehicles in Car Group (number/hr)	Total Vehicles in Heavy Truck Group (number/hr)
2010 Baseline, No Build PM Peak Hour Volumes					
Dayton Drive	Broad to Wright Ave	WB	0.201	130	3
		EB	0.201	434	4
Dayton Drive	Wright to Central Ave	WB	0.145	261	1
		EB	0.145	396	2
Central Ave	Railroad to Dayton	NB	0.327	744	4
		SB	0.327	626	3
Kauffman Ave	Railroad to High St	NB	1.569	687	3
		SB	1.569	500	3
Kauffman Ave	High St to Dayton-Yellow Springs	NB	0.556	632	3
		SB	0.556	376	2
Kauffman Ave	Dayton-Yellow Springs to Montgomery Ave	NB	0.072	647	3
		SB	0.072	432	2
2032 No Build PM Peak Hour Volumes					
Dayton Drive	Broad to Wright	WB	0.201	153	3
		EB	0.201	484	5
Dayton Drive	Wright to Central	WB	0.145	284	1
		EB	0.145	371	2
Central Ave	Railroad to Dayton	NB	0.327	801	4
		SB	0.327	649	3
Kauffman Ave	Railroad to High St	NB	1.569	749	4
		SB	1.569	533	3
Kauffman Ave	High St to Dayton-Yellow Springs	NB	0.556	698	4
		SB	0.556	418	2
Kauffman Ave	Dayton-Yellow Springs to Montgomery Ave	NB	0.072	708	4
		SB	0.072	474	2

	2032 Build PM Peak Hour Volumes				
Dayton Drive	Broad to Wright	WB	0.201	845	17
		EB	0.201	1112	23
Dayton Drive	Wright to Central	WB	0.145	1067	22
		EB	0.145	1322	27
Central Ave	Railroad to Dayton	NB	0.327	1656	34
		SB	0.327	1583	32
Kauffman Ave	Railroad to High St	NB	1.569	1640	33
		SB	1.569	1450	30
Kauffman Ave	High St to Dayton-Yellow Springs	NB	0.556	1623	33
		SB	0.556	1317	27
Kauffman Ave	Dayton-Yellow Springs to Montgomery Ave	NB	0.072	728	15
		SB	0.072	483	10
	Total Route Distance		5.740	Miles	
			9238.4118	Meters	0.118282627 g/m^2 CO

Step 2 Select the Appropriate Air Pollutant Emission Factors (grams per mile) for the POV Fleet

The USEPA MOVES2010 Program has become the offical model approved for use with transportation confomity studies.
The following method was used to develop emission factor from MOVE2010 output data.
1. MOVES 2010 was run for years 2010 and 2032 and output data for thirteen vehicle catagories was collected for Green County Ohio.
The data included annual total mileage for gasoline and diesel vehicles and total emissions for each pollutants.
2. The thirteen vehicle categories were divided into two groups to correspond to the "car" and "heavy truck" groups from traffic count data.
3. An emission factor was calculated for each pollutant per gasoline type for each of the thirteen vehicle catagories from MOVES2010 data.
4. A weight emission factor was calculated for the"car" and "Heavy truck" group using emission factors for the thirteen categories weighted by the total miles compiled for Greene County,OH by MOVES2010.
Note that PM10 and PM 2.5 emission factors include both exhaust and "fugitive" emissions (paved road, brake & tire dust, etc.).
This was an available data selection that was made when compiling a MOVES2010 output report for Greene County, OH.

Emission Factors in g/mi from Moves2010 output for Greene County Ohio for all Vehicle Groups in CY 2010 and CY 2032.									
		NOx	VOC	CO	SO2	PM10	PM2.5	CO2	CO2e
2010	Car Grouping of Vehicles	0.70	0.14	4.02	0.009	0.033	0.033	450.855	452.920
2010	Heavy Truck Grouping of Vehicles	4.97	0.53	8.36	0.017	0.363	0.354	931.771	934.613
2032	Car Grouping of Vehicles	0.11	0.03	2.01	0.005	0.008	0.007	340.599	341.150
2032	Heavy Truck Grouping of Vehicles	1.20	0.25	6.43	0.009	0.021	0.020	978.239	978.239

Reference: Data from MOVES2010 Output Report Data for Greene County Ohio and the SR444 EIS Noise Traffic Volume Study

Notes: The g/mi emission factors are the result of the weighted average calculation from the MOVE2010 output report.

Step 3 Multiply the Emission Factors Times the Annual Vehicle Miles Traveled for Each Vehicle Class

Emissions (g/hr) = [(EB + WB)car number x (weighted pollutant EF car group, g/mi) + (EB +WB)Trucks x (weighted pollutant EF truck group, g/mi.)] x (distance of road section, mi.)

2010 Baseline, No Build PM Peak Hour Volumes									
		Emissions in Grams Per Peak Hour							
		NOx	VOC	CO	SO2	PM10	PM2.5	CO2	CO2e
Dayton Drive	Broad to Wright Ave	86.3425	16.5786	467.6566	1.0199	4.2946	4.2034	52,482.0	52,720.4
Dayton Drive	Wright to Central Ave	68.7643	13.5238	386.3091	0.8437	3.3335	3.2636	43,357.5	43,555.4
Central Ave	Railroad to Dayton	324.2736	63.6646	1816.9756	3.9679	15.7495	15.4192	203,927.0	204,857.7
Kauffman Ave	Railroad to High St	1348.7446	264.8448	7559.2953	16.5082	65.4942	64.1207	848,413.0	852,285.2
Kauffman Ave	High St to Dayton-Yellow Springs	405.8784	79.7237	2275.8543	4.9702	19.7027	19.2896	255,429.5	256,595.3
Kauffman Ave	Dayton-Yellow Springs to Montgomery Ave	56.1144	11.0336	315.1409	0.6883	2.7209	2.6639	35,369.8	35,531.3
Total		**2290.118**	**449.369**	**12821.232**	**27.998**	**111.295**	**108.960**	**1,438,978.9**	**1,445,545.3**

2032 No Build PM Peak Hour Volumes									
		Emissions in Grams Per Peak Hour							
		NOx	VOC	CO	SO2	PM10	PM2.5	CO2	CO2e
Dayton Drive	Broad to Wright	16.4665	3.6765	267.8154	0.6620	1.0732	0.9905	45,234.2	45,304.9
Dayton Drive	Wright to Central	11.2948	2.5367	193.5666	0.4834	0.7793	0.7187	32,775.0	32,827.3
Central Ave	Railroad to Dayton	56.4752	12.6814	966.2040	2.4124	3.8895	3.5871	163,586.0	163,847.4
Kauffman Ave	Railroad to High St	241.3100	54.1589	4110.5971	10.2546	16.5409	15.2562	695,816.8	696,926.4
Kauffman Ave	High St to Dayton-Yellow Springs	74.4262	16.7051	1268.5403	3.1649	5.1048	4.7083	214,736.5	215,079.0
Kauffman Ave	Dayton-Yellow Springs to Montgomery Ave	10.1735	2.2840	173.7555	0.4337	0.6993	0.6450	29,415.9	29,462.8
Total		**410.146**	**92.043**	**6980.479**	**17.411**	**28.087**	**25.906**	**1,181,564.3**	**1,183,447.8**

2032 Build PM Peak Hour Volumes									
		Emissions in Grams Per Peak Hour							
		NOx	VOC	CO	SO2	PM10	PM2.5	CO2	CO2e
Dayton Drive	Broad to Wright	54.2989	12.0624	842.7359	2.0628	3.3618	3.1054	142,004.9	142,222.2
Dayton Drive	Wright to Central	47.7938	10.6169	741.4757	1.8148	2.9577	2.7322	124,939.5	125,130.6
Central Ave	Railroad to Dayton	145.8260	32.3962	2264.0702	5.5423	9.0320	8.3431	381,513.3	382,097.1
Kauffman Ave	Railroad to High St	668.1553	148.4341	10372.9828	25.3921	41.3805	38.2241	1,747,921.7	1,750,596.2
Kauffman Ave	High St to Dayton-Yellow Springs	225.4648	50.0876	3499.9041	8.5672	13.9619	12.8969	589,755.5	590,657.8
Kauffman Ave	Dayton-Yellow Springs to Montgomery Ave	12.0463	2.6757	186.7463	0.4570	0.7449	0.6881	31,465.7	31,513.9
Total		**1153.585**	**256.273**	**17907.915**	**43.836**	**71.439**	**65.990**	**3,017,600.7**	**3,022,217.7**

Total Emissions		Comparison Between Alternatives							
Comparing	**2032 No Build PM Peak Hour Volumes**	Emissions Increase in Grams per Peak Hour							
to	**2010 Baseline, No Build PM Peak Hour Volumes**	NOx	VOC	CO	SO2	PM10	PM2.5	CO2	CO2e
Dayton Drive	**Broad to Wright**	-69.8761	-12.9021	-199.8412	-0.3579	-3.2215	-3.2129	-7,247.9	-7,415.5
Dayton Drive	**Wright to Central**	-57.4694	-10.9870	-192.7425	-0.3603	-2.5541	-2.5449	-10,582.5	-10,728.1
Central Ave	**Railroad to Dayton**	-267.7984	-50.9832	-850.7716	-1.5556	-11.8600	-11.8321	-40,341.0	-41,010.3
Kauffman Ave	**Railroad to High St**	-1107.4346	-210.6858	-3448.6982	-6.2536	-48.9533	-48.8646	-152,596.3	-155,358.8
Kauffman Ave	**High St to Dayton-Yellow Springs**	-331.4521	-63.0186	-1007.3140	-1.8052	-14.5979	-14.5813	-40,693.0	-41,516.3
Kauffman Ave	**Dayton-Yellow Springs to Montgomery Ave**	-45.9409	-8.7496	-141.3854	-0.2546	-2.0215	-2.0189	-5,954.0	-6,068.5
Grand Total		**-1879.972**	**-357.326**	**-5840.753**	**-10.587**	**-83.208**	**-83.055**	**-257,414.6**	**-262,097.5**

Total Emissions		Comparison Between Alternatives							
Comparing	**2032 Build PM Peak Hour Volumes**	Emissions Increase in Grams Per Peak Hour							
to	**2032 No Build PM Peak Hour Volumes**	NOx	VOC	CO	SO2	PM10	PM2.5	CO2	CO2e
Dayton Drive	**Broad to Wright**	37.8324	8.3859	574.9205	1.4008	2.2886	2.1149	96,770.8	96,917.3
Dayton Drive	**Wright to Central**	36.4990	8.0801	547.9091	1.3313	2.1784	2.0134	92,164.6	92,303.3
Central Ave	**Railroad to Dayton**	89.3508	19.7148	1297.8662	3.1299	5.1426	4.7559	217,927.3	218,249.7
Kauffman Ave	**Railroad to High St**	426.8453	94.2752	6262.3857	15.1375	24.8396	22.9679	1,052,105.0	1,053,669.9
Kauffman Ave	**High St to Dayton-Yellow Springs**	151.0385	33.3824	2231.3638	5.4023	8.8570	8.1886	375,019.0	375,578.8
Kauffman Ave	**Dayton-Yellow Springs to Montgomery Ave**	1.8729	0.3918	12.9908	0.0233	0.0455	0.0431	2,049.9	2,051.0
Grand Total		**743.439**	**164.230**	**10927.436**	**26.425**	**43.352**	**40.084**	**1,836,036.4**	**1,838,769.9**

Step 1 Estimate the Vehicle Miles Traveled (VMT) by Vehicle Class

For this analysis, Peak Hour Traffic count data was derived from the noise study conducted by LJB, Inc. for this EIS.
The route distance was estimated from maps and diagrams provided in the LJB Traffic Study (2009)

Area Description			Distance	Total Vehicles in Car Group	Total Vehicles in Heavy Truck Group
2010 Baseline, No Build PM Peak Hour Volumes		Direction	(miles)	(number/hr)	(number/hr)
Dayton Drive	Broad to Wright Ave	WB	0.201	130	3
		EB	0.201	434	4
Dayton Drive	Wright to Central Ave	WB	0.145	261	1
		EB	0.145	396	2
Central Ave	Railroad to Dayton	NB	0.327	744	4
		SB	0.327	626	3
Kauffman Ave	Railroad to High St	NB	1.569	687	3
		SB	1.569	500	3
Kauffman Ave	High St to Dayton-Yellow Springs	NB	0.556	632	3
		SB	0.556	376	2
Kauffman Ave	Dayton-Yellow Springs to Montgomery Ave	NB	0.072	647	3
		SB	0.072	432	2
	2032 No Build PM Peak Hour Volumes				
Dayton Drive	Broad to Wright	WB	0.201	153	3
		EB	0.201	484	5
Dayton Drive	Wright to Central	WB	0.145	284	1
		EB	0.145	371	2
Central Ave	Railroad to Dayton	NB	0.327	801	4
		SB	0.327	649	3
Kauffman Ave	Railroad to High St	NB	1.569	749	4
		SB	1.569	533	3
Kauffman Ave	High St to Dayton-Yellow Springs	NB	0.556	698	4
		SB	0.556	418	2
Kauffman Ave	Dayton-Yellow Springs to Montgomery Ave	NB	0.072	708	4
		SB	0.072	474	2

	2032 Build PM Peak Hour Volumes				
Dayton Drive	Broad to Wright	WB	0.201	845	17
		EB	0.201	1112	23
Dayton Drive	Wright to Central	WB	0.145	1067	22
		EB	0.145	1322	27
Central Ave	Railroad to Dayton	NB	0.327	1656	34
		SB	0.327	1583	32
Kauffman Ave	Railroad to High St	NB	1.569	1640	33
		SB	1.569	1450	30
Kauffman Ave	High St to Dayton-Yellow Springs	NB	0.556	1623	33
		SB	0.556	1317	27
Kauffman Ave	Dayton-Yellow Springs to Montgomery Ave	NB	0.072	728	15
		SB	0.072	483	10
	Total Route Distance		5.740	Miles	
			9238.4118	Meters	

Step 2 Select the Appropriate Air Pollutant Emission Factors (grams per mile) for the Study Group

The USEPA MOVES2010 Program has become the offical model approved for use with transportation confomity studies.
The following method was used to develop emission factor from MOVE2010 output data.
1. MOVES 2010 was run for years 2010 and 2032 and output data for thirteen vehicle catagories was collected for Green County Ohio.
The data included annual total mileage for gasoline and diesel vehicles and total emissions for each pollutants.
2. The thirteen vehicle categories were divided into two groups to correspond to the "car" and "heavy truck" groups from traffic count data.
3. An emission factor was calculated for each pollutant per gasoline type for each of the thirteen vehicle catagories from MOVES2010 data.
4. A weight emission factor was calculated for the"car" and "Heavy truck" group using emission factors for the thirteen categories weighted by the total miles compiled for Greene County,OH by MOVES2010.
Note that PM10 and PM 2.5 emission factors include both exhaust and "fugitive" emissions (paved road, brake & tire dust, etc.).
This was an available data selection that was made when compiling a MOVES2010 output report for Greene County, OH.

Emission Factors in g/mi from Moves2010 output for Greene County Ohio for all Vehicle Groups in CY 2010 and CY 2032.									
		NOx	VOC	CO	SO2	PM10	PM2.5	CO2	CO2e
2010	Car Grouping of Vehicles	0.70	0.14	4.02	0.009	0.033	0.033	450.855	452.920
2010	Heavy Truck Grouping of Vehicles	4.97	0.53	8.36	0.017	0.363	0.354	931.771	934.613
2032	Car Grouping of Vehicles	0.11	0.03	2.01	0.005	0.008	0.007	340.599	341.150
2032	Heavy Truck Grouping of Vehicles	1.20	0.25	6.43	0.009	0.021	0.020	977.313	978.239

Reference: Data from MOVES2010 Output Report Data for Greene County Ohio and the SR444 EIS Noise Traffic Volume Study
Notes: The g/mi emission factors are the result of the weighted average calculation from the MOVE2010 output report.

Step 3 Multiply the Emission Factors Times the Annual Vehicle Miles Traveled for Each Vehicle Class

Emissions (ton/yr) = [(EB + WB)car number x (weighted pollutant EF car group, g/mi) + (EB +WB)Trucks x (weighted pollutant EF truck group, g/mi.)] x (distance of road section, mi.) x (8,760 hr/yr)÷ (453.6 g/lb x 2000 lb/ton)

2010 Baseline, No Build PM Peak Hour Volumes

		Emissions in Tons per Year							
		NOx	VOC	CO	SO2	PM10	PM2.5	CO2	CO2e
Dayton Drive	Broad to Wright Ave	0.8337	0.1601	4.5157	0.0098	0.0415	0.0406	506.77	509.07
Dayton Drive	Wright to Central Ave	0.6640	0.1306	3.7302	0.0081	0.0322	0.0315	418.66	420.57
Central Ave	Railroad to Dayton	3.1312	0.6148	17.5449	0.0383	0.1521	0.1489	1,969.14	1,978.12
Kauffman Ave	Railroad to High St	13.0236	2.5574	72.9932	0.1594	0.6324	0.6192	8,192.35	8,229.74
Kauffman Ave	High St to Dayton-Yellow Springs	3.9192	0.7698	21.9758	0.0480	0.1903	0.1863	2,466.45	2,477.71
Kauffman Ave	Dayton-Yellow Springs to Montgomery Ave	0.5418	0.1065	3.0430	0.0066	0.0263	0.0257	341.53	343.09
Total		**22.114**	**4.339**	**123.803**	**0.270**	**1.075**	**1.052**	**13,894.90**	**13,958.31**

2032 No Build PM Peak Hour Volumes

		Emissions in Tons Per Year							
		NOx	VOC	CO	SO2	PM10	PM2.5	CO2	CO2e
Dayton Drive	Broad to Wright	0.1590	0.0355	2.5860	0.0064	0.0104	0.0096	436.77	437.47
Dayton Drive	Wright to Central	0.1091	0.0245	1.8691	0.0047	0.0075	0.0069	316.47	316.98
Central Ave	Railroad to Dayton	0.5453	0.1225	9.3297	0.0233	0.0376	0.0346	1,579.58	1,582.12
Kauffman Ave	Railroad to High St	2.3301	0.5230	39.6923	0.0990	0.1597	0.1473	6,718.77	6,729.58
Kauffman Ave	High St to Dayton-Yellow Springs	0.7187	0.1613	12.2491	0.0306	0.0493	0.0455	2,073.48	2,076.82
Kauffman Ave	Dayton-Yellow Springs to Montgomery Ave	0.0982	0.0221	1.6778	0.0042	0.0068	0.0062	284.04	284.50
Total		**3.960**	**0.889**	**67.404**	**0.168**	**0.271**	**0.250**	**11,409.11**	**11,427.47**

2032 Build PM Peak Hour Volumes

		Emissions in Tons Per Year							
		NOx	VOC	CO	SO2	PM10	PM2.5	CO2	CO2e
Dayton Drive	Broad to Wright	0.5243	0.1165	8.1375	0.0199	0.0325	0.0300	1,371.14	1,373.31
Dayton Drive	Wright to Central	0.4615	0.1025	7.1598	0.0175	0.0286	0.0264	1,206.36	1,208.27
Central Ave	Railroad to Dayton	1.4081	0.3128	21.8621	0.0535	0.0872	0.0806	3,683.73	3,689.56
Kauffman Ave	Railroad to High St	6.4518	1.4333	100.1624	0.2452	0.3996	0.3691	16,877.20	16,903.91
Kauffman Ave	High St to Dayton-Yellow Springs	2.1771	0.4836	33.7954	0.0827	0.1348	0.1245	5,694.43	5,703.44
Kauffman Ave	Dayton-Yellow Springs to Montgomery Ave	0.1163	0.0258	1.8032	0.0044	0.0072	0.0066	303.82	304.30
Total		**11.139**	**2.475**	**172.920**	**0.423**	**0.690**	**0.637**	**29,136.68**	**29,182.79**

Total Emissions		Comparison Between Alternatives							
Comparing	2032 No Build PM Peak Hour Volumes	Emissions Increase in Tons Per Year							
to	2010 Baseline, No Build PM Peak Hour Volumes	NOx	VOC	CO	SO2	PM10	PM2.5	CO2	CO2e
Dayton Drive	**Broad to Wright**	-0.6747	-0.1246	-1.9297	-0.0035	-0.0311	-0.0310	-70.00	-71.60
Dayton Drive	**Wright to Central**	-0.5549	-0.1061	-1.8611	-0.0035	-0.0247	-0.0246	-102.19	-103.59
Central Ave	**Railroad to Dayton**	-2.5859	-0.4923	-8.2151	-0.0150	-0.1145	-0.1143	-389.56	-396.00
Kauffman Ave	**Railroad to High St**	-10.6935	-2.0344	-33.3009	-0.0604	-0.4727	-0.4718	-1,473.58	-1,500.16
Kauffman Ave	**High St to Dayton-Yellow Springs**	-3.2005	-0.6085	-9.7267	-0.0174	-0.1410	-0.1408	-392.96	-400.89
Kauffman Ave	**Dayton-Yellow Springs to Montgomery Ave**	-0.4436	-0.0845	-1.3652	-0.0025	-0.0195	-0.0195	-57.50	-58.60
Grand Total		**-18.153**	**-3.450**	**-56.399**	**-0.102**	**-0.803**	**-0.802**	**-2,485.79**	**-2,530.84**

Total Emissions		Comparison Between Alternatives							
Comparing	2032 Build PM Peak Hour Volumes	Emissions Increase in Tons Per Year							
to	2032 No Build PM Peak Hour Volumes	NOx	VOC	CO	SO2	PM10	PM2.5	CO2	CO2e
Dayton Drive	**Broad to Wright**	0.3653	0.0810	5.5515	0.0135	0.0221	0.0204	934.37	935.84
Dayton Drive	**Wright to Central**	0.3524	0.0780	5.2907	0.0129	0.0210	0.0194	889.89	891.29
Central Ave	**Railroad to Dayton**	0.8628	0.1904	12.5323	0.0302	0.0497	0.0459	2,104.15	2,107.44
Kauffman Ave	**Railroad to High St**	4.1217	0.9103	60.4701	0.1462	0.2399	0.2218	10,158.43	10,174.33
Kauffman Ave	**High St to Dayton-Yellow Springs**	1.4584	0.3223	21.5462	0.0522	0.0855	0.0791	3,620.95	3,626.62
Kauffman Ave	**Dayton-Yellow Springs to Montgomery Ave**	0.0181	0.0038	0.1254	0.0002	0.0004	0.0004	19.78	19.81
Grand Total		**7.179**	**1.586**	**105.516**	**0.255**	**0.419**	**0.387**	**17,727.57**	**17,755.32**

Appendix C

Traffic Noise Screening Report

TRAFFIC NOISE SCREENING REPORT

Environmental Impact Statement for Entry Control Reconfiguration and Base Perimeter Fence Relocation, Area A
Wright-Patterson Air Force Base, Ohio

Prepared For:
88th Air Base Wing
Wright-Patterson Air Force Base

Prepared By:
LJB Inc.

May 25, 2011

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1 INTRODUCTION

To conform to the elevated anti-terrorism security standards, Wright-Patterson Air Force Base (WPAFB) is proposing to improve security, safety, and traffic flow through base property by consolidating, relocating, and reconfiguring vehicle entry control facilities (ECFs) which include closure of State Route (SR) 444 located on base property between Dayton-Yellow Springs Road and Dayton Drive in the city of Fairborn, Ohio.

The purpose of this report is to document existing and future potential traffic noise conditions along roadways potentially impacted by the Proposed Action. The noise screening will determine whether existing and/or predicted traffic noise will result in potential noise impacts, and, if necessary, consider the feasibility and reasonability of noise abatement measures.

1.1 STUDY AREA DESCRIPTION

SR 444 is a principal arterial running from the west at SR 4, between WPAFB's Area A and B, through the city of Fairborn, and ending at Interstate Route 675 in the east. The section of SR 444 proposed for closure is currently located on base property and separates Area A from WPAFB's Kittyhawk Center. The study area included roadways north of Gate 12A at the intersection of SR 444 and Dayton-Yellow Springs Road; Dayton-Yellow Springs Road to Kauffman Avenue; and north along Kauffman Avenue parallel to SR 444 and Norfolk Southern Railroad to Central Avenue; Central Avenue west along Dayton Drive; SR 444 at the intersection of Dayton Drive and Broad Street near Gate 1A.

Adding traffic along proposed route from SR 444 could potentially impact the surrounding noise sensitive land uses within the study area.

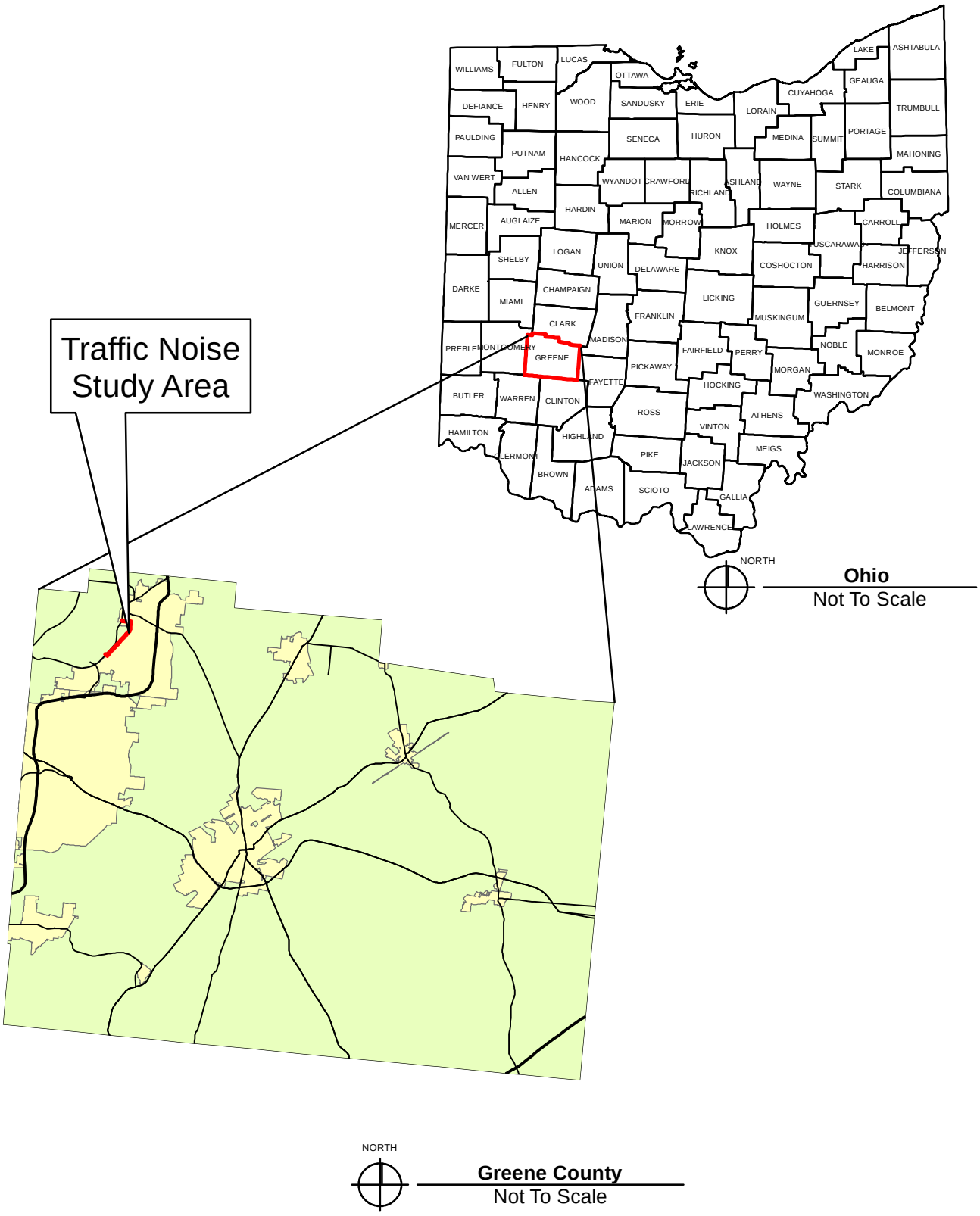


Figure 1: Project Location Map

EIS for State Route 444 Reconfiguration
Traffic Noise Screening

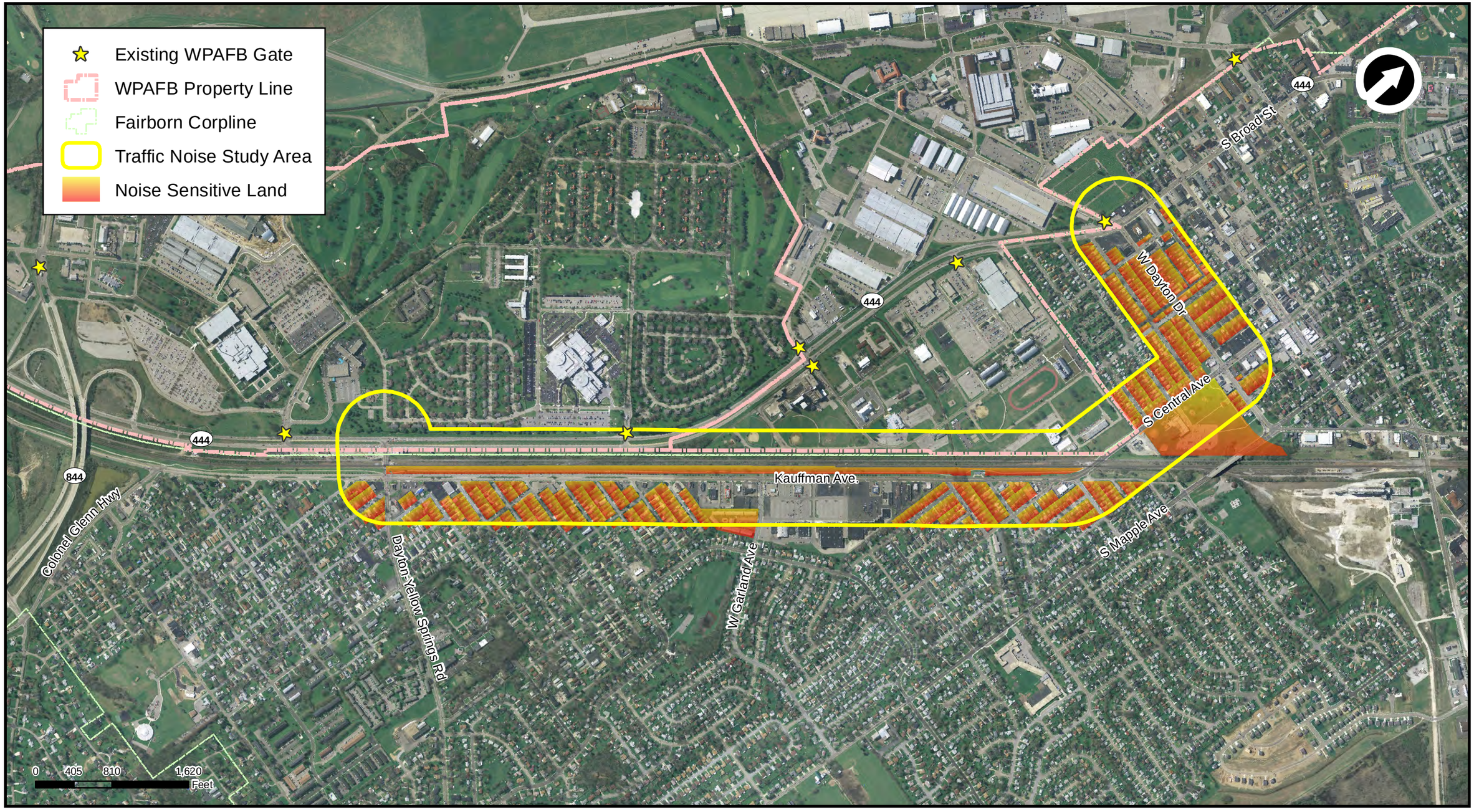


Figure 2: Traffic Noise Study Area

EIS for State Route 444 Reconfiguration
Traffic Noise Screening

2 TRAFFIC NOISE ANALYSIS OVERVIEW

2.1 GUIDANCE

The Ohio Department of Transportation (ODOT) policy memorandum *Standard Procedure for Analysis and Abatement of Highway Traffic Noise* effective February 5, 2010, defines procedures for conducting noise impact analyses and assessing mitigation measures for highway projects in the State of Ohio. The guidance provided in this memorandum was issued under the authority of Federal Highway Administration (FHWA) Policy memorandum *Highway Traffic Noise Analysis and Abatement: Policy and Guidance* (June 12, 1995), and Title 23 Code of Federal Regulations Section 772 *Procedures for Abatement of Highway Traffic Noise and Construction Noise*.

2.2 APPLICABILITY

Under ODOT guidance and Federal regulations, the EIS Proposed Action qualifies this project as a Type I project. Type I projects consist of federal and/or state funded highway projects that involve the construction of a highway on new location, or involve a substantial change in either the horizontal or vertical alignment of an existing highway, or increase the number of through lanes on an existing highway, and therefore increase capacity resulting in additional traffic volumes. In this case, the increase in traffic volumes is expected to result from the action closing SR 444, resulting in additional traffic along the city streets within the study area.

2.3 TRAFFIC NOISE SCREENING OBJECTIVES

- Identify noise sensitive land uses within the traffic noise analysis area.
- Demonstrate existing noise conditions through the use of field measurements and computer modeling.
- Predict future noise levels for both the build and no-build scenarios through traffic noise modeling.
- Analyze model results to determine if potential traffic noise impacts to noise sensitive land uses are present, and/or whether the project will elevate potential traffic noise impacts or create new traffic noise impacts in the project design year.
- If impacts warrant, identify and evaluate reasonable and feasible noise abatement measures for reducing noise where impacts at noise sensitive land uses are present.

2.4 TRAFFIC NOISE IMPACT CRITERIA

For a traffic noise screening, potential traffic noise impacted locations are considered to be any noise sensitive land use predicted to experience design year traffic noise levels exceeding 60 dBA (A-weighted decibel) based on current design information. These areas identified during the screening process may require further analysis during subsequent project phases based on the criteria below.

Traffic noise impacts are considered to occur when one of the following criteria is met:

1. Predicted traffic noise levels for the project design year at noise sensitive land uses approach (within 1 dBA) or exceed the Noise Abatement Criteria (NAC) provided in **Table 1** below.
2. The predicted traffic noise levels for the project design year substantially exceed existing noise levels at noise sensitive land uses. The ODOT policy identifies a 10 dBA increase over existing traffic noise as “substantial.”

If one or both of these conditions are met as a result of the project, noise abatement measures must be considered.

Table 1: Noise Abatement Criteria (NAC)
Hourly A-Weighted Sound Level in Decibels (dBA)

Activity Category	$L_{eq}(h)$	$L_{10}(h)$	Description of Activity Category
A	57 (Exterior)	60 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need, and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose
B	67 (Exterior)	70 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks that are not included in Category A, residences, motels, hotels, public meeting rooms, schools, churches, libraries, and hospitals.
C	72 (Exterior)	75 (Exterior)	Developed lands, properties or activities not included in Categories A or B above.
D	--	--	Undeveloped land.
E	52 (Interior)	55 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

Notes: $L_{eq}(h)$=equivalent noise levels on an hourly value; $L_{10}(h)$=A-weighted sound level exceeded 10 percent of the time

Measures to mitigate traffic noise impacts are considered only if a substantial decrease [at least 5 decibels (dB)] can be realized through the mitigation measures. Otherwise, noticeable and effective attenuation has not been obtained. Mitigation measures must also be found to be reasonable and feasible to build. While such measures may be feasible to implement (e.g., the topography of the project area would permit the installation of barriers, for example), the policy also considers whether the cost per benefitted dwelling unit is reasonable. The reasonable test identified in the ODOT policy requires that the construction cost estimate per benefited dwelling unit (household) is not to exceed $35,000.

2.5 NOISE DESCRIPTORS

This report will describe noise in dB. Decibels are a unit of measure on a logarithmic scale used to demonstrate the amount of sound pressure at a given location from the general environment or specific sources. The decibel scale includes a range of 0 dB to 120 dB. A change of 10 dB in either direction constitutes doubling or halving the sound pressure level.

Sound is composed of a variety of frequencies, but the human ear does not respond to all of these frequencies. When measuring traffic noise levels, it is important to filter out selected frequencies that may be part of the sound emitted from traffic, but do not contribute to the traffic “noise” because the human ear does not respond to them. Weighting methods that approximate the response of the human ear to sound have been developed, and are available as settings on noise measuring meters to filter out those frequencies that the human ear does not hear. The dBA has been found to best approximate the frequency response of the human ear. This is the measure most typically used in community sound ordinances and in traffic related noise measurements. Therefore, measurements of ambient noise levels and levels predicted by the traffic noise modeling software are presented in dBA in this report. Typically, a person is unable to detect changes in the sound pressure level of less than 3 dBA. Generally, people can readily detect a change of 5 dBA.

When quantifying environmental noise, consideration must be given to the changes in noise levels over time. To properly measure environmental noise, it is best to measure an equivalent sound level over a period of interest. The $L_{eq(h)}$ measure is widely accepted for calculating environmental noise based on an hourly value (h). Field measurements and the computer traffic noise model used this measure for this analysis.

2.6 NOISE SENSITIVE LAND USES – PROJECT AREA

A traffic noise analysis is required when nearby land uses include those categorized as "noise sensitive" by ODOT and FHWA policy, and when the project meets the applicable characteristics described in section 2.2 above. Noise sensitive land uses within 500 feet of a proposed transportation project (referred to as the "traffic noise analysis area") were identified and analyzed for traffic noise impacts.

Table 1 above provides the five activity categories established by FHWA for assessment of traffic noise impacts - ODOT's noise policy identifies noise sensitive land use areas based on Activity Category A and B. Land uses identified as Activity Category B are present in the traffic noise analysis area, and are comprised of over 400 residential dwelling units, a bikeway, and a city park. **Figure 2** above shows noise sensitive land uses in the study area. The land adjacent to the project area is primarily comprised of residential areas and small business.

2.7 AREA NOISE GENERATORS – TRAFFIC NOISE ANALYSIS AREA

The proposed roadway network through the project area serves as the predominant traffic noise generator in the analysis area. No heavy industries are evident in the traffic noise analysis area. An active Norfolk Southern rail line located approximately 95 feet west of Kauffman Road and crosses the project area twice at grade-level crossings and is expected to contribute noise spikes at noise sensitive land uses.

WPAFB airfield is located as close as 0.5 miles northwest of the study area and is expected to contribute noise spikes at noise sensitive land uses when aircraft fly over. However, the 1995 AICUZ Study for Wright-Patterson AFB, Ohio (WPAFB 1995a), as part of the Department of Defense program that identifies compatible use zones for air installation, established that no noise-sensitive receptors were identified in the compatible use zones in the vicinity of WPAFB. In addition, WPAFB has initiated a project that potentially would transition their aircraft fleet from the existing C-5 aircraft to the quieter C-17. This transition is expected to be combined with a reduction in total airfield operations compared to the maximum operational scenario for WPAFB. Additional information regarding the on-base noise environment is provided in Section 8.0 below.

2.8 FIELD MEASUREMENTS EQUIPMENT

A Quest 2800 sound meter was used to measure traffic noise for this screening. The meter used was set to L_{eq} mode, and the frequency response set to the A scale (to filter out frequencies that the human ear does not respond to) – both of these settings are considered by ODOT and FHWA as the typical settings to use for traffic noise analysis. The meter was calibrated using a Quest Technologies Model QC-10 Sound Calibrator immediately before sound measurements were taken, and a windscreen was used to shield the microphones from the effects of wind noise. The noise meter was placed on a tripod at a height of 5 feet above the ground. 15-minute recording intervals were used for this analysis.

The Quest 2800 noise-measuring device and the Quest QC-10 Calibrator were professionally recalibrated in July 2010. Certificates of calibration have been provided in Appendix A.

3 TRAFFIC NOISE MODEL

3.1 MODELING SOFTWARE

Traffic noise levels for the existing conditions (2010) and the design year (2032) were modeled using the FHWA Traffic Noise Model (TNM) Version 2.5, in accordance with ODOT and FHWA guidelines.

3.2 REPRESENTATIVE NOISE RECEPTORS

This traffic noise study analyzed existing and future traffic noise impacts on seven noise sensitive properties located within 500 feet from the edge of the outside travel lane for the proposed project. This 500 foot boundary was used in accordance with *Standard Procedure for Analysis and Abatement of Highway Traffic Noise* (see Section 2.1 above).

Seven traffic noise receptor locations were identified for inclusion in the TNM model, most representing multiple noise sensitive properties in the traffic noise analysis area. The TNM program models traffic noise levels at these receptor locations to determine if traffic noise currently impacts these noise sensitive land uses, and if the Proposed Action would result in new impacts or a substantial increase in traffic noise levels in the project design year. Appendix B contains aerial mapping at a 1 inch equals 200 foot scale that provides the locations of the representative receptors.

3.3 TRAFFIC VOLUMES – PROJECT AREA

The traffic modeling performed for this noise screening is comprised of two components: exhibiting the validity of the traffic noise model results, and performing traffic noise modeling that is the basis of the screening findings. The process involved in each component is discussed in more detail in the next section.

Each component uses a different set of traffic volumes. To validate the TNM results, traffic volumes were collected along Kauffman Avenue, Central Avenue, and Dayton Drive during the periods when traffic noise measurements were collected (see 4.0 below). These volumes were input into the TNM and the results compared to the field measurements to establish that the TNM predictions are valid.

The TNM models constructed to derive the noise levels for the traffic noise screening used PM peak hour traffic volumes that were generated during the NEPA process for the Proposed Action. The volumes generated represent the worst-case hourly traffic volumes to input into the TNM. This process involves predicting traffic noise levels under three conditions: the 2010 Existing condition, the 2032 No Build condition, and 2032 Build (proposed) condition. Appendix C provides the traffic volume data as inputted into the TNM.

4 MODEL RESULTS AND POTENTIAL IMPACT ASSESSMENT

4.1 TRAFFIC MODEL VALIDATION

Manual field measurements were taken at six locations to validate the accuracy of the TNM model output. According to ODOT guidance regarding traffic noise modeling, if field measurements vary from the model results by more than 3 dBA, assessment of the TNM may be required. Measurement locations were selected to measure traffic noise impacts at representative receptor locations for noise sensitive land uses in the analysis area, including residential developments, a location along Huffman Prairie Bikeway, and city of Fairborn's Central Park. Appendix B contains aerial mapping that shows the overall locations of the field measurements in the study area, and scaled in maps showing the locations at a scale of 1-inch equals 200 feet. During the field measurement period, manual traffic volume counts were performed on traffic travelling on the respective frontage road, the dominant traffic noise generator in the study area. These manual traffic counts were used to validate prediction output data from the TNM.

Field measurements were conducted during two measurement sessions over a two day period during the week of April 11, 2011. Manual traffic counts on each section of Kauffman Ave (Montgomery Road to Dayton-Yellow Spring Road, Dayton-Yellow Springs Road to State Street, State Street to High Street, and High Street to Central Avenue), Central Avenue (Kauffman Ave to Dayton Drive), and Dayton Drive (SR 444 to Central Avenue) were performed over each measurement session, and the peak hour volumes from each session was calculated and used in the TNM. Appendix C provides the data from the manual traffic count and the worksheet developed to determine the appropriate hour of data to use in the 2010 Existing condition model.

Table 2 provides the results of the field measurements and a comparison of model output data at the same locations. All locations are categorized as "Activity Category B" as described in **Table 1** above.

Table 2: Field Measurement Results

Location of Field Measurement	TNM Name	Field Measured Traffic Noise (dBA)	TNM Results (dBA)	Change btw TNM Output and Field Measurment (dBA)
1662 Kauffman Avenue	1	64.3	63.3	-1.0
417 Madison Street	2	57.6	59.6	2.0
Huffman Prairie Bikeway	3	62.5	59.8	-2.7
110 Lindberg Drive	4	59.8	60.6	0.8
Central Park	5	54.3	55.8	1.5
112 Dayton Drive	6	52.0	54.5	2.5

Notes: TNM= Traffic Noise Model; dBA=A-weighted decibel

4.2 TNM MODELS – EXISTING, NO BUILD, AND BUILD SCENARIOS

The Existing scenario represents the current condition where SR 444 is open to traffic through the Kittyhawk area. TNM 2.5 was used to predict traffic noise levels for the year 2010. The year 2010 represents the latest year that traffic volume data has been derived for the peak traffic volume hour. The Existing condition represents the baseline prediction for this screening, against which the other conditions are compared to assess the potential for traffic noise impacts to result from the Proposed Action. See Appendix D for TNM model input data tables and Appendix E for TNM output results for the Existing condition.

Both the Build and the No Build scenarios represent conditions in the noise screening area in the year 2032 (the project design year). The No Build scenario represents the condition where the subject section of SR 444 remains open and traffic is not diverted through the study area, therefore additional traffic is not moved closer to noise sensitive land uses adjacent to the highway. The Build scenario represents the condition where the proposed closed section of SR 444 diverts traffic through the project area, thus moving traffic closer to adjacent land uses. TNM 2.5 was used to predict the traffic noise levels in the year 2032 for both conditions - see Appendix D for TNM model input data tables and Appendix E for TNM output results. **Table 3** below provides a summary of model results for each condition.

Table 3: TNM Summary Results

Location of Representative Reciever	TNM Name	Existing - 2010 No Build (dBA)	No Build- 2032 (dBA)	Build - 2032 (dBA)	Increase over Existing - No Build (dBA)	Increase over Existing - Build (dBA)	Increase over No Build - Build (dBA)
1662 Kauffman Avenue	1	63.7	64.2	65.4	0.5	1.7	1.2
417 Madison Street	2	59.4	59.8	64.8	0.4	5.4	5.0
Huffman Prairie Bikeway	3	59.3	59.7	65.3	0.4	6.0	5.6
110 Lindberg Drive	4	61.0	61.4	**66.1**	0.4	5.1	4.7
Central Park	5	58.4	58.6	63.3	0.2	4.9	4.7
112 Dayton Drive	6	54.2	54.4	61.0	0.2	6.8	6.6
315 Dayton Drive	7	54.5	55.0	60.1	0.5	5.6	5.1

As Table 3 shows, the model results indicate that both the Existing (2010) and the 2032 No Build conditions identify two of the seven representative receiver locations having predicted noise levels greater than 60 dBA, thus classifying these as potentially impacted locations (indicated in red). The locations identified as having potential noise impacts for the existing and no build conditions are primarily single family residential properties with a few small businesses fronting the screened route. However, none of the receiver locations for either Existing or 2032 No Build conditions had predicted noise levels approaching the 67 dBA noise mitigation criteria. Appendix E provides model results and analysis for each representative receiver location.

Also, Table 3 shows virtually no change in traffic noise levels when comparing the Existing conditions (2010) with the 2032 No Build condition. The average (mean) dBA for the Existing condition is 58.6, while the 2032 No Build condition is predicted at 59.0 dBA, with no representative receiver predicted to experience an increase of more than 0.5 dBA. Generally speaking, this slight increase in traffic noise would not be discernable by the human ear.

Even though the Existing 2010 and the 2032 No Build noise levels showed few potential impacts, under the 2032 Build condition TNM predicted noise levels greater than 60 dBA, indicating the potential for traffic noise impacts that may require additional, more detailed study at a later stage in the project development process. In addition to the already identified residential properties for the

Existing and 2032 No Build scenarios, potentially impacted locations include the Huffman Prairie Bikeway, YMCA, and Four Oaks Early Intervention adjacent to Central Park, and a greater number of residential properties.

Based on these results, all locations in the study area have potential noise impacts greater than 60 dBA and would require further noise analysis to determine if these locations are predicted to experience noise levels approaching the NAC of 67 dBA. One location, shown in bold red in Table 3, is predicted to approach the NAC as part of this screening.

4.3 TNM MODEL RESULTS SUMMARY

All noise sensitive land uses along the proposed corridor could potentially be impacted as a result of the additional traffic generated by the closure of SR 444 between Dayton-Yellow Springs Road and Dayton Drive. However, based on the screening TNM results, only one section of Kauffman Avenue could experience noise levels of approaching the 67 dBA level thus requiring a noise abatement assessment. Following the ODOT procedure for noise abatement a final and more detailed noise analysis would be required to fully determine noise mitigation measures.

5 CONSIDERATION OF TRAFFIC NOISE ABATEMENT

In accordance with 23 CFR 772, noise abatement measures were conceptually evaluated for potentially impacted land uses that are predicted to approach or exceed the NAC. Abatement measures that should be considered include traffic management, modification to vertical and horizontal alignments, noise insulation and construction of permanent noise barriers within, or adjacent to, the right-of-way. To be considered for implementation, a measure must be both reasonable and feasible. Feasibility includes considerations for the effectiveness of the measure and the number of receivers that would benefit from implementation of the measure. Reasonableness includes such considerations as overall environmental effects, community desirability, the degree that future noise levels are impacted by the project, and practical constructability. For the purposes of this screening, these measures are addressed in relation to the study area, identified noise sensitive land uses, and the potential noise impacts discussed above. Further consideration and any final decisions on implementation of one or more of these measures would require more detailed traffic noise analyses that would occur in later design phases of any proposed project.

5.1 ABATEMENT MEASURES CONSIDERED

Traffic Management Measures. Traffic management measures include restrictions on speed, traffic volumes, access for certain motor vehicle types, and times of travel. Current local traffic uses each of these streets (Kauffman Avenue, Central Avenue and Dayton Drive) to reach surrounding neighborhoods and other local amenities. With the closure of SR 444 and the subsequent re-designation of the SR to the study area network, these streets are expected to also provide the connections to both SR 4 and Interstate 675 and therefore support more regional travel patterns. Traffic management restrictions described above would be counter to the purpose of this transportation facility, and therefore are not reasonable to implement.

Alteration of Horizontal and Vertical Alignments. Alignment of the road refers to the physical layout and location of the highway. No changes in the alignment along the proposed traffic diversion route are anticipated to occur with the WPAFB's closure of SR 444 project. The existing general alignment of all roads are already fixed within the existing right of way through a fully developed urban area, and changes to either the vertical or horizontal alignment would likely require substantial and expensive property acquisition. In addition, noise sensitive land uses flank both sides of the highway throughout the study area. Widening to one side would potentially move traffic away from noise sensitive areas on one side of the street network, but would result in shifting the traffic closer to noise sensitive uses on the other side.

Noise Insulation of Public Use or Non-Profit Institutional Structures. The only property potentially fulfilling the requirements for noise insulation would be the YMCA of Greater Dayton and Four Oaks Early Intervention building, located just south of Central Park along Central Avenue. This is not a location indicated in the TNM results to have noise levels requiring noise mitigation. Therefore, noise insulation measures are likely not warranted.

Noise Barrier Construction. Noise barriers reduce noise by blocking the path of sound between the source of the noise and the receiver. To be effective, a noise barrier should be located adjacent to either the noise source or the receiver. There must be a long, continuous break of the line-of-sight from the highway to the receiver. Noise barriers are typically designed to achieve a minimum reduction of 5 dBA for "first row" receptors, and 3 dBA for other receptors further from the noise generator to be considered effective. A minimum reduction of 3 dBA must be achieved for a particular receiver to be considered benefiting from a barrier. Noise barrier construction is considered reasonable (according to ODOT noise policy) if the construction cost is less than $35,000 per benefited receiver.

As stated in the ODOT Standard Procedure for Analysis and Abatement of Highway Traffic Noise, noise abatement in the form of noise barriers and other measures are often not feasible in an urban setting, due to property access issues and the nature of the urban environment. Since the project study area is completely within an urban environment with numerous driveways for residences and business and additional breaks for side street access would make a noise barrier would be ineffective and unreasonable. Therefore, further barrier analysis would be unnecessary given the urban nature of the study area.

6 UNDEVELOPED LAND

Little vacant land is present in the traffic noise screening area. Most open areas are designated as park or recreation areas. A few properties appear vacant and therefore may represent land with development potential. If these properties develop it would not comprise a noise sensitive land use if developed under the current zoning designation.

7 ON-BASE NOISE ENVIRONMENT & GENERATION

The Occupational Safety and Health Administration (OSHA) established noise exposure standards to protect the hearing of employees. One such standard is designed to protect general industry employees, such as those working in the manufacturing, utilities, and service sectors (1910.95, Occupational Noise Exposure). OSHA standards for noise in the construction industry include 1926.52, Occupational Noise Exposure, and 1926.101, Hearing Protection. Other federal agencies and organizations have established similar criteria. The American Conference of Governmental Industrial Hygienists (ACGIH) has established exposure guidelines for occupational exposure to noise in its threshold limit values, and the National Institute for Occupational Safety and Health (NIOSH) recommends following noise exposure criteria established in the Criteria for a Recommended Standard: Occupational Noise Exposure – Revised Criteria, Publication No. 98-126 (NIOSH, 1998) (CH2MHill, 2007).

To address both noise and safety, the DOD requires 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. Noise generated by aircraft approaching and leaving the main runway at Patterson Field (Area A) has been modeled based on the type and number of aircraft, and is expressed as the average day-night noise level in dB. The day-night noise level is mapped as contours in increments of 5 dB, radiating from the main airfield. The airfield near the museum in Area B is so infrequently used that it is not included in the model. These aircraft noise levels represent existing conditions to which potential noise levels from construction can be compared. The project area is located in the less than 65 dB and 65 to 70 dB current operations noise contours. Should the mission increase in the future, the noise levels may increase in Area A to 65 to 70 and 70 to 75 dB.

While noise is generated from many sources, transportation related noise is a pervasive and difficult source to avoid in modern culture, and in particular traffic noise generated by automobiles is a major contributor to the typical noise environment. The action alternatives involve transportation related modifications to ECFs, and some of the modifications are in areas that are adjacent to noise sensitive land uses, such as residential and recreational uses.

The proposed reconfigurations of ECFs and related roadways are limited to Area A of the base. The noise sensitive uses within Area A generally lie in two locations;

- The area bound by Skeel Avenue to the west and north, Schuster Road to the East, and SR 444 to the south includes three residential developments (Brick Quarters, Green Acres, and Pine Estates), the Prairie Trace golf course, Dodge Gym, Hope Hotel and Medical Center; and
- The southern side of the Kittyhawk Center, bound by SR 444 to the north, Redwood Street to the east, and rail corridor to the south, with outdoor recreational uses including baseball diamonds and a running track.

The proposed action involves reconfiguring the following ECFs in Area A: Gate 1A, Gate 15A, and Gate 26A. A brief discussion of each proposed action and its potential affect to on-Base noise sensitive land uses are described below.

Relocate/Reconfigure Gate 1A and SR 444 Closure. Under the Proposed Action, Gate 1A would be relocated and designed as a new manned gate that would serve as a secondary ECF in Area A (see Figure 3). Gate 1A would be relocated just north of existing Gate 39A at the intersection of Redwood Street and SR 444. The new location of Gate 1A would utilize the SR 444 roadway. SR 444 would be closed as a public roadway west of existing Gate 1A and constructed on new location west of

Estabrook Road to connect into Spruce Way. Wright Avenue would be closed at existing Gate 1A. Schuster Road will be widened and constructed as the through movement at the Schuster/Wright/Pearson intersection.

This Proposed Action will reduce on-Base vehicular noise levels by the reroute of SR 444 traffic that would not enter the base. Schuster Road and the proposed connector road to Spruce Way are expected to experience an increase in traffic volumes, but due to its proximity to SR 444 the overall vehicular noise levels on-Base are expected to be reduced by this action.

Reconfigure Gare 15A. Gate 15A is currently the highest volume gate in Area A. Under the Proposed Action, Gate 15A would be reconfigured in the vicinity of its current location (see Figure 4). Access from gate 15A to Communications Boulevard would be permanently closed, as would access from Gate 15A to Kuglics Boulevard. Traffic resulting in closing access to Communications Boulevard and Kuglics Boulevard from 15A would be redirected north, via Warner Robins Street, to the Skeel Avenue and Hebble Creek Road intersection.

The Proposed Action exists in a location with only one identified noise sensitive land use – the Prairie Trace golf course. Vehicular traffic will likely increase around the Skeel Avenue/Hebble Creek Road intersection and further north along Skeel Avenue itself. Therefore vehicular noise levels could increase along properties adjacent to Skeel Avenue, including the Prairie Trace golf course. Only minor increases would be anticipated.

Relocate/Reconfigure Gate 26A. Underr the Proposed Action, Gate 26A would be relocated and reconfigured from its current location to a location north of the Circle Drive and SR 235 intersection (see Figure 5). Gate 26A would serve as a secondary gate to Area A with a primary purpose of inspecting commercial vehicles entering the base. Commercial vehicle inspections are currently conducted at gate 16A.

No on-Base noise sensitive land uses exist within the vicinity of the proposed location for Gate 26A. Although the area on-Base roadways will experience an increase in commercial vehicles, it is not expected to result in any significant increases to noise levels due to the expected delay between these vehicles caused by the need for their individual inspections at the gate.

Under the Proposed Action, which includes reconfiguring Gate 1A, Gate 15A, and Gate 26A, as well as closure of SR 444 to non-base traffic through the Base, the anticipated changes in vehicular roadway patterns would result in an overall reduction in transporation related noise volumes for Area A of the Base.

Installation Area
Proposed Alignment
Area of Potential Effect
Proposed Guard Shack
Proposed Road Closure/Remove Pavement
Houses Removed
Proposed Gate Closure

N

0 270 540 1,080

WRIGHT-PATTERSON AIR FORCE BASE, OHIO

Figure 3
Gate 1A Relocation / Reconfiguration

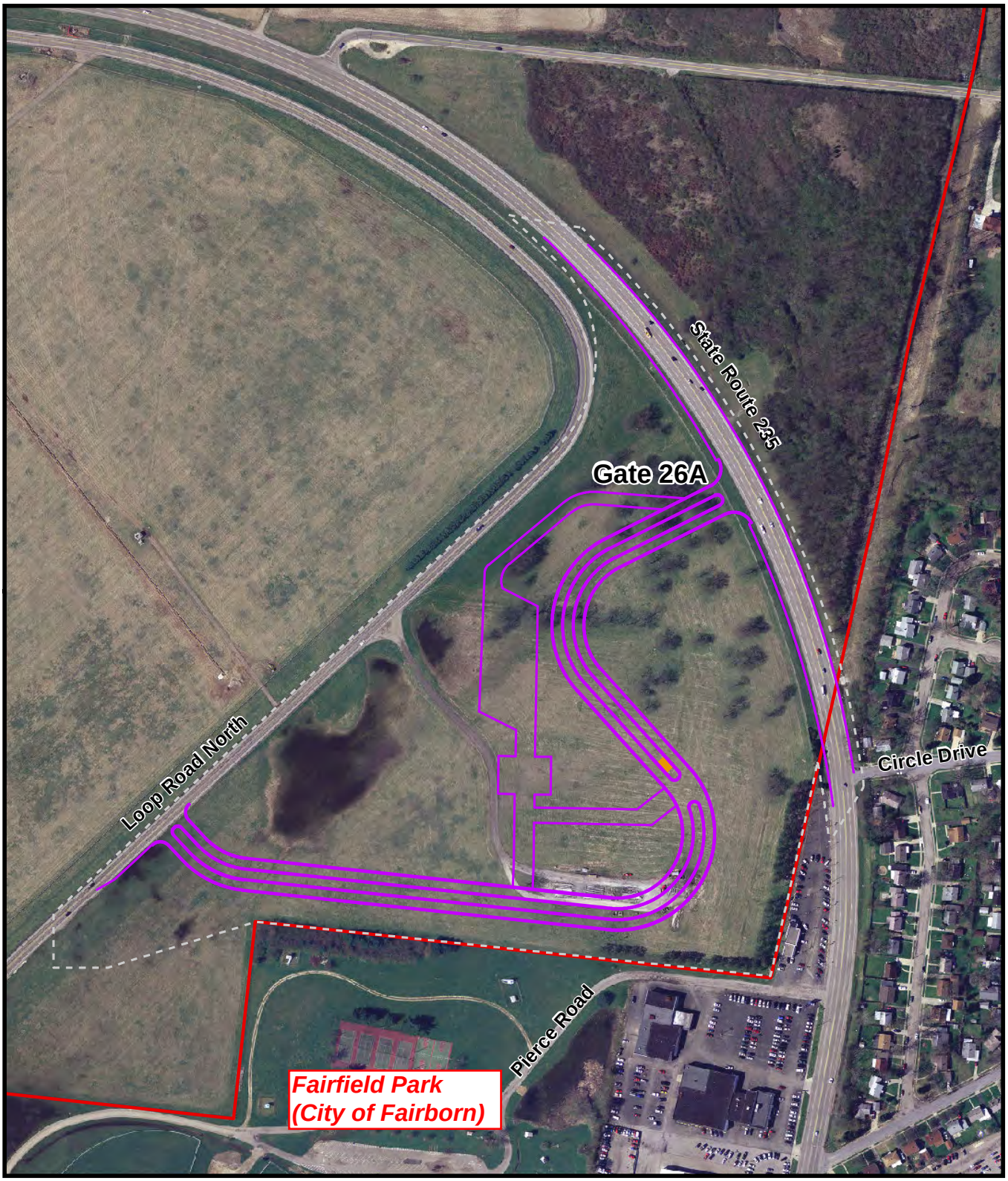
Installation Area
Proposed Alignment
Area of Potential Effect
Proposed Guard Shack

N

0 270 540 1,080

WRIGHT-PATTERSON AIR FORCE BASE, OHIO

Figure 4
Gate 15A Reconfiguration



Installation Area
Proposed Alignment
Area of Potential Effect
Proposed Guard Shack

N

0 125 250 500

WRIGHT-PATTERSON AIR FORCE BASE, OHIO

Figure 5
Gate 26A Relocation / Reconfiguration

8 CONSTRUCTION NOISE

Noise from construction activities will add to the average noise level during the construction phase of the project. However, construction activities will be temporary. All activities are expected to occur during normal daytime waking hours; however, noise from construction could result in annoyance or disruption of sleep if nighttime operations should occur near noise-sensitive land uses.

8.1 OFF-BASE CONSTRUCTION NOISE

In the case of off-Base roadway construction operations resulting from the Proposed Action, construction operations would need to adhere to any local construction noise ordinances. Noise may be generated by increases in heavy truck traffic to and from the project area. This increase in noise will typically occur during daytime hours.

Increases in the average noise level due to construction are temporary, but it is expected that measures would be taken to minimize the impact of additional noise. Standard measures include:

- Limit operation of heavy equipment and other noisy procedures to daylight hours whenever possible.
- Install and maintain effective mufflers on equipment.
- Locate equipment and vehicle staging areas as far from noise sensitive areas as possible.
- Limit unnecessary idling of equipment.

These recommended standard measures would be incorporated into the roadway construction plans developed by the city of Fairborn and/or the Ohio Department of Transportation.

8.2 ON-BASE CONSTRUCTION NOISE

Construction of the Proposed Action will generate minor, negative short-term impacts on ambient noise levels in and near the project area. The use of heavy equipment including bulldozers, graders, backhoes, excavators, and dump trucks would generate noise that could affect construction workers. Construction equipment typically emits noise in the 86 to 94 dB range, with heavy duty trucks generating a noise level of approximately 90 dBA (very loud) at 50 feet for example. Attenuation to 65 dBA (moderately loud) would occur at a distance of approximately 800 to 1,000 feet depending on climatic conditions, topography, vegetation, and manmade barriers (Generac Power System, Inc., 2004, as cited in USAF, 2007 and CH2MHill 2007).

Construction workers would be expected to use hearing protection and follow OSHA standards and procedures. Onsite workers in the nearby facilities would experience short-term, intermittent muffled noise during the workday. Residences in the vicinity of the proposed Gate 1A (see Figure 5) may experience some short-term, intermittent muffled noise during the workday when road improvements are under construction, particularly in the area of the Schuster Road intersection with Talbott Road, and the intersection of re-aligned Spruce Way with Redbud Lane. This would also be the case in the off-base neighborhood near the intersection of SR 235 and Circle Drive, across from the proposed relocation of Gate 26A, and for the residential area across SR 444 from Gate 12A. While this intermittent, temporary exposure could be a nuisance, it would not be expected to pose a threat to hearing.

Once construction of the ECFs and related roadway approaches is complete, noise associated with construction activities would cease.

9 CONCLUSIONS

The off-Base traffic noise screening report documents the assessment of potential traffic noise impacts resulting from the closure of SR 444 between Dayton-Yellow Springs Road and Dayton Drive in the city of Fairborn, Ohio and WPAFB property. Noise sensitive land uses are located adjacent to the proposed route for redirected traffic, requiring the need to screen for existing and potential future traffic noise impacts under either the build or no-build scenarios. According to ODOT noise policy, the TNM software was used to model potential traffic noise levels under the Existing (year 2011) conditions, and for the future (year 2032) Build and No Build conditions.

Under ODOT policy, a traffic noise screening is a preliminary assessment of the potential for traffic noise impacts to occur at noise sensitive land uses as a result of the proposed action. A screening level analysis is appropriate for this preliminary stage of project development. The screening is expected to identify noise sensitive land uses and predict at a preliminary level the *potential* for traffic noise impacts to occur as a result of the project. The conclusions drawn from this level of study will be carried forward and may indicate a need for additional more detailed traffic noise analysis (Final Noise Analysis) at later stages of project development, to determine with more certainty if traffic noise impacts will occur.

ODOT noise screening criteria states that potential noise impacts occur if the project results in a "substantial increase" in traffic noise levels, defined as an increase of 10 dBA or more, or when traffic noise levels generated by the transportation facility reach 60 dBA. Based on the screening results discussed in Section 4 above, no traffic noise impacts were predicted in the noise screening to meet the "substantial increase" criterion. However, potential noise impacts are predicted to occur along the entire length of the study area based on the 60 dBA threshold. Several potential noise abatement measures were conceptually examined to assess the feasibility and reasonableness to implement within the study area. Generally, these measures in this conceptual assessment were found to be challenging to implement within the constraints of the study area.

The screening results indicate the potential for the project to result in traffic noise impacts at noise sensitive land uses within the study area. Therefore, additional traffic noise analysis will be necessary once project details develop further to fully determine the presence and extent of any traffic noise impacts resulting from the proposed project, and to identify and recommend further noise mitigation measures.

The on-Base evaluation in the increase of traffic noise concluded that, under the Proposed Action, the anticipated changes in vehicular roadway patterns would result in an overall reduction in transporation related noise volumes for Area A of the Base. Once construction of the ECFs and related roadway approaches is complete, noise associated with construction activities would cease. Therfore, new long-term noise impacts associated with the Proposed Action are not anticipated on-Base.

Appendix A

Sound Meter Equipment Certificates of Calibration & Meter Output Data

SR 444 Reconfiguration
Noise Field Measurement Readings

1662 Kauffman Rd. Location #1

QUEST MODEL 2800 IMPULSE INTEGRATING SOUND LEVEL METER
DATE:___4-14-2011____ SERIAL NO. _____ CALIBRATED: _____

"A" WEIGHTING / SLOW RESPONSE

LEQ(dB)	MAX(dB)	MIN(dB)	SEL(dB)	RUN-TIME	OL-TIME
64.3	81.9	50.1	94.1	:16	:27

EXCEEDANCE LEVELS(dB)

	0	1	2	3	4	5	6	7	8	9
L00	82	74	71	70	69	69	68	68	68	67
L10	67	67	66	66	66	66	66	65	65	65
L20	65	65	65	65	64	64	64	64	64	64
L30	63	63	63	63	63	63	63	63	63	62
L40	62	62	62	62	62	62	62	62	62	62
L50	62	61	61	61	61	61	61	61	60	60
L60	60	60	60	60	60	60	59	59	59	59
L70	59	59	59	58	58	58	57	57	57	57
L80	57	56	56	56	56	55	55	55	54	54
L90	54	54	54	53	53	53	53	52	52	51

417 Madison Location #2

QUEST MODEL 2800 IMPULSE INTEGRATING SOUND LEVEL METER
DATE:___4-14-2011____ SERIAL NO. _____ CALIBRATED: _____

"A" WEIGHTING / SLOW RESPONSE

LEQ(dB)	MAX(dB)	MIN(dB)	SEL(dB)	RUN-TIME	OL-TIME
57.6	73.3	44.4	87.2	:15	:45

EXCEEDANCE LEVELS(dB)

	0	1	2	3	4	5	6	7	8	9
L00	74	66	64	63	63	62	62	62	61	61
L10	60	60	60	60	60	60	59	59	59	59
L20	59	59	59	59	58	58	58	58	58	58
L30	58	57	57	57	57	57	57	57	57	57
L40	57	57	56	56	56	56	56	56	56	56
L50	56	56	56	55	55	55	55	55	55	55
L60	54	54	54	54	54	54	54	54	54	54
L70	53	53	53	53	53	53	53	53	53	52
L80	52	52	52	52	52	51	51	51	51	51
L90	51	50	50	50	50	49	49	49	48	47

SR 444 Reconfiguration
Noise Field Measurement Readings

Bikepath between Buckeye and Euclid Location #3

QUEST MODEL 2800 IMPULSE INTEGRATING SOUND LEVEL METER
DATE:___4-14-2011____ SERIAL NO. _____ CALIBRATED: _____

"A" WEIGHTING / SLOW RESPONSE

LEQ(dB)	MAX(dB)	MIN(dB)	SEL(dB)	RUN-TIME	OL-TIME
62.5	83.1	50.4	92.3	:16	:05

EXCEEDANCE LEVELS(dB)

	0	1	2	3	4	5	6	7	8	9
L00	83	71	68	68	67	66	66	65	65	65
L10	65	65	65	64	64	64	64	64	63	63
L20	63	63	63	63	63	63	63	63	62	62
L30	62	62	62	62	62	62	62	62	62	61
L40	61	61	61	61	61	61	60	60	60	60
L50	60	60	60	60	60	60	59	59	59	59
L60	59	59	59	59	59	59	58	58	58	58
L70	58	58	58	58	57	57	57	57	57	57
L80	57	57	57	56	56	56	56	56	56	56
L90	56	56	55	55	55	54	54	54	53	52

Playground between channel and Lidberg Location #4

QUEST MODEL 2800 IMPULSE INTEGRATING SOUND LEVEL METER
DATE:___4-14-2011____ SERIAL NO. _____ CALIBRATED: _____

"A" WEIGHTING / SLOW RESPONSE

LEQ(dB)	MAX(dB)	MIN(dB)	SEL(dB)	RUN-TIME	OL-TIME
59.8	71.1	47.4	89.4	:15	:34

EXCEEDANCE LEVELS(dB)

	0	1	2	3	4	5	6	7	8	9
L00	71	66	66	65	65	65	65	64	64	63
L10	63	63	63	63	62	62	62	62	62	62
L20	62	62	62	61	61	61	61	61	61	60
L30	60	60	60	60	60	60	60	60	60	60
L40	60	60	59	59	59	59	59	59	59	59
L50	59	59	59	59	58	58	58	58	58	57
L60	57	57	57	57	57	57	56	56	56	56
L70	56	56	56	56	56	55	55	55	55	54
L80	54	54	54	54	54	53	53	53	53	53
L90	53	53	53	53	52	52	52	51	51	50

SR 444 Reconfiguration
Noise Field Measurement Readings

Central Ave Park Location #5

QUEST MODEL 2800 IMPULSE INTEGRATING SOUND LEVEL METER
DATE:__3-15-2011_____ SERIAL NO. _____ CALIBRATED: _____

"A" WEIGHTING / SLOW RESPONSE

LEQ(dB)	MAX(dB)	MIN(dB)	SEL(dB)	RUN-TIME	OL-TIME
54.3	61.3	47.1	83.8	:15	:15

EXCEEDANCE LEVELS(dB)

	0	1	2	3	4	5	6	7	8	9
L00	62	60	59	59	58	58	57	57	57	57
L10	57	57	57	57	56	56	56	56	56	56
L20	56	56	56	56	56	56	55	55	55	55
L30	55	55	55	55	55	55	54	54	54	54
L40	54	54	54	54	54	54	54	54	54	54
L50	54	54	54	54	54	54	53	53	53	53
L60	53	53	53	53	53	53	53	53	53	53
L70	53	53	53	53	53	53	52	52	52	52
L80	52	52	52	52	52	51	51	51	51	51
L90	51	51	51	51	51	50	50	50	50	49

112 Dayton Ave. Location #6

QUEST MODEL 2800 IMPULSE INTEGRATING SOUND LEVEL METER
DATE:__3-15-2011_____ SERIAL NO. _____ CALIBRATED: _____

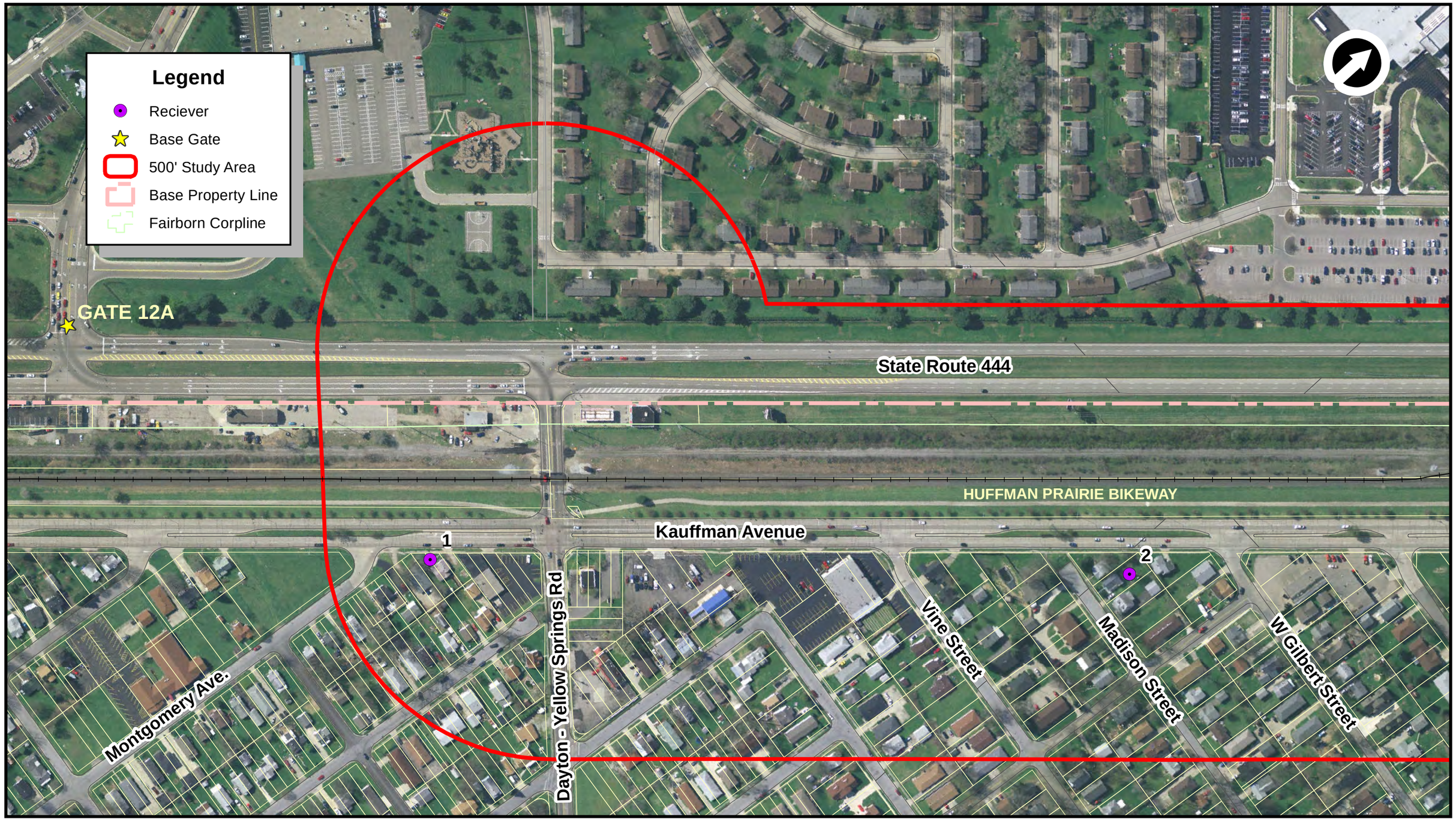
"A" WEIGHTING / SLOW RESPONSE

LEQ(dB)	MAX(dB)	MIN(dB)	SEL(dB)	RUN-TIME	OL-TIME
52.0	63.9	45.2	81.8	:16	:17

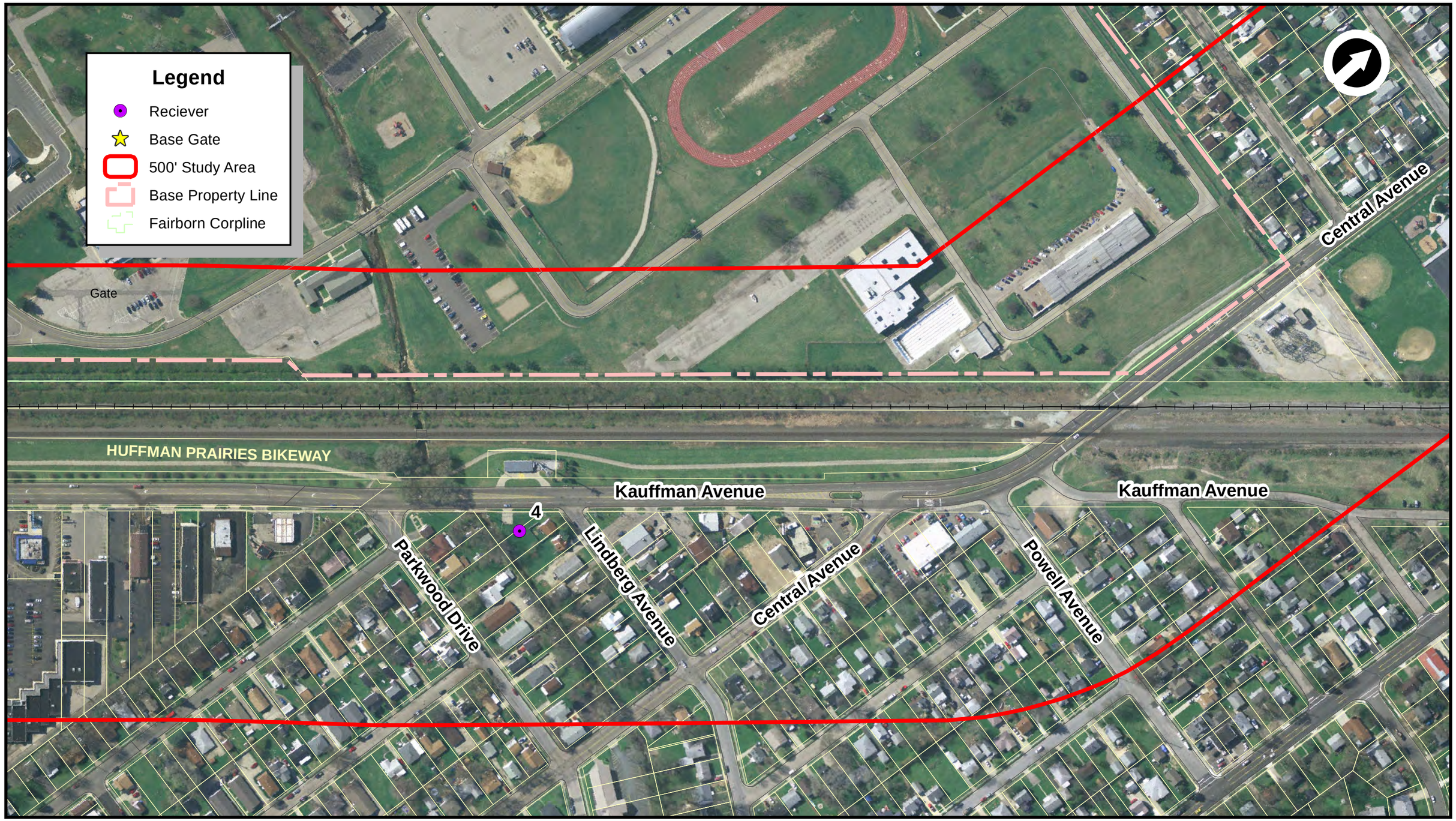
EXCEEDANCE LEVELS(dB)

	0	1	2	3	4	5	6	7	8	9
L00	64	58	57	57	56	56	56	55	55	55
L10	54	54	54	54	54	54	54	54	54	54
L20	54	53	53	53	53	53	53	53	53	53
L30	53	53	53	53	53	52	52	52	52	52
L40	52	52	52	52	51	51	51	51	51	51
L50	51	51	51	51	51	51	51	51	50	50
L60	50	50	50	50	50	50	50	50	50	50
L70	50	50	50	49	49	49	49	49	49	49
L80	49	49	48	48	48	48	48	48	48	48
L90	48	48	47	47	47	47	47	47	47	46

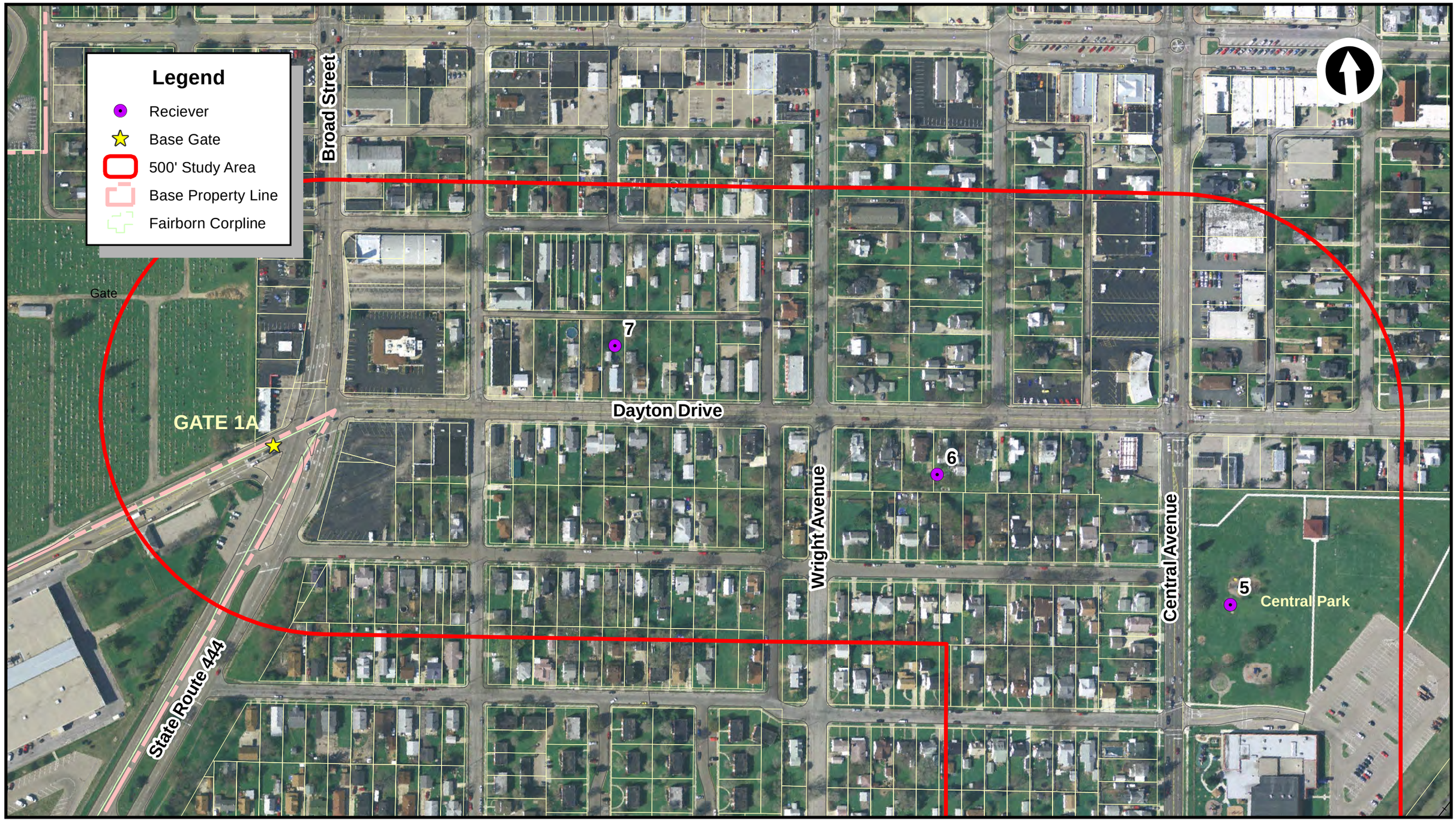
Appendix B
Project Traffic Data


Legend
Reciever
Base Gate
500' Study Area
Base Property Line
Fairborn Corpline
GATE 12A
State Route 444
HUFFMAN PRAIRIE BIKEWAY
Kauffman Avenue
1
2
Montgomery Ave.
Dayton - Yellow Springs Rd
Vine Street
Madison Street
W Gilbert Street

> State Route 444 - EIS Noise Screening



> State Route 444 - EIS Noise Screening


Legend
Reciever
Base Gate
500' Study Area
Base Property Line
Fairborn Corpline
Broad Street
Gate
GATE 1A
7
Dayton Drive
6
Wright Avenue
Central Avenue
5
Central Park
State Route 444

Appendix C
Traffic Input Data in TNM

2010 No Build PM Peak Hour Volumes

SR-444 EIS Noise TrafficVolumes

Dayton Drive - (Broad to Wright)

		Cars	Heavy Trucks
WB (2%)	133	**130**	**3**
EB (1%)	438	**434**	**4**

Assumed Heavy Truck Percentage = 0.5%

Datyon Drive - (Wright to Central)

		Cars	Heavy Trucks
WB	262	**261**	**1**
EB	398	**396**	**2**

Central Ave - (Railroad to Dayton)

		Cars	Heavy Trucks
NB	748	**744**	**4**
SB	629	**626**	**3**

Kauffman Ave - (Railroad to High St)

		Cars	Heavy Trucks
NB	690	**687**	**3**
SB	503	**500**	**3**

Kauffman Ave - (High St to Dayton-Yellow Springs)

		Cars	Heavy Trucks
NB	635	**632**	**3**
SB	378	**376**	**2**

Kauffman Ave - (Dayton-Yellow Springs to Montgomery Ave)

		Cars	Heavy Trucks
NB	650	**647**	**3**
SB	434	**432**	**2**

2011 Field Collected Traffic Volumes

SR-444 EIS Noise TrafficVolumes

Dayton Drive - (Broad to Wright)

	15-min field volume		*Peak Hour Volumes*	
	Car	Truck	**Cars**	**Heavy Trucks**
WB	35	1	**140**	**4**
EB	31	1	**124**	**4**

Datyon Drive - (Wright to Central)

	Car	Truck	**Cars**	**Heavy Trucks**
WB	79	1	**316**	**4**
EB	59	1	**236**	**4**

Central Ave - (Railroad to Dayton)

	Car	Truck	**Cars**	**Heavy Trucks**
NB	105	1	**420**	**4**
SB	68	1	**272**	**4**

Kauffman Ave - (Railroad to High St)

	Car	Truck	**Cars**	**Heavy Trucks**
NB	153	1	**612**	**4**
SB	97	1	**388**	**4**

Kauffman Ave - (High St to State St)

	Car	Truck	**Cars**	**Heavy Trucks**
NB	151	1	**604**	**4**
SB	105	1	**420**	**4**

Kauffman Ave - (State St to Dayton-Yellow Springs)

	Car	Truck	**Cars**	**Heavy Trucks**
NB	149	1	**596**	**4**
SB	124	1	**496**	**4**

Kauffman Ave - (Dayton-Yellow Springs to Montgomery Ave)

	Car	Truck	**Cars**	**Heavy Trucks**
NB	122	2	**488**	**8**
SB	93	1	**372**	**4**

2032 Build PM Peak Hour Volumes

SR-444 EIS Noise TrafficVolumes

Assumed Heavy Truck Percentage = 2%

Dayton Drive - (Broad to Wright)

		Cars	Heavy Trucks
WB	862	**845**	**17**
EB	1135	**1112**	**23**

Datyon Drive - (Wright to Central)

		Cars	Heavy Trucks
WB	1089	**1067**	**22**
EB	1349	**1322**	**27**

Central Ave - (Railroad to Dayton)

		Cars	Heavy Trucks
NB	1690	**1656**	**34**
SB	1615	**1583**	**32**

Kauffman Ave - (Railroad to High St)

		Cars	Heavy Trucks
NB	1673	**1640**	**33**
SB	1480	**1450**	**30**

Kauffman Ave - (High St to Dayton-Yellow Springs)

		Cars	Heavy Trucks
NB	1656	**1623**	**33**
SB	1344	**1317**	**27**

Kauffman Ave - (Dayton-Yellow Springs to Montgomery Ave)

		Cars	Heavy Trucks
NB	743	**728**	**15**
SB	493	**483**	**10**

2032 No Build PM Peak Hour Volumes

SR-444 EIS Noise TrafficVolumes

Dayton Drive - (Broad to Wright)

		Cars	Heavy Trucks
WB (2%)	156	**153**	**3**
EB (1%)	489	**484**	**5**

Assumed Heavy Truck Percentage = 0.5%

Datyon Drive - (Wright to Central)

		Cars	Heavy Trucks
WB	285	**284**	**1**
EB	373	**371**	**2**

Central Ave - (Railroad to Dayton)

		Cars	Heavy Trucks
NB	805	**801**	**4**
SB	652	**649**	**3**

Kauffman Ave - (Railroad to High St)

		Cars	Heavy Trucks
NB	753	**749**	**4**
SB	536	**533**	**3**

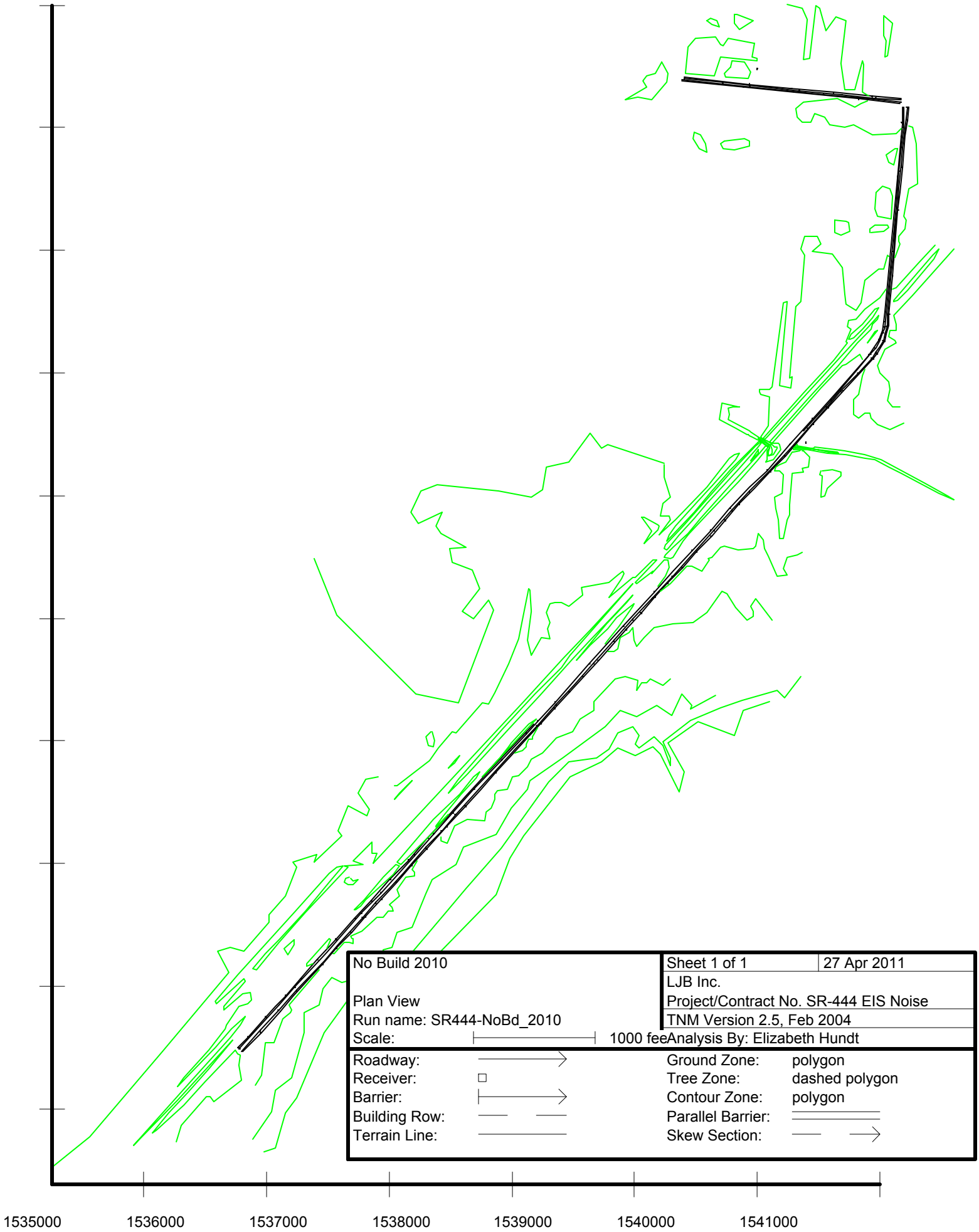
Kauffman Ave - (High St to Dayton-Yellow Springs)

		Cars	Heavy Trucks
NB	702	**698**	**4**
SB	420	**418**	**2**

Kauffman Ave - (Dayton-Yellow Springs to Montgomery Ave)

		Cars	Heavy Trucks
NB	712	**708**	**4**
SB	476	**474**	**2**

Appendix D
TNM Output Tables:
Sound Level Results



No Build 2010	Sheet 1 of 1	27 Apr 2011
	LJB Inc.	
Plan View	Project/Contract No. SR-444 EIS Noise	
Run name: SR444-NoBd_2010	TNM Version 2.5, Feb 2004	
Scale: 1000 fee	Analysis By: Elizabeth Hundt	

Roadway:		Ground Zone:	polygon
Receiver:		Tree Zone:	dashed polygon
Barrier:		Contour Zone:	polygon
Building Row:		Parallel Barrier:	
Terrain Line:		Skew Section:	

LJB Inc. 27 April 2011
Elizabeth Hundt TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: SR-444 EIS task
RUN: Field Check

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway Name	Width	Points Name	No.	Coordinates (pavement) X	Y	Z	Flow Control Control Device	Speed Constraint	Percent Vehicles Affected	Segment Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
Dayton-WB-6_1	12.0	point1	1	1,541,166.9	666,243.6	834.60				Average	
		point3	3	1,540,921.4	666,265.5	834.10				Average	
		point8	8	1,540,608.4	666,297.3	833.40				Average	
		point268	268	1,540,265.6	666,331.1	832.00					
Dayton-WB-6_2	12.0	point13	13	1,541,166.1	666,233.5	834.30				Average	
		point17	17	1,540,954.1	666,251.7	834.00				Average	
		point21	21	1,540,674.8	666,280.4	833.50				Average	
		point27	27	1,540,331.0	666,314.2	832.10					
Dayton-EB-7_2	12.0	point32	32	1,539,377.1	666,399.2	833.50				Average	
		point33	33	1,539,935.5	666,343.6	832.60				Average	
		point271	271	1,540,235.0	666,313.5	832.00					
Dayton-EB-7_1	12.0	point43	43	1,539,375.0	666,391.9	833.50				Average	
		point44	44	1,539,881.8	666,338.2	833.00				Average	
		point45	45	1,540,286.2	666,299.7	832.00					
Central-SB-5_2	12.0	point48	48	1,541,189.1	666,181.2	834.20				Average	
		point49	49	1,541,179.9	666,009.5	835.20				Average	
		point50	50	1,541,166.1	665,846.2	834.20				Average	
		point51	51	1,541,147.6	665,652.0	833.70				Average	
		point52	52	1,541,121.6	665,361.9	833.40				Average	
		point53	53	1,541,081.0	664,919.9	835.10				Average	
		point55	55	1,541,042.1	664,499.4	842.30					
Central-SB-5_1	12.0	point67	67	1,541,177.8	666,179.8	833.00				Average	
		point68	68	1,541,170.8	666,048.9	833.00				Average	
		point69	69	1,541,163.1	665,935.4	834.80				Average	
		point70	70	1,541,134.0	665,607.9	833.20				Average	

		point71	71	1,541,082.2	665,053.4	833.60				Average	
		point72	72	1,541,029.9	664,507.9	842.30					
Kauffman-SB-3_1	12.0	point159	159	1,538,170.5	661,154.1	842.30				Average	
		point160	160	1,537,924.2	660,892.6	843.90				Average	
		point161	161	1,537,761.4	660,720.4	844.00				Average	
		point162	162	1,537,618.8	660,564.5	845.60				Average	
		point163	163	1,537,465.6	660,394.4	846.40				Average	
		point164	164	1,537,306.5	660,218.7	847.50					
Kauffman-NB-1_2	12.0	point107	107	1,535,794.6	658,486.1	845.00				Average	
		point108	108	1,535,945.2	658,654.9	846.00				Average	
		point109	109	1,536,095.5	658,821.6	847.00					
Kauffman-NB-1_1	12.0	point178	178	1,535,803.2	658,479.4	845.00				Average	
		point179	179	1,535,948.8	658,641.0	846.00				Average	
		point180	180	1,536,106.1	658,814.2	847.00					
Kauffman-SB-1_1	12.0	point250	250	1,536,143.0	658,935.0	848.00				Average	
		point249	249	1,536,065.4	658,848.6	847.50				Average	
		point174	174	1,535,987.8	658,762.1	847.00				Average	
		point176	176	1,535,839.9	658,597.2	846.00				Average	
		point177	177	1,535,762.1	658,513.3	845.00					
Kauffman-SB-1_2	12.0	point252	252	1,536,092.0	658,859.5	848.00				Average	
		point105	105	1,535,961.4	658,713.8	847.00				Average	
		point106	106	1,535,772.2	658,504.9	845.00					
Kauffman-NB-2_2	12.0	point253	253	1,536,095.5	658,821.6	847.00				Average	
		point110	110	1,536,242.9	658,981.5	848.00				Average	
		point111	111	1,536,464.8	659,224.4	850.00				Average	
		point112	112	1,536,578.4	659,354.4	848.40				Average	
		point113	113	1,536,778.4	659,575.5	847.40				Average	
		point114	114	1,536,886.9	659,695.8	846.90				Average	
		point115	115	1,536,996.5	659,816.4	846.30				Average	
		point116	116	1,537,109.2	659,939.6	846.70				Average	
		point117	117	1,537,295.8	660,146.6	847.90					
Kauffman-NB-2_1	12.0	point254	254	1,536,106.1	658,814.2	847.00				Average	
		point181	181	1,536,213.1	658,935.0	848.00				Average	
		point182	182	1,536,333.6	659,067.6	850.00				Average	
		point183	183	1,536,451.1	659,197.0	850.00				Average	
		point184	184	1,536,570.9	659,327.8	848.00				Average	
		point185	185	1,536,687.4	659,456.9	848.00				Average	
		point186	186	1,536,803.8	659,585.3	847.00				Average	
		point187	187	1,536,931.4	659,726.4	846.00				Average	

		point188	188	1,537,055.0	659,863.4	846.00				Average	
		point190	190	1,537,178.8	660,001.9	846.90				Average	
		point191	191	1,537,300.9	660,136.6	847.80					
Kauffman-SB-2_1	12.0	point255	255	1,537,306.5	660,218.7	847.50				Average	
		point165	165	1,537,145.8	660,041.6	847.80				Average	
		point166	166	1,537,000.0	659,878.4	846.90				Average	
		point167	167	1,536,845.8	659,709.3	846.60				Average	
		point168	168	1,536,711.4	659,561.8	847.60				Average	
		point169	169	1,536,559.0	659,394.1	849.00				Average	
		point170	170	1,536,406.5	659,225.6	850.00				Average	
		point171	171	1,536,270.5	659,072.2	849.00				Average	
		point173	173	1,536,143.0	658,935.0	848.00					
Kauffman-SB-2_2	12.0	point256	256	1,537,355.1	660,256.2	847.60				Average	
		point99	99	1,537,196.9	660,082.6	848.10				Average	
		point100	100	1,536,919.8	659,773.9	846.30				Average	
		point101	101	1,536,763.1	659,602.8	847.10				Average	
		point102	102	1,536,480.1	659,289.2	850.00				Average	
		point103	103	1,536,222.5	659,005.1	849.00				Average	
		point251	251	1,536,092.0	658,859.5	848.00					
Kauffman-NB-3_2	12.0	point257	257	1,537,295.8	660,146.6	847.90				Average	
		point118	118	1,537,419.5	660,282.6	847.20				Average	
		point119	119	1,537,536.4	660,414.6	845.90				Average	
		point120	120	1,537,652.8	660,540.4	845.20				Average	
		point121	121	1,537,844.5	660,753.1	843.50				Average	
		point122	122	1,538,030.6	660,957.9	842.00				Average	
		point123	123	1,538,199.4	661,140.2	842.40					
Kauffman-NB-3_1	12.0	point258	258	1,537,300.9	660,136.6	847.80				Average	
		point192	192	1,537,467.8	660,319.1	846.50				Average	
		point193	193	1,537,615.5	660,483.2	845.10				Average	
		point194	194	1,537,742.5	660,622.8	844.00				Average	
		point195	195	1,537,866.0	660,760.0	843.00				Average	
		point196	196	1,537,988.9	660,895.4	842.70				Average	
		point197	197	1,538,099.9	661,017.8	841.60				Average	
		point198	198	1,538,229.5	661,155.9	842.70					
Kauffman-SB-3_2	12.0	point259	259	1,538,199.1	661,172.4	843.10				Average	
		point94	94	1,538,108.6	661,072.5	841.80				Average	
		point95	95	1,537,908.6	660,859.0	843.80				Average	
		point96	96	1,537,681.9	660,616.6	844.40				Average	
		point97	97	1,537,510.8	660,423.9	845.80				Average	

		point98	98	1,537,355.1	660,256.2	847.60					
Kauffman-NB-4_2	12.0	point260	260	1,538,199.4	661,140.2	842.40				Average	
		point124	124	1,538,352.5	661,309.0	843.60				Average	
		point125	125	1,538,499.4	661,471.2	844.20				Average	
		point126	126	1,538,661.5	661,649.6	843.30				Average	
		point127	127	1,538,824.8	661,830.9	842.20				Average	
		point128	128	1,538,982.4	662,004.8	840.90				Average	
		point129	129	1,539,139.6	662,178.1	840.00				Average	
		point130	130	1,539,302.1	662,356.9	838.10				Average	
		point131	131	1,539,470.6	662,543.1	837.00				Average	
		point132	132	1,539,639.0	662,729.1	836.10				Average	
		point133	133	1,539,786.2	662,893.1	835.30				Average	
		point134	134	1,539,928.9	663,048.2	834.40				Average	
		point135	135	1,540,094.2	663,218.1	833.40				Average	
		point137	137	1,540,246.6	663,382.2	834.00				Average	
		point138	138	1,540,405.2	663,564.6	833.30				Average	
		point139	139	1,540,560.1	663,740.2	834.10				Average	
		point140	140	1,540,674.4	663,866.6	835.20				Average	
		point141	141	1,540,815.0	664,013.2	837.80				Average	
		point142	142	1,540,928.2	664,138.5	840.60				Average	
		point143	143	1,540,963.2	664,180.9	842.40				Average	
		point144	144	1,540,993.1	664,225.7	843.80				Average	
		point145	145	1,541,017.8	664,281.2	843.60				Average	
		point146	146	1,541,035.5	664,332.9	843.40				Average	
		point147	147	1,541,047.6	664,397.2	842.60				Average	
		point148	148	1,541,056.0	664,486.8	842.80					
Kauffman-NB-4_1	12.0	point261	261	1,538,229.5	661,155.9	842.70				Average	
		point199	199	1,538,340.5	661,280.3	843.50				Average	
		point200	200	1,538,461.5	661,413.4	844.00				Average	
		point201	201	1,538,577.4	661,541.0	843.90				Average	
		point202	202	1,538,698.5	661,675.1	843.20				Average	
		point203	203	1,538,775.1	661,757.9	842.70				Average	
		point204	204	1,538,924.2	661,922.5	841.50				Average	
		point205	205	1,539,047.0	662,057.4	840.30				Average	
		point206	206	1,539,165.2	662,190.5	839.40				Average	
		point207	207	1,539,265.5	662,300.9	838.50				Average	
		point208	208	1,539,381.1	662,426.7	837.80				Average	
		point209	209	1,539,499.9	662,557.9	836.90				Average	
		point210	210	1,539,617.0	662,687.4	836.30				Average	

		point211	211	1,539,731.9	662,815.0	835.60				Average	
		point212	212	1,539,850.4	662,946.5	835.00				Average	
		point213	213	1,539,971.5	663,075.4	834.20				Average	
		point214	214	1,540,103.8	663,211.1	835.00				Average	
		point215	215	1,540,219.1	663,338.4	834.30				Average	
		point216	216	1,540,338.9	663,473.1	833.50				Average	
		point217	217	1,540,448.8	663,597.5	833.50				Average	
		point218	218	1,540,568.0	663,732.4	834.10				Average	
		point219	219	1,540,692.5	663,869.9	834.60				Average	
		point220	220	1,540,818.9	664,004.6	837.50				Average	
		point221	221	1,540,936.2	664,132.2	840.40				Average	
		point222	222	1,540,968.0	664,170.2	841.80				Average	
		point223	223	1,541,004.5	664,227.8	843.00				Average	
		point224	224	1,541,026.1	664,274.1	843.70				Average	
		point225	225	1,541,044.4	664,331.9	843.40				Average	
		point226	226	1,541,059.0	664,403.2	843.10				Average	
		point227	227	1,541,065.2	664,493.9	842.50					
kauffman-SB-4	12.0	point263	263	1,540,438.8	663,634.9	835.00				Average	
		point79	79	1,540,259.4	663,432.7	835.00				Average	
		point80	80	1,540,068.8	663,219.1	835.00				Average	
		point81	81	1,539,927.4	663,078.4	834.40				Average	
		point82	82	1,539,768.0	662,904.1	835.50				Average	
		point83	83	1,539,608.0	662,727.4	836.50				Average	
		point84	84	1,539,455.5	662,561.1	837.00				Average	
		point85	85	1,539,303.8	662,393.0	838.30				Average	
		point86	86	1,539,150.6	662,223.6	839.60				Average	
		point87	87	1,538,898.6	661,944.4	841.70				Average	
		point88	88	1,538,620.8	661,638.5	843.60				Average	
		point89	89	1,538,338.9	661,326.7	843.60				Average	
		point93	93	1,538,199.1	661,172.4	843.10					
Central-NB-5_1	12.0	point264	264	1,541,065.2	664,493.9	842.50				Average	
		point229	229	1,541,092.0	664,806.6	837.80				Average	
		point230	230	1,541,104.8	664,939.2	835.00				Average	
		point234	234	1,541,138.1	665,343.9	833.40				Average	
		point235	235	1,541,152.1	665,484.2	833.30				Average	
		point236	236	1,541,170.6	665,686.6	833.90				Average	
		point237	237	1,541,183.6	665,822.5	833.90				Average	
		point238	238	1,541,194.9	665,944.9	834.10				Average	
		point239	239	1,541,211.5	666,074.4	835.30				Average	

		point240	240	1,541,222.8	666,177.2	834.30					
Central-NB-5_2	12.0	point265	265	1,541,056.0	664,486.8	842.80				Average	
		point150	150	1,541,083.4	664,831.6	838.50				Average	
		point151	151	1,541,099.8	665,002.1	834.00				Average	
		point152	152	1,541,115.4	665,180.2	834.00				Average	
		point153	153	1,541,130.6	665,356.2	834.00				Average	
		point154	154	1,541,146.2	665,523.9	833.30				Average	
		point155	155	1,541,163.0	665,706.2	833.20				Average	
		point156	156	1,541,176.5	665,850.3	833.60				Average	
		point157	157	1,541,193.5	666,001.7	833.90				Average	
		point158	158	1,541,211.5	666,177.8	834.30					
Kauffman-SB-4_2	12.0	point266	266	1,541,042.1	664,499.4	842.30				Average	
		point56	56	1,541,026.2	664,380.9	842.00				Average	
		point57	57	1,541,015.4	664,335.3	842.80				Average	
		point58	58	1,540,990.6	664,275.4	843.20				Average	
		point59	59	1,540,954.9	664,213.7	843.60				Average	
		point61	61	1,540,910.9	664,162.1	839.70				Average	
		point62	62	1,540,813.0	664,049.6	837.60				Average	
		point63	63	1,540,589.5	663,790.0	834.40				Average	
		point64	64	1,540,477.2	663,661.6	833.60				Average	
		point66	66	1,540,370.2	663,546.0	833.20					
Kauffman-SB-4_1	12.0	point267	267	1,541,029.9	664,507.9	842.30				Average	
		point73	73	1,541,023.2	664,428.1	842.30				Average	
		point74	74	1,541,010.4	664,354.1	842.70				Average	
		point75	75	1,540,982.6	664,279.8	843.60				Average	
		point76	76	1,540,939.9	664,211.4	841.60				Average	
		point77	77	1,540,894.8	664,157.6	839.00				Average	
		point78	78	1,540,618.0	663,837.1	834.60				Average	
		point262	262	1,540,438.8	663,634.9	835.00					
Dayton-WB-7_1	12.0	point269	269	1,540,265.6	666,331.1	832.00				Average	
		point11	11	1,539,922.9	666,365.0	833.10				Average	
		point12	12	1,539,393.8	666,420.4	833.80					
Dayton-WB-7_2	12.0	point270	270	1,540,331.0	666,314.2	832.10				Average	
		point30	30	1,539,706.8	666,377.2	833.20				Average	
		point31	31	1,539,393.0	666,409.2	833.40					
Dayton-EB-6_2	12.0	point272	272	1,540,235.0	666,313.5	832.00				Average	
		point34	34	1,540,534.5	666,283.4	833.10				Average	
		point35	35	1,540,901.5	666,244.9	833.80				Average	
		point36	36	1,541,160.2	666,215.2	834.30					

Dayton-EB-6_1	12.0	point273	273	1,540,286.2	666,299.7	832.00				Average	
		point46	46	1,540,817.8	666,244.5	833.60				Average	
		point47	47	1,541,158.4	666,205.4	834.30					

LJB Inc. 27 April 2011
Elizabeth Hundt TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: SR-444 EIS task
RUN: Field Check

Roadway	Points											
Name	Name	No.	Segment									
			Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
Dayton-WB-6_1	point1	1	158	35	0	0	2	35	0	0	0	0
	point3	3	158	35	0	0	2	35	0	0	0	0
	point8	8	158	35	0	0	2	35	0	0	0	0
	point268	268										
Dayton-WB-6_2	point13	13	158	35	0	0	2	35	0	0	0	0
	point17	17	158	35	0	0	2	35	0	0	0	0
	point21	21	158	35	0	0	2	35	0	0	0	0
	point27	27										
Dayton-EB-7_2	point32	32	62	35	0	0	2	35	0	0	0	0
	point33	33	62	35	0	0	2	35	0	0	0	0
	point271	271										
Dayton-EB-7_1	point43	43	62	35	0	0	2	35	0	0	0	0
	point44	44	62	35	0	0	2	35	0	0	0	0
	point45	45										
Central-SB-5_2	point48	48	136	35	0	0	2	35	0	0	0	0
	point49	49	136	35	0	0	2	35	0	0	0	0
	point50	50	136	35	0	0	2	35	0	0	0	0
	point51	51	136	35	0	0	2	35	0	0	0	0
	point52	52	136	35	0	0	2	35	0	0	0	0
	point53	53	136	35	0	0	2	35	0	0	0	0
	point55	55										
Central-SB-5_1	point67	67	136	35	0	0	2	35	0	0	0	0
	point68	68	136	35	0	0	2	35	0	0	0	0

	point69	69	136	35	0	0	2	35	0	0	0	0
	point70	70	136	35	0	0	2	35	0	0	0	0
	point71	71	136	35	0	0	2	35	0	0	0	0
	point72	72										
Kauffman-SB-3_1	point159	159	210	35	0	0	2	35	0	0	0	0
	point160	160	210	35	0	0	2	35	0	0	0	0
	point161	161	210	35	0	0	2	35	0	0	0	0
	point162	162	210	35	0	0	2	35	0	0	0	0
	point163	163	210	35	0	0	2	35	0	0	0	0
	point164	164										
Kauffman-NB-1_2	point107	107	244	35	0	0	4	35	0	0	0	0
	point108	108	244	35	0	0	4	35	0	0	0	0
	point109	109										
Kauffman-NB-1_1	point178	178	244	35	0	0	4	35	0	0	0	0
	point179	179	244	35	0	0	4	35	0	0	0	0
	point180	180										
Kauffman-SB-1_1	point250	250	186	35	0	0	2	35	0	0	0	0
	point249	249	186	35	0	0	2	35	0	0	0	0
	point174	174	186	35	0	0	2	35	0	0	0	0
	point176	176	186	35	0	0	2	35	0	0	0	0
	point177	177										
Kauffman-SB-1_2	point252	252	186	35	0	0	2	35	0	0	0	0
	point105	105	186	35	0	0	2	35	0	0	0	0
	point106	106										
Kauffman-NB-2_2	point253	253	298	35	0	0	2	35	0	0	0	0
	point110	110	298	35	0	0	2	35	0	0	0	0
	point111	111	298	35	0	0	2	35	0	0	0	0
	point112	112	298	35	0	0	2	35	0	0	0	0
	point113	113	298	35	0	0	2	35	0	0	0	0
	point114	114	298	35	0	0	2	35	0	0	0	0
	point115	115	298	35	0	0	2	35	0	0	0	0
	point116	116	298	35	0	0	2	35	0	0	0	0
	point117	117										
Kauffman-NB-2_1	point254	254	298	35	0	0	2	35	0	0	0	0
	point181	181	298	35	0	0	2	35	0	0	0	0
	point182	182	298	35	0	0	2	35	0	0	0	0

	point183	183	298	35	0	0	2	35	0	0	0	0
	point184	184	298	35	0	0	2	35	0	0	0	0
	point185	185	298	35	0	0	2	35	0	0	0	0
	point186	186	298	35	0	0	2	35	0	0	0	0
	point187	187	298	35	0	0	2	35	0	0	0	0
	point188	188	298	35	0	0	2	35	0	0	0	0
	point190	190	298	35	0	0	2	35	0	0	0	0
	point191	191										
Kauffman-SB-2_1	point255	255	248	35	0	0	2	35	0	0	0	0
	point165	165	248	35	0	0	2	35	0	0	0	0
	point166	166	248	35	0	0	2	35	0	0	0	0
	point167	167	248	35	0	0	2	35	0	0	0	0
	point168	168	248	35	0	0	2	35	0	0	0	0
	point169	169	248	35	0	0	2	35	0	0	0	0
	point170	170	248	35	0	0	2	35	0	0	0	0
	point171	171	248	35	0	0	2	35	0	0	0	0
	point173	173										
Kauffman-SB-2_2	point256	256	248	35	0	0	2	35	0	0	0	0
	point99	99	248	35	0	0	2	35	0	0	0	0
	point100	100	248	35	0	0	2	35	0	0	0	0
	point101	101	248	35	0	0	2	35	0	0	0	0
	point102	102	248	35	0	0	2	35	0	0	0	0
	point103	103	248	35	0	0	2	35	0	0	0	0
	point251	251										
Kauffman-NB-3_2	point257	257	302	35	0	0	2	35	0	0	0	0
	point118	118	302	35	0	0	2	35	0	0	0	0
	point119	119	302	35	0	0	2	35	0	0	0	0
	point120	120	302	35	0	0	2	35	0	0	0	0
	point121	121	302	35	0	0	2	35	0	0	0	0
	point122	122	302	35	0	0	2	35	0	0	0	0
	point123	123										
Kauffman-NB-3_1	point258	258	302	35	0	0	2	35	0	0	0	0
	point192	192	302	35	0	0	2	35	0	0	0	0
	point193	193	302	35	0	0	2	35	0	0	0	0
	point194	194	302	35	0	0	2	35	0	0	0	0
	point195	195	302	35	0	0	2	35	0	0	0	0

	point196	196	302	35	0	0	2	35	0	0	0	0
	point197	197	302	35	0	0	2	35	0	0	0	0
	point198	198										
Kauffman-SB-3_2	point259	259	210	35	0	0	2	35	0	0	0	0
	point94	94	210	35	0	0	2	35	0	0	0	0
	point95	95	210	35	0	0	2	35	0	0	0	0
	point96	96	210	35	0	0	2	35	0	0	0	0
	point97	97	210	35	0	0	2	35	0	0	0	0
	point98	98										
Kauffman-NB-4_2	point260	260	306	35	0	0	2	35	0	0	0	0
	point124	124	306	35	0	0	2	35	0	0	0	0
	point125	125	306	35	0	0	2	35	0	0	0	0
	point126	126	306	35	0	0	2	35	0	0	0	0
	point127	127	306	35	0	0	2	35	0	0	0	0
	point128	128	306	35	0	0	2	35	0	0	0	0
	point129	129	306	35	0	0	2	35	0	0	0	0
	point130	130	306	35	0	0	2	35	0	0	0	0
	point131	131	306	35	0	0	2	35	0	0	0	0
	point132	132	306	35	0	0	2	35	0	0	0	0
	point133	133	306	35	0	0	2	35	0	0	0	0
	point134	134	306	35	0	0	2	35	0	0	0	0
	point135	135	306	35	0	0	2	35	0	0	0	0
	point137	137	306	35	0	0	2	35	0	0	0	0
	point138	138	306	35	0	0	2	35	0	0	0	0
	point139	139	306	35	0	0	2	35	0	0	0	0
	point140	140	306	35	0	0	2	35	0	0	0	0
	point141	141	306	35	0	0	2	35	0	0	0	0
	point142	142	306	35	0	0	2	35	0	0	0	0
	point143	143	306	35	0	0	2	35	0	0	0	0
	point144	144	306	35	0	0	2	35	0	0	0	0
	point145	145	306	35	0	0	2	35	0	0	0	0
	point146	146	306	35	0	0	2	35	0	0	0	0
	point147	147	306	35	0	0	2	35	0	0	0	0
	point148	148										
Kauffman-NB-4_1	point261	261	306	35	0	0	2	35	0	0	0	0
	point199	199	306	35	0	0	2	35	0	0	0	0

	point200	200	306	35	0	0	2	35	0	0	0	0
	point201	201	306	35	0	0	2	35	0	0	0	0
	point202	202	306	35	0	0	2	35	0	0	0	0
	point203	203	306	35	0	0	2	35	0	0	0	0
	point204	204	306	35	0	0	2	35	0	0	0	0
	point205	205	306	35	0	0	2	35	0	0	0	0
	point206	206	306	35	0	0	2	35	0	0	0	0
	point207	207	306	35	0	0	2	35	0	0	0	0
	point208	208	306	35	0	0	2	35	0	0	0	0
	point209	209	306	35	0	0	2	35	0	0	0	0
	point210	210	306	35	0	0	2	35	0	0	0	0
	point211	211	306	35	0	0	2	35	0	0	0	0
	point212	212	306	35	0	0	2	35	0	0	0	0
	point213	213	306	35	0	0	2	35	0	0	0	0
	point214	214	306	35	0	0	2	35	0	0	0	0
	point215	215	306	35	0	0	2	35	0	0	0	0
	point216	216	306	35	0	0	2	35	0	0	0	0
	point217	217	306	35	0	0	2	35	0	0	0	0
	point218	218	306	35	0	0	2	35	0	0	0	0
	point219	219	306	35	0	0	2	35	0	0	0	0
	point220	220	306	35	0	0	2	35	0	0	0	0
	point221	221	306	35	0	0	2	35	0	0	0	0
	point222	222	306	35	0	0	2	35	0	0	0	0
	point223	223	306	35	0	0	2	35	0	0	0	0
	point224	224	306	35	0	0	2	35	0	0	0	0
	point225	225	306	35	0	0	2	35	0	0	0	0
	point226	226	306	35	0	0	2	35	0	0	0	0
	point227	227										
kauffman-SB-4	point263	263	388	35	0	0	4	35	0	0	0	0
	point79	79	388	35	0	0	4	35	0	0	0	0
	point80	80	388	35	0	0	4	35	0	0	0	0
	point81	81	388	35	0	0	4	35	0	0	0	0
	point82	82	388	35	0	0	4	35	0	0	0	0
	point83	83	388	35	0	0	4	35	0	0	0	0
	point84	84	388	35	0	0	4	35	0	0	0	0
	point85	85	388	35	0	0	4	35	0	0	0	0

	point86	86	388	35	0	0	4	35	0	0	0	0
	point87	87	388	35	0	0	4	35	0	0	0	0
	point88	88	388	35	0	0	4	35	0	0	0	0
	point89	89	388	35	0	0	4	35	0	0	0	0
	point93	93										
Central-NB-5_1	point264	264	210	35	0	0	2	35	0	0	0	0
	point229	229	210	35	0	0	2	35	0	0	0	0
	point230	230	210	35	0	0	2	35	0	0	0	0
	point234	234	210	35	0	0	2	35	0	0	0	0
	point235	235	210	35	0	0	2	35	0	0	0	0
	point236	236	210	35	0	0	2	35	0	0	0	0
	point237	237	210	35	0	0	2	35	0	0	0	0
	point238	238	210	35	0	0	2	35	0	0	0	0
	point239	239	210	35	0	0	2	35	0	0	0	0
	point240	240										
Central-NB-5_2	point265	265	210	35	0	0	2	35	0	0	0	0
	point150	150	210	35	0	0	2	35	0	0	0	0
	point151	151	210	35	0	0	2	35	0	0	0	0
	point152	152	210	35	0	0	2	35	0	0	0	0
	point153	153	210	35	0	0	2	35	0	0	0	0
	point154	154	210	35	0	0	2	35	0	0	0	0
	point155	155	210	35	0	0	2	35	0	0	0	0
	point156	156	210	35	0	0	2	35	0	0	0	0
	point157	157	210	35	0	0	2	35	0	0	0	0
	point158	158										
Kauffman-SB-4_2	point266	266	194	35	0	0	2	35	0	0	0	0
	point56	56	194	35	0	0	2	35	0	0	0	0
	point57	57	194	35	0	0	2	35	0	0	0	0
	point58	58	194	35	0	0	2	35	0	0	0	0
	point59	59	194	35	0	0	2	35	0	0	0	0
	point61	61	194	35	0	0	2	35	0	0	0	0
	point62	62	194	35	0	0	2	35	0	0	0	0
	point63	63	194	35	0	0	2	35	0	0	0	0
	point64	64	194	35	0	0	2	35	0	0	0	0
	point66	66										
Kauffman-SB-4_1	point267	267	194	35	0	0	2	35	0	0	0	0

	point73	73	194	35	0	0	2	35	0	0	0	0
	point74	74	194	35	0	0	2	35	0	0	0	0
	point75	75	194	35	0	0	2	35	0	0	0	0
	point76	76	194	35	0	0	2	35	0	0	0	0
	point77	77	194	35	0	0	2	35	0	0	0	0
	point78	78	194	35	0	0	2	35	0	0	0	0
	point262	262										
Dayton-WB-7_1	point269	269	70	35	0	0	2	35	0	0	0	0
	point11	11	70	35	0	0	2	35	0	0	0	0
	point12	12										
Dayton-WB-7_2	point270	270	70	35	0	0	2	35	0	0	0	0
	point30	30	70	35	0	0	2	35	0	0	0	0
	point31	31										
Dayton-EB-6_2	point272	272	118	35	0	0	2	35	0	0	0	0
	point34	34	118	35	0	0	2	35	0	0	0	0
	point35	35	118	35	0	0	2	35	0	0	0	0
	point36	36										
Dayton-EB-6_1	point273	273	118	35	0	0	2	35	0	0	0	0
	point46	46	118	35	0	0	2	35	0	0	0	0
	point47	47										

LJB Inc. 27 April 2011
Elizabeth Hundt TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: SR-444 EIS task
RUN: Field Check

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria Existing LAeq1h	Impact Criteria LAeq1h	Sub'l	NR Goal	Active in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
6	3	1	1,540,672.6	666,145.9	833.40	4.92	0.00	66	10.0	8.0	Y
5	5	1	1,541,289.2	665,808.3	835.00	4.92	0.00	66	10.0	8.0	Y
4	7	1	1,540,389.8	663,443.4	832.00	4.92	0.00	66	10.0	8.0	Y
1	9	1	1,535,981.9	658,629.3	846.65	4.92	0.00	66	10.0	8.0	Y
2	10	1	1,537,037.9	659,749.6	846.95	4.92	0.00	66	10.0	8.0	Y
3	11	1	1,537,570.5	660,581.1	845.80	4.92	0.00	66	10.0	8.0	Y

LJB Inc. 27 April 2011
Elizabeth Hundt TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: SR-444 EIS Noise
RUN: No Build 2010

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway Name	Width	Points Name	No.	Coordinates (pavement) X	Y	Z	Flow Control Control Device	Speed Constraint	Percent Vehicles Affected	Segment Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
Dayton-WB-6_1	12.0	point1	1	1,541,166.9	666,243.6	834.60				Average	
		point3	3	1,540,921.4	666,265.5	834.10				Average	
		point8	8	1,540,608.4	666,297.3	833.40				Average	
		point268	268	1,540,265.6	666,331.1	832.00					
Dayton-WB-6_2	12.0	point13	13	1,541,166.1	666,233.5	834.30				Average	
		point17	17	1,540,954.1	666,251.7	834.00				Average	
		point21	21	1,540,674.8	666,280.4	833.50				Average	
		point27	27	1,540,331.0	666,314.2	832.10					
Dayton-EB-7_2	12.0	point32	32	1,539,377.1	666,399.2	833.50				Average	
		point33	33	1,539,935.5	666,343.6	832.60				Average	
		point271	271	1,540,235.0	666,313.5	832.00					
Dayton-EB-7_1	12.0	point43	43	1,539,375.0	666,391.9	833.50				Average	
		point44	44	1,539,881.8	666,338.2	833.00				Average	
		point45	45	1,540,286.2	666,299.7	832.00					
Central-SB-5_2	12.0	point48	48	1,541,189.1	666,181.2	834.20				Average	
		point49	49	1,541,179.9	666,009.5	835.20				Average	
		point50	50	1,541,166.1	665,846.2	834.20				Average	
		point51	51	1,541,147.6	665,652.0	833.70				Average	
		point52	52	1,541,121.6	665,361.9	833.40				Average	
		point53	53	1,541,081.0	664,919.9	835.10				Average	
		point55	55	1,541,042.1	664,499.4	842.20					
Central-SB-5_1	12.0	point67	67	1,541,177.8	666,179.8	833.00				Average	
		point68	68	1,541,170.8	666,048.9	833.00				Average	
		point69	69	1,541,163.1	665,935.4	834.80				Average	
		point70	70	1,541,134.0	665,607.9	833.20				Average	

		point71	71	1,541,082.2	665,053.4	833.60				Average	
		point72	72	1,541,029.9	664,507.9	834.40					
Kauffman-SB-3_1	12.0	point159	159	1,538,170.5	661,154.1	842.30				Average	
		point160	160	1,537,924.2	660,892.6	843.90				Average	
		point161	161	1,537,761.4	660,720.4	844.00				Average	
		point162	162	1,537,618.8	660,564.5	845.60				Average	
		point163	163	1,537,465.6	660,394.4	846.40				Average	
		point164	164	1,537,306.5	660,218.7	847.50					
Kauffman-NB-1_2	12.0	point107	107	1,535,794.6	658,486.1	845.00				Average	
		point108	108	1,535,945.2	658,654.9	846.00				Average	
		point109	109	1,536,095.5	658,821.6	847.00					
Kauffman-NB-1_1	12.0	point178	178	1,535,803.2	658,479.4	845.00				Average	
		point179	179	1,535,948.8	658,641.0	846.00				Average	
		point180	180	1,536,106.1	658,814.2	847.00					
Kauffman-SB-1_1	12.0	point250	250	1,536,143.0	658,935.0	848.00				Average	
		point249	249	1,536,065.4	658,848.6	847.50				Average	
		point174	174	1,535,987.8	658,762.1	847.00				Average	
		point176	176	1,535,839.9	658,597.2	846.00				Average	
		point177	177	1,535,762.1	658,513.3	845.00					
Kauffman-SB-1_2	12.0	point252	252	1,536,092.0	658,859.5	848.00				Average	
		point105	105	1,535,961.4	658,713.8	847.00				Average	
		point106	106	1,535,772.2	658,504.9	845.00					
Kauffman-NB-2_2	12.0	point253	253	1,536,095.5	658,821.6	847.00				Average	
		point110	110	1,536,242.9	658,981.5	848.00				Average	
		point111	111	1,536,464.8	659,224.4	850.00				Average	
		point112	112	1,536,578.4	659,354.4	848.40				Average	
		point113	113	1,536,778.4	659,575.5	847.40				Average	
		point114	114	1,536,886.9	659,695.8	846.90				Average	
		point115	115	1,536,996.5	659,816.4	846.30				Average	
		point116	116	1,537,109.2	659,939.6	846.70				Average	
		point117	117	1,537,295.8	660,146.6	847.90					
Kauffman-NB-2_1	12.0	point254	254	1,536,106.1	658,814.2	847.00				Average	
		point181	181	1,536,213.1	658,935.0	848.00				Average	
		point182	182	1,536,333.6	659,067.6	850.00				Average	
		point183	183	1,536,451.1	659,197.0	850.00				Average	
		point184	184	1,536,570.9	659,327.8	848.00				Average	
		point185	185	1,536,687.4	659,456.9	848.00				Average	
		point186	186	1,536,803.8	659,585.3	847.00				Average	
		point187	187	1,536,931.4	659,726.4	846.00				Average	

		point188	188	1,537,055.0	659,863.4	846.00				Average	
		point190	190	1,537,178.8	660,001.9	846.90				Average	
		point191	191	1,537,300.9	660,136.6	847.80					
Kauffman-SB-2_1	12.0	point255	255	1,537,306.5	660,218.7	847.50				Average	
		point165	165	1,537,145.8	660,041.6	847.80				Average	
		point166	166	1,537,000.0	659,878.4	846.90				Average	
		point167	167	1,536,845.8	659,709.3	846.60				Average	
		point168	168	1,536,711.4	659,561.8	847.60				Average	
		point169	169	1,536,559.0	659,394.1	849.00				Average	
		point170	170	1,536,406.5	659,225.6	850.00				Average	
		point171	171	1,536,270.5	659,072.2	849.00				Average	
		point173	173	1,536,143.0	658,935.0	848.00					
Kauffman-SB-2_2	12.0	point256	256	1,537,355.1	660,256.2	847.60				Average	
		point99	99	1,537,196.9	660,082.6	848.10				Average	
		point100	100	1,536,919.8	659,773.9	846.30				Average	
		point101	101	1,536,763.1	659,602.8	847.10				Average	
		point102	102	1,536,480.1	659,289.2	850.00				Average	
		point103	103	1,536,222.5	659,005.1	849.00				Average	
		point251	251	1,536,092.0	658,859.5	848.00					
Kauffman-NB-3_2	12.0	point257	257	1,537,295.8	660,146.6	847.90				Average	
		point118	118	1,537,419.5	660,282.6	847.20				Average	
		point119	119	1,537,536.4	660,414.6	845.90				Average	
		point120	120	1,537,652.8	660,540.4	845.20				Average	
		point121	121	1,537,844.5	660,753.1	843.50				Average	
		point122	122	1,538,030.6	660,957.9	842.00				Average	
		point123	123	1,538,199.4	661,140.2	842.40					
Kauffman-NB-3_1	12.0	point258	258	1,537,300.9	660,136.6	847.80				Average	
		point192	192	1,537,467.8	660,319.1	846.50				Average	
		point193	193	1,537,615.5	660,483.2	845.10				Average	
		point194	194	1,537,742.5	660,622.8	844.00				Average	
		point195	195	1,537,866.0	660,760.0	843.00				Average	
		point196	196	1,537,988.9	660,895.4	842.70				Average	
		point197	197	1,538,099.9	661,017.8	841.60				Average	
		point198	198	1,538,229.5	661,155.9	842.70					
Kauffman-SB-3_2	12.0	point259	259	1,538,199.1	661,172.4	843.10				Average	
		point94	94	1,538,108.6	661,072.5	841.80				Average	
		point95	95	1,537,908.6	660,859.0	843.80				Average	
		point96	96	1,537,681.9	660,616.6	844.40				Average	
		point97	97	1,537,510.8	660,423.9	845.80				Average	

		point98	98	1,537,355.1	660,256.2	847.60					
Kauffman-NB-4_2	12.0	point260	260	1,538,199.4	661,140.2	842.40				Average	
		point124	124	1,538,352.5	661,309.0	843.60				Average	
		point125	125	1,538,499.4	661,471.2	844.20				Average	
		point126	126	1,538,661.5	661,649.6	843.30				Average	
		point127	127	1,538,824.8	661,830.9	842.20				Average	
		point128	128	1,538,982.4	662,004.8	840.90				Average	
		point129	129	1,539,139.6	662,178.1	840.00				Average	
		point130	130	1,539,302.1	662,356.9	838.10				Average	
		point131	131	1,539,470.6	662,543.1	837.00				Average	
		point132	132	1,539,639.0	662,729.1	836.10				Average	
		point133	133	1,539,786.2	662,893.1	835.30				Average	
		point134	134	1,539,928.9	663,048.2	834.40				Average	
		point135	135	1,540,094.2	663,218.1	833.40				Average	
		point137	137	1,540,246.6	663,382.2	834.00				Average	
		point138	138	1,540,405.2	663,564.6	833.30				Average	
		point139	139	1,540,560.1	663,740.2	834.10				Average	
		point140	140	1,540,674.4	663,866.6	835.20				Average	
		point141	141	1,540,815.0	664,013.2	837.80				Average	
		point142	142	1,540,928.2	664,138.5	840.60				Average	
		point143	143	1,540,963.2	664,180.9	842.40				Average	
		point144	144	1,540,993.1	664,225.7	843.80				Average	
		point145	145	1,541,017.8	664,281.2	843.60				Average	
		point146	146	1,541,035.5	664,332.9	843.40				Average	
		point147	147	1,541,047.6	664,397.2	842.80				Average	
		point148	148	1,541,056.0	664,486.8	842.80					
Kauffman-NB-4_1	12.0	point261	261	1,538,229.5	661,155.9	842.70				Average	
		point199	199	1,538,340.5	661,280.3	843.50				Average	
		point200	200	1,538,461.5	661,413.4	844.00				Average	
		point201	201	1,538,577.4	661,541.0	843.90				Average	
		point202	202	1,538,698.5	661,675.1	843.20				Average	
		point203	203	1,538,775.1	661,757.9	842.70				Average	
		point204	204	1,538,924.2	661,922.5	841.50				Average	
		point205	205	1,539,047.0	662,057.4	840.30				Average	
		point206	206	1,539,165.2	662,190.5	839.40				Average	
		point207	207	1,539,265.5	662,300.9	838.50				Average	
		point208	208	1,539,381.1	662,426.7	837.80				Average	
		point209	209	1,539,499.9	662,557.9	836.90				Average	
		point210	210	1,539,617.0	662,687.4	836.30				Average	

		point211	211	1,539,731.9	662,815.0	835.60				Average	
		point212	212	1,539,850.4	662,946.5	835.00				Average	
		point213	213	1,539,971.5	663,075.4	834.20				Average	
		point214	214	1,540,103.8	663,211.1	835.00				Average	
		point215	215	1,540,219.1	663,338.4	834.30				Average	
		point216	216	1,540,338.9	663,473.1	833.50				Average	
		point217	217	1,540,448.8	663,597.5	833.50				Average	
		point218	218	1,540,568.0	663,732.4	834.10				Average	
		point219	219	1,540,692.5	663,869.9	834.60				Average	
		point220	220	1,540,818.9	664,004.6	837.50				Average	
		point221	221	1,540,936.2	664,132.2	840.40				Average	
		point222	222	1,540,968.0	664,170.2	841.80				Average	
		point223	223	1,541,004.5	664,227.8	843.00				Average	
		point224	224	1,541,026.1	664,274.1	843.70				Average	
		point225	225	1,541,044.4	664,331.9	843.40				Average	
		point226	226	1,541,059.0	664,403.2	843.10				Average	
		point227	227	1,541,065.2	664,493.9	842.50					
Roadway8-2	12.0	point263	263	1,540,438.8	663,634.9	834.00				Average	
		point79	79	1,540,259.4	663,432.7	835.00				Average	
		point80	80	1,540,068.8	663,219.1	835.00				Average	
		point81	81	1,539,927.4	663,078.4	834.40				Average	
		point82	82	1,539,768.0	662,904.1	835.50				Average	
		point83	83	1,539,608.0	662,727.4	836.50				Average	
		point84	84	1,539,455.5	662,561.1	837.00				Average	
		point85	85	1,539,303.8	662,393.0	838.30				Average	
		point86	86	1,539,150.6	662,223.6	839.60				Average	
		point87	87	1,538,898.6	661,944.4	841.70				Average	
		point88	88	1,538,620.8	661,638.5	843.60				Average	
		point89	89	1,538,338.9	661,326.7	843.60				Average	
		point93	93	1,538,199.1	661,172.4	843.10					
Central-NB-5_1	12.0	point264	264	1,541,065.2	664,493.9	842.50				Average	
		point229	229	1,541,092.0	664,806.6	837.80				Average	
		point230	230	1,541,104.8	664,939.2	835.00				Average	
		point234	234	1,541,138.1	665,343.9	833.40				Average	
		point235	235	1,541,152.1	665,484.2	833.30				Average	
		point236	236	1,541,170.6	665,686.6	833.90				Average	
		point237	237	1,541,183.6	665,822.5	833.90				Average	
		point238	238	1,541,194.9	665,944.9	834.10				Average	
		point239	239	1,541,211.5	666,074.4	835.30				Average	

		point240	240	1,541,222.8	666,177.2	834.30					
Central-NB-5_2	12.0	point265	265	1,541,056.0	664,486.8	842.80				Average	
		point150	150	1,541,083.4	664,831.6	838.50				Average	
		point151	151	1,541,099.8	665,002.1	834.00				Average	
		point152	152	1,541,115.4	665,180.2	834.00				Average	
		point153	153	1,541,130.6	665,356.2	834.00				Average	
		point154	154	1,541,146.2	665,523.9	833.30				Average	
		point155	155	1,541,163.0	665,706.2	833.20				Average	
		point156	156	1,541,176.5	665,850.3	833.60				Average	
		point157	157	1,541,193.5	666,001.7	833.90				Average	
		point158	158	1,541,211.5	666,177.8	834.30					
Kauffman-SB-4_2	12.0	point266	266	1,541,042.1	664,499.4	842.20				Average	
		point56	56	1,541,026.2	664,380.9	842.00				Average	
		point57	57	1,541,015.4	664,335.3	842.80				Average	
		point58	58	1,540,990.6	664,275.4	843.20				Average	
		point59	59	1,540,954.9	664,213.7	843.60				Average	
		point61	61	1,540,910.9	664,162.1	839.70				Average	
		point62	62	1,540,813.0	664,049.6	837.60				Average	
		point63	63	1,540,589.5	663,790.0	834.40				Average	
		point64	64	1,540,477.2	663,661.6	833.60				Average	
		point66	66	1,540,370.2	663,546.0	833.20					
Kauffman-SB-4_1	12.0	point267	267	1,541,029.9	664,507.9	834.40				Average	
		point73	73	1,541,023.2	664,428.1	842.30				Average	
		point74	74	1,541,010.4	664,354.1	842.70				Average	
		point75	75	1,540,982.6	664,279.8	843.60				Average	
		point76	76	1,540,939.9	664,211.4	841.60				Average	
		point77	77	1,540,894.8	664,157.6	839.00				Average	
		point78	78	1,540,618.0	663,837.1	834.60				Average	
		point262	262	1,540,438.8	663,634.9	834.00					
Dayton-WB-7_1	12.0	point269	269	1,540,265.6	666,331.1	832.00				Average	
		point11	11	1,539,922.9	666,365.0	833.10				Average	
		point12	12	1,539,393.8	666,420.4	833.80					
Dayton-WB-7_2	12.0	point270	270	1,540,331.0	666,314.2	832.10				Average	
		point30	30	1,539,706.8	666,377.2	833.20				Average	
		point31	31	1,539,393.0	666,409.2	833.40					
Dayton-EB-6_2	12.0	point272	272	1,540,235.0	666,313.5	832.00				Average	
		point34	34	1,540,534.5	666,283.4	833.10				Average	
		point35	35	1,540,901.5	666,244.9	833.80				Average	
		point36	36	1,541,160.2	666,215.2	834.30					

Dayton-EB-6_1	12.0	point273	273	1,540,286.2	666,299.7	832.00				Average	
		point46	46	1,540,817.8	666,244.5	833.60				Average	
		point47	47	1,541,158.4	666,205.4	834.30					

LJB Inc. 27 April 2011
Elizabeth Hundt TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: SR-444 EIS Noise
RUN: No Build 2010

Roadway	Points											
Name	Name	No.	Segment									
			Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
Dayton-WB-6_1	point1	1	131	35	0	0	1	35	0	0	0	0
	point3	3	131	35	0	0	1	35	0	0	0	0
	point8	8	131	35	0	0	1	35	0	0	0	0
	point268	268										
Dayton-WB-6_2	point13	13	130	35	0	0	1	35	0	0	0	0
	point17	17	130	35	0	0	1	35	0	0	0	0
	point21	21	130	35	0	0	1	35	0	0	0	0
	point27	27										
Dayton-EB-7_2	point32	32	217	35	0	0	2	35	0	0	0	0
	point33	33	217	35	0	0	2	35	0	0	0	0
	point271	271										
Dayton-EB-7_1	point43	43	217	35	0	0	2	35	0	0	0	0
	point44	44	217	35	0	0	2	35	0	0	0	0
	point45	45										
Central-SB-5_2	point48	48	313	35	0	0	2	35	0	0	0	0
	point49	49	313	35	0	0	2	35	0	0	0	0
	point50	50	313	35	0	0	2	35	0	0	0	0
	point51	51	313	35	0	0	2	35	0	0	0	0
	point52	52	313	35	0	0	2	35	0	0	0	0
	point53	53	313	35	0	0	2	35	0	0	0	0
	point55	55										
Central-SB-5_1	point67	67	313	35	0	0	1	35	0	0	0	0
	point68	68	313	35	0	0	1	35	0	0	0	0

	point69	69	313	35	0	0	1	35	0	0	0	0
	point70	70	313	35	0	0	1	35	0	0	0	0
	point71	71	313	35	0	0	1	35	0	0	0	0
	point72	72										
Kauffman-SB-3_1	point159	159	188	35	0	0	1	35	0	0	0	0
	point160	160	188	35	0	0	1	35	0	0	0	0
	point161	161	188	35	0	0	1	35	0	0	0	0
	point162	162	188	35	0	0	1	35	0	0	0	0
	point163	163	188	35	0	0	1	35	0	0	0	0
	point164	164										
Kauffman-NB-1_2	point107	107	324	35	0	0	2	35	0	0	0	0
	point108	108	324	35	0	0	2	35	0	0	0	0
	point109	109										
Kauffman-NB-1_1	point178	178	323	35	0	0	1	35	0	0	0	0
	point179	179	323	35	0	0	1	35	0	0	0	0
	point180	180										
Kauffman-SB-1_1	point250	250	216	35	0	0	1	35	0	0	0	0
	point249	249	216	35	0	0	1	35	0	0	0	0
	point174	174	216	35	0	0	1	35	0	0	0	0
	point176	176	216	35	0	0	1	35	0	0	0	0
	point177	177										
Kauffman-SB-1_2	point252	252	216	35	0	0	1	35	0	0	0	0
	point105	105	216	35	0	0	1	35	0	0	0	0
	point106	106										
Kauffman-NB-2_2	point253	253	316	35	0	0	1	35	0	0	0	0
	point110	110	316	35	0	0	1	35	0	0	0	0
	point111	111	316	35	0	0	1	35	0	0	0	0
	point112	112	316	35	0	0	1	35	0	0	0	0
	point113	113	316	35	0	0	1	35	0	0	0	0
	point114	114	316	35	0	0	1	35	0	0	0	0
	point115	115	316	35	0	0	1	35	0	0	0	0
	point116	116	316	35	0	0	1	35	0	0	0	0
	point117	117										
Kauffman-NB-2_1	point254	254	316	35	0	0	2	35	0	0	0	0
	point181	181	316	35	0	0	2	35	0	0	0	0
	point182	182	316	35	0	0	2	35	0	0	0	0

	point183	183	316	35	0	0	2	35	0	0	0	0
	point184	184	316	35	0	0	2	35	0	0	0	0
	point185	185	316	35	0	0	2	35	0	0	0	0
	point186	186	316	35	0	0	2	35	0	0	0	0
	point187	187	316	35	0	0	2	35	0	0	0	0
	point188	188	316	35	0	0	2	35	0	0	0	0
	point190	190	316	35	0	0	2	35	0	0	0	0
	point191	191										
Kauffman-SB-2_1	point255	255	188	35	0	0	1	35	0	0	0	0
	point165	165	188	35	0	0	1	35	0	0	0	0
	point166	166	188	35	0	0	1	35	0	0	0	0
	point167	167	188	35	0	0	1	35	0	0	0	0
	point168	168	188	35	0	0	1	35	0	0	0	0
	point169	169	188	35	0	0	1	35	0	0	0	0
	point170	170	188	35	0	0	1	35	0	0	0	0
	point171	171	188	35	0	0	1	35	0	0	0	0
	point173	173										
Kauffman-SB-2_2	point256	256	188	35	0	0	1	35	0	0	0	0
	point99	99	188	35	0	0	1	35	0	0	0	0
	point100	100	188	35	0	0	1	35	0	0	0	0
	point101	101	188	35	0	0	1	35	0	0	0	0
	point102	102	188	35	0	0	1	35	0	0	0	0
	point103	103	188	35	0	0	1	35	0	0	0	0
	point251	251										
Kauffman-NB-3_2	point257	257	316	35	0	0	2	35	0	0	0	0
	point118	118	316	35	0	0	2	35	0	0	0	0
	point119	119	316	35	0	0	2	35	0	0	0	0
	point120	120	316	35	0	0	2	35	0	0	0	0
	point121	121	316	35	0	0	2	35	0	0	0	0
	point122	122	316	35	0	0	2	35	0	0	0	0
	point123	123										
Kauffman-NB-3_1	point258	258	316	35	0	0	1	35	0	0	0	0
	point192	192	316	35	0	0	1	35	0	0	0	0
	point193	193	316	35	0	0	1	35	0	0	0	0
	point194	194	316	35	0	0	1	35	0	0	0	0
	point195	195	316	35	0	0	1	35	0	0	0	0

	point196	196	316	35	0	0	1	35	0	0	0	0
	point197	197	316	35	0	0	1	35	0	0	0	0
	point198	198										
Kauffman-SB-3_2	point259	259	188	35	0	0	1	35	0	0	0	0
	point94	94	188	35	0	0	1	35	0	0	0	0
	point95	95	188	35	0	0	1	35	0	0	0	0
	point96	96	188	35	0	0	1	35	0	0	0	0
	point97	97	188	35	0	0	1	35	0	0	0	0
	point98	98										
Kauffman-NB-4_2	point260	260	344	35	0	0	2	35	0	0	0	0
	point124	124	344	35	0	0	2	35	0	0	0	0
	point125	125	344	35	0	0	2	35	0	0	0	0
	point126	126	344	35	0	0	2	35	0	0	0	0
	point127	127	344	35	0	0	2	35	0	0	0	0
	point128	128	344	35	0	0	2	35	0	0	0	0
	point129	129	344	35	0	0	2	35	0	0	0	0
	point130	130	344	35	0	0	2	35	0	0	0	0
	point131	131	344	35	0	0	2	35	0	0	0	0
	point132	132	344	35	0	0	2	35	0	0	0	0
	point133	133	344	35	0	0	2	35	0	0	0	0
	point134	134	344	35	0	0	2	35	0	0	0	0
	point135	135	344	35	0	0	2	35	0	0	0	0
	point137	137	344	35	0	0	2	35	0	0	0	0
	point138	138	344	35	0	0	2	35	0	0	0	0
	point139	139	344	35	0	0	2	35	0	0	0	0
	point140	140	344	35	0	0	2	35	0	0	0	0
	point141	141	344	35	0	0	2	35	0	0	0	0
	point142	142	344	35	0	0	2	35	0	0	0	0
	point143	143	344	35	0	0	2	35	0	0	0	0
	point144	144	344	35	0	0	2	35	0	0	0	0
	point145	145	344	35	0	0	2	35	0	0	0	0
	point146	146	344	35	0	0	2	35	0	0	0	0
	point147	147	344	35	0	0	2	35	0	0	0	0
	point148	148										
Kauffman-NB-4_1	point261	261	343	35	0	0	1	35	0	0	0	0
	point199	199	343	35	0	0	1	35	0	0	0	0

	point200	200	343	35	0	0	1	35	0	0	0	0
	point201	201	343	35	0	0	1	35	0	0	0	0
	point202	202	343	35	0	0	1	35	0	0	0	0
	point203	203	343	35	0	0	1	35	0	0	0	0
	point204	204	343	35	0	0	1	35	0	0	0	0
	point205	205	343	35	0	0	1	35	0	0	0	0
	point206	206	343	35	0	0	1	35	0	0	0	0
	point207	207	343	35	0	0	1	35	0	0	0	0
	point208	208	343	35	0	0	1	35	0	0	0	0
	point209	209	343	35	0	0	1	35	0	0	0	0
	point210	210	343	35	0	0	1	35	0	0	0	0
	point211	211	343	35	0	0	1	35	0	0	0	0
	point212	212	343	35	0	0	1	35	0	0	0	0
	point213	213	343	35	0	0	1	35	0	0	0	0
	point214	214	343	35	0	0	1	35	0	0	0	0
	point215	215	343	35	0	0	1	35	0	0	0	0
	point216	216	343	35	0	0	1	35	0	0	0	0
	point217	217	343	35	0	0	1	35	0	0	0	0
	point218	218	343	35	0	0	1	35	0	0	0	0
	point219	219	343	35	0	0	1	35	0	0	0	0
	point220	220	343	35	0	0	1	35	0	0	0	0
	point221	221	343	35	0	0	1	35	0	0	0	0
	point222	222	343	35	0	0	1	35	0	0	0	0
	point223	223	343	35	0	0	1	35	0	0	0	0
	point224	224	343	35	0	0	1	35	0	0	0	0
	point225	225	343	35	0	0	1	35	0	0	0	0
	point226	226	343	35	0	0	1	35	0	0	0	0
	point227	227										
Roadway8-2	point263	263	501	35	0	0	2	35	0	0	0	0
	point79	79	501	35	0	0	2	35	0	0	0	0
	point80	80	501	35	0	0	2	35	0	0	0	0
	point81	81	501	35	0	0	2	35	0	0	0	0
	point82	82	501	35	0	0	2	35	0	0	0	0
	point83	83	501	35	0	0	2	35	0	0	0	0
	point84	84	501	35	0	0	2	35	0	0	0	0
	point85	85	501	35	0	0	2	35	0	0	0	0

	point86	86	501	35	0	0	2	35	0	0	0	0
	point87	87	501	35	0	0	2	35	0	0	0	0
	point88	88	501	35	0	0	2	35	0	0	0	0
	point89	89	501	35	0	0	2	35	0	0	0	0
	point93	93										
Central-NB-5_1	point264	264	372	35	0	0	2	35	0	0	0	0
	point229	229	372	35	0	0	2	35	0	0	0	0
	point230	230	372	35	0	0	2	35	0	0	0	0
	point234	234	372	35	0	0	2	35	0	0	0	0
	point235	235	372	35	0	0	2	35	0	0	0	0
	point236	236	372	35	0	0	2	35	0	0	0	0
	point237	237	372	35	0	0	2	35	0	0	0	0
	point238	238	372	35	0	0	2	35	0	0	0	0
	point239	239	372	35	0	0	2	35	0	0	0	0
	point240	240										
Central-NB-5_2	point265	265	372	35	0	0	2	35	0	0	0	0
	point150	150	372	35	0	0	2	35	0	0	0	0
	point151	151	372	35	0	0	2	35	0	0	0	0
	point152	152	372	35	0	0	2	35	0	0	0	0
	point153	153	372	35	0	0	2	35	0	0	0	0
	point154	154	372	35	0	0	2	35	0	0	0	0
	point155	155	372	35	0	0	2	35	0	0	0	0
	point156	156	372	35	0	0	2	35	0	0	0	0
	point157	157	372	35	0	0	2	35	0	0	0	0
	point158	158										
Kauffman-SB-4_2	point266	266	250	35	0	0	1	35	0	0	0	0
	point56	56	250	35	0	0	1	35	0	0	0	0
	point57	57	250	35	0	0	1	35	0	0	0	0
	point58	58	250	35	0	0	1	35	0	0	0	0
	point59	59	250	35	0	0	1	35	0	0	0	0
	point61	61	250	35	0	0	1	35	0	0	0	0
	point62	62	250	35	0	0	1	35	0	0	0	0
	point63	63	250	35	0	0	1	35	0	0	0	0
	point64	64	250	35	0	0	1	35	0	0	0	0
	point66	66										
Kauffman-SB-4_1	point267	267	251	35	0	0	1	35	0	0	0	0

	point73	73	251	35	0	0	1	35	0	0	0	0
	point74	74	251	35	0	0	1	35	0	0	0	0
	point75	75	251	35	0	0	1	35	0	0	0	0
	point76	76	251	35	0	0	1	35	0	0	0	0
	point77	77	251	35	0	0	1	35	0	0	0	0
	point78	78	251	35	0	0	1	35	0	0	0	0
	point262	262										
Dayton-WB-7_1	point269	269	65	35	0	0	1	35	0	0	0	0
	point11	11	65	35	0	0	1	35	0	0	0	0
	point12	12										
Dayton-WB-7_2	point270	270	65	35	0	0	1	35	0	0	0	0
	point30	30	65	35	0	0	1	35	0	0	0	0
	point31	31										
Dayton-EB-6_2	point272	272	198	35	0	0	1	35	0	0	0	0
	point34	34	198	35	0	0	1	35	0	0	0	0
	point35	35	198	35	0	0	1	35	0	0	0	0
	point36	36										
Dayton-EB-6_1	point273	273	198	35	0	0	1	35	0	0	0	0
	point46	46	198	35	0	0	1	35	0	0	0	0
	point47	47										

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INPUT: RECEIVERS
PROJECT/CONTRACT: SR-444 EIS Noise
RUN: No Build 2032

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria Existing LAeq1h	Impact Criteria LAeq1h	Sub'l	NR Goal	Active in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
7	1	1	1,539,990.2	666,488.8	833.40	4.92	0.00	66	10.0	8.0	Y
6	3	1	1,540,672.6	666,145.9	833.40	4.92	0.00	66	10.0	8.0	Y
5	5	1	1,541,289.2	665,808.3	835.00	4.92	0.00	66	10.0	8.0	Y
4	7	1	1,540,389.8	663,443.4	832.00	4.92	0.00	66	10.0	8.0	Y
1	9	1	1,535,981.9	658,629.3	846.65	4.92	0.00	66	10.0	8.0	Y
2	10	1	1,537,037.9	659,749.6	846.95	4.92	0.00	66	10.0	8.0	Y
3	11	1	1,537,570.5	660,581.1	845.80	4.92	0.00	66	10.0	8.0	Y

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INPUT: ROADWAYS
PROJECT/CONTRACT: SR-444 EIS Noise
RUN: No Build 2032

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway Name	Width	Points Name	No.	Coordinates (pavement) X	Y	Z	Flow Control Control Device	Speed Constraint	Percent Vehicles Affected	Segment Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
Dayton-WB-6_1	12.0	point1	1	1,541,166.9	666,243.6	834.60				Average	
		point3	3	1,540,921.4	666,265.5	834.10				Average	
		point8	8	1,540,608.4	666,297.3	833.40				Average	
		point268	268	1,540,265.6	666,331.1	832.00					
Dayton-WB-6_2	12.0	point13	13	1,541,166.1	666,233.5	834.30				Average	
		point17	17	1,540,954.1	666,251.7	834.00				Average	
		point21	21	1,540,674.8	666,280.4	833.50				Average	
		point27	27	1,540,331.0	666,314.2	832.10					
Dayton-EB-7_2	12.0	point32	32	1,539,377.1	666,399.2	833.50				Average	
		point33	33	1,539,935.5	666,343.6	832.60				Average	
		point271	271	1,540,235.0	666,313.5	832.00					
Dayton-EB-7_1	12.0	point43	43	1,539,375.0	666,391.9	833.50				Average	
		point44	44	1,539,881.8	666,338.2	833.00				Average	
		point45	45	1,540,286.2	666,299.7	832.00					
Central-SB-5_2	12.0	point48	48	1,541,189.1	666,181.2	834.20				Average	
		point49	49	1,541,179.9	666,009.5	835.20				Average	
		point50	50	1,541,166.1	665,846.2	834.20				Average	
		point51	51	1,541,147.6	665,652.0	833.70				Average	
		point52	52	1,541,121.6	665,361.9	833.40				Average	
		point53	53	1,541,081.0	664,919.9	835.10				Average	
		point55	55	1,541,042.1	664,499.4	842.20					
Central-SB-5_1	12.0	point67	67	1,541,177.8	666,179.8	833.00				Average	
		point68	68	1,541,170.8	666,048.9	833.00				Average	
		point69	69	1,541,163.1	665,935.4	834.80				Average	
		point70	70	1,541,134.0	665,607.9	833.20				Average	

		point71	71	1,541,082.2	665,053.4	833.60				Average	
		point72	72	1,541,029.9	664,507.9	834.40					
Kauffman-SB-3_1	12.0	point159	159	1,538,170.5	661,154.1	842.30				Average	
		point160	160	1,537,924.2	660,892.6	843.90				Average	
		point161	161	1,537,761.4	660,720.4	844.00				Average	
		point162	162	1,537,618.8	660,564.5	845.60				Average	
		point163	163	1,537,465.6	660,394.4	846.40				Average	
		point164	164	1,537,306.5	660,218.7	847.50					
Kauffman-NB-1_2	12.0	point107	107	1,535,794.6	658,486.1	845.00				Average	
		point108	108	1,535,945.2	658,654.9	846.00				Average	
		point109	109	1,536,095.5	658,821.6	847.00					
Kauffman-NB-1_1	12.0	point178	178	1,535,803.2	658,479.4	845.00				Average	
		point179	179	1,535,948.8	658,641.0	846.00				Average	
		point180	180	1,536,106.1	658,814.2	847.00					
Kauffman-SB-1_1	12.0	point250	250	1,536,143.0	658,935.0	848.00				Average	
		point249	249	1,536,065.4	658,848.6	847.50				Average	
		point174	174	1,535,987.8	658,762.1	847.00				Average	
		point176	176	1,535,839.9	658,597.2	846.00				Average	
		point177	177	1,535,762.1	658,513.3	845.00					
Kauffman-SB-1_2	12.0	point252	252	1,536,092.0	658,859.5	848.00				Average	
		point105	105	1,535,961.4	658,713.8	847.00				Average	
		point106	106	1,535,772.2	658,504.9	845.00					
Kauffman-NB-2_2	12.0	point253	253	1,536,095.5	658,821.6	847.00				Average	
		point110	110	1,536,242.9	658,981.5	848.00				Average	
		point111	111	1,536,464.8	659,224.4	850.00				Average	
		point112	112	1,536,578.4	659,354.4	848.40				Average	
		point113	113	1,536,778.4	659,575.5	847.40				Average	
		point114	114	1,536,886.9	659,695.8	846.90				Average	
		point115	115	1,536,996.5	659,816.4	846.30				Average	
		point116	116	1,537,109.2	659,939.6	846.70				Average	
		point117	117	1,537,295.8	660,146.6	847.90					
Kauffman-NB-2_1	12.0	point254	254	1,536,106.1	658,814.2	847.00				Average	
		point181	181	1,536,213.1	658,935.0	848.00				Average	
		point182	182	1,536,333.6	659,067.6	850.00				Average	
		point183	183	1,536,451.1	659,197.0	850.00				Average	
		point184	184	1,536,570.9	659,327.8	848.00				Average	
		point185	185	1,536,687.4	659,456.9	848.00				Average	
		point186	186	1,536,803.8	659,585.3	847.00				Average	
		point187	187	1,536,931.4	659,726.4	846.00				Average	

		point188	188	1,537,055.0	659,863.4	846.00				Average	
		point190	190	1,537,178.8	660,001.9	846.90				Average	
		point191	191	1,537,300.9	660,136.6	847.80					
Kauffman-SB-2_1	12.0	point255	255	1,537,306.5	660,218.7	847.50				Average	
		point165	165	1,537,145.8	660,041.6	847.80				Average	
		point166	166	1,537,000.0	659,878.4	846.90				Average	
		point167	167	1,536,845.8	659,709.3	846.60				Average	
		point168	168	1,536,711.4	659,561.8	847.60				Average	
		point169	169	1,536,559.0	659,394.1	849.00				Average	
		point170	170	1,536,406.5	659,225.6	850.00				Average	
		point171	171	1,536,270.5	659,072.2	849.00				Average	
		point173	173	1,536,143.0	658,935.0	848.00					
Kauffman-SB-2_2	12.0	point256	256	1,537,355.1	660,256.2	847.60				Average	
		point99	99	1,537,196.9	660,082.6	848.10				Average	
		point100	100	1,536,919.8	659,773.9	846.30				Average	
		point101	101	1,536,763.1	659,602.8	847.10				Average	
		point102	102	1,536,480.1	659,289.2	850.00				Average	
		point103	103	1,536,222.5	659,005.1	849.00				Average	
		point251	251	1,536,092.0	658,859.5	848.00					
Kauffman-NB-3_2	12.0	point257	257	1,537,295.8	660,146.6	847.90				Average	
		point118	118	1,537,419.5	660,282.6	847.20				Average	
		point119	119	1,537,536.4	660,414.6	845.90				Average	
		point120	120	1,537,652.8	660,540.4	845.20				Average	
		point121	121	1,537,844.5	660,753.1	843.50				Average	
		point122	122	1,538,030.6	660,957.9	842.00				Average	
		point123	123	1,538,199.4	661,140.2	842.40					
Kauffman-NB-3_1	12.0	point258	258	1,537,300.9	660,136.6	847.80				Average	
		point192	192	1,537,467.8	660,319.1	846.50				Average	
		point193	193	1,537,615.5	660,483.2	845.10				Average	
		point194	194	1,537,742.5	660,622.8	844.00				Average	
		point195	195	1,537,866.0	660,760.0	843.00				Average	
		point196	196	1,537,988.9	660,895.4	842.70				Average	
		point197	197	1,538,099.9	661,017.8	841.60				Average	
		point198	198	1,538,229.5	661,155.9	842.70					
Kauffman-SB-3_2	12.0	point259	259	1,538,199.1	661,172.4	843.10				Average	
		point94	94	1,538,108.6	661,072.5	841.80				Average	
		point95	95	1,537,908.6	660,859.0	843.80				Average	
		point96	96	1,537,681.9	660,616.6	844.40				Average	
		point97	97	1,537,510.8	660,423.9	845.80				Average	

		point98	98	1,537,355.1	660,256.2	847.60					
Kauffman-NB-4_2	12.0	point260	260	1,538,199.4	661,140.2	842.40				Average	
		point124	124	1,538,352.5	661,309.0	843.60				Average	
		point125	125	1,538,499.4	661,471.2	844.20				Average	
		point126	126	1,538,661.5	661,649.6	843.30				Average	
		point127	127	1,538,824.8	661,830.9	842.20				Average	
		point128	128	1,538,982.4	662,004.8	840.90				Average	
		point129	129	1,539,139.6	662,178.1	840.00				Average	
		point130	130	1,539,302.1	662,356.9	838.10				Average	
		point131	131	1,539,470.6	662,543.1	837.00				Average	
		point132	132	1,539,639.0	662,729.1	836.10				Average	
		point133	133	1,539,786.2	662,893.1	835.30				Average	
		point134	134	1,539,928.9	663,048.2	834.40				Average	
		point135	135	1,540,094.2	663,218.1	833.40				Average	
		point137	137	1,540,246.6	663,382.2	834.00				Average	
		point138	138	1,540,405.2	663,564.6	833.30				Average	
		point139	139	1,540,560.1	663,740.2	834.10				Average	
		point140	140	1,540,674.4	663,866.6	835.20				Average	
		point141	141	1,540,815.0	664,013.2	837.80				Average	
		point142	142	1,540,928.2	664,138.5	840.60				Average	
		point143	143	1,540,963.2	664,180.9	842.40				Average	
		point144	144	1,540,993.1	664,225.7	843.80				Average	
		point145	145	1,541,017.8	664,281.2	843.60				Average	
		point146	146	1,541,035.5	664,332.9	843.40				Average	
		point147	147	1,541,047.6	664,397.2	842.80				Average	
		point148	148	1,541,056.0	664,486.8	842.80					
Kauffman-NB-4_1	12.0	point261	261	1,538,229.5	661,155.9	842.70				Average	
		point199	199	1,538,340.5	661,280.3	843.50				Average	
		point200	200	1,538,461.5	661,413.4	844.00				Average	
		point201	201	1,538,577.4	661,541.0	843.90				Average	
		point202	202	1,538,698.5	661,675.1	843.20				Average	
		point203	203	1,538,775.1	661,757.9	842.70				Average	
		point204	204	1,538,924.2	661,922.5	841.50				Average	
		point205	205	1,539,047.0	662,057.4	840.30				Average	
		point206	206	1,539,165.2	662,190.5	839.40				Average	
		point207	207	1,539,265.5	662,300.9	838.50				Average	
		point208	208	1,539,381.1	662,426.7	837.80				Average	
		point209	209	1,539,499.9	662,557.9	836.90				Average	
		point210	210	1,539,617.0	662,687.4	836.30				Average	

		point211	211	1,539,731.9	662,815.0	835.60				Average	
		point212	212	1,539,850.4	662,946.5	835.00				Average	
		point213	213	1,539,971.5	663,075.4	834.20				Average	
		point214	214	1,540,103.8	663,211.1	835.00				Average	
		point215	215	1,540,219.1	663,338.4	834.30				Average	
		point216	216	1,540,338.9	663,473.1	833.50				Average	
		point217	217	1,540,448.8	663,597.5	833.50				Average	
		point218	218	1,540,568.0	663,732.4	834.10				Average	
		point219	219	1,540,692.5	663,869.9	834.60				Average	
		point220	220	1,540,818.9	664,004.6	837.50				Average	
		point221	221	1,540,936.2	664,132.2	840.40				Average	
		point222	222	1,540,968.0	664,170.2	841.80				Average	
		point223	223	1,541,004.5	664,227.8	843.00				Average	
		point224	224	1,541,026.1	664,274.1	843.70				Average	
		point225	225	1,541,044.4	664,331.9	843.40				Average	
		point226	226	1,541,059.0	664,403.2	843.10				Average	
		point227	227	1,541,065.2	664,493.9	842.50					
Roadway8-2	12.0	point263	263	1,540,438.8	663,634.9	834.00				Average	
		point79	79	1,540,259.4	663,432.7	835.00				Average	
		point80	80	1,540,068.8	663,219.1	835.00				Average	
		point81	81	1,539,927.4	663,078.4	834.40				Average	
		point82	82	1,539,768.0	662,904.1	835.50				Average	
		point83	83	1,539,608.0	662,727.4	836.50				Average	
		point84	84	1,539,455.5	662,561.1	837.00				Average	
		point85	85	1,539,303.8	662,393.0	838.30				Average	
		point86	86	1,539,150.6	662,223.6	839.60				Average	
		point87	87	1,538,898.6	661,944.4	841.70				Average	
		point88	88	1,538,620.8	661,638.5	843.60				Average	
		point89	89	1,538,338.9	661,326.7	843.60				Average	
		point93	93	1,538,199.1	661,172.4	843.10					
Central-NB-5_1	12.0	point264	264	1,541,065.2	664,493.9	842.50				Average	
		point229	229	1,541,092.0	664,806.6	837.80				Average	
		point230	230	1,541,104.8	664,939.2	835.00				Average	
		point234	234	1,541,138.1	665,343.9	833.40				Average	
		point235	235	1,541,152.1	665,484.2	833.30				Average	
		point236	236	1,541,170.6	665,686.6	833.90				Average	
		point237	237	1,541,183.6	665,822.5	833.90				Average	
		point238	238	1,541,194.9	665,944.9	834.10				Average	
		point239	239	1,541,211.5	666,074.4	835.30				Average	

		point240	240	1,541,222.8	666,177.2	834.30					
Central-NB-5_2	12.0	point265	265	1,541,056.0	664,486.8	842.80				Average	
		point150	150	1,541,083.4	664,831.6	838.50				Average	
		point151	151	1,541,099.8	665,002.1	834.00				Average	
		point152	152	1,541,115.4	665,180.2	834.00				Average	
		point153	153	1,541,130.6	665,356.2	834.00				Average	
		point154	154	1,541,146.2	665,523.9	833.30				Average	
		point155	155	1,541,163.0	665,706.2	833.20				Average	
		point156	156	1,541,176.5	665,850.3	833.60				Average	
		point157	157	1,541,193.5	666,001.7	833.90				Average	
		point158	158	1,541,211.5	666,177.8	834.30					
Kauffman-SB-4_2	12.0	point266	266	1,541,042.1	664,499.4	842.20				Average	
		point56	56	1,541,026.2	664,380.9	842.00				Average	
		point57	57	1,541,015.4	664,335.3	842.80				Average	
		point58	58	1,540,990.6	664,275.4	843.20				Average	
		point59	59	1,540,954.9	664,213.7	843.60				Average	
		point61	61	1,540,910.9	664,162.1	839.70				Average	
		point62	62	1,540,813.0	664,049.6	837.60				Average	
		point63	63	1,540,589.5	663,790.0	834.40				Average	
		point64	64	1,540,477.2	663,661.6	833.60				Average	
		point66	66	1,540,370.2	663,546.0	833.20					
Kauffman-SB-4_1	12.0	point267	267	1,541,029.9	664,507.9	834.40				Average	
		point73	73	1,541,023.2	664,428.1	842.30				Average	
		point74	74	1,541,010.4	664,354.1	842.70				Average	
		point75	75	1,540,982.6	664,279.8	843.60				Average	
		point76	76	1,540,939.9	664,211.4	841.60				Average	
		point77	77	1,540,894.8	664,157.6	839.00				Average	
		point78	78	1,540,618.0	663,837.1	834.60				Average	
		point262	262	1,540,438.8	663,634.9	834.00					
Dayton-WB-7_1	12.0	point269	269	1,540,265.6	666,331.1	832.00				Average	
		point11	11	1,539,922.9	666,365.0	833.10				Average	
		point12	12	1,539,393.8	666,420.4	833.80					
Dayton-WB-7_2	12.0	point270	270	1,540,331.0	666,314.2	832.10				Average	
		point30	30	1,539,706.8	666,377.2	833.20				Average	
		point31	31	1,539,393.0	666,409.2	833.40					
Dayton-EB-6_2	12.0	point272	272	1,540,235.0	666,313.5	832.00				Average	
		point34	34	1,540,534.5	666,283.4	833.10				Average	
		point35	35	1,540,901.5	666,244.9	833.80				Average	
		point36	36	1,541,160.2	666,215.2	834.30					

Dayton-EB-6_1	12.0	point273	273	1,540,286.2	666,299.7	832.00				Average	
		point46	46	1,540,817.8	666,244.5	833.60				Average	
		point47	47	1,541,158.4	666,205.4	834.30					

LJB Inc. 27 April 2011
Elizabeth Hundt TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: SR-444 EIS Noise
RUN: No Build 2032

Roadway	Points		Segment									
Name	Name	No.	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
Dayton-WB-6_1	point1	1	142	35	0	0	1	35	0	0	0	0
	point3	3	142	35	0	0	1	35	0	0	0	0
	point8	8	142	35	0	0	1	35	0	0	0	0
	point268	268										
Dayton-WB-6_2	point13	13	142	35	0	0	1	35	0	0	0	0
	point17	17	142	35	0	0	1	35	0	0	0	0
	point21	21	142	35	0	0	1	35	0	0	0	0
	point27	27										
Dayton-EB-7_2	point32	32	242	35	0	0	3	35	0	0	0	0
	point33	33	242	35	0	0	3	35	0	0	0	0
	point271	271										
Dayton-EB-7_1	point43	43	242	35	0	0	2	35	0	0	0	0
	point44	44	242	35	0	0	2	35	0	0	0	0
	point45	45										
Central-SB-5_2	point48	48	325	35	0	0	2	35	0	0	0	0
	point49	49	325	35	0	0	2	35	0	0	0	0
	point50	50	325	35	0	0	2	35	0	0	0	0
	point51	51	325	35	0	0	2	35	0	0	0	0
	point52	52	325	35	0	0	2	35	0	0	0	0
	point53	53	325	35	0	0	2	35	0	0	0	0
	point55	55										
Central-SB-5_1	point67	67	324	35	0	0	1	35	0	0	0	0
	point68	68	324	35	0	0	1	35	0	0	0	0

	point69	69	324	35	0	0	1	35	0	0	0	0
	point70	70	324	35	0	0	1	35	0	0	0	0
	point71	71	324	35	0	0	1	35	0	0	0	0
	point72	72										
Kauffman-SB-3_1	point159	159	209	35	0	0	1	35	0	0	0	0
	point160	160	209	35	0	0	1	35	0	0	0	0
	point161	161	209	35	0	0	1	35	0	0	0	0
	point162	162	209	35	0	0	1	35	0	0	0	0
	point163	163	209	35	0	0	1	35	0	0	0	0
	point164	164										
Kauffman-NB-1_2	point107	107	354	35	0	0	2	35	0	0	0	0
	point108	108	354	35	0	0	2	35	0	0	0	0
	point109	109										
Kauffman-NB-1_1	point178	178	354	35	0	0	2	35	0	0	0	0
	point179	179	354	35	0	0	2	35	0	0	0	0
	point180	180										
Kauffman-SB-1_1	point250	250	237	35	0	0	1	35	0	0	0	0
	point249	249	237	35	0	0	1	35	0	0	0	0
	point174	174	237	35	0	0	1	35	0	0	0	0
	point176	176	237	35	0	0	1	35	0	0	0	0
	point177	177										
Kauffman-SB-1_2	point252	252	237	35	0	0	1	35	0	0	0	0
	point105	105	237	35	0	0	1	35	0	0	0	0
	point106	106										
Kauffman-NB-2_2	point253	253	349	35	0	0	2	35	0	0	0	0
	point110	110	349	35	0	0	2	35	0	0	0	0
	point111	111	349	35	0	0	2	35	0	0	0	0
	point112	112	349	35	0	0	2	35	0	0	0	0
	point113	113	349	35	0	0	2	35	0	0	0	0
	point114	114	349	35	0	0	2	35	0	0	0	0
	point115	115	349	35	0	0	2	35	0	0	0	0
	point116	116	349	35	0	0	2	35	0	0	0	0
	point117	117										
Kauffman-NB-2_1	point254	254	350	35	0	0	1	35	0	0	0	0
	point181	181	350	35	0	0	1	35	0	0	0	0
	point182	182	350	35	0	0	1	35	0	0	0	0

	point183	183	350	35	0	0	1	35	0	0	0	0
	point184	184	350	35	0	0	1	35	0	0	0	0
	point185	185	350	35	0	0	1	35	0	0	0	0
	point186	186	350	35	0	0	1	35	0	0	0	0
	point187	187	350	35	0	0	1	35	0	0	0	0
	point188	188	350	35	0	0	1	35	0	0	0	0
	point190	190	350	35	0	0	1	35	0	0	0	0
	point191	191										
Kauffman-SB-2_1	point255	255	209	35	0	0	1	35	0	0	0	0
	point165	165	209	35	0	0	1	35	0	0	0	0
	point166	166	209	35	0	0	1	35	0	0	0	0
	point167	167	209	35	0	0	1	35	0	0	0	0
	point168	168	209	35	0	0	1	35	0	0	0	0
	point169	169	209	35	0	0	1	35	0	0	0	0
	point170	170	209	35	0	0	1	35	0	0	0	0
	point171	171	209	35	0	0	1	35	0	0	0	0
	point173	173										
Kauffman-SB-2_2	point256	256	209	35	0	0	1	35	0	0	0	0
	point99	99	209	35	0	0	1	35	0	0	0	0
	point100	100	209	35	0	0	1	35	0	0	0	0
	point101	101	209	35	0	0	1	35	0	0	0	0
	point102	102	209	35	0	0	1	35	0	0	0	0
	point103	103	209	35	0	0	1	35	0	0	0	0
	point251	251										
Kauffman-NB-3_2	point257	257	349	35	0	0	2	35	0	0	0	0
	point118	118	349	35	0	0	2	35	0	0	0	0
	point119	119	349	35	0	0	2	35	0	0	0	0
	point120	120	349	35	0	0	2	35	0	0	0	0
	point121	121	349	35	0	0	2	35	0	0	0	0
	point122	122	349	35	0	0	2	35	0	0	0	0
	point123	123										
Kauffman-NB-3_1	point258	258	350	35	0	0	1	35	0	0	0	0
	point192	192	350	35	0	0	1	35	0	0	0	0
	point193	193	350	35	0	0	1	35	0	0	0	0
	point194	194	350	35	0	0	1	35	0	0	0	0
	point195	195	350	35	0	0	1	35	0	0	0	0

	point196	196	350	35	0	0	1	35	0	0	0	0
	point197	197	350	35	0	0	1	35	0	0	0	0
	point198	198										
Kauffman-SB-3_2	point259	259	209	35	0	0	1	35	0	0	0	0
	point94	94	209	35	0	0	1	35	0	0	0	0
	point95	95	209	35	0	0	1	35	0	0	0	0
	point96	96	209	35	0	0	1	35	0	0	0	0
	point97	97	209	35	0	0	1	35	0	0	0	0
	point98	98										
Kauffman-NB-4_2	point260	260	375	35	0	0	2	35	0	0	0	0
	point124	124	375	35	0	0	2	35	0	0	0	0
	point125	125	375	35	0	0	2	35	0	0	0	0
	point126	126	375	35	0	0	2	35	0	0	0	0
	point127	127	375	35	0	0	2	35	0	0	0	0
	point128	128	375	35	0	0	2	35	0	0	0	0
	point129	129	375	35	0	0	2	35	0	0	0	0
	point130	130	375	35	0	0	2	35	0	0	0	0
	point131	131	375	35	0	0	2	35	0	0	0	0
	point132	132	375	35	0	0	2	35	0	0	0	0
	point133	133	375	35	0	0	2	35	0	0	0	0
	point134	134	375	35	0	0	2	35	0	0	0	0
	point135	135	375	35	0	0	2	35	0	0	0	0
	point137	137	375	35	0	0	2	35	0	0	0	0
	point138	138	375	35	0	0	2	35	0	0	0	0
	point139	139	375	35	0	0	2	35	0	0	0	0
	point140	140	375	35	0	0	2	35	0	0	0	0
	point141	141	375	35	0	0	2	35	0	0	0	0
	point142	142	375	35	0	0	2	35	0	0	0	0
	point143	143	375	35	0	0	2	35	0	0	0	0
	point144	144	375	35	0	0	2	35	0	0	0	0
	point145	145	375	35	0	0	2	35	0	0	0	0
	point146	146	375	35	0	0	2	35	0	0	0	0
	point147	147	375	35	0	0	2	35	0	0	0	0
	point148	148										
Kauffman-NB-4_1	point261	261	374	35	0	0	2	35	0	0	0	0
	point199	199	374	35	0	0	2	35	0	0	0	0

	point200	200	374	35	0	0	2	35	0	0	0	0
	point201	201	374	35	0	0	2	35	0	0	0	0
	point202	202	374	35	0	0	2	35	0	0	0	0
	point203	203	374	35	0	0	2	35	0	0	0	0
	point204	204	374	35	0	0	2	35	0	0	0	0
	point205	205	374	35	0	0	2	35	0	0	0	0
	point206	206	374	35	0	0	2	35	0	0	0	0
	point207	207	374	35	0	0	2	35	0	0	0	0
	point208	208	374	35	0	0	2	35	0	0	0	0
	point209	209	374	35	0	0	2	35	0	0	0	0
	point210	210	374	35	0	0	2	35	0	0	0	0
	point211	211	374	35	0	0	2	35	0	0	0	0
	point212	212	374	35	0	0	2	35	0	0	0	0
	point213	213	374	35	0	0	2	35	0	0	0	0
	point214	214	374	35	0	0	2	35	0	0	0	0
	point215	215	374	35	0	0	2	35	0	0	0	0
	point216	216	374	35	0	0	2	35	0	0	0	0
	point217	217	374	35	0	0	2	35	0	0	0	0
	point218	218	374	35	0	0	2	35	0	0	0	0
	point219	219	374	35	0	0	2	35	0	0	0	0
	point220	220	374	35	0	0	2	35	0	0	0	0
	point221	221	374	35	0	0	2	35	0	0	0	0
	point222	222	374	35	0	0	2	35	0	0	0	0
	point223	223	374	35	0	0	2	35	0	0	0	0
	point224	224	374	35	0	0	2	35	0	0	0	0
	point225	225	374	35	0	0	2	35	0	0	0	0
	point226	226	374	35	0	0	2	35	0	0	0	0
	point227	227										
Roadway8-2	point263	263	533	35	0	0	3	35	0	0	0	0
	point79	79	533	35	0	0	3	35	0	0	0	0
	point80	80	533	35	0	0	3	35	0	0	0	0
	point81	81	533	35	0	0	3	35	0	0	0	0
	point82	82	533	35	0	0	3	35	0	0	0	0
	point83	83	533	35	0	0	3	35	0	0	0	0
	point84	84	533	35	0	0	3	35	0	0	0	0
	point85	85	533	35	0	0	3	35	0	0	0	0

	point86	86	533	35	0	0	3	35	0	0	0	0
	point87	87	533	35	0	0	3	35	0	0	0	0
	point88	88	533	35	0	0	3	35	0	0	0	0
	point89	89	533	35	0	0	3	35	0	0	0	0
	point93	93										
Central-NB-5_1	point264	264	400	35	0	0	2	35	0	0	0	0
	point229	229	400	35	0	0	2	35	0	0	0	0
	point230	230	400	35	0	0	2	35	0	0	0	0
	point234	234	400	35	0	0	2	35	0	0	0	0
	point235	235	400	35	0	0	2	35	0	0	0	0
	point236	236	400	35	0	0	2	35	0	0	0	0
	point237	237	400	35	0	0	2	35	0	0	0	0
	point238	238	400	35	0	0	2	35	0	0	0	0
	point239	239	400	35	0	0	2	35	0	0	0	0
	point240	240										
Central-NB-5_2	point265	265	401	35	0	0	2	35	0	0	0	0
	point150	150	401	35	0	0	2	35	0	0	0	0
	point151	151	401	35	0	0	2	35	0	0	0	0
	point152	152	401	35	0	0	2	35	0	0	0	0
	point153	153	401	35	0	0	2	35	0	0	0	0
	point154	154	401	35	0	0	2	35	0	0	0	0
	point155	155	401	35	0	0	2	35	0	0	0	0
	point156	156	401	35	0	0	2	35	0	0	0	0
	point157	157	401	35	0	0	2	35	0	0	0	0
	point158	158										
Kauffman-SB-4_2	point266	266	266	35	0	0	1	35	0	0	0	0
	point56	56	266	35	0	0	1	35	0	0	0	0
	point57	57	266	35	0	0	1	35	0	0	0	0
	point58	58	266	35	0	0	1	35	0	0	0	0
	point59	59	266	35	0	0	1	35	0	0	0	0
	point61	61	266	35	0	0	1	35	0	0	0	0
	point62	62	266	35	0	0	1	35	0	0	0	0
	point63	63	266	35	0	0	1	35	0	0	0	0
	point64	64	266	35	0	0	1	35	0	0	0	0
	point66	66										
Kauffman-SB-4_1	point267	267	267	35	0	0	2	35	0	0	0	0

	point73	73	267	35	0	0	2	35	0	0	0	0
	point74	74	267	35	0	0	2	35	0	0	0	0
	point75	75	267	35	0	0	2	35	0	0	0	0
	point76	76	267	35	0	0	2	35	0	0	0	0
	point77	77	267	35	0	0	2	35	0	0	0	0
	point78	78	267	35	0	0	2	35	0	0	0	0
	point262	262										
Dayton-WB-7_1	point269	269	76	35	0	0	1	35	0	0	0	0
	point11	11	76	35	0	0	1	35	0	0	0	0
	point12	12										
Dayton-WB-7_2	point270	270	76	35	0	0	2	35	0	0	0	0
	point30	30	76	35	0	0	2	35	0	0	0	0
	point31	31										
Dayton-EB-6_2	point272	272	186	35	0	0	1	35	0	0	0	0
	point34	34	186	35	0	0	1	35	0	0	0	0
	point35	35	186	35	0	0	1	35	0	0	0	0
	point36	36										
Dayton-EB-6_1	point273	273	185	35	0	0	1	35	0	0	0	0
	point46	46	185	35	0	0	1	35	0	0	0	0
	point47	47										

LJB Inc. 27 April 2011
Elizabeth Hundt TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: SR-444 EIS Noise
RUN: No Build 2010

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria Existing LAeq1h	Impact Criteria LAeq1h	Sub'l	NR Goal	Active in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
7	1	1	1,539,990.2	666,488.8	833.40	4.92	0.00	66	10.0	8.0	Y
6	3	1	1,540,672.6	666,145.9	833.40	4.92	0.00	66	10.0	8.0	Y
5	5	1	1,541,289.2	665,808.3	835.00	4.92	0.00	66	10.0	8.0	Y
4	7	1	1,540,389.8	663,443.4	832.00	4.92	0.00	66	10.0	8.0	Y
1	9	1	1,535,981.9	658,629.3	846.65	4.92	0.00	66	10.0	8.0	Y
2	10	1	1,537,037.9	659,749.6	846.95	4.92	0.00	66	10.0	8.0	Y
3	11	1	1,537,570.5	660,581.1	845.80	4.92	0.00	66	10.0	8.0	Y

LJB Inc. 27 April 2011
Elizabeth Hundt TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: SR-444 EIS Noise
RUN: Build_2032

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway Name	Width	Points Name	No.	Coordinates (pavement) X	Y	Z	Flow Control Control Device	Speed Constraint	Percent Vehicles Affected	Segment Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
Dayton-WB-6_1	12.0	point1	1	1,541,166.9	666,243.6	834.60				Average	
		point3	3	1,540,921.4	666,265.5	834.10				Average	
		point8	8	1,540,608.4	666,297.3	833.40				Average	
		point268	268	1,540,265.6	666,331.1	832.00					
Dayton-WB-6_2	12.0	point13	13	1,541,166.1	666,233.5	834.30				Average	
		point17	17	1,540,954.1	666,251.7	834.00				Average	
		point21	21	1,540,674.8	666,280.4	833.50				Average	
		point27	27	1,540,331.0	666,314.2	832.10					
Dayton-EB-7_2	12.0	point32	32	1,539,377.1	666,399.2	833.50				Average	
		point33	33	1,539,935.5	666,343.6	832.60				Average	
		point271	271	1,540,235.0	666,313.5	832.00					
Dayton-EB-7_1	12.0	point43	43	1,539,375.0	666,391.9	833.50				Average	
		point44	44	1,539,881.8	666,338.2	833.00				Average	
		point45	45	1,540,286.2	666,299.7	832.00					
Central-SB-5_2	12.0	point48	48	1,541,189.1	666,181.2	834.20				Average	
		point49	49	1,541,179.9	666,009.5	835.20				Average	
		point50	50	1,541,166.1	665,846.2	834.20				Average	
		point51	51	1,541,147.6	665,652.0	833.70				Average	
		point52	52	1,541,121.6	665,361.9	833.40				Average	
		point53	53	1,541,081.0	664,919.9	835.10				Average	
		point55	55	1,541,042.1	664,499.4	842.20					
Central-SB-5_1	12.0	point67	67	1,541,177.8	666,179.8	833.00				Average	
		point68	68	1,541,170.8	666,048.9	833.00				Average	
		point69	69	1,541,163.1	665,935.4	834.80				Average	
		point70	70	1,541,134.0	665,607.9	833.20				Average	

		point71	71	1,541,082.2	665,053.4	833.60				Average	
		point72	72	1,541,029.9	664,507.9	834.40					
Kauffman-SB-3_1	12.0	point159	159	1,538,170.5	661,154.1	842.30				Average	
		point160	160	1,537,924.2	660,892.6	843.90				Average	
		point161	161	1,537,761.4	660,720.4	844.00				Average	
		point162	162	1,537,618.8	660,564.5	845.60				Average	
		point163	163	1,537,465.6	660,394.4	846.40				Average	
		point164	164	1,537,306.5	660,218.7	847.50					
Kauffman-NB-1_2	12.0	point107	107	1,535,794.6	658,486.1	845.00				Average	
		point108	108	1,535,945.2	658,654.9	846.00				Average	
		point109	109	1,536,095.5	658,821.6	847.00					
Kauffman-NB-1_1	12.0	point178	178	1,535,803.2	658,479.4	845.00				Average	
		point179	179	1,535,948.8	658,641.0	846.00				Average	
		point180	180	1,536,106.1	658,814.2	847.00					
Kauffman-SB-1_1	12.0	point250	250	1,536,143.0	658,935.0	848.00				Average	
		point249	249	1,536,065.4	658,848.6	847.50				Average	
		point174	174	1,535,987.8	658,762.1	847.00				Average	
		point176	176	1,535,839.9	658,597.2	846.00				Average	
		point177	177	1,535,762.1	658,513.3	845.00					
Kauffman-SB-1_2	12.0	point252	252	1,536,092.0	658,859.5	848.00				Average	
		point105	105	1,535,961.4	658,713.8	847.00				Average	
		point106	106	1,535,772.2	658,504.9	845.00					
Kauffman-NB-2_2	12.0	point253	253	1,536,095.5	658,821.6	847.00				Average	
		point110	110	1,536,242.9	658,981.5	848.00				Average	
		point111	111	1,536,464.8	659,224.4	850.00				Average	
		point112	112	1,536,578.4	659,354.4	848.40				Average	
		point113	113	1,536,778.4	659,575.5	847.40				Average	
		point114	114	1,536,886.9	659,695.8	846.90				Average	
		point115	115	1,536,996.5	659,816.4	846.30				Average	
		point116	116	1,537,109.2	659,939.6	846.70				Average	
		point117	117	1,537,295.8	660,146.6	847.90					
Kauffman-NB-2_1	12.0	point254	254	1,536,106.1	658,814.2	847.00				Average	
		point181	181	1,536,213.1	658,935.0	848.00				Average	
		point182	182	1,536,333.6	659,067.6	850.00				Average	
		point183	183	1,536,451.1	659,197.0	850.00				Average	
		point184	184	1,536,570.9	659,327.8	848.00				Average	
		point185	185	1,536,687.4	659,456.9	848.00				Average	
		point186	186	1,536,803.8	659,585.3	847.00				Average	
		point187	187	1,536,931.4	659,726.4	846.00				Average	

		point188	188	1,537,055.0	659,863.4	846.00				Average	
		point190	190	1,537,178.8	660,001.9	846.90				Average	
		point191	191	1,537,300.9	660,136.6	847.80					
Kauffman-SB-2_1	12.0	point255	255	1,537,306.5	660,218.7	847.50				Average	
		point165	165	1,537,145.8	660,041.6	847.80				Average	
		point166	166	1,537,000.0	659,878.4	846.90				Average	
		point167	167	1,536,845.8	659,709.3	846.60				Average	
		point168	168	1,536,711.4	659,561.8	847.60				Average	
		point169	169	1,536,559.0	659,394.1	849.00				Average	
		point170	170	1,536,406.5	659,225.6	850.00				Average	
		point171	171	1,536,270.5	659,072.2	849.00				Average	
		point173	173	1,536,143.0	658,935.0	848.00					
Kauffman-SB-2_2	12.0	point256	256	1,537,355.1	660,256.2	847.60				Average	
		point99	99	1,537,196.9	660,082.6	848.10				Average	
		point100	100	1,536,919.8	659,773.9	846.30				Average	
		point101	101	1,536,763.1	659,602.8	847.10				Average	
		point102	102	1,536,480.1	659,289.2	850.00				Average	
		point103	103	1,536,222.5	659,005.1	849.00				Average	
		point251	251	1,536,092.0	658,859.5	848.00					
Kauffman-NB-3_2	12.0	point257	257	1,537,295.8	660,146.6	847.90				Average	
		point118	118	1,537,419.5	660,282.6	847.20				Average	
		point119	119	1,537,536.4	660,414.6	845.90				Average	
		point120	120	1,537,652.8	660,540.4	845.20				Average	
		point121	121	1,537,844.5	660,753.1	843.50				Average	
		point122	122	1,538,030.6	660,957.9	842.00				Average	
		point123	123	1,538,199.4	661,140.2	842.40					
Kauffman-NB-3_1	12.0	point258	258	1,537,300.9	660,136.6	847.80				Average	
		point192	192	1,537,467.8	660,319.1	846.50				Average	
		point193	193	1,537,615.5	660,483.2	845.10				Average	
		point194	194	1,537,742.5	660,622.8	844.00				Average	
		point195	195	1,537,866.0	660,760.0	843.00				Average	
		point196	196	1,537,988.9	660,895.4	842.70				Average	
		point197	197	1,538,099.9	661,017.8	841.60				Average	
		point198	198	1,538,229.5	661,155.9	842.70					
Kauffman-SB-3_2	12.0	point259	259	1,538,199.1	661,172.4	843.10				Average	
		point94	94	1,538,108.6	661,072.5	841.80				Average	
		point95	95	1,537,908.6	660,859.0	843.80				Average	
		point96	96	1,537,681.9	660,616.6	844.40				Average	
		point97	97	1,537,510.8	660,423.9	845.80				Average	

		point98	98	1,537,355.1	660,256.2	847.60					
Kauffman-NB-4_2	12.0	point260	260	1,538,199.4	661,140.2	842.40				Average	
		point124	124	1,538,352.5	661,309.0	843.60				Average	
		point125	125	1,538,499.4	661,471.2	844.20				Average	
		point126	126	1,538,661.5	661,649.6	843.30				Average	
		point127	127	1,538,824.8	661,830.9	842.20				Average	
		point128	128	1,538,982.4	662,004.8	840.90				Average	
		point129	129	1,539,139.6	662,178.1	840.00				Average	
		point130	130	1,539,302.1	662,356.9	838.10				Average	
		point131	131	1,539,470.6	662,543.1	837.00				Average	
		point132	132	1,539,639.0	662,729.1	836.10				Average	
		point133	133	1,539,786.2	662,893.1	835.30				Average	
		point134	134	1,539,928.9	663,048.2	834.40				Average	
		point135	135	1,540,094.2	663,218.1	833.40				Average	
		point137	137	1,540,246.6	663,382.2	834.00				Average	
		point138	138	1,540,405.2	663,564.6	833.30				Average	
		point139	139	1,540,560.1	663,740.2	834.10				Average	
		point140	140	1,540,674.4	663,866.6	835.20				Average	
		point141	141	1,540,815.0	664,013.2	837.80				Average	
		point142	142	1,540,928.2	664,138.5	840.60				Average	
		point143	143	1,540,963.2	664,180.9	842.40				Average	
		point144	144	1,540,993.1	664,225.7	843.80				Average	
		point145	145	1,541,017.8	664,281.2	843.60				Average	
		point146	146	1,541,035.5	664,332.9	843.40				Average	
		point147	147	1,541,047.6	664,397.2	842.80				Average	
		point148	148	1,541,056.0	664,486.8	842.80					
Kauffman-NB-4_1	12.0	point261	261	1,538,229.5	661,155.9	842.70				Average	
		point199	199	1,538,340.5	661,280.3	843.50				Average	
		point200	200	1,538,461.5	661,413.4	844.00				Average	
		point201	201	1,538,577.4	661,541.0	843.90				Average	
		point202	202	1,538,698.5	661,675.1	843.20				Average	
		point203	203	1,538,775.1	661,757.9	842.70				Average	
		point204	204	1,538,924.2	661,922.5	841.50				Average	
		point205	205	1,539,047.0	662,057.4	840.30				Average	
		point206	206	1,539,165.2	662,190.5	839.40				Average	
		point207	207	1,539,265.5	662,300.9	838.50				Average	
		point208	208	1,539,381.1	662,426.7	837.80				Average	
		point209	209	1,539,499.9	662,557.9	836.90				Average	
		point210	210	1,539,617.0	662,687.4	836.30				Average	

		point211	211	1,539,731.9	662,815.0	835.60				Average	
		point212	212	1,539,850.4	662,946.5	835.00				Average	
		point213	213	1,539,971.5	663,075.4	834.20				Average	
		point214	214	1,540,103.8	663,211.1	835.00				Average	
		point215	215	1,540,219.1	663,338.4	834.30				Average	
		point216	216	1,540,338.9	663,473.1	833.50				Average	
		point217	217	1,540,448.8	663,597.5	833.50				Average	
		point218	218	1,540,568.0	663,732.4	834.10				Average	
		point219	219	1,540,692.5	663,869.9	834.60				Average	
		point220	220	1,540,818.9	664,004.6	837.50				Average	
		point221	221	1,540,936.2	664,132.2	840.40				Average	
		point222	222	1,540,968.0	664,170.2	841.80				Average	
		point223	223	1,541,004.5	664,227.8	843.00				Average	
		point224	224	1,541,026.1	664,274.1	843.70				Average	
		point225	225	1,541,044.4	664,331.9	843.40				Average	
		point226	226	1,541,059.0	664,403.2	843.10				Average	
		point227	227	1,541,065.2	664,493.9	842.50					
Roadway8-2	12.0	point263	263	1,540,438.8	663,634.9	834.00				Average	
		point79	79	1,540,259.4	663,432.7	835.00				Average	
		point80	80	1,540,068.8	663,219.1	835.00				Average	
		point81	81	1,539,927.4	663,078.4	834.40				Average	
		point82	82	1,539,768.0	662,904.1	835.50				Average	
		point83	83	1,539,608.0	662,727.4	836.50				Average	
		point84	84	1,539,455.5	662,561.1	837.00				Average	
		point85	85	1,539,303.8	662,393.0	838.30				Average	
		point86	86	1,539,150.6	662,223.6	839.60				Average	
		point87	87	1,538,898.6	661,944.4	841.70				Average	
		point88	88	1,538,620.8	661,638.5	843.60				Average	
		point89	89	1,538,338.9	661,326.7	843.60				Average	
		point93	93	1,538,199.1	661,172.4	843.10					
Central-NB-5_1	12.0	point264	264	1,541,065.2	664,493.9	842.50				Average	
		point229	229	1,541,092.0	664,806.6	837.80				Average	
		point230	230	1,541,104.8	664,939.2	835.00				Average	
		point234	234	1,541,138.1	665,343.9	833.40				Average	
		point235	235	1,541,152.1	665,484.2	833.30				Average	
		point236	236	1,541,170.6	665,686.6	833.90				Average	
		point237	237	1,541,183.6	665,822.5	833.90				Average	
		point238	238	1,541,194.9	665,944.9	834.10				Average	
		point239	239	1,541,211.5	666,074.4	835.30				Average	

		point240	240	1,541,222.8	666,177.2	834.30					
Central-NB-5_2	12.0	point265	265	1,541,056.0	664,486.8	842.80				Average	
		point150	150	1,541,083.4	664,831.6	838.50				Average	
		point151	151	1,541,099.8	665,002.1	834.00				Average	
		point152	152	1,541,115.4	665,180.2	834.00				Average	
		point153	153	1,541,130.6	665,356.2	834.00				Average	
		point154	154	1,541,146.2	665,523.9	833.30				Average	
		point155	155	1,541,163.0	665,706.2	833.20				Average	
		point156	156	1,541,176.5	665,850.3	833.60				Average	
		point157	157	1,541,193.5	666,001.7	833.90				Average	
		point158	158	1,541,211.5	666,177.8	834.30					
Kauffman-SB-4_2	12.0	point266	266	1,541,042.1	664,499.4	842.20				Average	
		point56	56	1,541,026.2	664,380.9	842.00				Average	
		point57	57	1,541,015.4	664,335.3	842.80				Average	
		point58	58	1,540,990.6	664,275.4	843.20				Average	
		point59	59	1,540,954.9	664,213.7	843.60				Average	
		point61	61	1,540,910.9	664,162.1	839.70				Average	
		point62	62	1,540,813.0	664,049.6	837.60				Average	
		point63	63	1,540,589.5	663,790.0	834.40				Average	
		point64	64	1,540,477.2	663,661.6	833.60				Average	
		point66	66	1,540,370.2	663,546.0	833.20					
Kauffman-SB-4_1	12.0	point267	267	1,541,029.9	664,507.9	834.40				Average	
		point73	73	1,541,023.2	664,428.1	842.30				Average	
		point74	74	1,541,010.4	664,354.1	842.70				Average	
		point75	75	1,540,982.6	664,279.8	843.60				Average	
		point76	76	1,540,939.9	664,211.4	841.60				Average	
		point77	77	1,540,894.8	664,157.6	839.00				Average	
		point78	78	1,540,618.0	663,837.1	834.60				Average	
		point262	262	1,540,438.8	663,634.9	834.00					
Dayton-WB-7_1	12.0	point269	269	1,540,265.6	666,331.1	832.00				Average	
		point11	11	1,539,922.9	666,365.0	833.10				Average	
		point12	12	1,539,393.8	666,420.4	833.80					
Dayton-WB-7_2	12.0	point270	270	1,540,331.0	666,314.2	832.10				Average	
		point30	30	1,539,706.8	666,377.2	833.20				Average	
		point31	31	1,539,393.0	666,409.2	833.40					
Dayton-EB-6_2	12.0	point272	272	1,540,235.0	666,313.5	832.00				Average	
		point34	34	1,540,534.5	666,283.4	833.10				Average	
		point35	35	1,540,901.5	666,244.9	833.80				Average	
		point36	36	1,541,160.2	666,215.2	834.30					

Dayton-EB-6_1	12.0	point273	273	1,540,286.2	666,299.7	832.00				Average	
		point46	46	1,540,817.8	666,244.5	833.60				Average	
		point47	47	1,541,158.4	666,205.4	834.30					

LJB Inc. 27 April 2011
Elizabeth Hundt TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: SR-444 EIS Noise
RUN: Build_2032

Roadway	Points											
Name	Name	No.	Segment									
			Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
Dayton-WB-6_1	point1	1	534	35	0	0	11	35	0	0	0	0
	point3	3	534	35	0	0	11	35	0	0	0	0
	point8	8	534	35	0	0	11	35	0	0	0	0
	point268	268										
Dayton-WB-6_2	point13	13	533	35	0	0	11	35	0	0	0	0
	point17	17	533	35	0	0	11	35	0	0	0	0
	point21	21	533	35	0	0	11	35	0	0	0	0
	point27	27										
Dayton-EB-7_2	point32	32	556	35	0	0	11	35	0	0	0	0
	point33	33	556	35	0	0	11	35	0	0	0	0
	point271	271										
Dayton-EB-7_1	point43	43	556	35	0	0	12	35	0	0	0	0
	point44	44	556	35	0	0	12	35	0	0	0	0
	point45	45										
Central-SB-5_2	point48	48	791	35	0	0	16	35	0	0	0	0
	point49	49	791	35	0	0	16	35	0	0	0	0
	point50	50	791	35	0	0	16	35	0	0	0	0
	point51	51	791	35	0	0	16	35	0	0	0	0
	point52	52	791	35	0	0	16	35	0	0	0	0
	point53	53	791	35	0	0	16	35	0	0	0	0
	point55	55										
Central-SB-5_1	point67	67	792	35	0	0	16	35	0	0	0	0
	point68	68	792	35	0	0	16	35	0	0	0	0

	point69	69	792	35	0	0	16	35	0	0	0	0
	point70	70	792	35	0	0	16	35	0	0	0	0
	point71	71	792	35	0	0	16	35	0	0	0	0
	point72	72										
Kauffman-SB-3_1	point159	159	659	35	0	0	14	35	0	0	0	0
	point160	160	659	35	0	0	14	35	0	0	0	0
	point161	161	659	35	0	0	14	35	0	0	0	0
	point162	162	659	35	0	0	14	35	0	0	0	0
	point163	163	659	35	0	0	14	35	0	0	0	0
	point164	164										
Kauffman-NB-1_2	point107	107	364	35	0	0	8	35	0	0	0	0
	point108	108	364	35	0	0	8	35	0	0	0	0
	point109	109										
Kauffman-NB-1_1	point178	178	364	35	0	0	7	35	0	0	0	0
	point179	179	364	35	0	0	7	35	0	0	0	0
	point180	180										
Kauffman-SB-1_1	point250	250	242	35	0	0	5	35	0	0	0	0
	point249	249	242	35	0	0	5	35	0	0	0	0
	point174	174	242	35	0	0	5	35	0	0	0	0
	point176	176	242	35	0	0	5	35	0	0	0	0
	point177	177										
Kauffman-SB-1_2	point252	252	241	35	0	0	5	35	0	0	0	0
	point105	105	241	35	0	0	5	35	0	0	0	0
	point106	106										
Kauffman-NB-2_2	point253	253	812	35	0	0	17	35	0	0	0	0
	point110	110	812	35	0	0	17	35	0	0	0	0
	point111	111	812	35	0	0	17	35	0	0	0	0
	point112	112	812	35	0	0	17	35	0	0	0	0
	point113	113	812	35	0	0	17	35	0	0	0	0
	point114	114	812	35	0	0	17	35	0	0	0	0
	point115	115	812	35	0	0	17	35	0	0	0	0
	point116	116	812	35	0	0	17	35	0	0	0	0
	point117	117										
Kauffman-NB-2_1	point254	254	811	35	0	0	16	35	0	0	0	0
	point181	181	811	35	0	0	16	35	0	0	0	0
	point182	182	811	35	0	0	16	35	0	0	0	0

	point183	183	811	35	0	0	16	35	0	0	0	0
	point184	184	811	35	0	0	16	35	0	0	0	0
	point185	185	811	35	0	0	16	35	0	0	0	0
	point186	186	811	35	0	0	16	35	0	0	0	0
	point187	187	811	35	0	0	16	35	0	0	0	0
	point188	188	811	35	0	0	16	35	0	0	0	0
	point190	190	811	35	0	0	16	35	0	0	0	0
	point191	191										
Kauffman-SB-2_1	point255	255	659	35	0	0	14	35	0	0	0	0
	point165	165	659	35	0	0	14	35	0	0	0	0
	point166	166	659	35	0	0	14	35	0	0	0	0
	point167	167	659	35	0	0	14	35	0	0	0	0
	point168	168	659	35	0	0	14	35	0	0	0	0
	point169	169	659	35	0	0	14	35	0	0	0	0
	point170	170	659	35	0	0	14	35	0	0	0	0
	point171	171	659	35	0	0	14	35	0	0	0	0
	point173	173										
Kauffman-SB-2_2	point256	256	658	35	0	0	13	35	0	0	0	0
	point99	99	658	35	0	0	13	35	0	0	0	0
	point100	100	658	35	0	0	13	35	0	0	0	0
	point101	101	658	35	0	0	13	35	0	0	0	0
	point102	102	658	35	0	0	13	35	0	0	0	0
	point103	103	658	35	0	0	13	35	0	0	0	0
	point251	251										
Kauffman-NB-3_2	point257	257	812	35	0	0	17	35	0	0	0	0
	point118	118	812	35	0	0	17	35	0	0	0	0
	point119	119	812	35	0	0	17	35	0	0	0	0
	point120	120	812	35	0	0	17	35	0	0	0	0
	point121	121	812	35	0	0	17	35	0	0	0	0
	point122	122	812	35	0	0	17	35	0	0	0	0
	point123	123										
Kauffman-NB-3_1	point258	258	811	35	0	0	16	35	0	0	0	0
	point192	192	811	35	0	0	16	35	0	0	0	0
	point193	193	811	35	0	0	16	35	0	0	0	0
	point194	194	811	35	0	0	16	35	0	0	0	0
	point195	195	811	35	0	0	16	35	0	0	0	0

	point196	196	811	35	0	0	16	35	0	0	0	0
	point197	197	811	35	0	0	16	35	0	0	0	0
	point198	198										
Kauffman-SB-3_2	point259	259	658	35	0	0	13	35	0	0	0	0
	point94	94	658	35	0	0	13	35	0	0	0	0
	point95	95	658	35	0	0	13	35	0	0	0	0
	point96	96	658	35	0	0	13	35	0	0	0	0
	point97	97	658	35	0	0	13	35	0	0	0	0
	point98	98										
Kauffman-NB-4_2	point260	260	820	35	0	0	17	35	0	0	0	0
	point124	124	820	35	0	0	17	35	0	0	0	0
	point125	125	820	35	0	0	17	35	0	0	0	0
	point126	126	820	35	0	0	17	35	0	0	0	0
	point127	127	820	35	0	0	17	35	0	0	0	0
	point128	128	820	35	0	0	17	35	0	0	0	0
	point129	129	820	35	0	0	17	35	0	0	0	0
	point130	130	820	35	0	0	17	35	0	0	0	0
	point131	131	820	35	0	0	17	35	0	0	0	0
	point132	132	820	35	0	0	17	35	0	0	0	0
	point133	133	820	35	0	0	17	35	0	0	0	0
	point134	134	820	35	0	0	17	35	0	0	0	0
	point135	135	820	35	0	0	17	35	0	0	0	0
	point137	137	820	35	0	0	17	35	0	0	0	0
	point138	138	820	35	0	0	17	35	0	0	0	0
	point139	139	820	35	0	0	17	35	0	0	0	0
	point140	140	820	35	0	0	17	35	0	0	0	0
	point141	141	820	35	0	0	17	35	0	0	0	0
	point142	142	820	35	0	0	17	35	0	0	0	0
	point143	143	820	35	0	0	17	35	0	0	0	0
	point144	144	820	35	0	0	17	35	0	0	0	0
	point145	145	820	35	0	0	17	35	0	0	0	0
	point146	146	820	35	0	0	17	35	0	0	0	0
	point147	147	820	35	0	0	17	35	0	0	0	0
	point148	148										
Kauffman-NB-4_1	point261	261	820	35	0	0	16	35	0	0	0	0
	point199	199	820	35	0	0	16	35	0	0	0	0

	point200	200	820	35	0	0	16	35	0	0	0	0
	point201	201	820	35	0	0	16	35	0	0	0	0
	point202	202	820	35	0	0	16	35	0	0	0	0
	point203	203	820	35	0	0	16	35	0	0	0	0
	point204	204	820	35	0	0	16	35	0	0	0	0
	point205	205	820	35	0	0	16	35	0	0	0	0
	point206	206	820	35	0	0	16	35	0	0	0	0
	point207	207	820	35	0	0	16	35	0	0	0	0
	point208	208	820	35	0	0	16	35	0	0	0	0
	point209	209	820	35	0	0	16	35	0	0	0	0
	point210	210	820	35	0	0	16	35	0	0	0	0
	point211	211	820	35	0	0	16	35	0	0	0	0
	point212	212	820	35	0	0	16	35	0	0	0	0
	point213	213	820	35	0	0	16	35	0	0	0	0
	point214	214	820	35	0	0	16	35	0	0	0	0
	point215	215	820	35	0	0	16	35	0	0	0	0
	point216	216	820	35	0	0	16	35	0	0	0	0
	point217	217	820	35	0	0	16	35	0	0	0	0
	point218	218	820	35	0	0	16	35	0	0	0	0
	point219	219	820	35	0	0	16	35	0	0	0	0
	point220	220	820	35	0	0	16	35	0	0	0	0
	point221	221	820	35	0	0	16	35	0	0	0	0
	point222	222	820	35	0	0	16	35	0	0	0	0
	point223	223	820	35	0	0	16	35	0	0	0	0
	point224	224	820	35	0	0	16	35	0	0	0	0
	point225	225	820	35	0	0	16	35	0	0	0	0
	point226	226	820	35	0	0	16	35	0	0	0	0
	point227	227										
Roadway8-2	point263	263	1450	35	0	0	30	35	0	0	0	0
	point79	79	1450	35	0	0	30	35	0	0	0	0
	point80	80	1450	35	0	0	30	35	0	0	0	0
	point81	81	1450	35	0	0	30	35	0	0	0	0
	point82	82	1450	35	0	0	30	35	0	0	0	0
	point83	83	1450	35	0	0	30	35	0	0	0	0
	point84	84	1450	35	0	0	30	35	0	0	0	0
	point85	85	1450	35	0	0	30	35	0	0	0	0

	point86	86	1450	35	0	0	30	35	0	0	0	0
	point87	87	1450	35	0	0	30	35	0	0	0	0
	point88	88	1450	35	0	0	30	35	0	0	0	0
	point89	89	1450	35	0	0	30	35	0	0	0	0
	point93	93										
Central-NB-5_1	point264	264	825	35	0	0	17	35	0	0	0	0
	point229	229	825	35	0	0	17	35	0	0	0	0
	point230	230	825	35	0	0	17	35	0	0	0	0
	point234	234	825	35	0	0	17	35	0	0	0	0
	point235	235	825	35	0	0	17	35	0	0	0	0
	point236	236	825	35	0	0	17	35	0	0	0	0
	point237	237	825	35	0	0	17	35	0	0	0	0
	point238	238	825	35	0	0	17	35	0	0	0	0
	point239	239	825	35	0	0	17	35	0	0	0	0
	point240	240										
Central-NB-5_2	point265	265	828	35	0	0	17	35	0	0	0	0
	point150	150	828	35	0	0	17	35	0	0	0	0
	point151	151	828	35	0	0	17	35	0	0	0	0
	point152	152	828	35	0	0	17	35	0	0	0	0
	point153	153	828	35	0	0	17	35	0	0	0	0
	point154	154	828	35	0	0	17	35	0	0	0	0
	point155	155	828	35	0	0	17	35	0	0	0	0
	point156	156	828	35	0	0	17	35	0	0	0	0
	point157	157	828	35	0	0	17	35	0	0	0	0
	point158	158										
Kauffman-SB-4_2	point266	266	725	35	0	0	15	35	0	0	0	0
	point56	56	725	35	0	0	15	35	0	0	0	0
	point57	57	725	35	0	0	15	35	0	0	0	0
	point58	58	725	35	0	0	15	35	0	0	0	0
	point59	59	725	35	0	0	15	35	0	0	0	0
	point61	61	725	35	0	0	15	35	0	0	0	0
	point62	62	725	35	0	0	15	35	0	0	0	0
	point63	63	725	35	0	0	15	35	0	0	0	0
	point64	64	725	35	0	0	15	35	0	0	0	0
	point66	66										
Kauffman-SB-4_1	point267	267	725	35	0	0	15	35	0	0	0	0

	point73	73	725	35	0	0	15	35	0	0	0	0
	point74	74	725	35	0	0	15	35	0	0	0	0
	point75	75	725	35	0	0	15	35	0	0	0	0
	point76	76	725	35	0	0	15	35	0	0	0	0
	point77	77	725	35	0	0	15	35	0	0	0	0
	point78	78	725	35	0	0	15	35	0	0	0	0
	point262	262										
Dayton-WB-7_1	point269	269	422	35	0	0	8	35	0	0	0	0
	point11	11	422	35	0	0	8	35	0	0	0	0
	point12	12										
Dayton-WB-7_2	point270	270	423	35	0	0	9	35	0	0	0	0
	point30	30	423	35	0	0	9	35	0	0	0	0
	point31	31										
Dayton-EB-6_2	point272	272	661	35	0	0	14	35	0	0	0	0
	point34	34	661	35	0	0	14	35	0	0	0	0
	point35	35	661	35	0	0	14	35	0	0	0	0
	point36	36										
Dayton-EB-6_1	point273	273	661	35	0	0	13	35	0	0	0	0
	point46	46	661	35	0	0	13	35	0	0	0	0
	point47	47										

LJB Inc. 27 April 2011
Elizabeth Hundt TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: SR-444 EIS Noise
RUN: Build_2032

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria Existing LAeq1h	Impact Criteria LAeq1h	Sub'l	NR Goal	Active in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
7	1	1	1,539,990.2	666,488.8	833.40	4.92	0.00	66	10.0	8.0	Y
6	3	1	1,540,672.6	666,145.9	833.40	4.92	0.00	66	10.0	8.0	Y
5	5	1	1,541,289.2	665,808.3	835.00	4.92	0.00	66	10.0	8.0	Y
4	7	1	1,540,389.8	663,443.4	832.00	4.92	0.00	66	10.0	8.0	Y
1	9	1	1,535,981.9	658,629.3	846.65	4.92	0.00	66	10.0	8.0	Y
2	10	1	1,537,037.9	659,749.6	846.95	4.92	0.00	66	10.0	8.0	Y
3	11	1	1,537,570.5	660,581.1	845.80	4.92	0.00	66	10.0	8.0	Y

Appendix E
Noise Model Results & TNM Output Tables

LJB Inc. 27 April 2011
Elizabeth Hundt TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: SR-444 EIS task
RUN: Field Check
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
6	3	1	0.0	54.5	66	54.5	10	----	54.5	0.0	8	-8.0
5	5	1	0.0	55.8	66	55.8	10	----	55.8	0.0	8	-8.0
4	7	1	0.0	60.6	66	60.6	10	----	60.6	0.0	8	-8.0
1	9	1	0.0	63.3	66	63.3	10	----	63.3	0.0	8	-8.0
2	10	1	0.0	59.6	66	59.6	10	----	59.6	0.0	8	-8.0
3	11	1	0.0	59.8	66	59.8	10	----	59.8	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	6	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

LJB Inc. 27 April 2011
Elizabeth Hundt TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: SR-444 EIS Noise
RUN: No Build 2010
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
7	1	1	0.0	54.5	66	54.5	10	----	54.5	0.0	8	-8.0
6	3	1	0.0	54.2	66	54.2	10	----	54.2	0.0	8	-8.0
5	5	1	0.0	58.4	66	58.4	10	----	58.4	0.0	8	-8.0
4	7	1	0.0	61.0	66	61.0	10	----	61.0	0.0	8	-8.0
1	9	1	0.0	63.7	66	63.7	10	----	63.7	0.0	8	-8.0
2	10	1	0.0	59.4	66	59.4	10	----	59.4	0.0	8	-8.0
3	11	1	0.0	59.3	66	59.3	10	----	59.3	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	7	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

LJB Inc. 27 April 2011
Elizabeth Hundt TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: SR-444 EIS Noise
RUN: No Build 2032
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
7	1	1	0.0	55.0	66	55.0	10	----	55.0	0.0	8	-8.0
6	3	1	0.0	54.4	66	54.4	10	----	54.4	0.0	8	-8.0
5	5	1	0.0	58.6	66	58.6	10	----	58.6	0.0	8	-8.0
4	7	1	0.0	61.4	66	61.4	10	----	61.4	0.0	8	-8.0
1	9	1	0.0	64.2	66	64.2	10	----	64.2	0.0	8	-8.0
2	10	1	0.0	59.8	66	59.8	10	----	59.8	0.0	8	-8.0
3	11	1	0.0	59.7	66	59.7	10	----	59.7	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min dB	Avg dB	Max dB
All Selected	7	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

LJB Inc. 27 April 2011
Elizabeth Hundt TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: SR-444 EIS Noise
RUN: Build_2032
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
7	1	1	0.0	60.1	66	60.1	10	----	60.1	0.0	8	-8.0
6	3	1	0.0	61.0	66	61.0	10	----	61.0	0.0	8	-8.0
5	5	1	0.0	63.3	66	63.3	10	----	63.3	0.0	8	-8.0
4	7	1	0.0	66.1	66	66.1	10	Snd Lvl	66.1	0.0	8	-8.0
1	9	1	0.0	65.4	66	65.4	10	----	65.4	0.0	8	-8.0
2	10	1	0.0	64.8	66	64.8	10	----	64.8	0.0	8	-8.0
3	11	1	0.0	65.3	66	65.3	10	----	65.3	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	7	0.0	0.0	0.0
All Impacted	1	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

State Route 444 EIS Noise Screening Results

Field Measurement Results

Location of Field Measurement	TNM Name	Field Reading (dBA)	Field Model (dBA)	Change (dBA)
1662 Kaufman Road	1	64.3	63.3	-1.0
417 Madison Street	2	57.6	59.6	2.0
Huffman Prairie Bikeway	3	62.5	59.8	-2.7
110 Lindberg Dr.	4	59.8	60.6	0.8
Central Park	5	54.3	55.8	1.5
112 Dayton Drive	6	52.0	54.5	2.5

TNM Summary Results

Location of Representative Receiver	TNM Name	Existing - 2010 No Build (dBA)	No Build- 2032 (dBA)	Build - 2032 (dBA)	Existing vs. No Build Change (dBA)	Existing vs. Build Change (dBA)	No Build vs. Build Change (dBA)
1662 Kaufman Road	1	63.7	64.2	65.4	0.5	1.7	1.2
417 Madison Street	2	59.4	59.8	64.8	0.4	5.4	5.0
Huffman Prairie Bikeway	3	59.3	59.7	65.3	0.4	6.0	5.6
110 Lindberg Dr.	4	61.0	61.4	**66.1**	0.4	5.1	4.7
Central Park	5	58.4	58.6	63.3	0.2	4.9	4.7
112 Dayton Drive	6	54.2	54.4	61.0	0.2	6.8	6.6
315 Dayton Drive	7	54.5	55.0	60.1	0.5	5.6	5.1

Red - Exceeds the 60 dBA criteria for Potential Noise Impacts
Bold Red - Approaches the 67dBA criteria for Noise Mitigation

Appendix D

Natural Resources Report

Natural Resource Report
For
Environmental Impact Statement for Entry Control Reconfiguration and Base Perimeter Fence Relocation in Area A, Wright-Patterson Air Force Base, Ohio

Contract No. FA8903-08-D-8780

Task Order Q702

Prepared by:

Shaw Environmental & Infrastructure, Inc.

5050 Section Avenue

Cincinnati, OH 45212

May 2011

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List of Acronyms

AFPD	Air Force Policy Directive
AFI	Air Force Instruction
ARFP	Antiterrorism/Force Protection
BFE	Base Flood Elevation
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CWA	Clean Water Act
DEIS	Draft EIS
DoD	Department of Defense
ECF	entry control facility
EIAP	Environmental Impact Analysis Process
EIS	environmental impact statement
ESA	Endangered Species Act
FEIS	Final EIS
FIRM	Flood Insurance Rate Map
ft	foot or feet
HHEI	Headwater Habitat Evaluation Index
INRMP	Integrated Natural Resources Management Plan
MCD	Miami Conservancy District
mi	miles
NEPA	National Environmental Policy Act
ODNR	Ohio Department of natural Resources
ODOT	Ohio Department of Transportation
OEPA	Ohio Environmental Protection Agency
ORAM	Ohio Rapid Assessment Method
PHWH	Primary Headwater Habitat
QHEI	Qualitative Habitat Evaluation Index
ROD	Record of Decision
SDDCTEA	Surface Deployment and Distribution Command Transportation Engineering Agency
SR	State Route
T&E	threatened and endangered
USACE	U.S. Army Corps of Engineers
USAF	United States Air Force
USFWS	U.S. Fish and Wildlife Service
WPAFB	Wright-Patterson Air Force Base

1.0 Introduction

1.1 Purpose of the Report

In conformance with security standards, the United States Air Force (USAF) and Wright-Patterson Air Force Base (WPAFB) are proposing to implement solutions to improve security, safety, and traffic flow into and on the Base. The existing security environment at WPAFB is in need of updating based on the revised USAF anti-terrorism standards as defined by the Military Surface Deployment and Distribution Command Transportation Engineering Agency (SDDCTEA) Pamphlet 55-15, dated 2006, and the United Facilities Criteria (UFC 4-010-01) Department of Defense (DoD) Minimum Antiterrorism Standards for Buildings. The objectives of these standards are two-fold:

- Seek effective ways to minimize the likelihood of mass casualties from terrorist attacks against DoD personnel in the buildings in which they work and live; and
- Improve highway safety and reduce traffic congestion on DoD installation roads and on routes providing access to installations thereby saving lives, decreasing injuries, minimizing lost time, and maintaining readiness.

To improve security, safety, and traffic flow into and on the Base as part of this project, WPAFB will take into consideration and analyze safety concerns and traffic flow to off-Base street networks that may be affected by proposed USAF actions to achieve compliance with the anti-terrorism standards.

This report describes the natural resources – that is, vegetation, wildlife, threatened and endangered (T&E) species, wetlands, other jurisdictional waters of the United States, and floodplain issues within or adjacent to the proposed project areas.

1.2 Description of the Action

The USAF is preparing an environmental impact statement (EIS) to evaluate environmental impacts associated with modifying traffic entry into Area A of the Base, and relocating a portion of the base perimeter fence. This includes consolidating, relocating, and modifying vehicle entry control facilities (ECFs); upgrading ECFs to meet current Antiterrorism / Force Protection (ATFP) standards; and extending the base perimeter fence to encompass the Kittyhawk Center, enabling it to be contiguous with Area A.

The EIS will analyze issues related to ECFs and the on-Base roadway network located in Area A. A primary security concern related to entry control and the existing roadway network is the existing condition of State Route (SR) 444 that separates the Kittyhawk Center from Area A. Another security concern is the need to consolidate the existing nine ECFs in Area A into a smaller set of three upgraded and strategically placed gates to be referred to as Gates 1A, 15A, and 26A.

Based on a review of potential alternatives during scoping, the EIS will analyze WPAFB's Proposed Action, one reasonable action alternative to the Proposed Action, and the no action alternative. Upon completion of the public comment period for the Draft EIS (DEIS), WPAFB will issue a Record of Decision (ROD) no sooner than 30 days following public distribution of the Final EIS (FEIS). The EIS will be prepared in accordance with the National Environmental Policy Act (NEPA) of 1969; 40 Code of Federal Regulations (CFR), Parts 1500-1508, the Council on Environmental Quality (CEQ) regulations implementing NEPA; and the USAF *Environmental Impact Analysis Process* (EIAP) [32 CFR Part 989].

1.3 Description of the Action Area

WPAFB is located in the southwest portion of the state of Ohio in Greene and Montgomery counties, approximately 10 miles (mi) east of the city of Dayton **(Figure 1-1)**. The Base encompasses 8,145 acres and is classified as non-industrial with mixed development. WPAFB is subdivided into two areas: Areas A and B. Area A consists primarily of administrative offices and an active airfield. Area B consists primarily of research and development facilities with educational functions and is located across SR 444 to the southwest of Area A.

Off-Base, the area around WPAFB varies from heavily urbanized to rural agricultural. Most of the urbanized areas are west of the Base, with the low-density or agricultural area located east of the Base.

Figure 1-2 shows the location of WPAFB, Areas A and B at WPAFB, and the surrounding area including both on-Base and off-Base portions of the proposed project areas. General photographs of the proposed project area may be found in **Attachment B**.

1.3.1 On-Base Area

The majority of WPAFB and proposed project areas lie within the broad alluvial plain of the Mad River Valley. Topographically, the area is characterized by low rolling hills, level plains, and flat alluvial valleys. The on-Base portion of the proposed project area incorporates a mixture of base facilities including both administrative and maintenance activities. Open grounds include right-of-ways landscaped areas, and other disturbed grounds designated as turf areas. The proposed project area also includes two unnamed tributaries to Hebble Creek and an unnamed headwater tributary to Hebble Creek.

1.3.2 Off-Base Area

The proposed project area (**Figure 1-2**) involves portions of SR 235, SR 444 (Kauffman Avenue), South Broad Street, West Dayton Drive, and Highway 844 Bypass. Included within these areas are businesses, residents, and open right-of-ways and other disturbed grounds.

1.4 Applicable Regulations

The biological resources within and adjacent to the proposed project area were surveyed to comply with those statutes and regulations with which the USAF must comply. The following statutes and regulations apply to the proposed actions by WPAFB:

- Clean Water Act, Section 404
- 16 U.S.C §1531 et seq. – Endangered Species Act, as amended
- 42 U.S.C. §4321 et seq. – National Environmental Policy Act as amended
- 33 CFR – Navigation and Navigable Waters of the U.S.
- 40 CFR Part 6 Appendix A – Protection of Floodplains
- 40 CFR Parts 22, and 230-233 – Protection of Wetlands
- 50 CFR Part 200 – Wildlife and Fisheries
- 50 CFR Part 402 – Interagency Cooperation
- Ohio Revised Code 1531.25 – Protection of Species Threatened with State-Wide Extinction
- Ohio Revised Code Chapter 1518 – Endangered Species
- Executive Order 11988 – Floodplain Management
- Executive Order 11990 – Protection of Wetlands
- AFI 32-7064 – Integrated Natural Resource Management Plan

Under the Endangered Species Act (ESA) (16 U.S.C. §1536), an "endangered species" is defined as any species in danger of extinction throughout all or a large portion of its range. A "threatened species" is defined as any species likely to become an endangered species in the foreseeable future. The U.S. Fish and Wildlife Service (USFWS) also maintains a list of species considered to be candidates for possible listing under the ESA. Although candidate species receive no statutory protection under the ESA, the USFWS has attempted to advise government agencies, industry, and the public that these species are at risk and might warrant protection under the Act.

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

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

1.5 Survey Methodology

A literature review was conducted to provide baseline information on the proposed project area's natural resources. This review provided current information on vegetation, wildlife, T&E species, wetlands, streams, lakes, and floodplains. The information was gathered from WPAFB's current Integrated Natural Resources Management Plan (INRMP) 2007 and an Update to WPAFB Wetland and Stream Management Plan (2009). Data was also gathered from the USFWS, ODNR, Miami Conservancy District (MCD), and private persons specifically contacted for additional data especially on the sensitive natural resources.

A field survey was conducted in March 2011 to assess current conditions and note any changes to previous knowledge relating to natural resources. The field survey consisted of characterizing

the existing vegetation, wildlife, streams, and wetlands within or adjacent to the proposed project area. This survey followed guidance presented in the February 2010 Ohio Department of Transportation (ODOT) *Ecological Manual* (ODOT 2010).

During the survey, all plant communities natural or otherwise were identified, and dominant species were recorded. Plants were identified according to Gleason and Cronquist (1991) and nomenclature follows Cooperrider, et al. (2001). Terrestrial wildlife within the proposed project area was noted based on actual observance, calls, tracks, scat, nests, burrows, or road kill.

The proposed project area was surveyed for the presence of suitable habitat for T&E species known from within, or in the vicinity of, the proposed project area based on the literature review. Suitable habitat survey included habitat for both Federal- and state-listed species.

A survey for potential wetlands was conducted following guidelines provided in the *Corps of Engineers Wetland Delineation Manual* (U.S. Army Corps of Engineers [USACE] Environmental Laboratory 1987). If a wetland was suspected to occur within the proposed project area, it was identified according to the routine determination method outlined in Section D of the manual based on three criteria—vegetation, soil, and hydrological features. If wetlands were encountered and delineated, the functional quality of the wetland was also assessed using the Ohio Rapid Assessment Method (ORAM) (OEPA 2001). This functional assessment categorizes wetlands into three categories (Ohio Administrative Code Rule 3745-1-54(C)(1, 2, and 3)):

- Category 1 wetlands "…support minimal wildlife habitat, and minimal hydrological and recreational functions"

- Category 2 wetlands "…support moderate wildlife habitat, or hydrological or recreational functions"

- Category 3 wetlands having "…superior habitat, or superior hydrological or recreational functions".

Any encountered wetlands were also classified according to the classification scheme for both class and subclass set forth by Cowardin, et al. (1979).

Jurisdictional waters other than wetlands include channelized waterways and deep water habitats. The field survey included noting the existence of any waterway that possessed a defined channel and streambed as defined by the ordinary high water mark were present in the proposed project area. If present, these streams would be evaluated to determine whether the waterway qualified as a Primary Headwater Habitat (PHWH) stream, as defined by the Ohio Environmental Protection Agency (OEPA 2002) or a non-headwater stream as defined by Rankin (1989).

PHWH streams have a defined bed and bank, with either continuous or periodic flowing water, a watershed area of less than 1 square mile (mi_2), and maximum pool depth (excluding plunge pools) of 16 inches or less. Streams that met this definition were evaluated using the Headwater Habitat Evaluation Index (HHEI) (OEPA 2002). This evaluation is based on three physical measurements that have been found to correlate well with biological measures of stream quality. Streams are assigned to a Class (I, II, or III) based on the score that is derived from the HHEI:

- Class I streams typically are ephemeral with little or no aquatic life present
- Class II streams are typically found to have a moderately diverse community of warm-water adapted native fauna either present seasonally or on an annual basis
- Class III streams have native fauna adapted to cool-cold perennial flowing water characterized by a community of vertebrate and /or a diverse community of benthic macroinvertebrates.

The Qualitative Habitat Evaluation Index (QHEI), as described by Rankin (1989), was used to evaluate habitat quality for non-headwater streams with a watershed area of greater than 1 mi_2. The QHEI is based on a quality rating of the stream substrate, in-stream cover, channel morphology, riparian zone, stream bank erosion, pool/glide and riffle/run quality. QHEI scores can range from 0 to 100, and are grouped into five narrative ranges: very poor (0–30), poor (31–45), fair (46–59), good (60–74), and excellent ($\geq$75).

2.0 Listed Species and Critical Habitat in the Action Area

T&E species on the Base are protected under the ESA of 1973. In addition, Air Force Policy Directive (AFPD) 32-70 and Air Force Instruction (AFI) 32-7064 require all USAF installations to protect species classified as federally or state endangered or threatened. The Endangered Species Management Plan (BHE 2001), which has been incorporated into the Base INRMP (WPAFB 2007) provides species-specific protection and conservation measures to protect known special status species occurring on the Base. Protected wildlife species known to occur or known to have occurred on WPAFB are:

Federally-Listed

- Indiana bat (*Myotis sodalis*), endangered
- Eastern massasauga rattlesnake (*Sistrurus c. catenatus*), candidate species
- Clubshell (*Pleurobema clava*), endangered
- Snuffbox (*Epioblasma triquetra*), species proposed for listing
- Rayed bean (*Villisa fabalis*), species proposed for listing

State-Listed

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

Recent correspondence with ODNR, Division of Wildlife (June 2, 2011), provided locations of seven species within a 1-mile radius of the proposed project area. These include the Indiana bat, Great Plains Ladies' tresses, Ear-Leaved-Foxglove, Upland Sandpiper, Sedge Wren, Beer's Noctuid, and the Midland Sedge. The midland sedge (*Carex mesochorea*) is known from just outside the boundary of the Base in Greene County and is listed as endangered in Ohio. This

species is quite similar to more common species like oval-leaf sedge (*C. cephalophora*), both of which can occur in lawns, right-of-ways, and other open, disturbed areas. While some potential habitat does exist within the proposed project area, mowing schedules for these disturbed areas lessen the likelihood of fruiting and identifiable plants. Otherwise, only the following listed species have records or potential habitat available within the proposed project areas as noted by the ODNR:

Indiana bat (*Myotis sodalis*): The ODNR Natural Heritage Database search results indicate that there are several Indiana bat capture sites on the Base. Additionally, a mist net survey was conducted in 2007 that yielded forty-seven bats, 5 five of which were Indiana bats. The capture sites were all associated with the Mad River and its immediate tributaries. While no known sightings of the Indiana bat have been documented within the proposed project areas, there is potential habitat associated with the Gate 26A portion of the proposed project areas.

Bald eagle (*Haliaeetus leucocephalus*): The bald eagle was removed from the Federal list of threatened and endangered species in 2007, but it has been designated as threatened in the state of Ohio and continues to be afforded protection by the Bald and Golden Eagle Protection Act and Migratory Bird Treaty Act. This species is typically found along waterways and impoundments. Although bald eagles may be found year round in Ohio, they only occur on WPAFB as rare winter visitors, with most previous sightings having been along the Mad River corridor, which contains potentially suitable winter foraging and roosting habitat (WPAFB 2007). While no known sightings of the bald eagle have been documented within the proposed project areas, the Gate 26A portion of the proposed project areas is within a designated bald eagle habitat area.

Recent correspondence with the USFWS, Ecological Services (October 28, 2011), provided locations of six species of concern located in proximity to the proposed project area. These include the bald eagle, Indiana bat, eastern massasauga, clubshell, snuffbox, and rayed bean. Discussion of the Indiana bat and bald eagle are noted above with the clubshell, snuffbox, and rayed bean (freshwater mussels) discussed below.

Clubshell (*Pleurobema clava*) is a federally listed endangered freshwater mussel inhabiting areas with sand or gravel substrate and also prefers areas with riffles and runs. The clubshell

is potentially present in the Little Miami River and drainages where preferred habitat exists. No sightings of the clubshell have been reported within the project area.

Snuffbox (*Epioblasma triquetra*) is a freshwater mussel that occurs in swift current of riffles and shoals over gravel and sand with occasional cobble and boulders. The snuffbox is known to be present in the Stillwater and Little Miami River and drainages where preferred habitat exists. As noted for the clubshell, no sightings of the snuffbox have been reported within the project area.

Rayed bean (*Villosa fabalis*) is a freshwater mussel that is generally known to exist in small headwater creeks, but records exist indicating this species has been sited in larger rivers. The rayed bean is usually found in or near shoal or riffle areas, and in the shallow, wave-washed areas of lakes. Substrates typically include gravel and sand, and the rayed bean is often associated with, and buried under the roots of vegetation, including water willow and water milfoil. The rayed bean is known to exist in perennial streams in Greene and Montgomery Counties where preferred habitat exists. As noted for the clubshell and snuffbox, no sightings of the rayed bean have been reported within the project area.

3.0 Biological Baseline Conditions

This section presents a summary of the vegetation, wildlife, T&E species, and wetlands / jurisdictional waters / floodplains in the vicinity of the project area.

3.1 Vegetation

3.1.1 On-Base

3.1.1.1 Literature Review Summary

WPAFB contains four general types of natural vegetative communities, including forest, old fields, prairie, and wetlands. Comprehensive vegetation surveys were conducted in Areas A and B of WPAFB in 1998 and 1999 (BHE 1999).

3.1.1.2 Field Survey Summary

Areas that may be impacted by the Proposed Action are primarily disturbed areas. These include maintained areas that are frequently mowed such as right-of-ways, lawns, and recreational areas and have been designated by the Base as turf and landscaped areas. The maintained areas are largely dominated by weedy and non-native species like tall fescue (*Festuca elatior*), smooth crabgrass (*Digitaria ischaemum*), red clover (*Trifolium pratense*), and common dandelion (*Taraxacum officinale*). There are occasional tree lines along small tributaries within the proposed project areas. These contain species common in the area such as box elder (*Acer negundo*) or cottonwood (*Populus deltoides*). The various forest, prairie, and wetlands, located on the Base are outside of proposed project areas. Representative photographs may be found in **Attachment B**.

3.1.2 Off-Base

3.1.2.1 Literature Review Summary

There are no known accounts of vegetation associated with the areas designated as the off-Base portion of the proposed project area. The vegetation of urban environments is typically disturbed, maintained lawns, parks, right-of-ways, and occasional tree lines, and old fields.

3.1.2.2 Field Survey Summary

The off-Base portion of the proposed project area contains vegetation associated primarily with road right-of-ways, urban lawns, scattered trees (mostly planted), and other landscaped features. Vegetation is largely dominated by weedy and non-native species like tall fescue (*Festuca*

elatior), smooth crabgrass (*Digitaria ischaemum*), red clover (*Trifolium pratense*), and common dandelion (*Taraxacum officinale*). Representative photographs may be found in **Attachment B**.

3.2 Wildlife

3.2.1 On-Base

3.2.1.1 Literature Review Summary

WPAFB is home to a variety of wildlife. Previously conducted surveys documented the presence of 23 mammals, 118 birds, 8 reptiles, and 6 amphibians on the Base (3D/I 1998, BHE 1999, 2005). Mammals common on the Base include white-tailed deer (*Odocoileus virginianus*), raccoon (*Procyon lotor*), Virginia opossum (*Didelphis virginiana*), beaver (*Castor canadensis*), groundhog (*Marmota monax*), eastern fox squirrel (*Sciurus niger*), eastern gray squirrel (*Sciurus carolinensis*), eastern chipmunk (*Tamias striatus*), and deer mouse (*Peromyscus maniculata*). Birds commonly observed include European starling (*Sturnus vulgarus*), eastern meadowlark (*Sturnella magna*), barn swallow (*Hirundo rustica*), Savannah sparrow (*Passerculus sandwichensis*), red-winged blackbird (*Agelaius phoeniceus*), Canada goose (*Branta canadensis*), red-tailed hawk (*Buteo jamaicensis*), horned lark (*Eremophila alpestris*), American robin (*Turdus migratorius*), turkey vulture (*Cathartes aura*), mourning dove (*Zenaida macroura*), killdeer (*Charadrius vociferus*), American crow (*Corvus brachyrhynchos*), and mallard (*Anas platyrhynchos*) (WPAFB 2007). Reptiles and amphibians commonly observed include the American toad (*Bufo americanus*) and eastern garter snake (*Thamnophis s. sirtalis*).

3.2.1.2 Field Survey Summary

Due to the urban nature of the proposed project areas, no animals were observed with the exception of an occasional American robin, European starling, mourning dove, or house sparrow (*Passer domesticus*). Groundhog burrows were also observed.

3.2.2 Off-Base

3.2.2.1 Literature Review Summary

There are no known accounts of wildlife associated with the areas designated as the off-Base portion of the proposed project areas. As with the on-Base portion, the wildlife would be expected as typical for those species adapted to urban environments. According to a Site-Wide Characterization Report (ICI and SAIC 1995), resident animals found in disturbed areas including the off-Base portion of the proposed project areas include eastern cottontail rabbit

(*Sylvilagus floridanus*), chipmunk, gray squirrel, pigeon (*Columba leucocephala*), house sparrow, mockingbird (*Mimus polyglottos*), and American robin.

3.2.2.2 Field Survey Summary

Within the off-Base portion of the proposed project areas, the only animals observed included the American robin, European starling, and house sparrow. As within the on-Base portion, groundhog burrows were also observed.

3.3 Threatened and Endangered Species

3.3.1 On-Base

3.3.1.1 Literature Review Summary

Based on the WPAFB INRMP (2007) the Indiana bat and bald eagle have potential habitat within the proposed project areas (**Figure 3-1**).

3.3.1.2 Field Survey Summary

While the above species have been found or may occur in the vicinity, there is no potential habitat for the bald eagle within the on-Base portion of the proposed project area. For the Indiana bat, there is one potential summer roost tree, a cottonwood, occurring within a narrow, tree lined riparian zone along the border of an unnamed tributary of Hebble Creek (**Figure 3-1**) along Skeel Avenue.

There is no potential habitat for other federally-listed species known to occur on Base including the eastern massasauga rattlesnake, clubshell, snuffbox, or the rayed bean. Additionally, there is no potential habitat for any state-listed species.

3.3.2 Off-Base

3.3.2.1 Literature Review Summary

The Indiana bat and bald eagle have no potential habitat including the off-Base portion of the proposed project area. In July 2000, two bats were captured during a base-wide mist net survey and fitted with radio transmitters. The bats were tracked to a small maternity colony in a dead tree within a woodlot on the campus of Wright State University (WPAFB 2007).

3.3.2.2 Field Survey Summary

While the above species have been found or may occur in the vicinity, there is no potential habitat for either species within the off-Base portion of the proposed project areas. There is no potential habitat for other federally-listed species known to occur on base including the eastern massasauga rattlesnake, clubshell, snuffbox, or the rayed bean, and no potential habitat for any state-listed species.

3.4 Wetlands/Jurisdictional Waters/Floodplains

3.4.1 On-Base

3.4.1.1 Literature Review Summary

Figure 3-1 shows the presence of wetlands, other jurisdictional waters, and floodplains within or in the vicinity of the proposed project areas. The last wetland survey and delineation at WPAFB was conducted in 2004. Wetland habitat was defined using onsite determination methods defined in the *Corps of Engineers Wetlands Delineation Manual* (USACE 1987) following the criteria outlined in the *Federal Manual for Identifying and Delineating Jurisdictional Wetlands* (Federal Interagency Committee for Wetland Delineation 1989). The wetland inventory identified 44 wetlands covering approximately 20.5 acres of wetlands within the limits of WPAFB.

Other jurisdictional waters include rivers, streams, and lakes. WPAFB is in the Mad River Valley. The Mad River originates approximately 40 mi north of Springfield, Ohio, and flows south and southwest past WPAFB to its confluence with the Great Miami River in Dayton, Ohio. The Great Miami River flows into the Ohio River, which flows into the Mississippi River. Sustained flow of the Mad River originates from groundwater discharge of glacial deposits upstream of Huffman Dam. The Mad River approaches WPAFB from the north and flows along the western border of Area A.

The OEPA has designated the Mad River through WPAFB suitable for Warmwater Habitat, Agricultural Water Supply, Industrial Water Supply, and Primary Contact Recreation (Ohio Administrative Code Chapter 3745-1-21). OEPA has identified the lower segment of the Mad River, which flows through WPAFB, as an impaired water under Section 303(d) of the CWA for not meeting recreation use standards (OEPA 2010).

There are several recreational lakes in Area A of WPAFB. The largest is Bass Lake in the northeastern portion. The Twin Lakes Recreational Area comprised of East Twin Lake, West Twin Lake, and Gravel Lake, is located in the southwest portion of Area A (WPAFB 2007). Trout and Hebble creeks are minor surface water features located in Area A. They flow in a general westward direction into the Mad River. Mud Run is another small surface water feature joining the Mad River along the Base's northern border.

Approximately 80 percent of WPAFB lies within the Mad River floodplain which includes most of Area A. Only a small portion of the Gate 15A proposed project area (**Figure 3-2**) lies within the 100-year floodplain of the Mad River (WPAFB 2007).

3.4.1.2 Field Survey Summary

No wetlands fall within the on-Base portion of the proposed project areas. An unnamed tributary of Hebble Creek and multiple open and concrete lined roadside ditches are present within the Gate 15A project area (**Figure 3-2**). Hebble Creek flows along Skeel Avenue and then west across Area A into the Mad River. Hebble Creek would be expected to meet the USACE and USEPA criteria as a jurisdictional water as it appears to be a relatively permanent water that ultimately flows into navigable waters of the United States.

As depicted in **Figures 3-1** and **3-2**, an unnamed tributary of Hebble Creek (Stream 1) flows through a portion of the Gate 15A project area, west of Skeel Avenue, and north of Communications Boulevard. This stream would be expected to meet the USACE and the USEPA criteria as a jurisdictional as it appears to be a permanent water that ultimately flow into navigable waters of the United States. This unnamed tributary is an approximate 8 feet (ft) wide previously channelized drainage. Water depth is less than 6 inches and the stream's substrate is made up of gravel and silt. A brief survey for biological activity on March 21, 2011, revealed no evidence of fish or mussels. Additionally, no evidence macroinvertebrates was encountered.

The open and concrete-lined drainage channel (Stream 2) near the ramps to SR 444 in the Gate 15A project area were narrow drainages with gravel, cobble, and concrete substrates. No signs of fish or mussels were observed during a brief survey on March 21, 2011. The only sign of biological activity was the capture and release of several aquatic damselfly juveniles (nymphs).

Another unnamed tributary (Stream 3) and headwater stream of Hebble Creek is located within the Gate 1A project area (**Figure 3-2**). The stream appears to be culverted in sections through Area A and then flows overland south of Skeel Avenue. This previously channelized stream is approximately 10 to 12 ft wide with a gravel/cobble/silt substrate. No signs of fish, mussels, or macroinvertebrates were noted during a brief survey on March 21, 2011.

OEPA's HHEI forms for these drainages are **Attachment C**. Representative photographs may be found in **Attachment B**. All streams (unnamed tributaries) within the proposed and alternative project areas show minimal evidence of biological activity as might be expected in highly disturbed urban environments.

3.4.2 Off-Base

3.4.2.1 Literature Review Summary

For the off-Base portion of the proposed project area, Flood Insurance Rate Maps (FIRM) were reviewed for portions of Greene County (**Figure 3-3a** and **Figure 3-3b**). Based on these maps, a portion of the proposed project area associated with an unnamed tributary of Hebble Creek (Stream 3) is classified as Zone A2 where the FIRM shows a Base Flood Elevation (BFE) and refers to a 1% annual chance of flood probability.

3.4.2.2 Field Survey Summary

The field survey indicated that no wetlands exist within the off-Base portion of the proposed project areas. Within the off-Base portion of the proposed project area, Streams 2 and 3 are both culverted under Kauffman Avenue and continue off-Base and outside the proposed project areas.

4.0 Effects of the Action

In evaluating the potential impacts on the biological resources within the proposed project area, including both the Proposed Action, Alternative A, and the No Action Alternative, the level of impact on biological resources is based on:

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

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

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

This section describes potential impacts to on-Base and off-Base natural resources resulting from implementation of the Proposed Action. No adverse impacts would be anticipated under the No Action Alternative.

4.1 On-Base Area

4.1.1 Vegetation

Vegetation within the proposed project areas of Gates 1A, 15A, and 26A consists primarily of previously disturbed vegetation and areas of isolated trees. Vegetation occurring in the project areas would be disturbed and removed during site preparation of reconfiguration/relocation efforts. Impacts to vegetation in the project areas would be minor since vegetation consists of planted and maintained grass areas with few isolated landscaped trees. This habitat type is common throughout the Base, and is not a locally rare, unique, or high quality vegetative community. Under the Proposed Action, disturbed areas as part of construction activities would

be restored and replaced with similar vegetative species after completion of construction activities.

Under the Proposed Action, approximately 300 linear ft of narrow forested riparian corridor lying along the border of the unnamed tributary of Hebble Creek (Stream 1) would be removed for the reconfiguration of Skeel Avenue (north of Communications Boulevard) within the Gate 15A project area. Mitigation under the CWA Sections 404 and 401 permit requirements for stream impacts would include riparian corridor mitigation, which would compensate for the loss of vegetation within this corridor.

The proposed construction of an on-Base access road at SR 235 near the proposed relocation of Gate 26A would impact approximately half of a sparsely forested woodlot. Trees in this area do not represent a locally rare, unique, or high quality vegetative community; therefore, adverse impacts would be negligible.

Vegetation within the project area is located adjacent to existing roadways, buildings and/or pavement; therefore, no fragmentation of large habitat areas would occur. Although short- term minor impacts to vegetation would occur as part of construction activities including soil disturbances, mitigation and restoration may be implemented to prevent long-term impacts to vegetation.

4.1.2 Wildlife

For wildlife, the urban disturbed grounds associated with the proposed project areas may provide foraging and roosting areas for a wide variety of wildlife species. Most animals common to such urban environments are mobile and could easily disperse throughout adjacent areas. Woodlots, roadside habitat, and maintained turf are widely available across the Base and would provide nearby refuges for displaced wildlife. Therefore, short-term adverse impacts from the destruction of these habitat types would be negligible for terrestrial wildlife.

Proposed construction activities associated with a tree-lined riparian corridor along the unnamed tributary of Hebble Creek would remove part of a potential travel corridor that is likely used for a variety of wildlife. Habitat destruction from fill or culvert placement in the unnamed tributary of Hebble Creek could adversely impact aquatic wildlife. The mobility of some aquatic species would provide for movement upstream or downstream of the potentially impacted area. The

more stationary macroinvertebrates would be unable to avoid impacts and would suffer mortality. However, aquatic sampling during the field survey revealed no evidence of macroinvertebrates, suggesting water quality issues. If any stationary species are present, these habitat alterations would likely result in a localized decrease in the amount and diversity of the species present.

Mitigation required under the CWA Sections 404 and 401 would minimize impacts on aquatic and terrestrial wildlife. The resulting long-term adverse impacts on aquatic and terrestrial wildlife would be expected to be minor.

4.1.3 Threatened and Endangered Species

A portion of the proposed project area for Gate 26A is within an area designated as potential habitat for the bald eagle. To protect and promote habitat for the bald eagle, the Base manages riparian forests that protect existing tall, large-diameter trees, and promotes growth in stands where they are lacking (WPAFB 2007). Trees within this portion of the project area 8 to 10 inches in diameter at breast height have taken on an open or old field growth pattern and, thus, would not be expected to provide suitable habitat for the bald eagle. No known sightings of the bald eagle have been reported in the project area. No short- or long-term impacts to the bald eagle would be expected under the Proposed Action.

The USFWS confirms that the approved seasonal cutting restrictions would avoid impact to this species in the project area (WPAFB 2007). There is no potential summer roost habitat for the Indiana bat within the proposed project areas associated with Gates 26A or 1A. Only one tree found along the tree-lined corridor of the un-named tributary of Hebble Creek (Stream 1) was considered to have potential for summer roost habitat. While a potential short-term adverse effect would occur with the tree's removal, no long-term effects would be expected based on the number of trees to be cut and the availability of other potential summer roost trees in the vicinity.

4.1.4 Wetlands/Jurisdictional Waters/Floodplains

There are no wetlands occurring within the proposed project areas; thus, there would be no short-term or long-term adverse impacts to wetland resources. Impacts to a tree-lined riparian corridor along the unnamed tributary (Stream 1) of Hebble Creek would remove part of a potential travel corridor that is likely used for a variety of wildlife. Habitat destruction from fill or culvert placement in the unnamed tributary of Hebble Creek could impact aquatic wildlife. Any impact

would be considered short-term, minor, and direct. No impacts are anticipated for Streams 2 or 3. Approximately 80 percent of WPAFB lies within the Mad River floodplain which includes most of Area A. Only a small portion of the Gate 15A proposed project area (**Figure 3-2**) lies within the 100-year floodplain of the Mad River (WPAFB 2007).

4.2 Off-Base Area

4.2.1 Vegetation and Wildlife

Impacts to vegetation and wildlife within the proposed project areas would be negligible since vegetation consists of previously disturbed mowed and landscaped areas and most of the wildlife associated with urban environments is mobile. As part of relocating the base perimeter fence resulting in a diversion of traffic onto off-Base roadways, the off-Base roadways would potentially require widening and/or turn-lanes would be required to accommodate increased traffic. Disturbed areas as part of construction activities would be restored and replaced with similar vegetative species. Any adverse impacts would be considered short-term and there would not be expected to be any long-term impacts to either vegetation or wildlife.

4.2.2 Threatened and Endangered Species

There is no potential habitat or known occurrences for either the Indiana bat or bald eagle within the off-Base portion of the proposed project areas. No short-term or long-term adverse effects are expected for either species.

4.2.3 Wetlands/Jurisdictional Waters/Floodplains

There are no wetlands occurring within the off-Base portion of the proposed project area. Streams 2 and 3 flow under Kauffman Avenue onto the Base thus portions of these streams occur within the off-Base portion of the proposed project area. However, there are no anticipated effects to either. The off-Base portion of the proposed project area is outside of the 100-year Mad River floodplain. However, a portion of the off-Base project area along Kauffman Avenue is classified as Zone 2A. This zone is associated with an unnamed tributary of Hebble Creek (Stream 3) and refers to a 1% annual chance of flood probability. The majority of this zone is outside of the proposed project area and no adverse effects are anticipated.

5.0 Cumulative Effects

Construction activities associated with the proposed project would result in negligible to minor adverse impacts related to natural resources over the short-term, thereby incrementally contributing to short-term cumulative impacts. No long-term cumulative effects are anticipated either on- or off-Base.

6.0 Conclusions

On Base, short-term minor impacts to vegetation would occur as part of construction activities. Impacts to terrestrial and aquatic wildlife would predominantly be short-term due to construction activities and any resulting long-term impacts on aquatic and terrestrial wildlife would be expected to be minor. No short- or long-term impacts to either the bald eagle or Indiana bat would be expected under the Proposed Action. No wetlands occur within the proposed project areas and impacts to Stream 1 would be considered short-term and minor. No impacts are anticipated for Streams 2 or 3.

Off Base, impacts to vegetation and wildlife within the proposed project areas would be negligible since vegetation consists of previously disturbed mowed and landscaped areas and most of the wildlife associated with urban environments is mobile. There is no potential habitat or known occurrences for either the Indiana bat or bald eagle within the off-Base portion of the proposed project areas thus impacts are expected for either species. No wetlands occur within the off-Base portion of the proposed project area. Streams 2 and 3 flow under Kauffman Avenue on to the base but there are no anticipated impacts based on construction parameters. The off-Base portion of the proposed project area is outside of the 100-year Mad River floodplain.

Direct impacts to natural resources within the proposed project areas involving Gates 15A, 1A, and 26A are expected to be minimal. No indirect or cumulative effects are expected.

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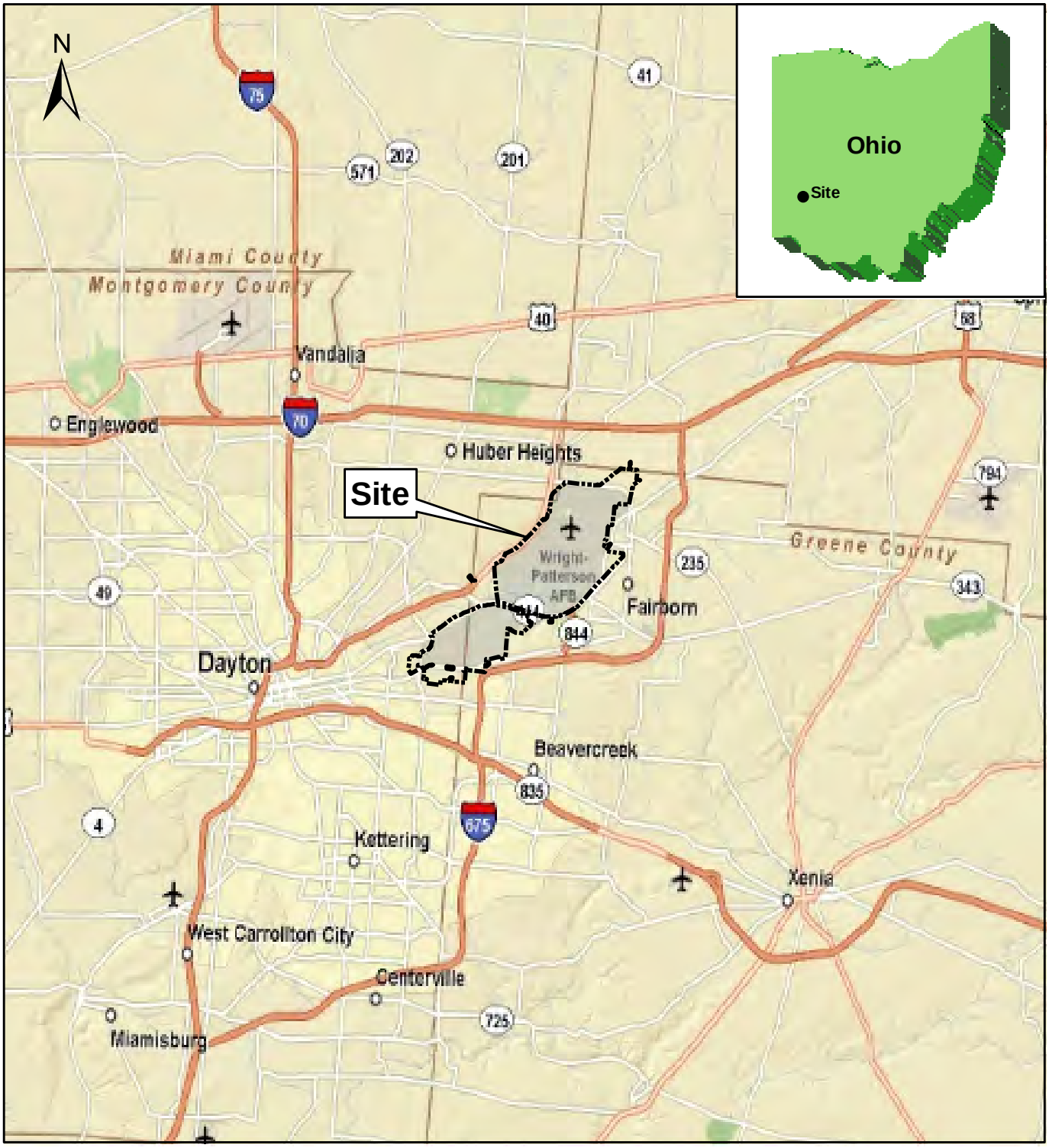
ATTACHMENT A

Figures



0 10,000 20,000 40,000 Feet

0 1 2 4 Miles

Legend

Installation Boundary

WRIGHT-PATTERSON
AIR FORCE BASE,
OHIO

Figure 1-1

Site Vicinity Map

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Cincinnati, OH	5/16/11	--	MSN	LM	LM	140401.0801-03.mxd

Map Document: (C:\CAD-GIS\Acad 2011\140401.0801\140401.0801-03.mxd)
5/24/2011 -- 11:39:57 AM

Legend

- Installation Boundary
- Proposed Alignment Gate 1A
- Proposed Alignment Gate 15A
- Proposed Alignment Gate 26A
- Off-Site Study Area

N

0 500 1,000 2,000 Feet

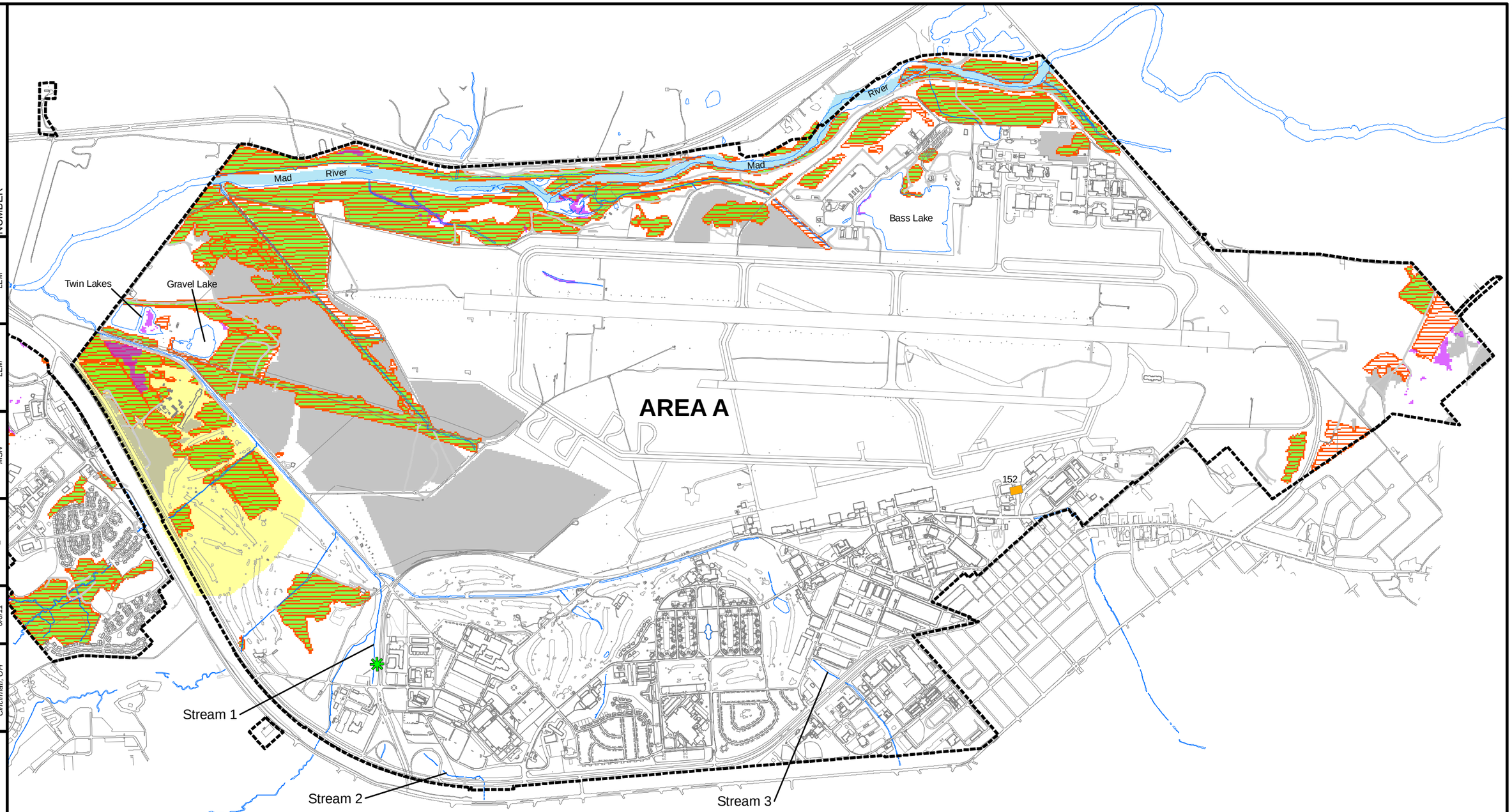
WRIGHT-PATTERSON
AIR FORCE BASE,
OHIO

Figure 1-2
On-Base / Off-Base
Study Area of Influence

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Cincinnati, OH	6/2/11	-	MSN	LM	WHS	140401.0801-08.mxd

Map Document: (C:\CAD-GIS\Acad 2011\140401.0801\140401.0801-08.mxd)
6/6/2011 -- 12:32:53 PM

DRAWING NUMBER	APPROVED BY	CHECKED BY	DRAWN BY	DESIGNED BY	DATE	OFFICE
140401.0801-09.MXD	LEM	LEM	MSN	-	6/6/11	Cincinnati, OH



Map Document: (C:\CAD-GIS\Acad 2011\140401.0801\140401.0801-09.mxd)
6/6/2011 -- 12:43:59 PM

Legend

- Indiana Bat Potential Summer Roost Tree
- Installation Area
- Wetland Area
- Indiana Bat
- Clubshell
- Bald Eagle
- Blazing Star Stem Borer
- East Mass Snake

Source: Base Map, Threatened, Endangered Species and Wetlands data from WPAFB.

N

0 1,000 2,000 4,000 Feet

WRIGHT-PATTERSON
AIR FORCE BASE,
OHIO

Figure 3-1
T&E, Wetlands, Jurisdictional Waters,
Floodplains Locations
Area A Wright-Patterson AFB

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Cincinnati, OH	6/2/11	-	MSN	LM	WHS	140401.0801-07.MXD

Map Document: (C:\CAD-GIS\Acad 2011\140401.0801\140401.0801-07.mxd)
6/6/2011 -- 2:40:53 PM

Legend

- Installation Area
- Proposed Alignment
- Proposed Guard Shack
- 100-year Flood Contour

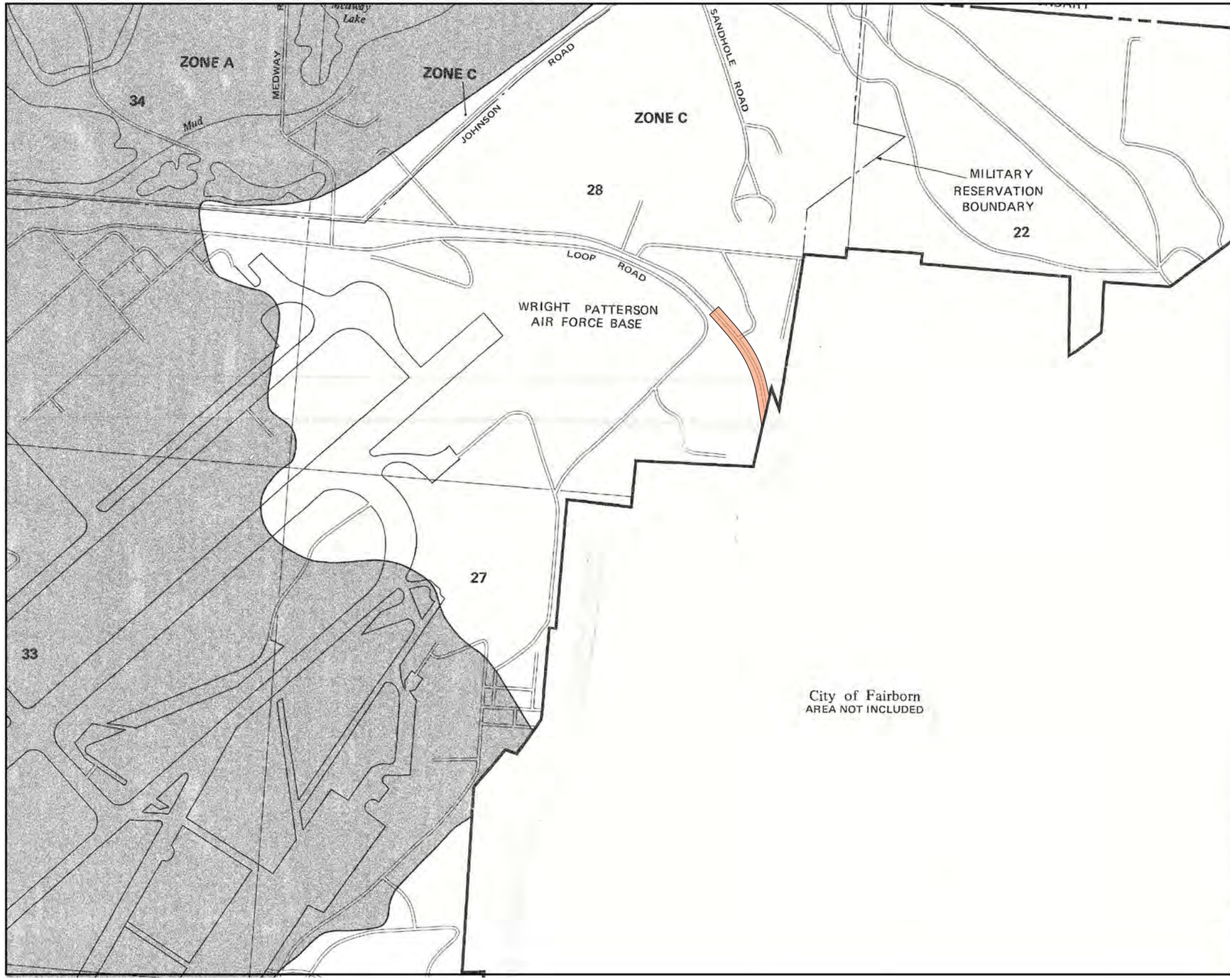
N

0 150 300 600 Feet

WRIGHT-PATTERSON
AIR FORCE BASE,
OHIO

Figure 3-2
Gate 15A Reconfiguration
in Relation to Mad River
100-Year Floodplain

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Cincinnati, OH	5/20/11	--	JIS	SB	--	s-140401.0801-5/11-w



APPROXIMATE SCALE
1000 0 1000 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

COUNTY OF
GREENE,
OHIO
(UNINCORPORATED AREAS)

PANEL 5 OF 105
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
390193 0005 B

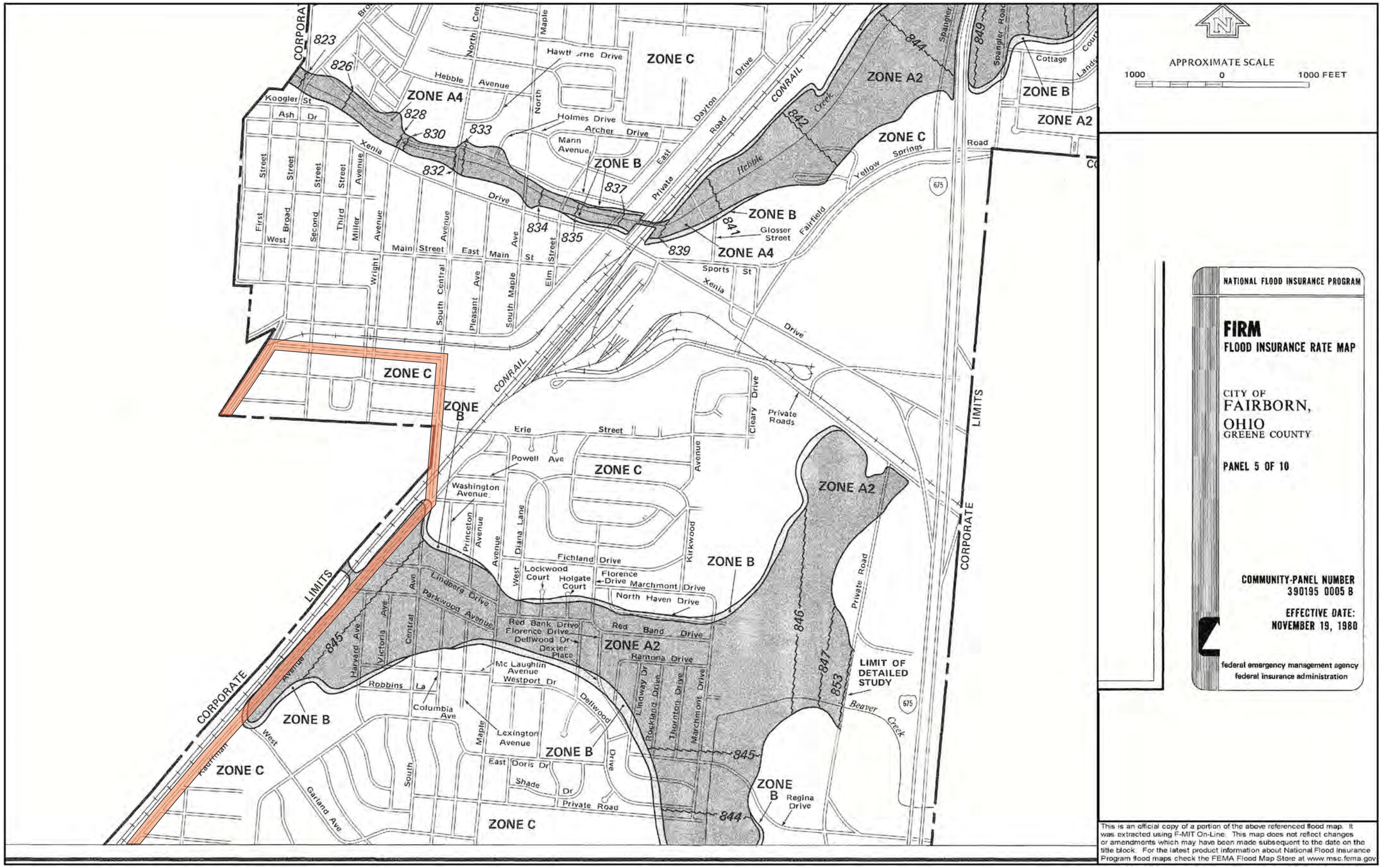
EFFECTIVE DATE:
APRIL 1, 1981

federal emergency management agency
federal insurance administration

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

WRIGHT-PATTERSON AIR FORCE BASE, OHIO

Figure 3-3a
Off-Base Area of Influence
Flood Zones - State Route 235



OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Cincinnati, OH	5/20/11	--	JIS	SB	--	s-140401.0801-5/11-w

WRIGHT-PATTERSON AIR FORCE BASE, OHIO

Figure 3-3b
Off-Base Area of Influence
Flood Zones - Kauffman Avenue

ATTACHMENT B

Photographs

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Cincinnati, OH	5/17/11	--	JIS	SB	CH	s-140401.0605-5/11-w

1. Looking east toward existing Gate 1A.

2. Looking southeast toward existing Gate 15A.

WRIGHT-PATTERSON AIR FORCE BASE, OHIO

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Cincinnati, OH	5/17/11	--	JIS	SB	CH	s-140401.0605-5/11-w

3. Looking northwest toward existing Gate 26A.

4. Mowed field and scattered trees in the vicinity of existing Gate 26A.

WRIGHT-PATTERSON AIR FORCE BASE, OHIO

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Cincinnati, OH	5/17/11	--	JIS	SB	CH	s-140401.0605-5/11-w

5. Example of maintained/landscaped areas along Schuster Road near existing Gate 1A.

6. Example of maintained right-of-way in the vicinity of existing Gate 15A.

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Cincinnati, OH	5/17/11	--	JIS	SB	CH	s-140401.0605-5/11-w

7. Example of old field in the vicinity of existing Gate 15A.

8. State Route 444 in the vicinity of Gate 1A, looking south.

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Cincinnati, OH	5/17/11	--	JIS	SB	CH	s-140401.0605-5/11-w

9. State Route 444 in the vicinity of Gate 1A, looking north.

10. Stream #1, unnamed tributary to Hebble Creek, looking northwest.

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Cincinnati, OH	5/17/11	--	JIS	SB	CH	s-140401.0605-5/11-w

11. Stream #2, unnamed tributary to Hebble Creek, looking northeast.

12. Stream #3, on-Base headwater tributary to Hebble Creek, looking northeast.

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Cincinnati, OH	5/17/11	--	JIS	SB	CH	s-140401.0605-5/11-w

13. Stream #3, at junction of Base perimeter and State Route 444, looking northwest.

14. Indiana bat potential summer habitat roost tree.

ATTACHMENT C

Stream Forms

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : 69

SITE NAME/LOCATION: WRIGHT PATTERSON AIR FORCE BASE

SITE NUMBER: Stream #1 RIVER BASIN: Mad River DRAINAGE AREA (mi²):

LENGTH OF STREAM REACH (ft): LAT.: LONG.: RIVER CODE: RIVER MILE:

DATE: 12/02/10 SCORER: LEM COMMENTS: unnamed trib to Hebble Creek

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☑ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	0%	☐ ☐	SILT [3 pt]	0%
☐ ☐	BOULDER (>256 mm) [16 pts]	0%	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	10%
☐ ☐	BEDROCK [16 pt]	0%	☐ ☐	FINE DETRITUS [3 pts]	0%
☐ ☐	COBBLE (65-256 mm) [12 pts]	2%	☐ ☐	CLAY or HARDPAN [0 pt]	0%
☑ ☐	GRAVEL (2-64 mm) [9 pts]	23%	☐ ☐	MUCK [0 pts]	0%
☐ ☑	SAND (<2 mm) [6 pts]	65%	☐ ☐	ARTIFICIAL [3 pts]	0%

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock: 2.00% (A) 100% (B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 15 **TOTAL NUMBER OF SUBSTRATE TYPES:** 4

HHEI Metric Points

Substrate Max = 40

19

A + B

2. Maximum Pool Depth ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

- ☐ > 30 centimeters [20 pts]
- ☐ > 22.5 - 30 cm [30 pts]
- ☑ > 10 - 22.5 cm [25 pts]
- ☐ > 5 cm - 10 cm [15 pts]
- ☐ < 5 cm [5 pts]
- ☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS **MAXIMUM POOL DEPTH (centimeters):**

Pool Depth Max = 30

25

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

- ☐ > 4.0 meters (> 13') [30 pts]
- ☑ > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]
- ☐ > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]
- ☐ > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
- ☐ ≤ 1.0 m (<=3' 3") [5 pts]

COMMENTS **AVERAGE BANKFULL WIDTH (meters):**

Bankfull Width Max=30

25

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH L R	(Per Bank)	FLOODPLAIN QUALITY L R	(Most Predominant per Bank)	L R	
☐ ☐	Wide >10m	☐ ☐	Mature Forest, Wetland	☐ ☐	Conservation Tillage
☐ ☐	Moderate 5-10m	☐ ☑	Immature Forest, Shrub or Old Field	☑ ☐	Urban or Industrial
☑ ☑	Narrow <5m	☐ ☐	Residential, Park, New Field	☐ ☐	Open Pasture, Row Crop
☐ ☐	None	☐ ☐	Fenced Pasture	☐ ☐	Mining or Construction

COMMENTS:

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

- ☑ Stream Flowing
- ☐ Subsurface flow with isolated pools (Interstitial)
- ☐ Moist Channel, isolated pools, no flow (Intermittent)
- ☐ Dry channel, no water (Ephemeral)

COMMENTS:

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☐ None	☐ 1.0	☐ 2.0	☐ 3.0
☑ 0.5	☐ 1.5	☐ 2.5	☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☑ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☑ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☑ WWH Name: **Mad River** Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: _____ NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: **Greene** Township / City: **Fairborn**

MISCELLANEOUS

Base Flow Conditions? (Y/N): **Y** Date of last precipitation: _____ Quantity: **0.00**

Photograph Information: _____

Elevated Turbidity? (Y/N): **N** Canopy (% open): **50%**

Were samples collected for water chemistry? (Y/N): **N** (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) **Y** If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

Performed? (Y/N): **Y** (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

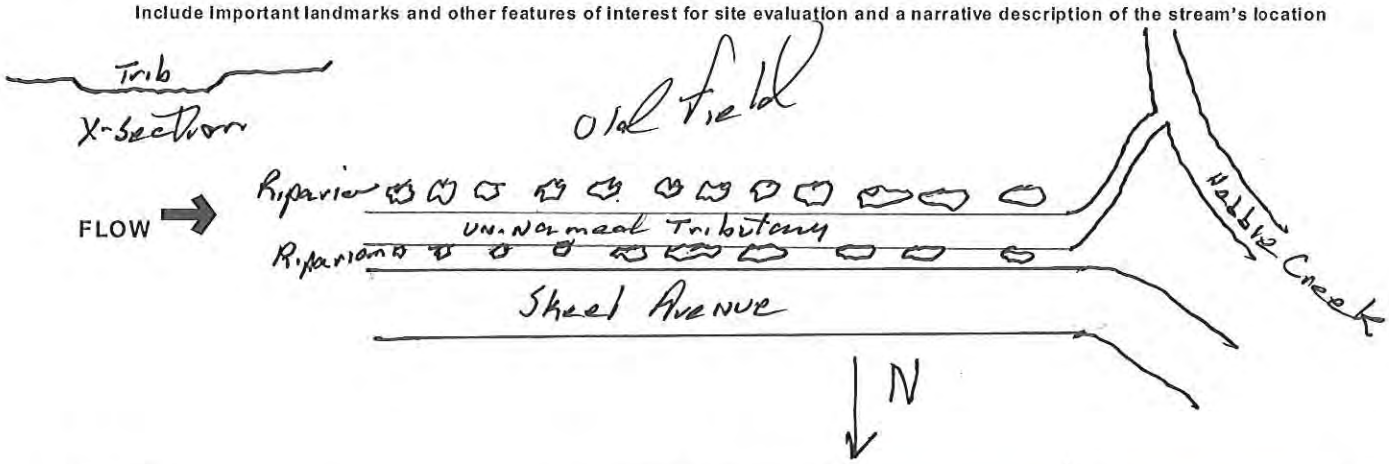
Fish Observed? (Y/N) **N** Voucher? (Y/N) **N** Salamanders Observed? (Y/N) **N** Voucher? (Y/N) **N**

Frogs or Tadpoles Observed? (Y/N) **N** Voucher? (Y/N) **N** Aquatic Macroinvertebrates Observed? (Y/N) **N** Voucher? (Y/N) **N**

Comments Regarding Biology: **No evidence of fish, mussels, crayfish, or other macroinvertebrates**

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location



October 24, 2002 Revision

Save as pdf Reset Form

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : 61

SITE NAME/LOCATION: WRIGHT PATTERSON AIR FORCE BASE

SITE NUMBER: Stream #2 RIVER BASIN: Mad River DRAINAGE AREA (mi²):

LENGTH OF STREAM REACH (ft): LAT.: LONG.: RIVER CODE: RIVER MILE:

DATE: 12/02/10 SCORER: LEM COMMENTS: unnamed trib to Hebble Creek

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☑ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE		PERCENT	TYPE		PERCENT
☐	BLDR SLABS [16 pts]	0%	☑	SILT [3 pt]	30%
☐	BOULDER (>256 mm) [16 pts]	0%	☐	LEAF PACK/WOODY DEBRIS [3 pts]	20%
☐	BEDROCK [16 pt]	0%	☐	FINE DETRITUS [3 pts]	0%
☐	COBBLE (65-256 mm) [12 pts]	10%	☐	CLAY or HARDPAN [0 pt]	0%
☑	GRAVEL (2-64 mm) [9 pts]	40%	☐	MUCK [0 pts]	0%
☐	SAND (<2 mm) [6 pts]	0%	☐	ARTIFICIAL [3 pts]	0%

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock: 10.00% (A) 100% (B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 12 **TOTAL NUMBER OF SUBSTRATE TYPES:** 4

HHEI Metric Points

Substrate Max = 40

16

A + B

2. Maximum Pool Depth ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

- ☐ > 30 centimeters [20 pts]
- ☐ > 22.5 - 30 cm [30 pts]
- ☑ > 10 - 22.5 cm [25 pts]
- ☐ > 5 cm - 10 cm [15 pts]
- ☐ < 5 cm [5 pts]
- ☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS **MAXIMUM POOL DEPTH (centimeters):**

Pool Depth Max = 30

25

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

- ☐ > 4.0 meters (> 13') [30 pts]
- ☐ > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]
- ☑ > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]
- ☐ > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
- ☐ ≤ 1.0 m (<=3' 3") [5 pts]

COMMENTS **AVERAGE BANKFULL WIDTH (meters):**

Bankfull Width Max=30

20

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH (Per Bank) L	R		FLOODPLAIN QUALITY (Most Predominant per Bank) L	R		L	R	
☐	☐	Wide >10m	☐	☐	Mature Forest, Wetland	☐	☐	Conservation Tillage
☐	☐	Moderate 5-10m	☐	☐	Immature Forest, Shrub or Old Field	☑	☑	Urban or Industrial
☑	☑	Narrow <5m	☐	☐	Residential, Park, New Field	☐	☐	Open Pasture, Row Crop
☐	☐	None	☐	☐	Fenced Pasture	☐	☐	Mining or Construction

COMMENTS

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

- ☑ Stream Flowing
- ☐ Subsurface flow with isolated pools (Interstitial)
- ☐ Moist Channel, isolated pools, no flow (Intermittent)
- ☐ Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☐ None	☐ 1.0	☐ 2.0	☐ 3.0
☑ 0.5	☐ 1.5	☐ 2.5	☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☑ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☑ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☑ WWH Name: Mad River Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: _____ NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: Greene Township / City: Fairborn

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: _____ Quantity: 0.00

Photograph Information: _____

Elevated Turbidity? (Y/N): N Canopy (% open): 0%

Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) Y If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

Performed? (Y/N): Y (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N

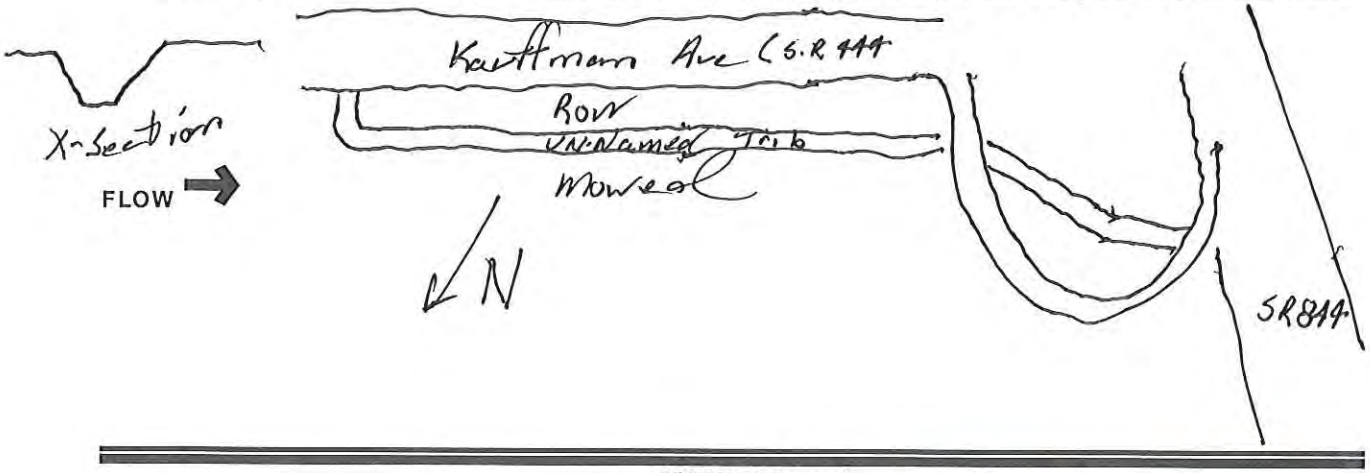
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) Y Voucher? (Y/N) N

Comments Regarding Biology:

No evidence of fish, mussels, crayfish, only one individual of damselfly nymph

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location



October 24, 2002 Revision

Save as pdf Reset Form

OhioEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : 71

SITE NAME/LOCATION: WRIGHT PATTERSON AIR FORCE BASE

SITE NUMBER: Stream #3 RIVER BASIN: Mad River DRAINAGE AREA (mi²):

LENGTH OF STREAM REACH (ft): LAT.: LONG.: RIVER CODE: RIVER MILE:

DATE: 12/02/10 SCORER: LEM COMMENTS: unnamed trib to Hebble Creek, headwater stream

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☑ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	0%	☐ ☑	SILT [3 pt]	60%
☐ ☐	BOULDER (>256 mm) [16 pts]	0%	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	0%
☐ ☐	BEDROCK [16 pt]	0%	☐ ☐	FINE DETRITUS [3 pts]	2%
☐ ☐	COBBLE (65-256 mm) [12 pts]	10%	☐ ☐	CLAY or HARDPAN [0 pt]	0%
☑ ☐	GRAVEL (2-64 mm) [9 pts]	25%	☐ ☐	MUCK [0 pts]	3%
☐ ☐	SAND (<2 mm) [6 pts]	0%	☐ ☐	ARTIFICIAL [3 pts]	0%

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock: 10.00% (A) 100% (B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 12 TOTAL NUMBER OF SUBSTRATE TYPES: 4

HHEI Metric Points

Substrate Max = 40: 16

A + B

2. Maximum Pool Depth ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

- ☐ > 30 centimeters [20 pts]
- ☐ > 22.5 - 30 cm [30 pts]
- ☑ > 10 - 22.5 cm [25 pts]
- ☐ > 5 cm - 10 cm [15 pts]
- ☐ < 5 cm [5 pts]
- ☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS: MAXIMUM POOL DEPTH (centimeters):

Pool Depth Max = 30: 25

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

- ☑ > 4.0 meters (> 13') [30 pts]
- ☐ > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]
- ☐ > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]
- ☐ > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
- ☐ ≤ 1.0 m (<=3' 3") [5 pts]

COMMENTS: AVERAGE BANKFULL WIDTH (meters):

Bankfull Width Max=30: 30

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

L R	RIPARIAN WIDTH (Per Bank)	L R	FLOODPLAIN QUALITY (Most Predominant per Bank)	L R	
☐ ☐	Wide >10m	☐ ☐	Mature Forest, Wetland	☐ ☐	Conservation Tillage
☐ ☐	Moderate 5-10m	☐ ☐	Immature Forest, Shrub or Old Field	☑ ☑	Urban or Industrial
☑ ☑	Narrow <5m	☐ ☐	Residential, Park, New Field	☐ ☐	Open Pasture, Row Crop
☐ ☐	None	☐ ☐	Fenced Pasture	☐ ☐	Mining or Construction

COMMENTS:

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

- ☑ Stream Flowing
- ☐ Subsurface flow with isolated pools (Interstitial)
- ☐ Moist Channel, isolated pools, no flow (Intermittent)
- ☐ Dry channel, no water (Ephemeral)

COMMENTS:

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

- ☐ None
- ☑ 0.5
- ☐ 1.0
- ☐ 1.5
- ☐ 2.0
- ☐ 2.5
- ☐ 3.0
- ☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☑ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☑ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☑ WWH Name: Mad River Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: _____ NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: Greene Township / City: Fairborn

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: _____ Quantity: 0.00

Photograph Information: _____

Elevated Turbidity? (Y/N): N Canopy (% open): 0%

Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) Y If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

Performed? (Y/N): Y (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

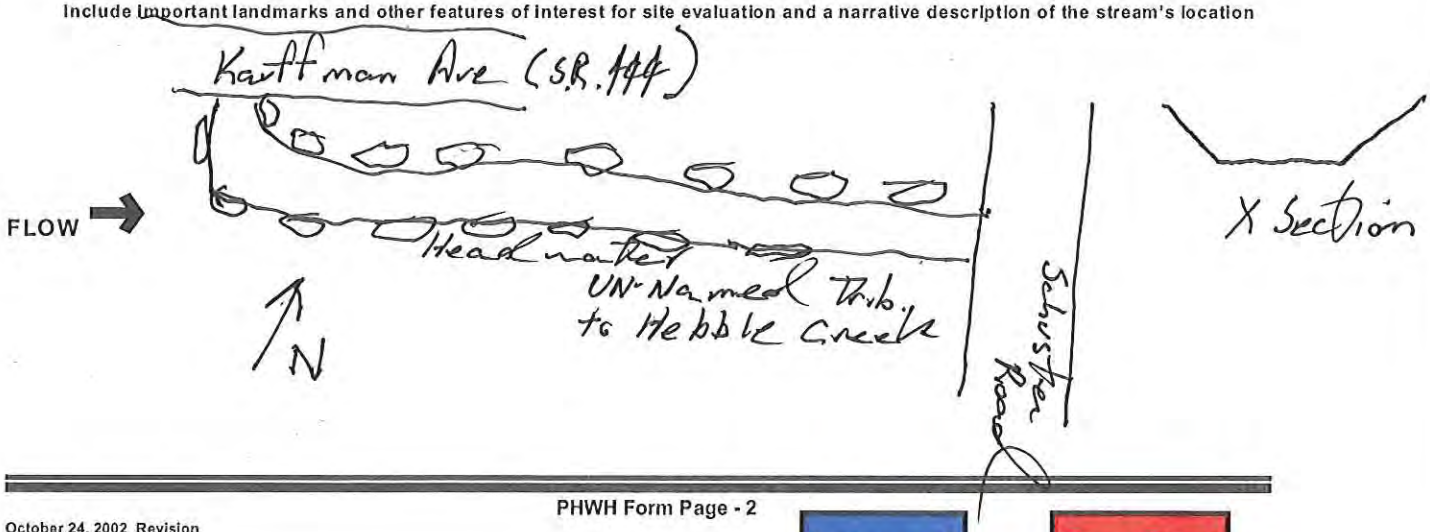
Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N

Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) N Voucher? (Y/N) N

Comments Regarding Biology: No evidence of fish, mussels, crayfish, or other macroinvertebrates

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location



October 24, 2002 Revision

Save as pdf Reset Form

Appendix E

Cultural Resources Survey

Note: **The *Cultural Resources Survey* has been published separately from the Draft EIS and will be available in the WPAFB Administrative Record (copy included on cd in front pocket of three-ring binder).**

Appendix F

Socioeconomic Impact Analysis Study

SOCIOECONOMIC IMPACT ANALYSIS

Environmental Impact Statement for Entry Control Reconfiguration and Base Perimeter Fence Relocation, Area A
Wright-Patterson Air Force Base, Ohio

Prepared For:
88th Air Base Wing
Wright-Patterson Air Force Base

Prepared By:
LJB Inc.

August 31, 2011

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1 INTRODUCTION

The purpose of the Wright-Patterson Air Force Base (WPAFB or the Base) entry control reconfiguration project is to improve WPAFB security to meet current Air Force anti-terrorism standards as defined by the SDDCTEA Pamphlet 55-15, dated 2006 and the minimum standards per UFC 4-010-01 "DoD Minimum Antiterrorism Standards for Buildings." In addition to an increase in security, improvements will include better management of resources and security personnel by reducing the overall number of Entry Control Facilities (ECFs) at WPAFB.

The total number of ECFs entering Area A would be reduced to three: Gate 15A at the south end of Area A in line with State Road (SR) 844 would serve as the primary ECF and would operate 24 hours per day; Gate 1A on the northeast side of Area A south of the intersection of Broad Street and Dayton Drive in Fairborn would serve as a secondary ECF operating generally during normal business hours; and Gate 26A would be relocated south of its existing location off SR 235 and would serve as the new truck inspection ECF operating generally during normal business hours. This reduction in ECFs would not serve to improve security to the levels required unless the Kittyhawk Center also becomes contiguous with the remainder of Area A. Because SR 444 passes between the majority of Area A and the Kittyhawk Center, an analysis of alternatives determined that a portion of SR 444 must be closed to achieve this requirement.

The project is located at WPAFB Area A and in the adjacent city of Fairborn in Greene County, Ohio, as shown on the County Location Map and Project Vicinity Map (Figures 1 and 2, Appendix A). The socioeconomic impact study area for this project includes the areas outside of WPAFB that are directly impacted by the traffic that is expected to be displaced by the closure of the portion of SR 444 between Dayton-Yellow Springs Road and Dayton Avenue, as well as the area outside of WPAFB that is directly impacted by the approach along SR 235 to the proposed relocated Gate 26A. The study area is shown in red on the Project Study Area map (Figure 3, Appendix A).

2 AFFECTED ENVIRONMENT

2.1 PROJECT INFORMATION

WPAFB is located in the southwest portion of the state of Ohio in Greene and Montgomery counties, approximately 10 miles east of the city of Dayton. The Base encompasses 8,145 acres and is subdivided into two areas: Areas A and B. Area A consists primarily of administrative offices and an active airfield. Area B consists primarily of research and development facilities with educational functions and is located across SR 444 to the southwest of Area A. Figure 2 shows the location of WPAFB Areas A and B and the neighboring communities.

In conformance with security standards, the United States Air Force (USAF) and WPAFB are proposing to implement solutions to improve security, safety and traffic flow into and on the Base. The existing security environment at WPAFB is not in compliance with current USAF anti-terrorism standards designed to minimize the likelihood of mass casualties from terrorist attacks against Department of Defense (DoD) facilities and to improve highway safety and reduce traffic congestion on DoD installation roads and on routes providing access to installations. To bring the security environment of the Base into alignment with the USAF standards, WPAFB plans to consolidate the existing nine ECFs for Area A into three upgraded and strategically placed gates (1A, 15A and 26A) and to extend the Base perimeter fence to include Kittyhawk Center, which is currently separated from the majority of Area A by SR 444. The latter improvement would involve closing SR 444 between Dayton-Yellow Springs Road on the south and Dayton Avenue on the north. The plan designates Gate 1A for traffic entering from the north and Gate 15A for traffic entering from the south and after hours. Gate 26A at the north end of the Base will serve as the commercial gate and perform delivery truck inspections.

The socioeconomic impact study area for this project includes the areas outside of WPAFB that are directly impacted by the traffic that is expected to be displaced by the closure of the portion of SR 444 between Dayton-Yellow Springs Road and Dayton Avenue, as well as the area outside of WPAFB that is directly impacted by the approach along SR 235 to the proposed relocated Gate 26A. Figure 3 shows the study area, the proposed locations of new Gates 1A, 15A and 26A, and the section of SR 444 to be closed.

The portion of the study area addressing the displaced traffic route follows the arterial roadways that are expected to receive the traffic and includes the properties on both sides of each roadway, except as noted below:

- SR 444 at its intersection with Dayton-Yellow Springs Road and 485 feet to the west.
- Dayton-Yellow Springs Road between SR 444 and Kauffman Avenue, and extending south on the east side only to the open space south of Stewart Boulevard
- Kauffman Avenue from North Boulevard to Central Avenue
- South Central Avenue from Kauffman Avenue to Dayton Drive; excludes the land belonging to WPAFB on the west side of Central Avenue south of South Street
- Dayton Drive from Central Avenue to Broad Street/SR 444
- South side of Broad Street/SR 444 from South Street to Dayton Drive, including the area in which South Street, Ohio Street and Greene Street may be converted to cul-de-sacs to further secure access to the new location of Gate 1A

The portion of the study area addressing the approach to relocated Gate 26C includes both sides of SR 235/North Central Avenue from the north entrance to Fairborn Park to the proposed turn-off for the relocated gate.

2.2 PROJECT LOCATION AND SETTING

Physical Setting

The project is located in Fairborn and Bath Township within Greene County in the southwestern part of Ohio. Fairborn was formed by the merger of two adjacent communities, Fairfield and Osborn, and was incorporated in 1950. It wraps around the east and southeast sides of WPAFB Area A and includes Wright State University (WSU). All of the project study area with the exception of the existing SR 444 lies within the Fairborn corporate boundary.

Downtown Fairborn lies generally between the two parts of the project study area. Broad Street and Main Street are urban retail/commercial districts with a variety of shops, service providers, and community organization offices. Central Avenue and Dayton Drive are part of the local historic district, which is located directly north of the Dayton Drive portion of the study area.

Fairborn contains 18 parks and wetland reserves. Central Park and the associated Fairborn YMCA are located along the southern project study area east of the intersection of Ohio Avenue and Dayton Drive. One entrance to Fairfield Park is located within the northern project study area; the park itself is located further to the west.

The Kauffman Avenue Bike Path travels through the southern study area, paralleling Kauffman Avenue and Central Avenue on the west/northwest through the bike path's current end at Dayton Drive. This segment of bike path is also part of the Wright Brothers-Huffman Prairie bike trail which connects to WSU, the Wright Brothers Memorial and Huffman Metro Park, Buckeye Trail, a system of hiking trails that circles the state of Ohio, and the North Country National Scenic Trail, a hiking trail winding through seven northeastern states from New York to North Dakota. Fairborn's Thoroughfare Plan indicates plans to continue the path north to connect with an existing path at Xenia Drive; community officials indicated that some cyclists currently use Central Avenue to travel north from the bike path. Community officials also expressed support for the regional plan, documented by the 2011 Miami Valley Bikeways Guide Map produced by the Miami Valley Regional Planning Commission (MVRPC), to connect the south end of the Wright Brothers-Huffman Prairie path to the Mad River Trail, which leads to the city of Dayton.

Also paralleling Kauffman on the northwest side of the bike path is one railroad track maintained by Norfolk Southern Railway. This track crosses Central Avenue and continues northeast. Current traffic averages twenty 12,000-foot long trains per day. The Ohio Department of Transportation (ODOT) projects traffic on this rail corridor, as for all freight rail corridors, to double in the next fifteen years. A second track was previously present but has been removed.

The areas north and south of Dayton Drive and west of Central Avenue, including the areas of the proposed cul-de-sacs, have a mix of single-family homes and apartment houses. Land use is primarily commercial along SR 444 and Dayton-Yellow Springs Road, and at the intersections of Dayton Drive with Central Avenue and with Broad Street, as shown on the Land Use Map (Figure 4, Appendix A). Along the southeast side of Kauffman Avenue commercial development prevails adjacent to the roadway with residences further south and east. The northern part of the study area at proposed Gate 26A is adjacent to a residential area on the east and a commercial area on the west.

Zoning and land use in the study area mostly coincide. The few minor exceptions to this pattern exist along Kauffman Avenue in two areas: 1) at the Kauffman Avenue/Dayton Yellow Springs Road intersection in which a few properties are zoned commercial and are being used as residential or industrial; and 2) along Kauffman Avenue between Lindberg Drive and Powell Avenue where a few properties are zoned commercial and are being used as residential. Figure 4

shows land use in the project study area, and Figure 5 (Appendix A) shows Fairborn's zoning for the same area.

Demographics

The city of Fairborn is located in Greene County, and is intimately connected with the Miami Valley region represented by the Dayton Metropolitan Statistical Area (MSA), which includes Montgomery, Greene, Preble, and Miami counties. At the time of this report, 2010 Census data were available for demographic categories such as age and race, but not for economic categories such as income and educational attainment. 2010 Census data were used for this analysis where available. When 2010 Census data were not available, data from the 2005-2009 tables of the American Community Survey (ACS) were used. It should be noted that the financial uncertainty of the late 2000s and the effects of the Base Realignment and Closure (BRAC) process on WPAFB may have caused changes in economic conditions of individuals and households in the region that will not be reflected in the ACS.

The project study area is part of five 2010 Census tracts: 2803, 2003, 2004, 2005 and 2007. Areas of census tract 2001.04 included in the study area have only commercial development and therefore this tract was not included in discussions of project area demographics. The location and extent of these tracts are shown in Figure 6. The corresponding 2000 Census tracts (which are used for the ACS) are tracts 2002, 2003, 2004, 2005, and 2007, with 2001.02 having commercial properties in the project area as with 2001.04 in the 2010 Census. The 2000 Census tracts have similar but not precisely matching boundaries. These tracts are shown in Figure 7. Because this report deals mostly with percentages of the population fitting various demographic categories and located near the project, the boundary changes were not considered significant to the analysis. Table 1 shows basic demographic data for each census tract as well as Fairborn, Greene County, and the Dayton MSA. Table 2 shows ACS economic data for the corresponding 2000 Census tracts and for Fairborn, Greene Count and the Dayton MSA. The following discussion relies on the data presented in the tables.

The city of Fairborn has a total population of 32,352 according to the 2010 Census. Fairborn is similar to Greene County in racial demographics, with approximately 16% of the population identifying as minority. In the Dayton MSA, the percentage of minorities is 21%. Census tracts 2003, 2004 and 2005 are more similar to Fairborn and Greene County in terms of racial proportions, while census tracts 2007 and 2803 are more similar to the Dayton MSA. Census tract 2803 has a relatively large Hispanic population at 7.5%, compared to no more than 2.5% for other area tracts, Fairborn, Greene County and the Dayton MSA.

Median household income is lower for Fairborn than for either Greene County or the Dayton MSA. Fairborn's median household income is $39,315. The five census tracts in the project study area vary widely where income is concerned. Census tract 2002's (now 2803) median household income is the highest, at $55,017, and census tract 2007's is the lowest, at $21,076. This tract is also the only one with more than 25% of the population with income at or below the poverty level in the previous 12 months; in 2009 37.1% of the population in this census tract experienced this condition. In census tract 2005, 23.6% of the population experienced this condition.

In terms of per capita income, all five census tracts have less than the Fairborn per capita income, which is in turn less than either the Dayton MSA or Greene County per capita income. Census tract 2005 has the lowest per capita income of the five census tracts in the study area, at $16,119.

Table 1: Census 2010 Demographic Data for the Project Study Area

	Census Tract 2803	Census Tract 2003	Census Tract 2004	Census Tract 2005	Census Tract 2007	Fairborn City	Greene County	Dayton MSA
Total Population	1,832	3,907	2,064	5,048	4,520	32,352	161,573	841,502
% White	79.5%	90.2%	87.1%	90.0%	81.4%	84.8%	86.4%	80.0%
% Black/African American	10.6%	4.4%	6.0%	4.1%	11.5%	7.7%	7.2%	15.0%
% American Indian/Alaskan Native	0.1%	0.4%	0.4%	0.3%	0.5%	0.3%	0.3%	0.2%
% Asian	3.2%	1.3%	1.8%	1.1%	1.7%	3.1%	2.9%	1.8%
% Native Hawaiian/Pacific Islander	0.2%	0.1%	0.0%	0.2%	0.1%	0.1%	0.1%	0.0%
% Other single race	1.7%	0.4%	0.8%	0.8%	1.2%	0.8%	0.5%	0.7%
% Multiple race	4.7%	3.2%	3.9%	3.3%	3.6%	3.1%	2.6%	2.3%
% Hispanic or Latino, of any race	7.5%	1.7%	1.6%	2.5%	2.6%	2.4%	2.1%	2.0%
% Minority, total	25.2%	10.8%	13.4%	10.8%	19.1%	16.3%	14.7%	21.0%
Age Distribution for Sensitive Groups								
Under 5 years	149	324	119	411	407	2,255	9,069	51,438
% of total population	8.1%	8.3%	5.8%	8.1%	9.0%	7.0%	5.6%	6.3%
5 to 14 years	235	481	175	733	489	3,382	19,629	107,412
% of total population	12.8%	12.3%	8.5%	14.5%	10.8%	10.5%	12.1%	12.7%
Females 15 to 44 years	493	785	447	1,076	1,185	7,400	33,635	163,640
% of total population	26.9%	20.1%	21.7%	21.3%	26.2%	22.9%	20.8%	19.4%
65 and older	11	555	275	589	342	4,273	21,998	125,198
% of total population	0.6%	14.2%	13.3%	11.7%	7.6%	13.2%	13.6%	14.3%
75 and older	3	296	112	262	145	2,043	10,207	59,610
% of total population	0.2%	7.6%	5.4%	5.2%	3.2%	6.3%	6.3%	6.9%

Table 2: American Community Survey 2005-2009 Economic Data for the Project Study Area

	Census Tract 2002	Census Tract 2003	Census Tract 2004	Census Tract 2005	Census Tract 2007	Fairborn City	Greene County	Dayton MSA
Educational Attainment								
% with high school degree or higher	96.0%	88.7%	91.1%	79.4%	72.7%	85.7%	91.1%	87.4%
% with bachelor's degree or higher	32.5%	17.3%	16.3%	7.5%	7.4%	23.8%	33.4%	24.3%
Median household income in the past 12 months (in 2009 inflation-adjusted dollars)	$55,017	$49,792	$36,098	$37,267	$21,076	$39,315	$57,011	$47,145
Per capita income in the past 12 months (in 2009 inflation-adjusted dollars)	$20,062	$21,934	$22,017	$16,119	$18,373	$22,147	$28,115	$25,244
Percent with income in the past 12 months below poverty level	2.5%	13.3%	15.7%	23.6%	37.1%	19.1%	10.8%	13.3%

Fairborn is similar to the Dayton MSA with respect to educational attainment; for each, around 85% of the population has a high school diploma or better and around 25% of the population has at least a bachelor's degree. Greene County is generally better educated, with 91.1% of the population having a high school diploma and 33.4% having at least a bachelor's degree. Census tract 2002 (equivalent to 2803) is similar to Greene County in both measures, and census tracts 2003 and 2004 are similar to the larger area in terms of high school graduates but have fewer residents with bachelor's degrees, at around 17% of the population. Census tracts 2005 and 2007 are notable for lower levels of educational attainment overall: around 75% of the population have a high school degree and only 7.4-7.5% of the population have at least a bachelor's degree.

Because socioeconomic and environmental justice impacts can affect specific age groups proportionately more than for the general population, age distribution of the population was also examined. Of the census tracts in the study area, census tract 2003 is similar to Fairborn, Greene County and the Dayton MSA, while census tracts 2004 and 2005 differ only in terms of number of primary school-age children: census tract 2004 is slightly lower and census tract 2005 is slightly higher than the surrounding area. Census tracts 2803 and 2007 each have higher percentages of females of child-bearing age (15-44 years) and lower percentages of individuals 65 and older and 75 and older, with census tract 2803 having especially low percentages of older adults at 0.6% of the population. While all of the census tracts except tract 2004 have somewhat higher percentages of children under 5 years of age than Fairborn, Greene County or the Dayton MSA, census tract 2007 stands out at 9% of the population.

In summary, compared to Fairborn, Greene County, and the Dayton MSA, residents of census tract 2803 are better educated, with slightly more preschool-age children and more females of child-bearing age, the only concentration in the area of those claiming Hispanic origins and, notably, very few persons at 65 or more years of age. Census tract 2803 is located on WPAFB. Census tract 2003 is similar to the wider region in most respects but has a slightly higher percentage of preschool-age children, a somewhat lower rate of residents with bachelor's degrees and a somewhat lower percentage of minorities; within the study area it is located near the Gate 26A portion of the project. Census tract 2004 residents have slightly lower income and fewer primary school-age children but are the most similar to the larger region in other respects; within the study area this tract is located north of the Central Avenue railroad crossing and includes Central Avenue and Dayton Drive and the cul-de-sac areas on Greene, Ohio and South Streets. Census tract 2005 residents have less educational attainment and the lowest per capita income, with a higher percentage of the population having an income below the poverty level, a higher percentage of both preschool and primary school-age children and a lower percentage of minorities. Within the study area, this tract includes the Kauffman Avenue corridor north of Dayton-Yellow Springs Road. Tract 2007 differs most from the surrounding area: residents have lower educational attainment, higher percentages of females of child-bearing age and children under 5, fewer adults age 65 and older, the lowest median household income in the area and a significant percentage of the population with income below the poverty level in 2009. Because it meets ODOT's definition of a low-income environmental justice population, this tract requires evaluation to determine whether the project results in disproportionate negative impacts on its low-income population. This tract includes the study area south of the intersection of Kauffman Avenue with Garland Avenue.

Economic Setting

WPAFB is a major employer in the project area, and the largest single-site employer in the state of Ohio (ODOD, 2010). According to the 2009 Economic Impact Analysis prepared for WPAFB, the total payroll for appropriated fund military, appropriated fund civilian and non-appropriated fund, contract civilians and private business associated with the Base is over $2

billion annually. When annual expenditures and the value of indirect jobs created by the presence of the Base are added, the total economic impact of the Base on the Miami Valley is over $5 billion.

The Skyway Shopping Plaza is located along Kauffman Avenue within the study area. This shopping center was previously a local retail attraction but now has significant vacancies due to the migration of former anchor stores to the Fairfield Commons Mall in Beavercreek to the southeast.

Between the two segments of the study area lie the Fairborn downtown business district, defined as the properties facing Main Street between Pleasant Street on the east and Broad Street on the west, and the Broad Street retail district, located along Broad Street between Dayton Avenue and Highview Drive. A 2007 study of possible steps for revitalization of the downtown business district (Bailey & Spring, 2007) indicated that competition from newer shopping malls, difficulties of customers in accessing the district and closing of gates at WPAFB have presented challenges to the business district that have been part of its decline. Long-term successful businesses primarily appear to be destination shops such as Foy's Halloween Store and Bookery Fantasy book store that draw clientele from a larger area and have name recognition within their specialities. Among other recommendations, the study suggested that the city and businesses establish an executive committee that could reach out to WPAFB leaders to encourage cooperative interaction between the two.

School-age children of families housed on WPAFB who are not attending private schools attend Fairborn City Schools, including Fairborn Primary School at 4 West Dayton-Yellow Springs Road, Fairborn Intermediate at 25 Dellwood Drive/1020 South Maple Avenue, Baker Middle School at 200 Lincoln Drive and Fairborn High School at 900 East Dayton-Yellow Springs Road, all in Fairborn. Census 2010 figures indicate 235 primary school-age children in census tract 2803, and another 167 in the 15 to 19-year-old range within the same tract; the latter count may include newly enlisted personnel residing in the Base dormitories.

The city of Fairborn provides emergency, school and waste collection services to the project study area. WPAFB provides mutual aid in the event of emergencies.

An analysis of the property values in the Central Avenue/Dayton Drive neighborhood identified an average residential property value (including building) of slightly more than $86,000, while the average value for commercial properties is nearly $123,000. The properties elsewhere along the project study area are primarily commercial, with values varying in large part based on the parcel size.

3 IMPACTS OF PROPOSED PROJECT

The closure of SR 444 between Dayton-Yellow Springs Road and Dayton Avenue to through traffic would displace traffic that is not entering WPAFB. For purposes of this study, it has been assumed that traffic would divert to the nearest arterial roads that connect the two ends of the closed segment of SR 444. The resulting route, from southwest to northeast, travels from SR 444 along Dayton-Yellow Springs Road, Kauffman Road, Central Avenue and Dayton Drive to return to SR 444; it will be referred to as the diversion route. All of the following discussions are based on this assumption.

It is expected that ODOT will wish to designate a revised SR 444 for future use, and that the revised route may follow a different alignment than that assumed for this discussion. LJB Inc. performed a traffic study of WPAFB Area A (previously known as Areas A and C) and the surrounding off-base roadway system in connection with modification of entry control facilities (ECF) at WPAFB, documenting existing traffic conditions and anticipating changes resulting from near-term planned growth. The study (LJB, 2009) included consideration of conceptual alternatives for configuration of each ECF, the on-base roadway network and SR 444. On behalf of the city of Fairborn, City Manager Deborah McDonnell indicated a strong preference for shifting SR 444 for the entire length of Kauffman Avenue, beginning at the current intersection of the two roads south of the current project study area. Ms. McDonnell cited support of the downtown business district, the safety of pedestrians and cyclists using the Kauffman Avenue Bikeway and the ease of connecting Wright State University with the city, WPAFB Areas A and B and Calamityville as reasons for this preference. Because of this stated preference, the following discussion briefly considers this alignment and notes any obvious changes to the socioeconomic impacts of the ECF reconfiguration and perimeter fence relocation that would result from use of this alignment rather than the diversion route.

Traffic studies performed as part of this EIS determined that two intersections on the alternate route would experience significant decreases in level of service (LOS), which would likely prompt local organizations to pursue improvements to handle the increased traffic. WPAFB expects that local jurisdictions would work with ODOT to complete these improvements. Comments on the impacts of such improvements are based on conceptual alternatives found in the LJB traffic study and should be understood as one possible solution among a number of alternatives, depending on the actual impacts on traffic volumes.

3.1 IMPACTS TO TRANSPORTATION ACCESS AND SAFETY

Vehicular Traffic

The project is designed in part to improve vehicular traffic flow into and out of WPAFB and to reduce the impact of WPAFB gate delays on local traffic, particularly during peak flow times and times of heightened security. Vehicles approaching the Base from the south and those wishing to enter the Base after regular business hours will be directed to the reconstructed Gate 15A on the southeast edge of Area A. SR 844 feeds directly into this location from I-675. Traffic from SR 444 would access this gate via a new ramp to be constructed adjacent to the current off ramp from SR 844 to SR 444. Traffic exiting the gate to SR 444 would use Davis-Monthan Road. Multiple entry lanes are designed to increase storage on Base property so that no traffic delays occur off Base. Proper construction sequencing will be required to prevent the impacts on vehicular access to SR 444 that would occur if current gates and on-Base roadways are closed before the new gates and associated connecting ramps open.

Vehicles approaching the Base from the north during regular business hours will be directed to the relocated Gate 1A directly south of the intersection of Broad Street and Dayton Drive. Departing traffic from this gate will feed directly onto northbound Broad Street/SR 444. As with Gate 15A, multiple entry lanes will be used to minimize the potential for traffic delays on SR 444 off Base property.

Trucks approaching and departing Gate 26A are expected either to use SR 235 from and to US Route 4, or to use SR 444 or SR 235 from and to I-675. A holding area for trucks awaiting inspection will be located on Base property adjacent to Gate 26A. Mr. Fred Tito, 88 Civil Engineer Division Design Manager, indicated that commercial truck traffic at the Base generally peaks at 6 AM, with truck drivers timing their arrival to coincide with the opening of the truck inspection gate, and that the holding area will be designed with sufficient capacity to manage this peak. Trucks waiting for inspection are not expected to encroach on the flow of traffic along SR 235, the entrance to Pierce Road or the adjacent businesses, and therefore the changes near the relocated Gate 26A are not expected to impact transportation access.

SR 235 between I-675 and the proposed location of Gate 26A passes through a largely residential area. If truck drivers select this route to access WPAFB from the northeast, the additional truck traffic may increase safety risks in this area.

The diverted traffic from SR 444 will increase traffic volume on the diversion route. As part of the current EIS, LJB prepared a traffic analysis of the project that updated the 2009 traffic study. The current study analyzes traffic in part by comparing the function of four major intersections (Dayton Drive & Gate 1A, Dayton Drive & Central Avenue, Dayton-Yellow Springs Road & Kauffman Avenue and Dayton-Yellow Springs Road & SR 444) under existing conditions and for the design year (2032) both if the proposed changes are made (Build) and if the street system remains unchanged (No Build). Intersections' levels of service (LOS) are categorized according to the average delay per vehicle caused by the traffic signals, from A (very low delay) through F (unacceptable to most drivers).

Current function of the intersections studied is at levels B and C except for AM peak flow at Dayton Drive and the existing Gate 1A, which is at level D. Under No Build conditions, one intersection drops from level B to level C during PM peak hour traffic; other LOS remain unchanged. Under Build conditions, two intersections (Dayton/Central and Dayton-Yellow Springs/Kauffman) drop to level F during both AM and PM peak hour traffic; the other two intersections improve one to two levels during AM peak hour and remain unchanged from No Build conditions during PM peak hour.

Traffic volume projections prepared by LJB indicate that by 2032, AM and PM peak hour traffic volumes that would have increased by one-third to one-half under no-build conditions will instead be double to triple the current volumes. The highest calculated increase is projected for PM peak hour northbound Kauffman Avenue traffic, which is expected to grow from 420 vehicles per hour at present to 1,344 vehicles per hour. The increase in traffic combined with a lack of turn lanes may result in more difficult access to Central Park, the Fairborn YMCA and the residential area southwest of Dayton Drive and Central Avenue. Throughout the study area, the combination of increased traffic and movement from a limited access route with no intersections to local streets with intersections and multiple driveways is likely to result in an increase in the number of accidents but a decrease in the severity of such accidents due to lower speed.

Projected volumes are not likely to interfere significantly with access to Skyway Shopping Plaza or any business in the section of Kauffman Avenue having a center turn lane. Along Central

Avenue and Dayton Drive, residential driveways empty onto the diversion route; these residents may experience delays if arriving or departing during peak flow times.

The project plan calls for Greene, Ohio and South Streets to be closed with cul-de-sacs at the current SR 444/ Broad Street. The cul-de-sacs would be designed to allow large vehicles such as trash trucks and fire engines to turn around. The cul-de-sacs would eliminate cut-through traffic, potentially improving safety along these streets. Direct access to the northbound relocated route from the area bounded by Central Avenue, Dayton Drive, Broad Street, and South Street would require a left turn, and access to this area from the northbound relocated route would require a left turn from a roadway section with no center turn lanes, potentially increasing delays and interrupting traffic flow during peak flow times. The same situation would apply to vehicles accessing the Fairborn YMCA from the southbound relocated route. Due to space restrictions, the future addition of a dedicated center turn lane on Dayton Drive or Central Avenue is unlikely without direct impact to the adjacent homes and businesses.

Rail Traffic

The Norfolk Southern rail track crosses the diversion route in two places: at Dayton-Yellow Springs Road between SR 444 and Kauffman Avenue, and at Central Avenue directly north of Kauffman Avenue. Both crossings are at grade; at Central Avenue the railroad is at an angle to the road. Because of the current and projected train and vehicular traffic, and because the present SR 444 has no rail crossings, the diversion route is expected to experience a significant increase in delays over the existing conditions and an increase in the potential for accidents.

The Dayton-Yellow Springs Road crossing is situated on a short segment of roadway between the intersections of that road with SR 444 and with Kauffman Avenue. Limited vehicle storage space is available on Dayton-Yellow Springs Road outside the rail crossing area, and safety is dependent on drivers heeding warning signs and leaving the space over the tracks open while waiting for the traffic signal to change. This crossing experienced a number of accidents in the past, but only one in the last two decades according to records available from the Federal Rail Administration. However, the expected increase in both vehicular and train traffic increases the likelihood of future incidents.

One at-grade crossing could be eliminated from a relocated SR 444 by redirecting traffic onto Kauffman Road at its intersection with SR 444 south of the study area, thus avoiding the use of Dayton-Yellow Springs Road between SR 444 and Kauffman. The Central Avenue crossing that would remain has not experienced any accidents in over 20 years, according to the Federal Rail Administration. As part of evaluating this alternative, the LJB 2009 traffic study considered the creation of a grade-separated crossing at Central Avenue and identified three major impediments to the effort: right-of-way would be required from residential and commercial property at significant cost, the work may impact an environmental justice population, and constructing a structure that minimizes impacts to the community and the environment would likely increase the cost of the project.

Public and School Transportation

There is currently no scheduled public transportation that uses SR 444, SR 235 or the diversion route; public transportation in this area is via scheduled curb-to-curb service. Therefore, no impacts to public transportation or the ease with which it is accessed are expected, except to the same extent as will impact overall traffic flow. School buses serving the area are expected to have the same experience as residents living in the vicinity of the project as discussed under Vehicular Traffic above. The proposed cul-de-sacs on Greene, Ohio and South Streets would allow school buses to turn around.

Bicycle and Pedestrian Traffic

The diversion route will significantly increase traffic in the vicinity of the Kauffman Avenue Bikeway, which crosses Dayton-Yellow Springs Road at its intersection with Kauffman. The bikeway is used by both cyclists and pedestrians. Both the Fairborn Thoroughfare Plan and resident comments at the scoping meeting indicate that significant bikeway traffic crosses the diversion route in at least two additional locations: across Central Avenue at Ohio Street to access the Fairborn YMCA and Central Park, and across Dayton Drive at Central Avenue to continue north along Central Avenue. Both rising fuel prices and the proposed connections of the Kauffman Avenue Bikeway to the existing bikeway to the north and the Mad River Trail to the south are likely to increase bicycle and pedestrian traffic on the bikeway.

In addition to the increased vehicular and bicycle/pedestrian traffic, roadway design considerations may contribute to a decrease in safety for cyclists and pedestrians through the diversion route corridor. If no changes are made to roadway design by the design year (2032), overloaded intersections and related delayed traffic are expected at the diversion route intersections likely to have high numbers of bikeway and pedestrian crossings. If changes are made to roadway design, the potential addition of dedicated turn lanes and in some cases through lanes could intrude on the open space between the bikeway and traffic and between existing sidewalks and traffic, potentially requiring a redesign of the bikeway to maintain safety as perceived by users of the bikeway.

3.2 IMPACTS TO COMMUNITY FACILITIES

Fairborn's Kauffman Avenue Bike Path is located within the project study area along Kauffman and Central Avenues, where its facilities are shared by the statewide Buckeye Trail and the North Country National Scenic Trail, a multi-state bike trail. The project study area also includes Fairborn's Central Park and the adjacent Fairborn YMCA.

Traffic studies performed as part of this EIS determined that two intersections on the alternate route would experience significant decreases in level of service (LOS), which would likely prompt local organizations to pursue improvements to handle the increased traffic. The extent of changes required as a result of these improvements, and therefore the extent of any impact to the bikeway, park and YMCA, is unknown. As part of the 2009 LJB Traffic Study, conceptual drawings were prepared of changes that may be necessary if intersections are improved to higher service levels and if Kauffman Avenue is widened to a continuous profile having two through lanes in each direction and a center median with dedicated left turn lanes. The conceptual drawings indicate that added lanes along Kauffman Avenue may encroach on the bikeway where it crosses the unnamed intermittent stream that passes under Kauffman Avenue between Lindberg and Parkwood Drives, requiring relocation of the bikeway. However, the conceptual drawings were made based on 12-foot-wide lanes, and Mr. Jay Hamilton, ODOT District 8 Traffic Planning Engineer, has indicated that it would likely approve 11-foot lanes for at least portions of such a project, reducing impacts on the bikeway. Citizen comment on the project during the scoping meetings for the EIS was emphatically against any impact to the bikeway (WPAFB 2011).

Assuming that either ODOT or FHWA chooses to redesignate SR 444 along a new alignment, one option to avoid the safety concerns at the railroad crossing on Dayton-Yellow Springs Road is to shift SR 444 traffic from the existing alignment to Kauffman Road where the two intersect, just over 1-mile west of Dayton-Yellow Springs Road. LJB's conceptual drawings of a SR 444 realigned under this assumption and which allow the roadway to handle traffic at 55 MPH indicate the road would encroach on the bikeway between National Road and McClellan Drive

and again between Wright State Road and the SR 844 overpass. Again, the drawings are conceptual and may include assumptions that create a greater impact than would be required by the selected design.

Based on the difficulty of acquiring right-of-way from Section 4f properties such as Central Park, LJB's 2009 conceptual drawings avoided impacts to the park. Whether Central Avenue is widened or not, maintenance of the existing traffic signal at Ohio Street and Central Avenue would likely be required to minimize impacts to the ease of entering the park and YMCA by vehicle, bicycle or on foot given the increased traffic.

The WPAFB Medical Center serves as an emergency medical facility for the Fairborn community, with over 100 ambulance runs to the facility from the city each year. Chief Mike Riley expressed concern that the closure of SR 444 and Gate 9A would affect the fire department's ability to transport patients quickly and efficiently to the hospital.

Community facilities within and near the Skyway Plaza shopping center, such as the Fairborn Municipal Court and Fairborn Community Center, a worship center and retail facilities including two small markets and a dry cleaner, are likely to experience either no impact or positive impacts as a result of the increased traffic along Kauffman Avenue. Access is not expected to be significantly more difficult as a result of the changes.

3.3 IMPACTS TO COMMUNITY COHESION

Because excessive exterior noise can result in fewer interactions between neighbors if it interferes with comfortable outdoor communication, noise is a potential impediment to community cohesion. LJB performed a noise screening at multiple points in residential neighborhoods within the project study area and determined that at all seven screening data collection points, noise would exceed the ODOT screening level noise criterion of 60 decibels (dB). However, ODOT also specifies that a 10 dB increase is required for the increase in noise level to be significant. None of the data collection points are projected to experience that magnitude of noise increase. Several potential noise abatement measures were conceptually examined to assess the feasibility and reasonableness to implement within the study area. Generally, these measures were found to be challenging to implement within the constraints of the study area.

A primary impact of the project on the project study area and the larger community has to do with the connection between WPAFB and the community of Fairborn. A number of children living in Base housing attend Fairborn schools, employees of the Base may visit Fairborn for meals and for services such as clothing and vehicle care, and some personnel stationed at WPAFB live in Fairborn, including personnel with families. The reconfiguration of the gates produces efficiencies in terms of entering and leaving the Base, but loosens the connection between the Base and the community in which the off-Base impacts are located.

The proposed reconfiguration of gates and roadways would require families residing on Base and having children with evening or weekend events in the schools to use Gate 15A to enter and leave the Base. The 2010 census identifies 147 households with school-age children living in census tract 2803, which lies within the WPAFB fence. Several hundred school-age children were counted in this tract. Information on whether the children attend public or private schools or are home-schooled was unavailable, but it is assumed that some of the children attend Fairborn public schools.

Locations of Fairborn Primary School, Fairborn Intermediate School, Baker Middle School and Fairborn High School are shown on Figure 8 (Appendix A). Particularly for families traveling to

the high school located adjacent to I-675, the preferred route is likely to travel around the periphery of the city rather than have the potential to deal with train crossing or traffic delays. Therefore, while high school families are participating in community school activities they do not experience other parts of the community or have reason to interact with the city. For families with students in the other three schools, travel routes will require driving through Fairborn to reach the schools; while the changes to SR 444 may result in less convenience for these families, the likely future routes result in less separation from Fairborn as a community than for the high school families. Families located outside the WPAFB fence are not expected to experience the same levels of separation from the community.

3.4 IMPACTS TO VISUAL ENVIRONMENT

In the short term, the re-routing of traffic from SR 444 along Dayton-Yellow Springs Road/ Kauffman Avenue/ Central Avenue/ Dayton Drive would have limited visual impacts beyond increased traffic.

It is expected that SR 444 would be officially re-designated and the selected new route would be improved to carry the projected traffic. If roadway widening and intersection changes are required, visual impacts may include the removal of several buildings along Dayton Drive to accommodate turn lanes and/or the use of a portion of the green space between Kauffman Avenue and the bikeway near the Skyway Shopping Plaza for the addition of a second southbound through-lane. Citizens have expressed opposition to bikeway impacts in any form, this presumably includes the removal of landscaping trees that currently form a line between Kauffman Avenue and the bikeway.

The proposed relocation of Gate 26A originally included the creation of a truck pull-off along SR 235 south of the entrance to the new ECF, which is strongly opposed by Fairborn officials due to its negative visual impact on one of the main gateways into their community's business district. The current gate design places truck parking on Base property on the opposite side of SR 235 and the main gate roadway and guard shack from city residences and businesses, minimizing impacts to the visual environment.

Fairborn officials are concerned that truck traffic would be directed to approach the gate along SR 235 from I-675, passing through a residential neighborhood with picturesque qualities and possible historic homes. If truck traffic from I-675 is instead directed to follow SR 444 to its intersection with SR 235, impacts to the visual environment of the residential neighborhood would be avoided.

3.5 IMPACTS TO EXISTING BUSINESSES AND TO COMMUNITY ECONOMIC DEVELOPMENT PLANS

In the short term, the re-routing of SR 444 traffic along the alternate route of Dayton-Yellow Springs Road/ Kauffman Avenue/ Central Avenue/ Dayton Drive has the potential to alter patronage of several businesses through reduced access to their entrance drives. These include R. Robinson's Auto Repair and the Exxon gas station, both at SR 444 and Dayton-Yellow Springs Road; the Fairborn YMCA at Central Avenue and Ohio Street and the day care provider located in a house on the west side of Central Avenue; and the Marathon station on the southwest corner of Dayton Drive and Central Avenue. The impact to the YMCA entrance is expected only if the signal at that intersection is removed.

The Downtown Fairborn Business District Revitalization Plan prepared for the city in 2007 interviewed former City Manager Allen Rothermel concerning the effectiveness of past

revitalization efforts. Mr. Rothermel noted in 2007 that the closure of several Base gates "had negatively impacted customer traffic in the downtown business district." (Bailey & Spring, 2007) One shopkeeper who completed a questionnaire for the revitalization study (all comments were anonymous) specifically identified Base downsizing and gate closures as a challenge to doing business. Current City Manager Deborah McDonnell echoed Mr. Rothermel, stating that Fairborn shopkeepers have noted a drop in business each time WPAFB closes a gate near the business district. The current project closes multiple gates along SR 444, closes Gate 1A to after-hours and weekend traffic and makes Gate 15A with its preferred departure route along SR 844 the primary entry control facility. The 2009 LJB traffic study does not indicate a noticeable difference between the "build" and "no build" scenarios in peak AM or PM traffic volumes at gates near the business district.

As discussed in Section 3.4 above, Fairborn officials strongly opposed the original plan for the relocated Gate 26A, which included the creation of a truck pull-off area on SR 235 south of the entrance to the relocated gate. The opposition to the visual impact of the truck parking was due to concern over their desire to create the public perception of Fairborn as a pleasant, family-oriented community with shops, restaurants and offices that provide friendly and high-quality service, and the negative impacts that the inability to maintain that image could have on economic development and successful growth in the community. With the new design, the visual impact of queued trucks awaiting inspection is minimized.

As discussed in Section 3.7 below, increased average fire department response times that may result from the delays caused by trains crossing the department's preferred response routes would likely result in a less favorable NFPA PPC Class, resulting in increased fire insurance rates for all buildings in the community.

The project study area, as part of the city of Fairborn, is part of several regional economic development plans. These include the Fairborn Thoroughfare Plan, the Fairborn Downtown Business District Revitalization Plan, the WSU Master Plan and plans for Calamityville® and the multiple planned regional bikeways documented by MVRPC on its 2011 edition Miami Valley Bikeways Guide Map. Fairborn officials provided comments that elaborated on the links between the plans. WPAFB is required to respond to the changing needs of the Air Force, and therefore does not have a long-term master plan. Each plan that was reviewed for this study has a connection to or interest in the changes caused by the current project:

- Fairborn's Thoroughfare Plan designates SR 444 and SR 235 as major arterial roadways. The diversion of traffic from SR 444 will likely cause Kauffman Avenue, Central Avenue and Dayton Drive to become major arterial roads under the plan's definitions. Fairborn officials welcome the increased traffic the change would provide to the Skyway Shopping Plaza, located on the east side of Kauffman Drive north of Garland Avenue, provided that assistance is available for improving these streets to handle the increased traffic. Because SR 444 is part of the National Highway System (NHS), procedures defined at 23 CFR 470 Subpart A must be followed to make a change to the route. The procedures will likely include coordination with Fairborn officials as representatives of the local government and with WPAFB officials as representatives of an area under Federal jurisdication. MVRPC will coordinate the changes, and could apply Defense Access Roads funds, NHS funds or Surface Transportation Program (STP) funds as appropriate to the project.

- Fairborn's Downtown Business District Revitalization Plan includes comments expressing concern over the consolidation of gates, as discussed above. Among other recommendations, the plan suggests the business district form an executive committee that could speak for

business owners in discussions with WPAFB officials on ways to solidify the mutually supportive connection between the city and the Base.

- The WSU Master Plan calls for additional vehicular entry and exit points from campus, including two located on Kauffman Avenue, and calls for ensuring that the campus pedestrian/bikeway loop safely and conveniently connects with adjacent public pedestrian systems, such as the Kauffman Avenue/Wright Brothers-Huffman Prairie bikeway located along Kauffman Avenue on the north side of the campus. Each vehicular entry and exit point is to act as a campus gateway and create a sense of arrival at the campus. The plan calls for the Kauffman Road/Service area to develop into a complex offering sports medicine facilities, a relocated child care center, and an engineering student project building within 10 years, with additional opportunity sites to be developed along Kauffman Avenue in the longer term. According to Fairborn City Manager Deborah McDonnell, WSU would welcome the relocation of SR 444 onto the current alignment of Kauffman Avenue because of the increase in traffic past its gates.

- The Calamityville™ Tactical Laboratory is located on Xenia Drive east of Dayton Drive, northeast of the project study area. The site can be reached by turning east rather than west on Dayton Drive at Central Avenue, then turning east again onto Xenia Avenue a few blocks to the north. This initiative of Wright State University's (WSU) National Center for Medical Readiness is a training and research facility focusing on improving interactions between the civilian and military medical communities and traditional disaster first responders. A developing relationship between WSU and the United States Air Force School of Aerospace Medicine will allow collaboration on both research and training at this facility. Calamityville™ is expected to generate $374 million in economic benefits for the Miami Valley over its first 5 years of operation. SR 444 is expected to be a major connecting route among WSU, WPAFB and Calamityville™.

- According to the MVRPC bikeway map, the regional bikeway plans include connecting the Kauffman Avenue/Wright Brothers-Huffman Prairie bikeway to the existing Mad River Trail through an extension between the two, thus connecting WSU and Fairborn to downtown Dayton. The bikeway portion of Fairborn's Thoroughfare Plan calls for connecting the north end of the same bikeway to an existing bikeway on Xenia Drive that connects to a shared-roadway bike route travelling northeast. Also included in the Thoroughfare Plan are bike routes traveling east on Dayton-Yellow Springs Road, Garland Avenue and north from Dayton Drive through Fairborn to SR 235.

3.6 IMPACTS TO PROPERTY VALUES

Property values in the study area would likely be impacted – some would increase and some would decrease – as a result of this project. For instance, the commercial property values for parcels fronting Kauffman Avenue, Central Avenue and Dayton Drive are likely to increase because they would have greater exposure to an increased number of potential patrons diverted from State Route 444. Conversely, it is reasonable to expect that the residential values in this area likely would decrease because these residences would now be located in an area that would be significantly more "busy" simply because of increased traffic.

Another potential impact to the value of properties fronting Central Avenue and Dayton Road relates to the possible need to expand the roadway width to accommodate increased traffic. Should FHWA decide to expand Central Avenue and Dayton Drive, right-of-way may be required from the parcels fronting these roads. Acquisition of right-of-way would decrease the

overall size of the properties in this area, which likely would reduce their value. Currently, almost 68% of the properties fronting Central Avenue and Dayton Road are residential. Greater overall impacts to residential property values as a result of right-of-way takes are expected than for commercial properties because the latter experience the offsetting effect of increased exposure to potential customers as a result of the project.

Typically when significant roadway changes are made business patterns tend to shift from the areas of lower traffic volume to locations with greater exposure and more cars. In this study, the traffic will likely be diverted from SR 444 to Kauffman Avenue. Kauffman Avenue should incur increased business investment which should result in higher property values. However, these increased business investments will not likely be new businesses coming into the area, but rather existing businesses shifting to Kauffman Avenue to maintain their exposure in the commercial market. The negative side to this scenario is that businesses that locate along Kauffman Avenue may come from the portions of the Fairborn area in which the ECF reconfiguration is likely to reduce traffic. Property values in these areas would be expected to decline as a result.

3.7 IMPACTS TO ZONING AND LAND USE PLANS

In general, the project is not expected to impact zoning. The few cases in which properties are zoned for one use but are being used for another classification are considered legal non-conforming and likely will experience no impact.

The vehicle staging area being proposed for the relocated Gate 26A off SR 235 just north of North Broad Street would be located near an established residential neighborhood in the Oakhill Avenue area. Likely the staging area would be noisy and can generate odors and air pollution from the vehicles, which would have a deleterious effect on the residential area. The planned vegetative barrier and/or an earthen mound would increase separation between the two areas.

3.8 IMPACTS TO PUBLIC SERVICES

The Fairborn Fire Department maintains four fire stations that provide the city of Fairborn, including WSU, with fire and emergency medical service response. The fire department also has a mutual aid agreement with WPAFB, and EMS units regularly transport both non-critical and critical patients to Wright-Patterson Medical Center (WPMC), which is located within the secure portion of WPAFB.

Fire Chief Mike Riley provided an analysis of the impact of the Project on response times. Identified concerns included the potential for delays at red lights or train crossings along the response route, and delays in advanced treatment for the approximately 180 patients per year transported to WPMC. Chief Riley concluded that Fire Stations 2 and 3, located at 2200 Commerce Center Boulevard and 1000 Yellow Springs-Fairfield Road, respectively, would experience no significant impact to response times as a result of the Project. Station 1 at 495 North Broad Street is expected to experience delays that would add between 2 minutes 55 seconds and 4 minutes 15 seconds to the current response times. Response times from Station 4 at 444 West Funderburg Road are expected to increase between 57 seconds and 3 minutes 38 seconds. Fire station locations are shown on Figure 9 (Appendix A).

Fairborn is currently rated by the National Fire Protection Association as a Public Protection Classification Program (PPC) Class 3 community, a rating that fewer than 100 Ohio cities have attained. The PPC rating is based in part on response time for fire equipment. All other factors being equal, a high PPC rating can result in lower fire insurance costs for the buildings in a

community. Increased response times and more limited access to WPMC may therefore negatively impact both public safety and the affordability of insurance in the community.

While the police department did not provide a detailed analysis, similar concerns apply. Initial responses are most likely to be from the police station serving each police district, and because the two railroad crossings fall on boundaries between districts no delay is anticipated in initial response under normal circumstances. Mutual aid among districts may be subject to delays.

No additional impacts to public services are anticipated except as documented in Section 3.1.

3.9 CUMULATIVE IMPACTS AND ENVIRONMENTAL JUSTICE

Cumulative impacts are those effects that are the result of many smaller, incremental actions that occur over time and/or geography to combine into a larger single effect on a given location or population. The cumulative socioeconomic impacts to which the ECF reconfiguration project is most likely to contribute are the potential limitations on economic development of Fairborn and the related diminishment of the social connection between Fairborn and the Base as communities. As implied by their relative positions and sizes on a map of the area, the Base has a large influence on conditions in Fairborn. Over time and with the need for increased security and more limited access to the Base as the driver, multiple ECFs that previously allowed for both social and economic interaction have been closed or relocated. Additionally, the design of the SR 844 link connecting I-675, SR 444, WPAFB and WSU has tended to pull traffic and interaction away from central Fairborn and separated the center of town from the area to the south, to the extent that many Miami Valley residents are unaware that WSU is located in Fairborn's corporate boundary. Figure 10 illustrates the percentage change of traffic at key locations in the Fairborn business district and in other areas of Fairborn over the last two decades, showing a general decrease in business district traffic and increase in traffic near WSU. Based on both the convenience in travel fostered by SR 844 and the general public opinion of the character of various local communities, many individuals working at the Base have chosen to live in other parts of the Miami Valley. On the other hand, regional bikeway plans and the selection of the former Cemex facility in Fairborn as the location for Calamityville® support the continued viability of the existing businesses in the central community. Cumulatively, however, development of the region has tended to shift both economic resources and social connections away from central Fairborn.

The only environmental justice populations, as defined by ODOT, identified within the study area are located southeast of the intersection of Kauffman Avenue and Dayton-Yellow Springs Road and southeast of Kauffman Avenue and Central Avenue near their intersection. These populations are located in neighborhoods which are potentially affected by increased delays at major intersections along the redirected SR 444, as well as by related increases in traffic congestion, noise and air pollution and potential declines in property values as a result. While all commuters travelling along the redirected SR 444 will experience the increased delays and congestion, the low-income and minority populations in the neighborhoods adjacent to this route will likely experience a greater negative impact due to the added burden of the health and economic impacts specific to their location. However, the magnitude of this negative impact is not projected to rise to the level of a "disproportionately high and adverse" effect, based on data and evaluations presented elsewhere in the Draft Environmental Impact Statement and its attachments.

4 SUMMARY

The WPAFB ECF reconfiguration and perimeter fence relocation project would have a number of positive and negative impacts on socioeconomic conditions in the project study area.

- The changes would reduce or eliminate impacts on local traffic that might otherwise be caused by back-ups at WPAFB ECFs during times of high volume and increased security, thereby increasing safety by reducing conditions that might cause accidents.

- The changes would divert traffic that previously followed SR 444 between Dayton-Yellow Springs Road and Dayton Drive to local streets. Projected traffic volumes for the design year (2032) may cause significant delays at some intersections along the alternate route, increasing the potential for accidents but decreasing the average speed, and therefore the severity, at which those accidents are likely to occur.

- The alternate traffic route would direct traffic across two at-grade rail crossings along a rail line that is projected to see traffic increase from 20 to 40 trains per day in the next 10 years. One of the two crossings is located on a short stretch of road bound by two signalized intersections, and safety at this crossing relies on drivers to avoid stopping on the tracks. Under these conditions, the potential for accidents is increased by the project.

- The alternate traffic route would direct traffic along a commercial section of Kauffman Avenue, potentially increasing customer volume to the Skyway Shopping Plaza that has been struggling since the opening of the Fairfield Commons Mall in Beavercreek to the southwest. Other commercial establishments along the majority of the route may see similar benefits. Several corner service stations may see decreased traffic due to increased difficulty in accessing their properties during high volume traffic.

- Traffic accessing the Fairborn YMCA, Central Park and the residential area bound by Dayton Drive, Central Avenue, South Street and Broad Street via a left turn may experience access difficulties during high volume traffic. Cul-de-sacs on Greene Street, Ohio Street and South Street near Broad Street would eliminate cut-through traffic, increasing neighborhood safety.

- The designation of Gate 15A with its connection to SR 844 as the primary ECF would improve access to the Base from I-675, but may contribute to the cumulative negative impact to the Main Street and Broad Street businesses in Fairborn that has resulted from multiple ECF closures at WPAFB over time, transportation decisions directing traffic away from SR 444 onto SR 844 and I-675 and a trend toward regional shopping malls over local stores. However, build and no-build traffic projections prepared by LJB in 2009 do not appear to indicate a noticeable difference in peak AM and PM traffic traveling through gates located near the downtown business district.

- Citizens are particularly concerned over impacts to the Kauffman Avenue/Wright Brothers-Huffman Prairie bikeway that parallels Kauffman Avenue and crosses Dayton-Yellow Springs Road, officially ending at Ohio Street but with traffic continuing north on Central Avenue both in popular usage and in the Fairborn Bikeway Plan. In the short term, the only impact to the bikeway appears to be the increased traffic at the intersections of the bikeway/local route with Dayton-Yellow Springs Road and Dayton Drive, which may increase the accident potential for cyclists and pedestrians crossing the roads. If motorists do not follow the official alternate route but instead travel north on Central Avenue to Broad Street, potential for accidents may increase for neighborhood pedestrians and cyclists. The

existing signal at Ohio Street and Central Avenue, if retained, would prevent negative impacts of increased traffic volume on the ease of accessing the Fairborn YMCA and Central Park from the bikeway.

- ODOT has indicated that 12-foot lanes would not be required if Kauffman Avenue, Central Avenue and Dayton Drive are widened, thus lessening potential impacts on the landscaped environs of the Kauffman Avenue bikeway in the event of a widening project.

- The alternate route's two railroad crossings may increase fire department and police department response times due to the need to use less convenient alternate routes when trains are crossing. In addition to decreasing safety, an increased fire department response time would likely lower Fairborn's NFPA PPC Class rating, potentially increasing fire insurance rates across the city. The location of the sole 24-hour ECF at the south end of Area A and the coinciding closure of a section of SR 444 to through traffic may impact the ability of the fire department to expeditiously transport emergency patients to WPMC for treatment.

- Changes to SR 444 have the potential to impact development plans for Fairborn, WSU, and the regional bikeway system. Fairborn's Thoroughfare Plan would require revisions and its downtown business revitalization plan may also require adaptation. WSU's master plan calls for gateways to the campus along Kauffman Road, which could become more beneficial and important if Kauffman were designated as SR 444 in that area. Revisions to the alignment of the Kauffman Avenue/Wright Brothers-Huffman Prairie bikeway may be necessary if Kauffman were designated as SR 444 and widening was pursued. The maintenance of SR 444 as a major travel route allows easier travel for faculty and students between the WSU National Center for Medical Readiness Calamityville™ facility, the WSU campus and the USAF School of Aerospace Medicine located at WPAFB.

- The effects of increased traffic, increased noise and potential increased pollutants are expected to combine to reduce property values of residential properties along the alternate route. Commercial properties along the route are likely to experience an increase in value due to the potential increase in customer traffic.

- Because SR 444 is part of the NHS, procedures defined at 23 CFR 470 Subpart A must be followed to make a change to the route. The procedures would likely include coordination with Fairborn officials as representatives of the local government and with WPAFB officials as representatives of an area under Federal jurisdiction.

A disproportionate share of the negative impacts of the redirection of SR 444 along Dayton-Yellow Springs Road, Kauffman Avenue, Central Avenue and Dayton Drive will be borne by the low-income and minority populations in the neighborhoods southeast of Kauffman Avenue along the project study area, due to their inability to avoid the noise, air pollution and property value reduction impacts expected to accompany the traffic delays and congestion associated with this change. However, the impacts do not appear to rise to the level of a disproportionately high and negative impact that would constitute an environmental justice concern. Prevention or relief of the traffic delays and congestion would be the most likely method for addressing this negative impact.

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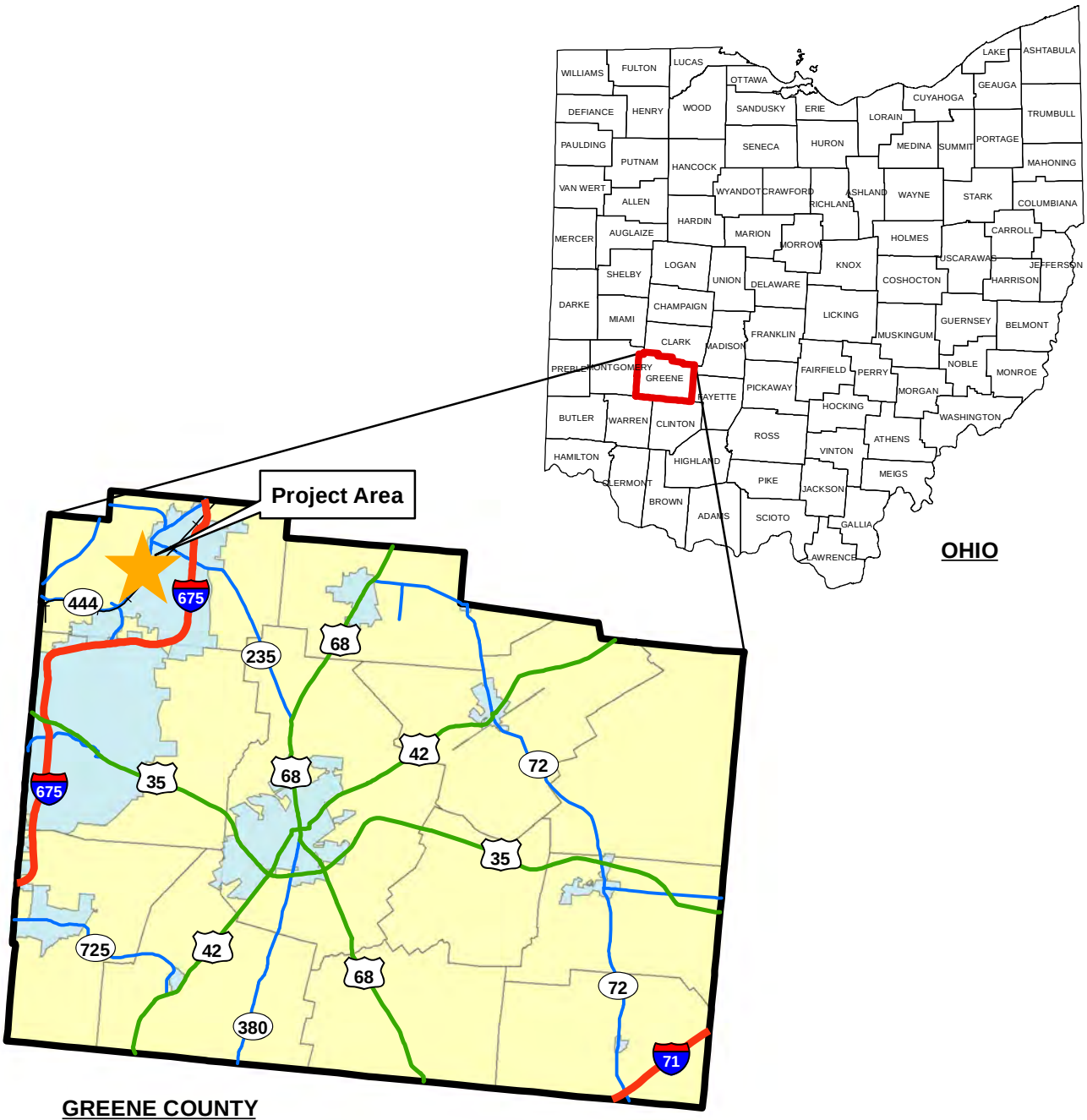
Appendix A
Figures

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Dayton, OH	3/4/11	-	SBSM	LAS	LAS	Figure 1-County Map



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Not to Scale

WRIGHT-PATTERSON
AIR FORCE BASE,
OHIO

Figure 1

County Location Map

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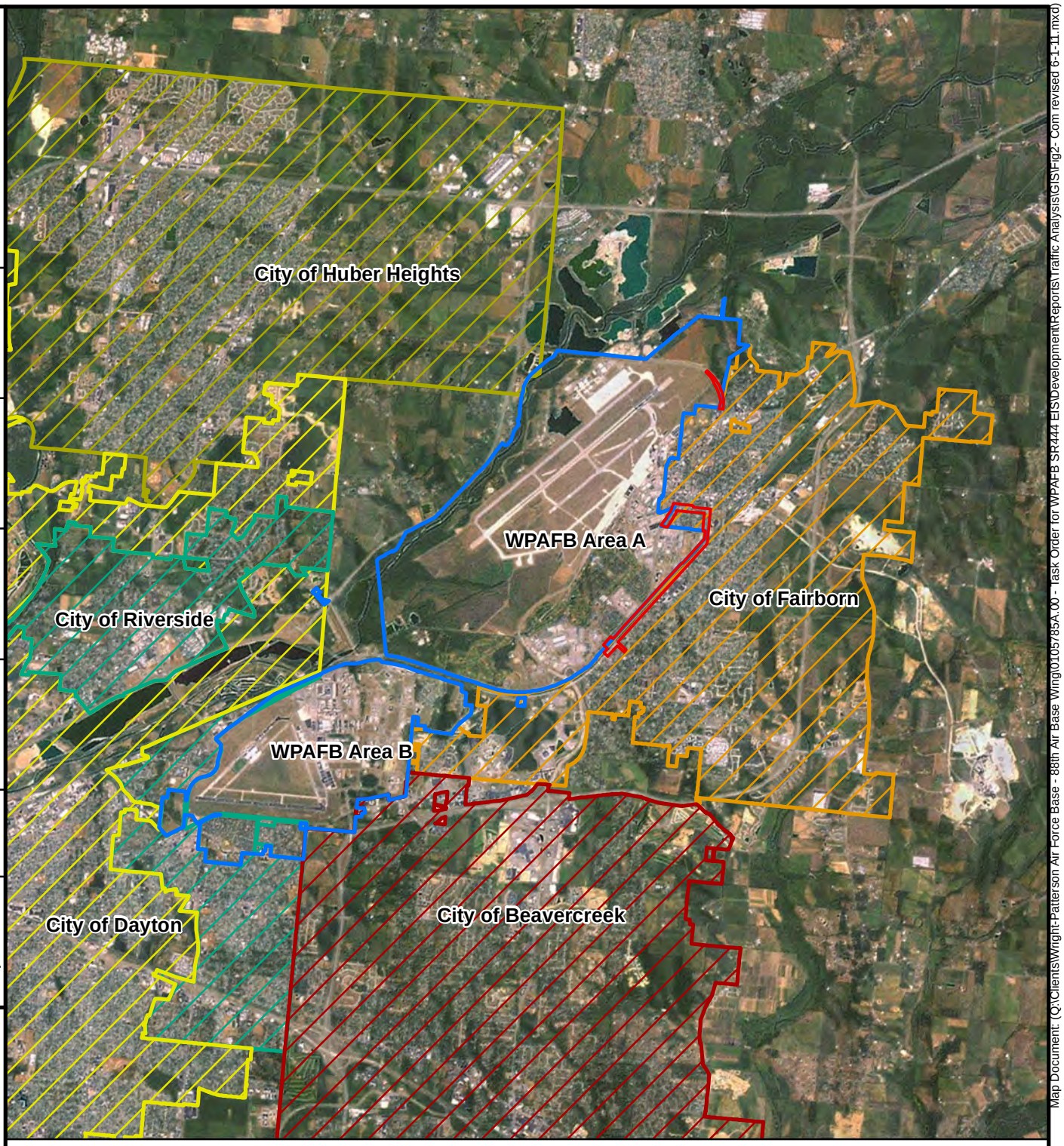
Dayton, OH	3/4/11	--	SBSM	LAS	LAS	Community Map



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Legend

Off-Base Study Area

N

0 2,750 5,500 11,000 Feet

WRIGHT-PATTERSON
AIR FORCE BASE,
OHIO

Figure 2

WPAFB and Surrounding Communities

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Dayton, OH	5/31/11	--	SBSM	LAS	LAS	Study Area Map

Legend

- Off-Base Study Area
- SR444 to be closed to public
- Proposed cul-de-sacs

N

0 750 1,500 3,000 Feet

WRIGHT-PATTERSON
AIR FORCE BASE,
OHIO

Figure 3

Off-Base Study Area

Map Document: (Q:\Clients\Wright-Patterson Air Force Base - 88th Air Base Wing\0105785A.00 - Task Order for WPAFB SR444 EIS\Development\Reports\Traffic Analysis\GIS\Figure3- Study Area.mxd)
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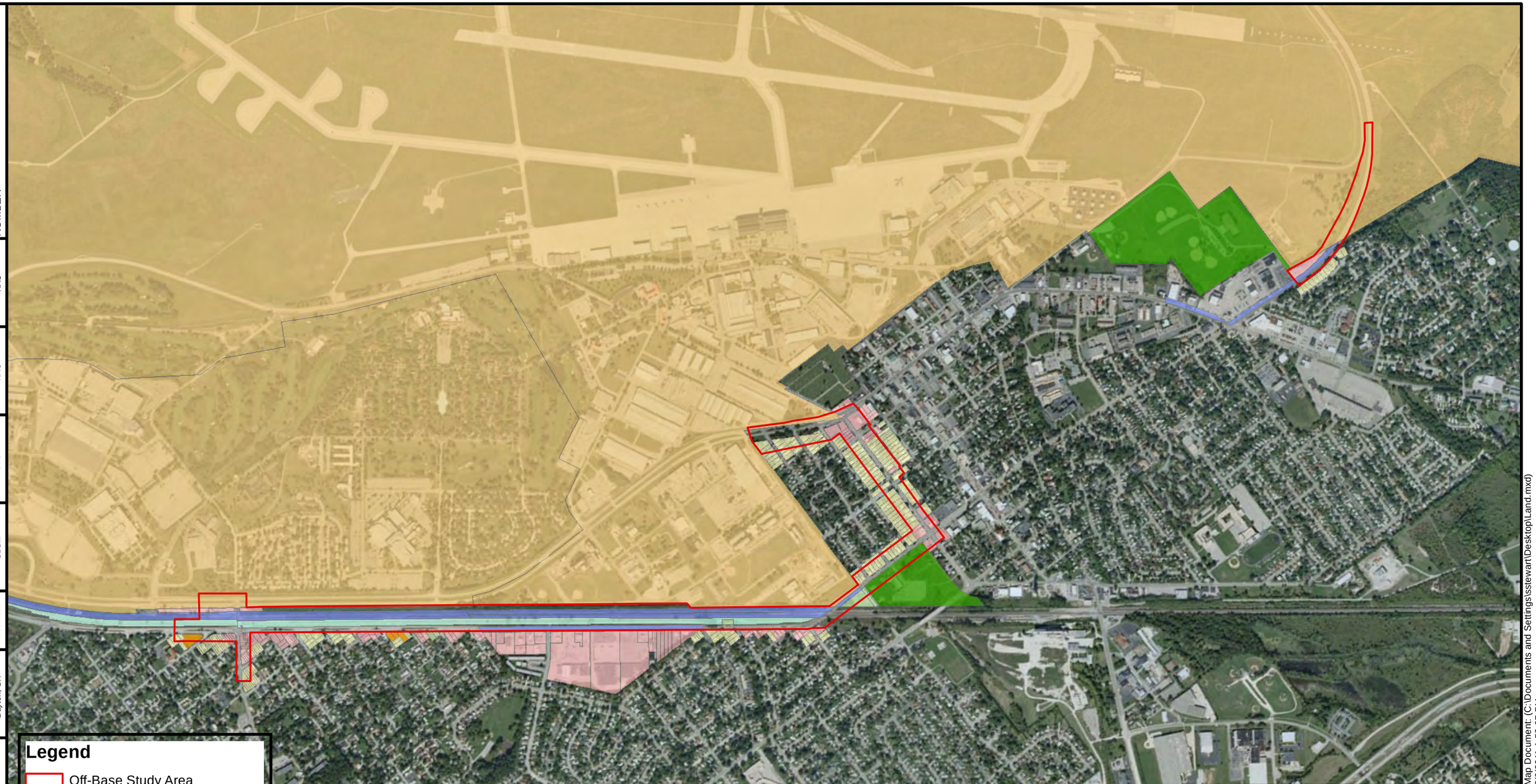
Dayton, OH	4/29/2011	SBSM	SBSM	NAC	NAC	Land



WRIGHT-PATTERSON
AIR FORCE BASE,
OHIO

Figure 4

Land Use

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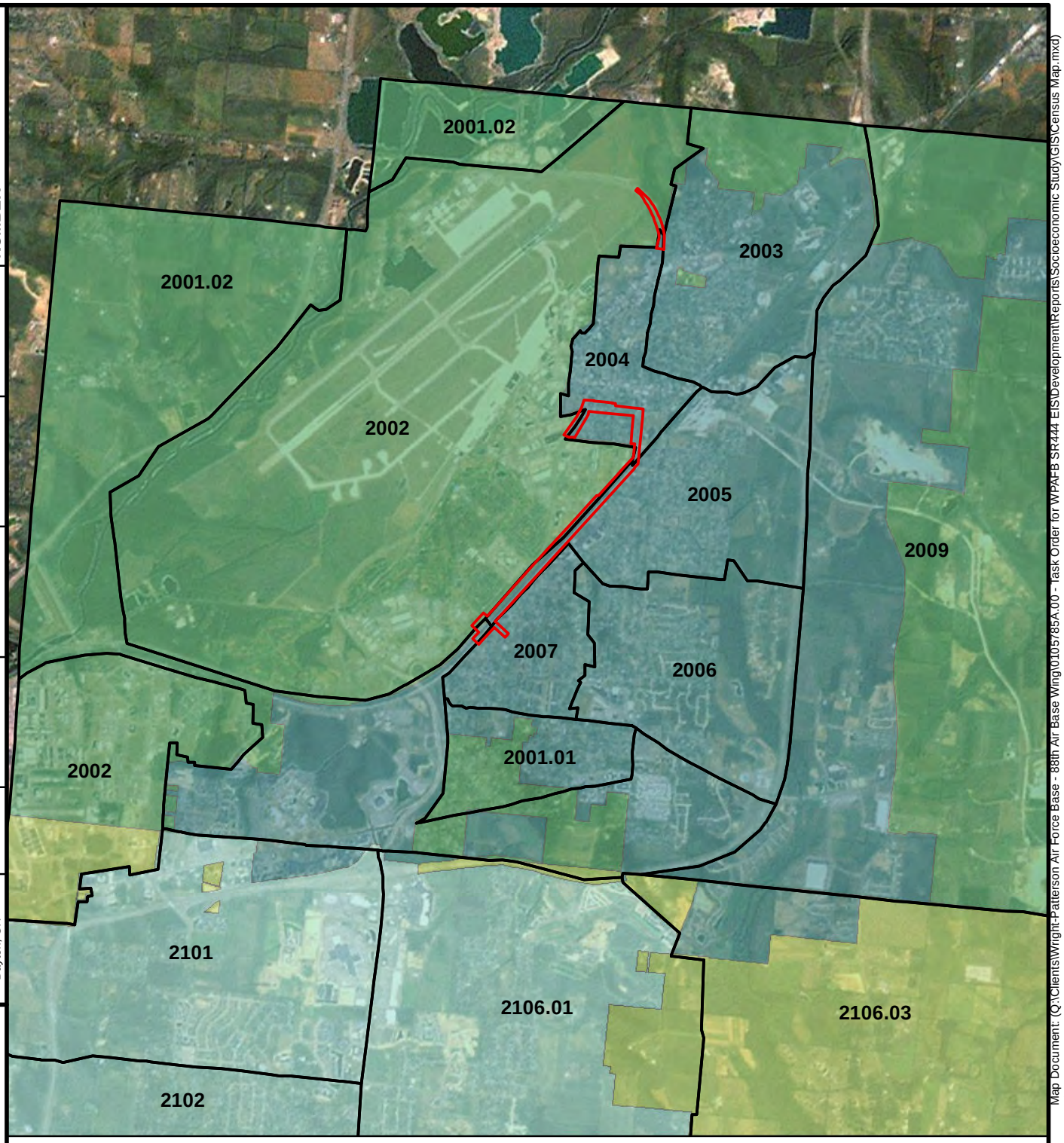
WRIGHT-PATTERSON
AIR FORCE BASE,
OHIO

Figure 5

City of Fairborn Zoning Map



OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
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Legend

- Off-Base Study Area
- Census Tract
- Bath Township
- City of Beavercreek
- Beavercreek Township
- City of Fairborn
- Xenia Township

N

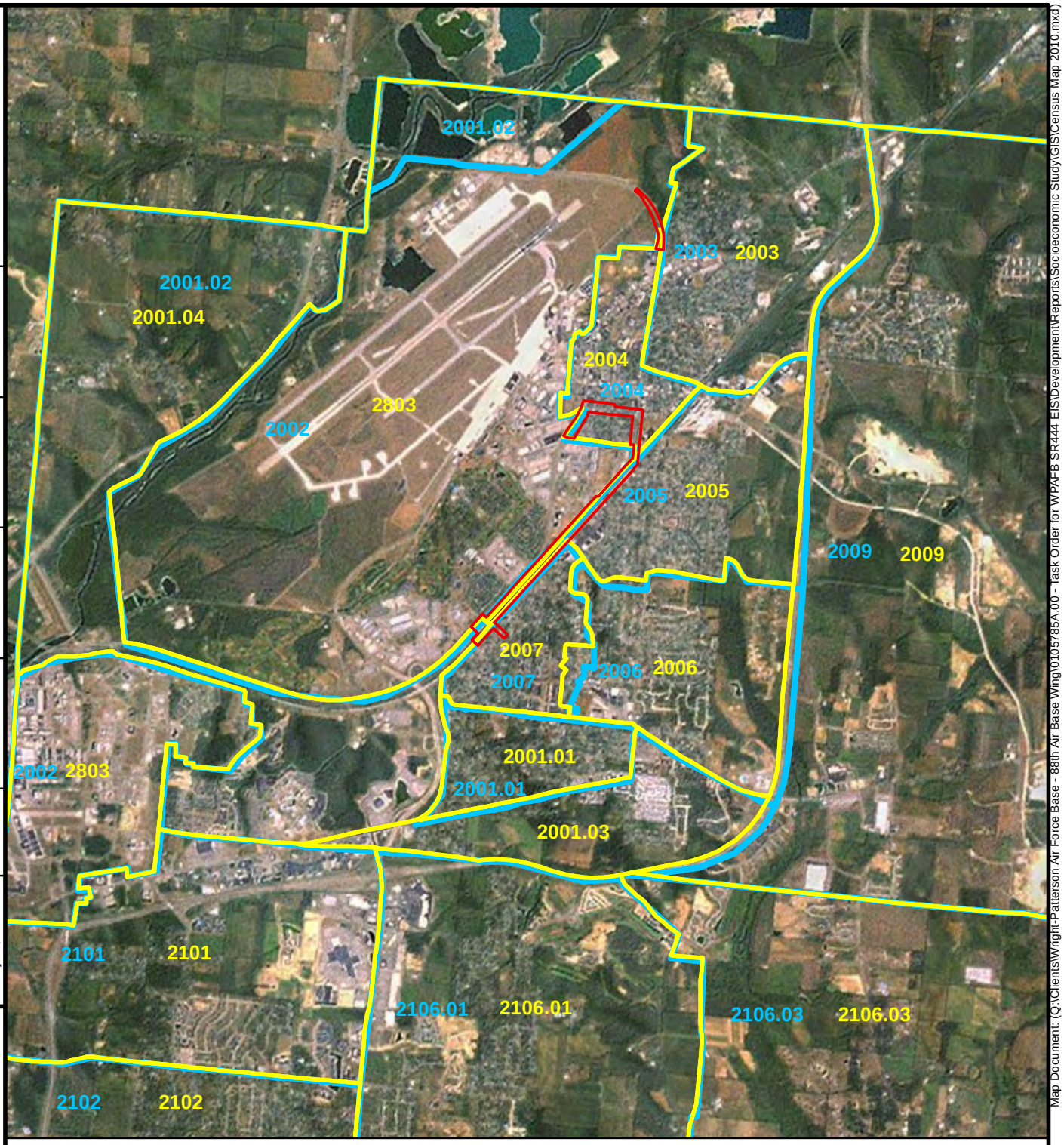
0 1,700 3,400 6,800 Feet

WRIGHT-PATTERSON
AIR FORCE BASE,
OHIO

Figure 6

Census Tracts

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Dayton, OH	4/29/2011	JKM	JKM	NAC	NAC	Census Map 2010



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Legend

- Off-Base Study Area
- 2000 Census
- 2010 Census

N

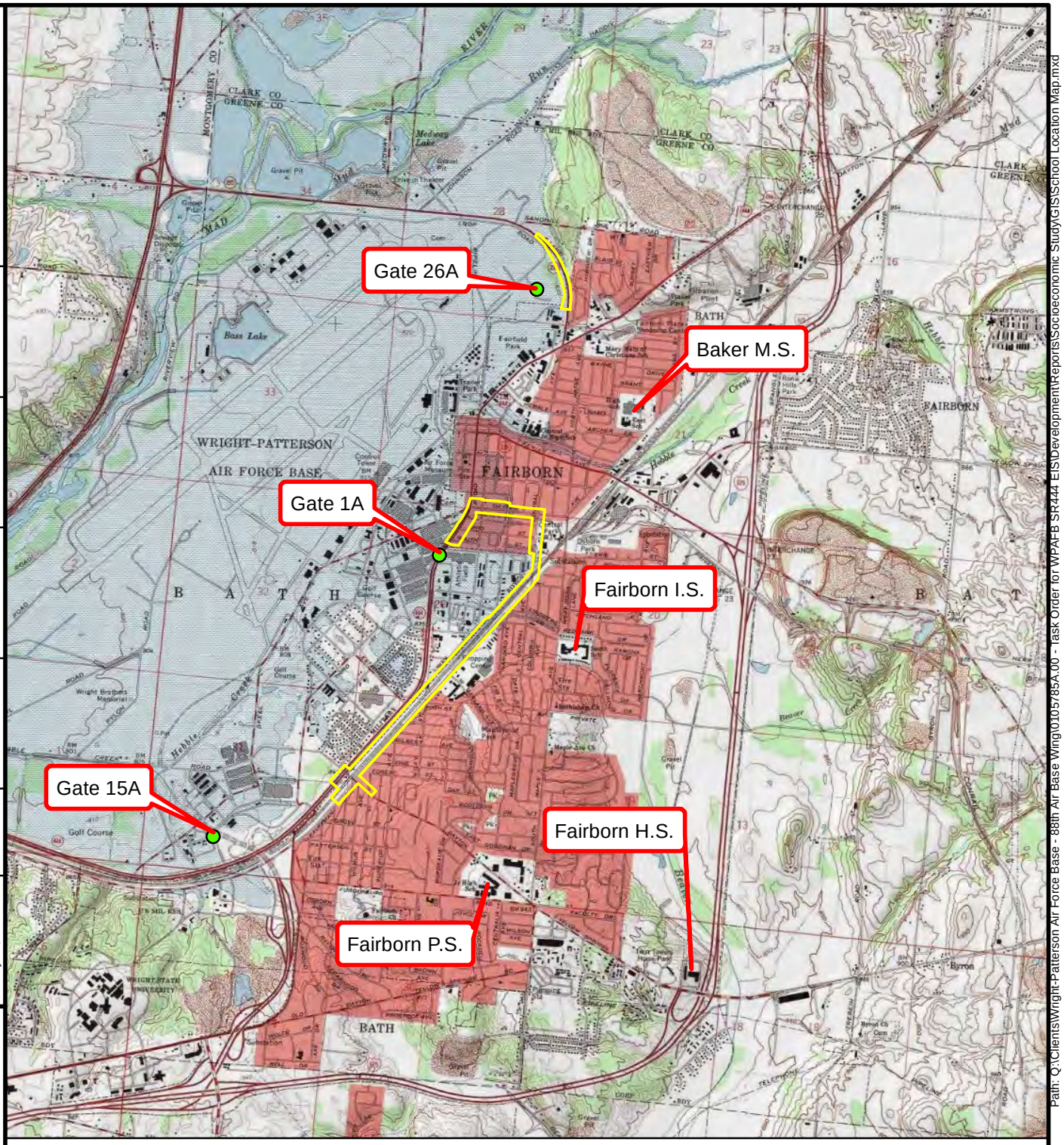
0 1,700 3,400 6,800 Feet

WRIGHT-PATTERSON
AIR FORCE BASE,
OHIO

Figure 7

Comparison of 2000 and 2010 Census Tract Geographic Areas

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Dayton, OH	4/29/2011	JKM	JKM	NAC	NAC	School Location Map



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N

0 1,000 2,000 4,000 Feet

WRIGHT-PATTERSON
AIR FORCE BASE,
OHIO

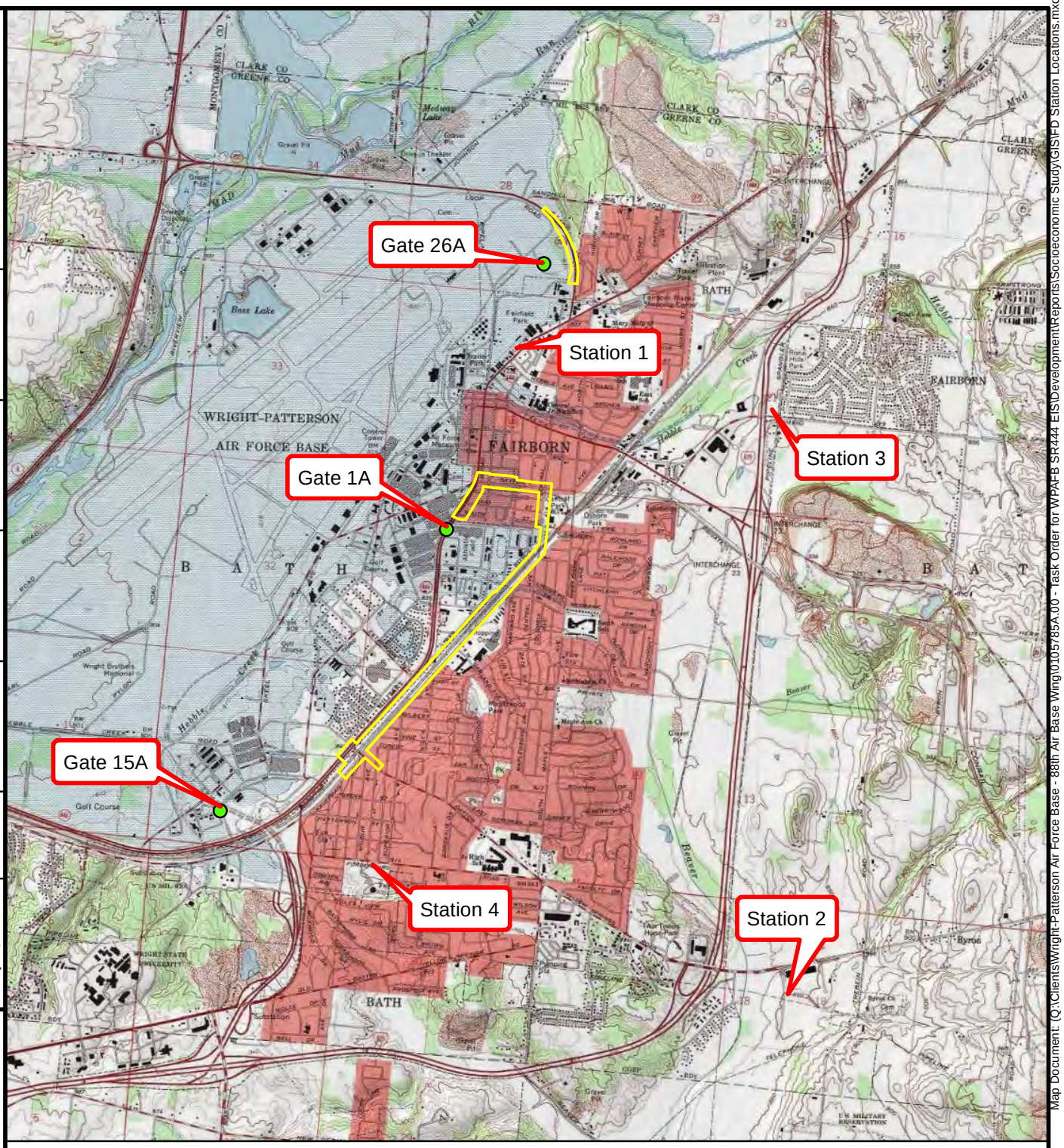
Legend

Off-Base Study Area

Figure 8

Fairborn School Locations

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Dayton, OH	4/29/2011	JKM	JKM	NAC	NAC	FD Station Locations



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N

0 1,000 2,000 4,000 Feet

Legend

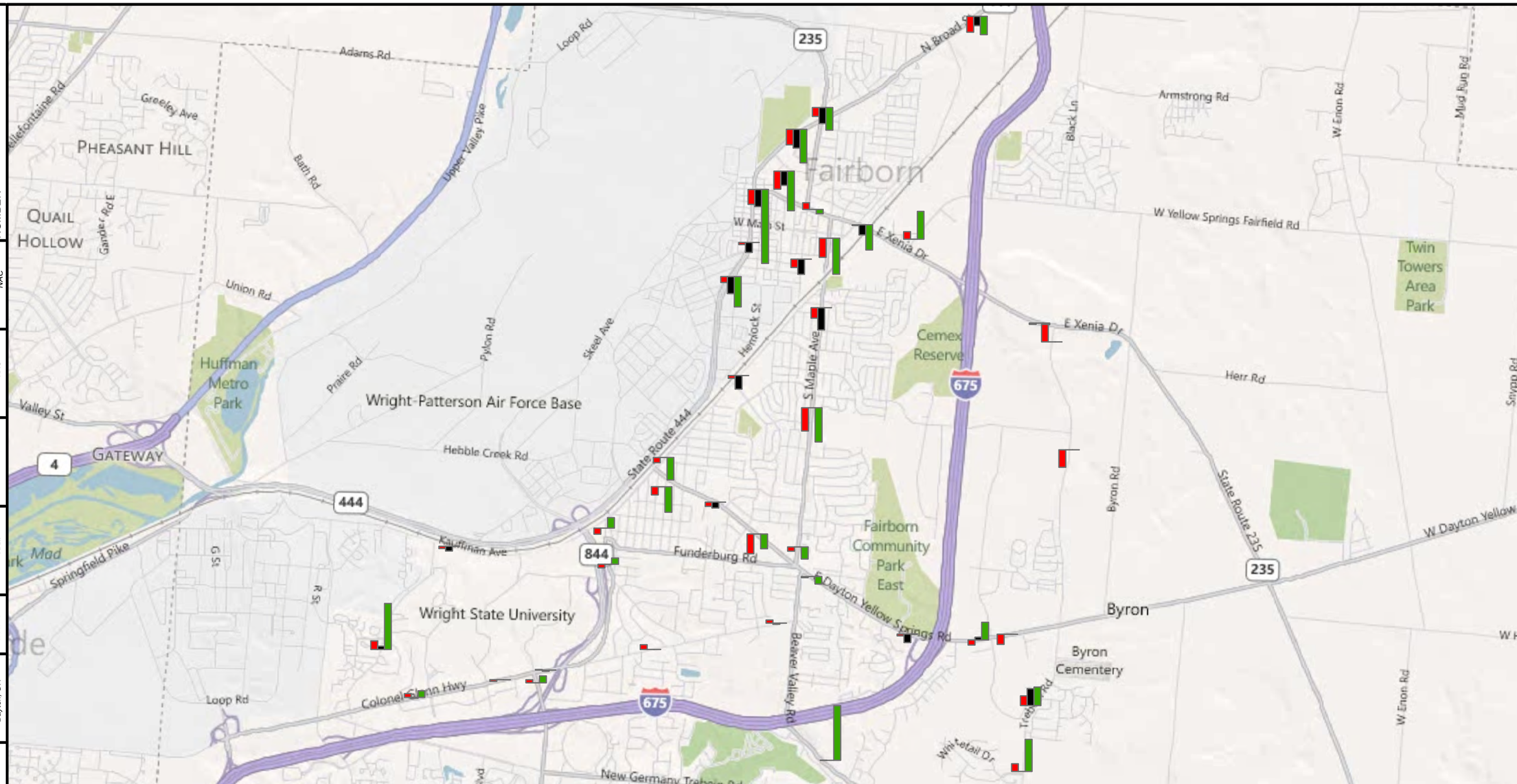
Off-Base Study Area

WRIGHT-PATTERSON
AIR FORCE BASE,
OHIO

Figure 9

Fairborn Fire Station Locations

Traffic Volume Changes	DRAWING NUMBER	APPROVED BY	CHECKED BY	DRAWN BY	DESIGNED BY	DATE	OFFICE
		NAC	NAC	KRM	KRM	8/30/2011	Dayton, OH



Legend

- 0.47
- % Change Since 2005
- % Change Since 2000
- % Change Since 1990

N

0 2,100 4,200 8,400 Feet

WRIGHT-PATTERSON
AIR FORCE BASE,
OHIO

Figure 10

Change in Traffic at Fairborn Intersections
1990 - Present

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Appendix B
Fairborn Fire Department Memo

Fairborn Fire Department

City of Fairborn ▪ 44 West Hebble Avenue ▪ Fairborn, OH 45324
Telephone: (937) 754-3080 ▪ Fax: (937) 879-2201

TO: Deborah McDonnell, City Manager

FROM: Mike Riley, Fire Chief

DATE: March 15, 2010

SUBJECT: Environmental assessment for entry control at WPAFB

COPIES: Bob Sowers, Public Administrative Services Director

We have evaluated the impact to Fire and EMS delivery to Fairborn and Bath Township as a result of the proposed entry control reconfiguration at WPAFB. Below are the applicable Fire and Emergency Medical Service standards that are relative to response times. Also included are the response time evaluations and the recommendation to reduce the increased response times.

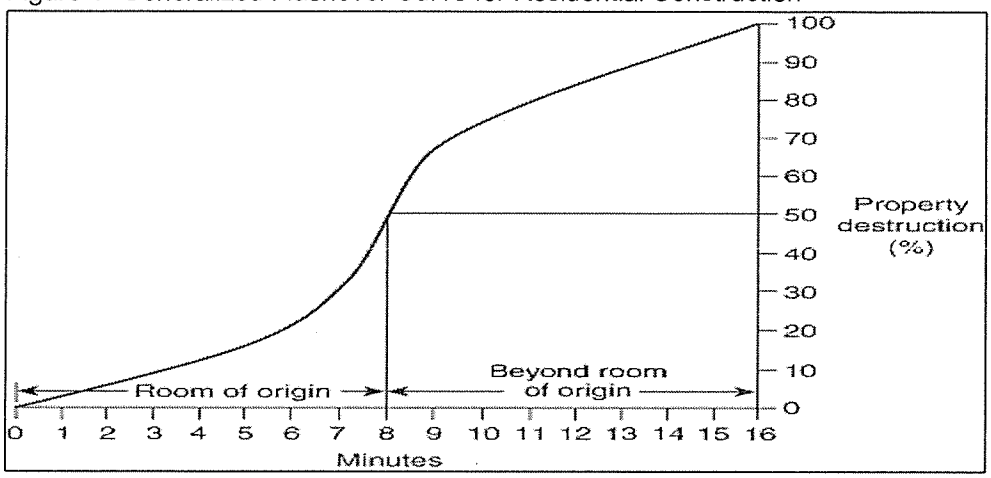
1. Response Standards

The level of resource deployment and response times for fire/rescue and emergency medical services (EMS) are important measures of effectiveness for local public safety departments and are key elements in fire/rescue and EMS planning. In defining service needs, jurisdictions consider the appropriate timely deployment of resources necessary to perform rescue and mitigate fire growth (relative to fire flashover times). Also considered are the insurance industry ratings of a community's fire suppression service and survival rates for medical patients.

a) Fire Suppression Resource Deployment

National Fire Protection Association (NFPA) 1710, Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments is the standard that applies to the deployment of resources by a fire department to emergency situations when operations can be implemented to save lives and property. The fire department's fire suppression resources shall be deployed to provide for the arrival of an engine company within a 240-second (4 minutes) travel time to 90 percent of the incidents. Additionally, the fire department shall have the capability to deploy an initial full alarm assignment within a 480-second (8 minutes) travel time to 90 percent of the incidents. This requirement is based on the flashover curve (Figure 1) for residential construction and the assembly of adequate apparatus with personnel to mitigate a structure fire.

Figure 1- Generalized Flashover Curve for Residential Construction[1]



b) Insurance Services Office (ISO)

Improved response times can lead to an improvement in the insurance industry ratings of a community's fire suppression service, with a corresponding reduction in fire insurance rates for residential and commercial property owners. ISO, through its Public Protection Classification (PPC) program, assigns insurance ratings to each community. ISO collects and evaluates information from communities on their structure fire suppression capabilities. A community's investment in fire mitigation is a proven and reliable predictor of future fire losses. In general, the price of fire insurance in a community with a good PPC is substantially lower than in a community with a poor PPC, assuming all other factors are equal. The City of Fairborn underwent a reevaluation from ISO in 2009 which resulted in an improved rating. The City's PPC rating is now a Class 3 (fewer than 100 cities in Ohio have a Class 3).
Part of the criteria evaluated to establish a community's PPC is the distribution of fire companies. The built-upon area of the city should have a first-due engine company within 1 ½ miles and a ladder- service company within 2 ½ miles.

c) Emergency Medical Services Resource Deployment

The American Heart Association (AHA) guidelines[2] recommend that anyone who is unresponsive should receive emergency care. Heart attack, cardiac arrest, stroke and choking can each cause unresponsiveness. Although many conditions — not just cardiac arrest — can cause unresponsiveness. Highly trained EMS personnel can help the heart respond to defibrillation and maintain a normal rhythm after a successful defibrillation. The AHA recommends arrival of EMS for treatment of these patients within 4 minutes.

Cardiac arrest is the sudden, abrupt loss of heart function. Sudden death (also called sudden cardiac death) occurs within minutes after symptoms appear. Early CPR and rapid defibrillation combined with early advanced care can result in high long-term survival rates for witnessed cardiac arrest. Figure 2 identifies the chances of patient survival of a cardiac arrest.

---

[1] NFPA 1710: Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments, 2010 Edition
[2] American Heart Association website: www.americanheart.org

Figure 2- Cardiac Arrest Survival Factors as a Function of Time

Time Until Defibrillation	Survival Chances
With every minute...	Chances are reduced by 7-10%
4 to 6 minutes...	Brain death
5 to 7 minutes...	30% to 40 % chance of survival
After 8 minutes...	Little chance of survival

2. Responses from Station 1

Apparatus from Station 1 respond south on State Route 444 to Fire and EMS calls for service located in the west section of south Fairborn, including Wright State University. The closing of State Route 444 between Dayton Dr. and Dayton Yellow Springs Rd. will cause apparatus responses to be rerouted south via Central Ave. or Maple Ave.

There is the potential for responding apparatus to be delayed at the Norfolk/Southern rail crossing on Central Ave. An average of twenty (20) 12,000 feet long trains passes through the City each day. This represents a possible three to four minute delay at the rail crossing. Apparatus stopped by a train must both turn around (if possible) and use Maple Ave., since it is the only other north/south corridor with an overpass. Maple Ave. also has a school zone at Fairborn Intermediate School.

Additionally, emergency apparatus must come to a complete stop at all red lights, ensure opposing traffic has yielded and then may proceed on the response. This increases the response time by roughly 15 seconds per red light.

a) Impact: Station 1 Response Times

Response times were evaluated (figure 3) for the above mentioned corridors from Station 1 to Dayton Yellow Springs Road (DYS). Travel time was measured without traffic signal delays and travel speed within posted speed limits.

Figure 3- Response times from Station 1 to Dayton Yellow Springs Rd.

From Station 1 (465 N. Broad) to:	Travel time	Travel distance	Traffic signals	Max travel time due to signal delay	Travel time due to train delay
N. Broad to 444 to DYS	3 min. 50 sec.	2.3 miles	9[3]	5 min. 50 sec.	N/A
N. Broad to Hebble to Central to Kauffman to DYS	4 min. 45 sec.	2.7 miles	8	6 min. 45 sec.	7 min. 45 sec. to 8 min. 45 sec.
N. Broad to Hebble to Central to Dayton to Maple to Garland to DYS	7 min. 00 sec.	3.5 miles	10	9 min. 0 sec.	N/A

Increased travel distance extends response times from 55 seconds to 3 minutes and 10 seconds, depending on the need to reroute due to a train. Signalized intersections have the potential to add an additional 2 minutes and 55 seconds to 4 minutes and 15 seconds to response times.

[3] Signal at gate 39C is flashing yellow.

The range of increased response times from Station 1 is between 55 seconds and 5 minutes, 10 seconds. This increase exceeds the AHA and NFPA recommended response times.

3. Responses from Station 4

Apparatus from Station 4 respond to calls for service located in the west section of north Fairborn and Bath Township. Response times were evaluated (figure 4) from Station 4 to Dayton Dr. at Gate 1C. Situations mentioned above related to Station 1 also apply to Station 4. Alternate routes north will be utilized with the closing of SR 444. Travel distance, rail crossings and traffic signals will increase response times to the north.

a) Impact: Station 4 Response Times

Response times were evaluated for north bound corridors (figure 4) from Station 4 to Gate 1C. Travel time was measured without traffic signal delays and travel speed within posted speed limits.

Figure 4- Response times from Station 4 to Gate 1C at Dayton Dr.

From Station 4 (444 W. Funderburg Rd) to:	Travel time	Travel distance	Traffic signals	Max travel time due to signal delay	Travel time due to train delay
Montgomery Ave. to Kauffman Ave. to DYS to 444 to Gate 1C	4 min. 07 sec.	2.2 miles	6[4]	5 min. 37 sec.	7 min. 07 sec. to 8 min. 07 sec.
Montgomery Ave. to Kauffman Ave. to Dayton Dr. to Gate 1C	5 min. 04 sec.	2.9 miles	5	6 min. 19 sec.	N/A
Montgomery Ave. to Kauffman Ave. to Pearl to Maple Ave. to Dayton Dr. to Gate 1C	6 min. 30 sec.	3.5 miles	5	7 min. 45 sec.	N/A

Increased travel distance extends response times between 57 seconds and 2 minutes and 23 seconds, depending on the need to reroute due to a train. Signalized intersections have the potential to add an additional 1 minute and 30 seconds to 2 minutes and 12 seconds to response times.

The range of increased response times from Station 4 is between 57 seconds and 3 minutes and 38 seconds. This increase exceeds the AHA and NFPA recommended response times.

4. Responses from Stations 2 and 3

Station 2 is located in the south east section of the city at 2200 Commerce Center Blvd. Station 3 is located in the north east section of the city at 1000 Yellow Springs Fairfield Rd. It is unlikely response times at Station 2 or 3 will be affected by the closure of State Route 444 from this station.

[4] Signal at gate 39C is flashing yellow.

5. Wright Patterson Medical Center (WPMC)

WPMC is the closest medical facility to the City of Fairborn. Medics routinely transport non–critical and critical patients to WPMC's emergency room in accordance with the Greater Miami Valley Emergency Medical Service Council (GMVWMSC) protocol. Patients transported between 2006 and 2009 are below (Figure 5):

Figure 5- Patients transported to WPMC

Year	Number of Transports
2009	171
2008	160
2007	199
2006	188

Gate configuration changes and traffic congestion may increase the response time from the location of the call for service to WPMC's emergency room.

6. Recommendations

The increased response times can be reduced by managing the signalized intersections. The National Highway Traffic Safety Administration performed a study on Traffic Signal Preemption in 2006[5]. This study revealed an average of 20% reduction in response times due to TSP. TSP systems are designed to give emergency response vehicles a green light on their approach to a signalized intersection while providing a red light to conflicting approaches. The benefits of using TSP include improved response time and improved safety.

The north and south corridors that serve as primary and secondary alternate routes to State Route 444 should be equipped with Traffic Signal Preemption (TSP) to offset the increased response times.

[5] Paniati and Amoni (2006):Traffic Signal Preemption for Emergency Vehicles "A cross Cutting Study"

Appendix G

Environmental Data Resources DataMap

Note: **The *Environmental Data Resources DataMap* has been published separately from the Draft EIS and will be available in the WPAFB Administrative Record (copy included on cd in front pocket of three-ring binder).**

Appendix H

Traffic Analysis

TRAFFIC ANALYSIS

Environmental Impact Statement for Entry Control Reconfiguration and Base Perimeter Fence Relocation, Area A
Wright-Patterson Air Force Base, Ohio

Prepared For:
88th Air Base Wing
Wright-Patterson Air Force Base

Prepared By:
LJB Inc.

May 31, 2011

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Figure 2 WPAFB and Surrounding Communities

Figure 3 Off-Base Study Area

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Figure 5 Gate 15A

Figure 6 Gate 26A

Figure 7 Hourly Distribution of Volumes

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B Traffic Volume Plates

C Highway Capacity Analysis

1 INTRODUCTION

The purpose of the Wright-Patterson Air Force Base (WPAFB or the Base) entry control reconfiguration project is to improve WPAFB security to meet current Air Force anti-terrorism standards as defined by the SDDCTEA Pamphlet 55-15 (latest version) and the minimum standards per UFC 4-010-01 "DoD Minimum Antiterrorism Standards for Buildings." In addition to an increase in security, improvements will include better management of resources and security personnel by reducing the overall number of Entry Control Facilities (ECFs) at WPAFB.

Area A is currently served by a total of nine ECFs. The total number of ECFs serving Area A will be reduced to the following three:

- Gate 15A at the south end of Area A in line with State Route (SR) 844 would serve as the primary ECF and would operate 24 hours per day.
- Gate 1A on the northeast side of Area A south of the Broad Street and Dayton Drive intersection would serve as a secondary ECF operating generally during normal business hours.
- Gate 26A would be relocated south of its existing location off SR 235 and would serve as the new truck inspection ECF operating generally during normal business hours.

The reduction of ECFs requires the Kittyhawk Center to become contiguous with the remainder of Area A. The closure of SR 444 between Dayton-Yellow Springs Road and Dayton Drive to through traffic would be included as part of the changes to the ECF location and configuration.

The project is located at WPAFB Area A and in the adjacent city of Fairborn in Greene County, Ohio, as shown in **Figure 1**, the County Location Map and **Figure 2**, WPAFB and Surrounding Communities, within **Appendix A**. The off-Base roadways studied for this project are shown in red on the Off-Base Study Area map, **Figure 3** of **Appendix A**.

1.1 EXISTING CONDITIONS

The transportation network serving the Base include SR 4, SR 844, SR 444, and SR 235, which all are classified as principal urban arterials and listed on the Federal Highway Administration (FHWA) National Highway System. These arterials connect the Base to Interstates 675 (I-675), I-75, and I-70, providing the installation with critical surface transportation access in all directions.

The on-Base street network in Area A provides access and traffic circulation to a number of land uses including residential, commercial, industrial, and medical uses. Area A currently serves the following uses:

- Air Force Materiel Command headquarters (Bldg 262/ 266)
- Office, research, and communication facilities
- Residential facilities (Brick Quarters, Temporary Lodging Facilities)
- Wright-Patterson Club and Banquet Center (Bldg 800)

- Hope Hotel is located outside the secured perimeter of the Base and serves as a regional meeting facility
- Prairie Trace Golf Course
- Wright-Patterson AFB Medical Center (Bldg 830)
- National Air and Space Intelligence Center (NASIC) (Bldgs 856/ 828/ 829)

Due to the high density of office space located within Area A, the area contains large parking facilities that provide approximately 4,350 spaces with an occupancy rate estimated at 90 percent during peak operating hours. Area A can be accessed from four existing locations:

- Primary ECF at Gate 12A – 2,490 parking spaces
- Secondary ECF at Gate 15A – 1,860 parking spaces
- Limited use (commercial vehicle) ECF at Gate 16A. This gate also serves as the public access to Huffman Prairie Flying Field, Twin Base Golf Course, and Rod and Gun Club
- Limited use (pedestrian) ECF at the southwest corner of the Air Force Materiel Command headquarters (Bldg 262/ 266)

The Kittyhawk Center primarily contains airfield operations, residential, office, medical, commercial, and warehousing facilities that serve the 445th Airlift Wing and the 88th Air Base Wing. The Kittyhawk Center includes recreational facilities and other commercial uses, and is currently separated from the rest of Area A by SR 444. The Kittyhawk Center is adjacent to residential land use in the city of Fairborn. Access to the Kittyhawk Center is possible at three locations:

- Secondary ECF at Gate 1A – 5,200 parking spaces
- Secondary ECF at Gate 26A – 1,000 parking spaces
- Primary ECF at Gate 38A – 2,500 parking spaces

1.2 TRAFFIC VOLUMES

Traffic volume data within the project area was collected to evaluate the existing traffic patterns near WPAFB as part of the *Areas A and C Entry Control Traffic Study, Wright-Patterson AFB,* March 2009. Volume data was collected in the form of AM and PM peak hour manual turning movement counts at a total of 25 intersections in the vicinity of WPAFB – nine of the intersections were located on-Base:

- State Route 844 at Ogden Road
- Skeel Avenue at Communications Boulevard (on-base)
- Skeel Avenue at Hebble Creek Road (on-base)
- Skeel Avenue at San Antonio (on-base)
- Skeel Avenue at Wright Avenue (on-base)

- Wright Avenue at Pearson Road (on-base)
- Wright Avenue at Schuster Road (on-base)
- Wright Avenue at Allbrook Drive (on-base)
- Chidlaw Road at Spruce Way (on-base)
- Douglas Road/Loop Road at Gate 26A/Medway Road (on-base)
- State Route 235 (Central Avenue) at Gate 26A/Medway Road
- State Route 444 at Gate 16A
- State Route 444 and SR 844 Southbound On/Off Ramp
- State Route 444 and SR 844 Northbound Off Ramp
- State Route 444 at Gate 12A
- State Route 444 at Dayton-Yellow Springs Road
- State Route 444 at Gate 38A
- State Route 444 at Gate 1A/Dayton Drive
- Dayton Drive at Central Avenue
- Kauffman Avenue and West Garland Avenue
- Kauffman Avenue and Dayton-Yellow Springs Road
- Kauffman Avenue at Colonel Glenn Highway
- Colonel Glenn Highway at University Boulevard
- SR844 Northbound ramp at University Boulevard
- SR844 Southbound ramp at University Boulevard

In addition to the collection of traffic volumes, origin-destination (OD) information was collected to document the existing travel patterns to and from WPAFB. The OD analysis was conducted on July 26, 2006 from 6 AM to 6 PM to capture trips throughout the AM, midday, and PM peak periods. The OD analysis was limited to SR 444 between Dayton Drive to SR 844. These survey stations were located where roadways intersected the OD analysis boundary (or external cordon line).

Examination of the traffic data collected in 2006 reveals two periods of time that are consistently larger than other times of a typical day. The graphs in **Figure 7** show large spikes of activity at normal commute times. Although Gate 1A (**Figure 7A)** shows significant, bi-directional activity at noon as workers leave and return on their lunch hour, other gates (**Figures 7B** and **7C**) have much larger spikes in the morning and evening peak hours. These other gates are more consistent with the expected travel patterns of metropolitan areas with the PM peak being larger and the AM peak the second largest volume. Because of the need to consider the roadway system as a whole and include both base and non-base related traffic, the more typical pattern shown in the other gates will be utilized for further analysis.

The process to develop traffic volume projections started with the 2006 volumes. The existing volumes were separated into background traffic and WPAFB related traffic. The background volumes were then increased to 2010 and 2032 values using the growth rates coordinated with the

Ohio Department of Transportation (ODOT) Office of Technical Services. For SR 444 related traffic, the growth rate was a linear 1.25 percent per year. For Kauffman Avenue traffic, the growth rate was a liner 0.5 percent per year. The background traffic was increased using these values and then combined with existing WPAFB traffic to create No Build traffic plates for 2010 and 2032 for both the AM and PM peak hours.

> The **No Build** scenario is defined as the condition where the existing roadway network remains unchanged.

The closure of SR 444 between Dayton-Yellow Springs Road and Dayton Drive to traffic would displace through traffic that is not entering WPAFB and would divert traffic to new ECF locations. It has been assumed that traffic would divert to the nearest arterial roads that connect the two ends of the closed segment of SR 444. The resulting route, from southwest to northeast, travels from SR 444 along Dayton-Yellow Springs Road, Kauffman Avenue, Central Avenue and Dayton Drive to return to SR 444; it will be referred to as the diversion route.

It is expected that ODOT will designate a revised SR 444 for future use, and that the revised route may follow a different alignment than that assumed for this discussion. Information obtained from Fairborn city officials, the Fairborn Thoroughfare Plan, and from resident comments during the public scoping meetings indicates a strong preference for shifting SR 444 to Kauffman Avenue at the current intersection of the two roads, south of the current project study area. This stated preference is consistent with assumptions made to future traffic assignments to the existing network.

The traffic volume and OD information collected during peak periods were also used to reassign background and WPAFB related traffic to the roadway network for the Design Year 2032 Build alternative.

> The **Build** scenario is defined as the condition where SR 444 is closed between Dayton-Yellow Springs Road and Dayton Drive. Gate 26A is also converted to become the commercial truck access to Area A. No additional capacity improvements are defined as part of this analysis for the roadway network outside of WPAFB property.

Additional traffic attributed to WPAFB growth was added to the volume plates at the following locations for the Build condition:

- 125 vehicle increase in volume at Gate 1A
- 500 vehicle increase at Gate 15A and Gate 1A (majority utilizing Gate 15A) to account for NASIC expansions
- 150 vehicle increase at Gate 15A and Gate 1A to account for changes in housing distribution on and off Base
- Relocation of Gate 26A and closure of the current truck inspection area at Gate 16A.

The volume plates for the various Build and No Build scenarios are included in **Appendix B.**

2 OFF-BASE CAPACITY ANALYSIS

An operational capacity analysis was conducted for Build and No Build alternatives to evaluate operational feasibility. These analyses were based on the traffic volumes that were reassigned to the roadway network and were conducted for a limited number of signalized intersections in the study area. The analysis was conducted for both the AM and PM peak hours of operations using *2000 Highway Capacity Manual* (HCM) methodologies as applied by Synchro version 6.0. The analyses determined the Level of Service (LOS) for four critical intersections within the study area:

1. Dayton Drive and Gate 1A
2. Dayton Drive and Central Avenue
3. Dayton-Yellow Springs Road and Kauffman Avenue
4. Dayton-Yellow Springs Road and SR 444

Operational results are typically reported in terms of average delay (seconds per vehicle) and the intersection level of service (LOS). Year 2032 was identified as the design year in the study. Under American Association of State Highway and Transportation Officials (AASHTO) criteria, a design year traffic volume of at least 20 years in the future is recommended to avoid under-design of capacity improvements. **Table 1** below describes each signalized intersection LOS by average control delay per vehicle and its characteristics. LOS is reported for the average intersection conditions.

Table 1: Signalized Intersection Level of Service Descriptions

Level of Service	Average Control Delay Per Vehicle (sec)	Characteristics
A	≤ 10	Very low delay. Occurs when progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all.
B	> 10 and ≤ 20	Occurs with good progression and/or short cycle lengths. More vehicles stop than for LOS A.
C	> 20 and ≤ 35	Higher delays result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear in this level. Significant numbers of vehicles stop although many still pass through the intersection without stopping.
D	> 35 and ≤ 55	Longer delays may result from unfavorable progression, long cycle lengths and/or high volume to capacity (v/c) ratios. Many vehicles stop and the proportion of vehicles not stopping declines.
E	> 55 and ≤ 80	Considered to be the limit of acceptable delay, these high delay values generally indicate poor progression, long cycle lengths and high v/c ratios. Individual cycle failures are frequent occurrences.
F	> 80	Considered to be unacceptable to most drivers, this condition often occurs with over-saturation. It may also occur at high v/c ratios below 1.00 with many individual cycle failures.

The output from the capacity analyses is summarized below in **Table 2: Capacity Analysis Summary**. **Table 2** contains the LOS and delay (in seconds per vehicle) for the selected intersections.

Table 2: Capacity Analysis Summary – AM Peak Hour & PM Peak Hour

Intersection	Operation	LOS / Delay (seconds/vehicle)*		
		2010 No Build	2032 No Build	2032 Build
AM Peak Hour				
Dayton-Yellow Springs Road & Kauffman Avenue	Signalized	B / 17.6	C / 29.3	F / 141.9
Dayton-Yellow Springs & State Route 444	Signalized	B / 14.6	C / 22.3	Free Flow
Dayton Drive & Central Avenue	Signalized	B / 14.3	C / 23.3	F / 84.8
Gate 1A & State Route 444	Signalized	C / 28.0	D / 33.6	C / 21.0
PM Peak Hour				
Dayton-Yellow Springs Road & Kauffman Avenue	Signalized	B / 19.6	C / 31.3	F / 180.8
Dayton-Yellow Springs & State Route 444	Signalized	B / 13.8	C / 24.2	Free Flow
Dayton Drive & Central Avenue	Signalized	B / 17.5	C / 25.0	F / 163.2
Gate 1A & State Route 444	Signalized	B / 18.4	C / 29.0	C / 26.8

* LOS = Level of Service / Average vehicle delay (seconds per vehicle)

The capacity analysis of selected intersections shows acceptable levels of service and delay during the AM and PM peak hours. An acceptable level of service is typically considered to be an LOS D in an urban area.

The Build scenario in the Design Year projects the Dayton Drive/Central Avenue and the Kauffman Avenue/Dayton-Yellow Springs Road intersections to operate at LOS F. As discussed in the draft WPAFB Entry Control Reconfiguration Environmental Assessment prepared by LJB, Inc. in 2010, improvements to the existing streets would be required to accommodate design year traffic volumes. Local jurisdictions would work with ODOT to complete roadway capacity improvements and maintain current bicycle and pedestrian facilities. The conceptual alternatives found in the March 2009 Areas A and C Entry Control Traffic Study prepared by LJB Inc. are possible options that may be used to develop a preferred alternative.

There are two operational issues which cannot be evaluated by capacity analyses: the effects of the at-grade rail crossing on Dayton-Yellow Springs Road and the ability to access side streets from Dayton Drive, Central Avenue, South Street and Broad Street. These issues are discussed below.

The alternate traffic route would direct traffic across two at-grade rail crossings along a rail line that is projected to see rail traffic increase from 20 to 40 trains per day in the next 10 years. One of the two crossings is located on a short stretch of road bound by two signalized intersections, and safety at this crossing relies on drivers to avoid stopping on the tracks. One signal is under

the city of Fairborn's control while the other is under ODOT's jurisdiction. These two signals are not coordinated nor are both interconnected to the railroad preemption circuit. Under these conditions, the existing potential for accidents is high while the Build condition increases this potential by virtue of increased vehicular traffic across the rail crossing. However the Build condition reduces the potential for accidents by removing one of the signals that could cause drivers to stop on the tracks, thereby reducing the potential by half or more as traffic would only be backing up in one of the two directions of travel.

Traffic accessing the Fairborn YMCA, Central Park and the residential area bound by Dayton Drive, Central Avenue, South Street and Broad Street via a left turn may experience access difficulties during high volume traffic. Vehicles would have to wait for gaps in traffic in order to access driveways and non-signalized intersections. To reduce accidents and operational problems, left turn lanes may be considered by local jurisdictions contemplating roadway capacity improvements. West-end closures on Greene Street, Ohio Street and South Street near Broad Street would eliminate neighborhood cut-through traffic and reduce speeds in the residential areas, increasing neighborhood safety.

Appendix C provides analysis output for all intersections evaluated.

3 ECF RELATED IMPROVEMENTS

Improvements to the operations of ECFs under the Build alternative are expected to reduce delays, enhance ATFP requirements, and provide additional vehicle storage at the ECFs. The improvements will reduce the potential for traffic that is attempting to enter the Base from queuing onto local streets and disrupting on street travel. Therefore, the proposed improvements at the ECFs are expected to have a positive effect on the areas in the immediate vicinity of the ECFs in the Build alternative.

3.1 GATE 1A

Gate 1A would be completely reconfigured and relocated. Traffic accessing Gate 1A would enter from the north through the intersection of Broad Street and Dayton Drive as shown on **Figure 4** in **Appendix A**. Three off-Base local streets would have their direct access to SR 444 removed to prevent conflicts with the Approach Zone for Gate 1A and prevent cut-through traffic on the local street network:

- Greene Street
- Ohio Street
- South Street

These three local streets would be terminated where the new Gate 1A would be constructed. The city of Fairborn may choose to design cul-de-sacs at the new termini. A cul-de-sac would be designed to permit large vehicles such as trash trucks, furniture delivery trucks, school buses and fire engines common to residential areas to turn around at the end of a dead-end street. Access to the residential neighborhood would be maintained via Second Street and other points along Dayton Drive and Central Avenue. These changes would effectively avoid a common complaint in residential areas by discouraging local streets from becoming attractive cut-through routes.

Looking at the on-Base roadway network, the Gate 1A relocation would remove traffic from Wright Avenue and shift traffic to Schuster Avenue. Schuster Avenue would be widened from Wright Avenue to SR 444. Schuster Avenue would become a collector roadway for Area A and the through movement at the Wright Avenue/Schuster Avenue intersection. The Build alternative would realign Schuster Avenue as a through-street with Wright Avenue and provide a direct route from Gate 1A to Skeel Avenue via Schuster Avenue. Adjacent roadways potentially affected from the relocation of Gate 1A and widening of Schuster Avenue include: Pearson Road, Talbott Road, Oak Street, Estabrook Road, Schlatter Road, and Spruce Way.

3.2 GATE 15A

Gate 15A would remain in the vicinity of its existing location but be completely reconfigured. The new alignment would maintain the width of the median of SR 844 and extend the roadway past Communications Boulevard. Gate 12A could be converted to a ceremonial access gate. The Ogden Avenue access from SR 844 would be closed with traffic rerouted north along SR 844 to Gate 12A. In addition, the intersection of Davis-Monthan Road and SR 844 would be signalized enabling traffic leaving the visitor center to access SR 444. Roadways potentially affected from the reconfiguration of Gate 15A include: Chidlaw Road, Hebble Creek Road, Kuglics Boulevard, Skeel Avenue, and Warner Robins Street.

The newly constructed Veterinary Clinic on Communications Boulevard would not be adversely affected by the construction of Gate 15A. The limits of the gate's impact would cause a driveway

to be reconstructed; however, the building and parking lot could remain unchanged. The location of this building and parking lot are shown on **Figure 5** in **Appendix A.** Other improvements associated with the gate reconfiguration are listed below:

1. Extend the roadway section past Communications Boulevard. Add two horizontal curves to manage threat speeds. Remove direct access from Gate 15A to Communications Boulevard.

2. Construct a new Ramp J to parallel Ramp K and provide direct access from SR 444 to Gate 15A. Form an add lane on SR 844 to avoid the need for a merge and to provide AM peak hour capacity.

3. Convert part of Ogden Avenue for access to a future Visitor Center and the POV inspection area. Close the Parking Lot 1A from Ogden Avenue that accesses SR 844 and construct dual left turn lanes at the Gate 12A/Ogden Avenue intersection with SR 444.

4. Signalize the Davis-Monthan Road and SR 444 intersection. Extend the northbound left turn lane to 55 mph standards.

5. Construct a northbound left turn lane on SR 444 and SR 844 northbound exit ramp intersection.

6. Construct a modern roundabout at the Skeel Avenue at Hebble Creek Road intersection with dual northbound right turn lanes and dual westbound left turn lanes. Widen the east leg of Hebble Creek Road to four lanes.

7. Dedicate limited access right of way to WPAFB for gate and fence installation.

Off-Base improvements are defined based on the analysis contained in the traffic study completed by LJB Inc. in March 2009.

3.3 GATE 26A

Gate 26A would also be relocated and reconfigured as shown in **Figure 6** in **Appendix A**. The new location of Gate 26A would access SR 235 north of Circle Drive and would serve as the new commercial vehicle inspection area for the Base (relocated from Gate 16A). A 14-stall parking field is proposed to be located on Base property adjacent to Gate 26A to store trucks awaiting inspection. Mr. Fred Tito, 88 Civil Engineer Division Design Manager, indicated that commercial truck traffic at the Base generally peaks at 6 AM, with truck drivers timing their arrival to coincide with the opening of the truck inspection gate, and that the holding area will be designed with sufficient capacity to manage this peak. Roadways potentially affected include Central Avenue, Circle Drive, and Loop Road.

Improvements may include the addition of an auxiliary left turn lane on SR 235 and signalization of the Gate 26A and Central Avenue intersection, as well as interconnecting this signal with Central Avenue and Broad Street. Off-Base improvements are defined based on the analysis contained in the traffic study completed by LJB Inc in March 2009.

4 SUMMARY

The WPAFB ECF reconfiguration and perimeter fence relocation project would have a number of positive and negative impacts on traffic conditions in the project's off-Base study area.

- The changes would reduce or eliminate impacts on local traffic that might otherwise be caused by back-ups at WPAFB ECFs during times of high volume and increased security, thereby increasing safety by reducing conditions that might cause accidents.

- The changes would divert traffic that previously followed SR 444 between Dayton-Yellow Springs Road and Dayton Drive to local streets. Projected traffic volumes for the design year (2032) may cause significant delays at some intersections along the alternate route, increasing the potential for accidents but decreasing the average speed, and therefore the severity, at which those accidents are likely to occur.

- The alternate traffic route would direct traffic across two at-grade rail crossings along a rail line that is projected to see traffic increase from 20 to 40 trains per day in the next 10 years. One of the two crossings is located on a short stretch of road bound by two signalized intersections, and safety at this crossing relies on drivers to avoid stopping on the tracks. Under these conditions, the potential for accidents is increased by the project. The Build condition reduces the potential for accidents by removing one of the signals that could cause drivers to stop on the tracks.

- Traffic accessing the Fairborn YMCA, Central Park and the residential area bound by Dayton Drive, Central Avenue, South Street and Broad Street via a left turn may experience access difficulties during high volume traffic. West-end closures on Greene Street, Ohio Street and South Street near Broad Street would eliminate cut-through traffic, increasing neighborhood safety.

- Because SR 444 is part of the NHS, procedures defined at 23 CFR 470 Subpart A must be followed to make a change to the route. The procedures would likely include coordination with city of Fairborn officials as representatives of the local government and with WPAFB officials as representatives of an area under Federal jurisdiction.

5 REFERENCES

Fairborn City Council and Fairborn Planning Board. Fairborn Thoroughfare Plan. August 2003.

Federal Railroad Administration. Accident/Incident Reports for Rail Crossings 527809G and 527810B. Available at http://safetydata.fra.dot.gov/OfficeofSafety/PublicSite/Crossing/Crossing.aspx . Downloaded April 22, 2011.

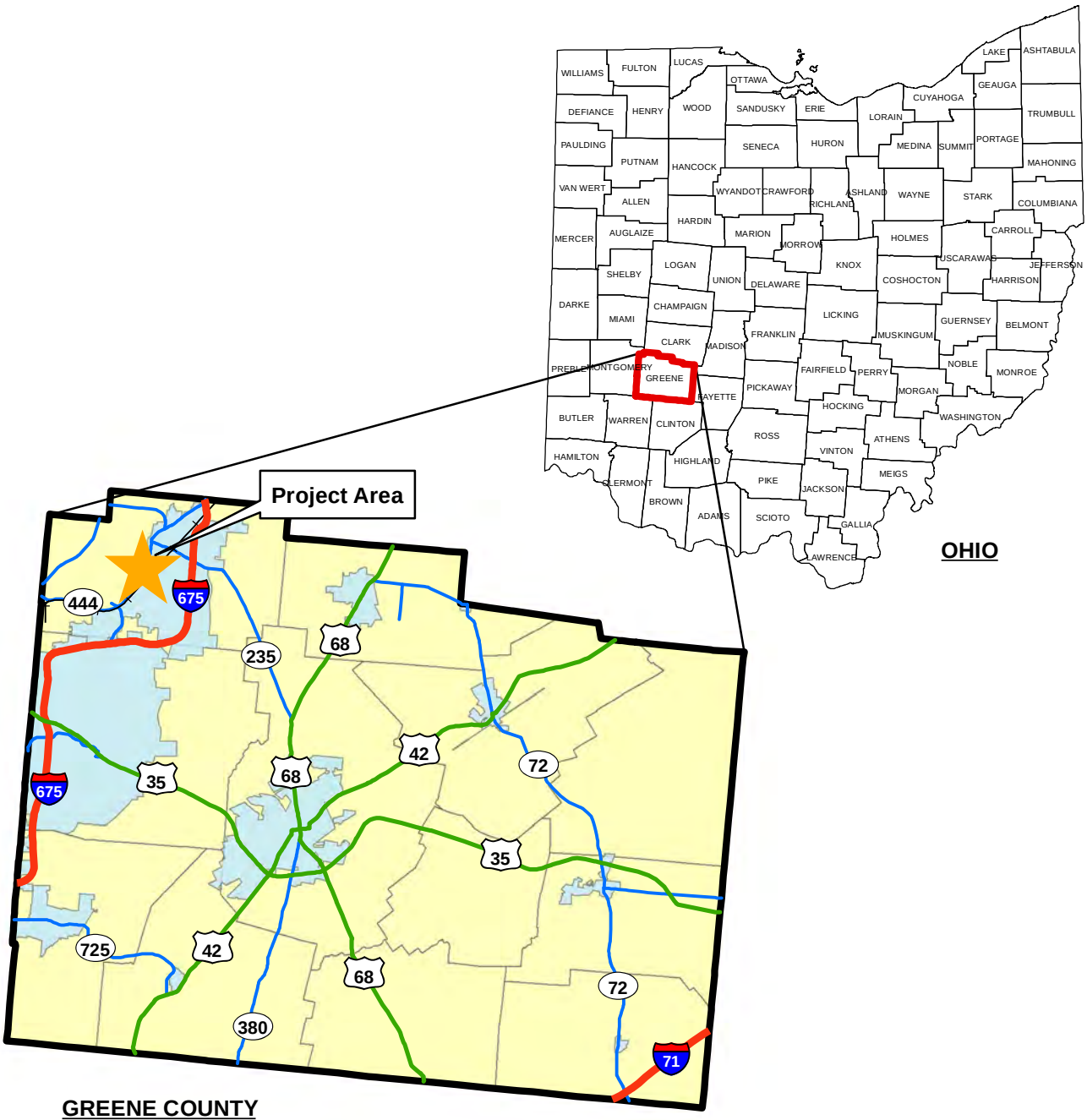
LJB Inc. Areas A and C Entry Control Traffic Study, Wright-Patterson AFB; Conceptual Alternatives. March 30, 2009.

LJB Inc. Draft Environmental Assessment for Entry Control Reconfiguration in Areas A and C, Wright-Patterson Air Force Base. Contract No. F33601-03-D-0018, Task Order 5010. February 2010.

LJB Inc. Traffic Analysis, Environmental Impact Statement for Entry Control Reconfiguration, and Base Perimeter Fence Relocation, Area A, Wright-Patterson Air Force Base, Ohio. April 2011.

Appendix A
Figures

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Dayton, OH	3/4/11	-	SBSM	LAS	LAS	Figure 1-County Map



N

Not to Scale

WRIGHT-PATTERSON
AIR FORCE BASE,
OHIO

Figure 1

County Location Map

Map Document: (Q:\Clients\Wright-Patterson Air Force Base - 88th Air Base Wing\0105785A.00 - Task Order for WPAFB SR444 EIS\Development\Reports\Traffic Analysis\GIS\Figure 1-County Map.mxd)
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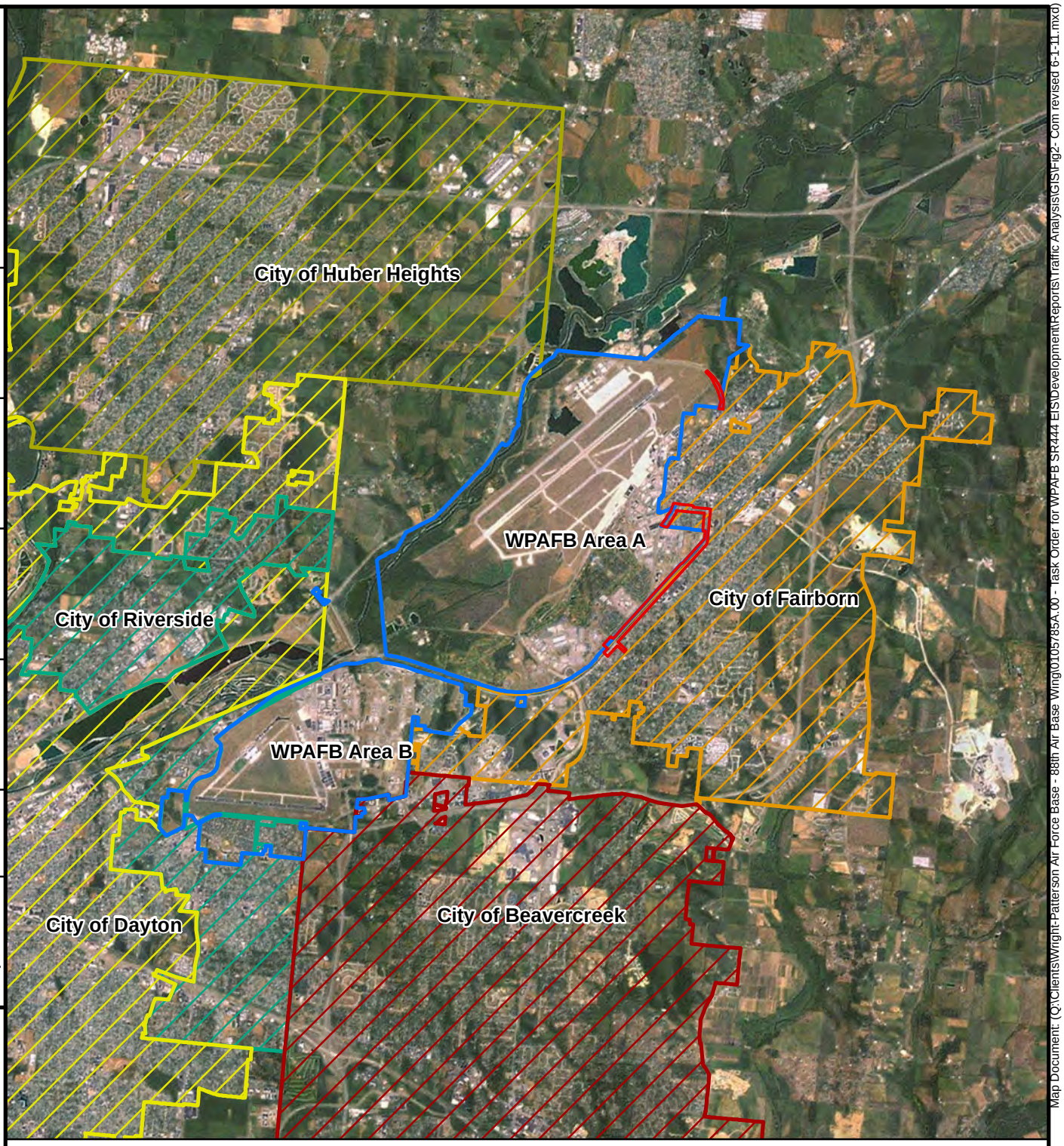
OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Dayton, OH	3/4/11	--	SBSM	LAS	LAS	Community Map



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6/2/2011 11:36:51 AM

Legend

Off-Base Study Area

N

0 2,750 5,500 11,000 Feet

WRIGHT-PATTERSON
AIR FORCE BASE,
OHIO

Figure 2

WPAFB and Surrounding Communities

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Dayton, OH	5/31/11	--	SBSM	LAS	LAS	Study Area Map

Legend

- Off-Base Study Area
- SR444 to be closed to public
- Proposed cul-de-sacs

N

0 750 1,500 3,000 Feet

WRIGHT-PATTERSON
AIR FORCE BASE,
OHIO

Figure 3

Off-Base Study Area

Map Document: (Q:\Clients\Wright-Patterson Air Force Base - 88th Air Base Wing\0105785A.00 - Task Order for WPAFB SR444 EIS\Development\Reports\Traffic Analysis\GIS\Figure3- Study Area.mxd)
5/31/2011 1:09:13 PM

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Dayton, OH	5/31/11	--	SBSM	LAS	LAS	Gate 1A

Map Document: (Q:\Clients\Wright-Patterson Air Force Base - 88th Air Base Wing\0105786\
5/31/2011 -- 12:43:51 PM

Legend

- Installation Area
- Proposed Alignment
- Area of Potential Effect
- Proposed Guard Shack
- Proposed Road Closure/Remove Pavement
- Houses Removed
- Proposed Gate Closure

N

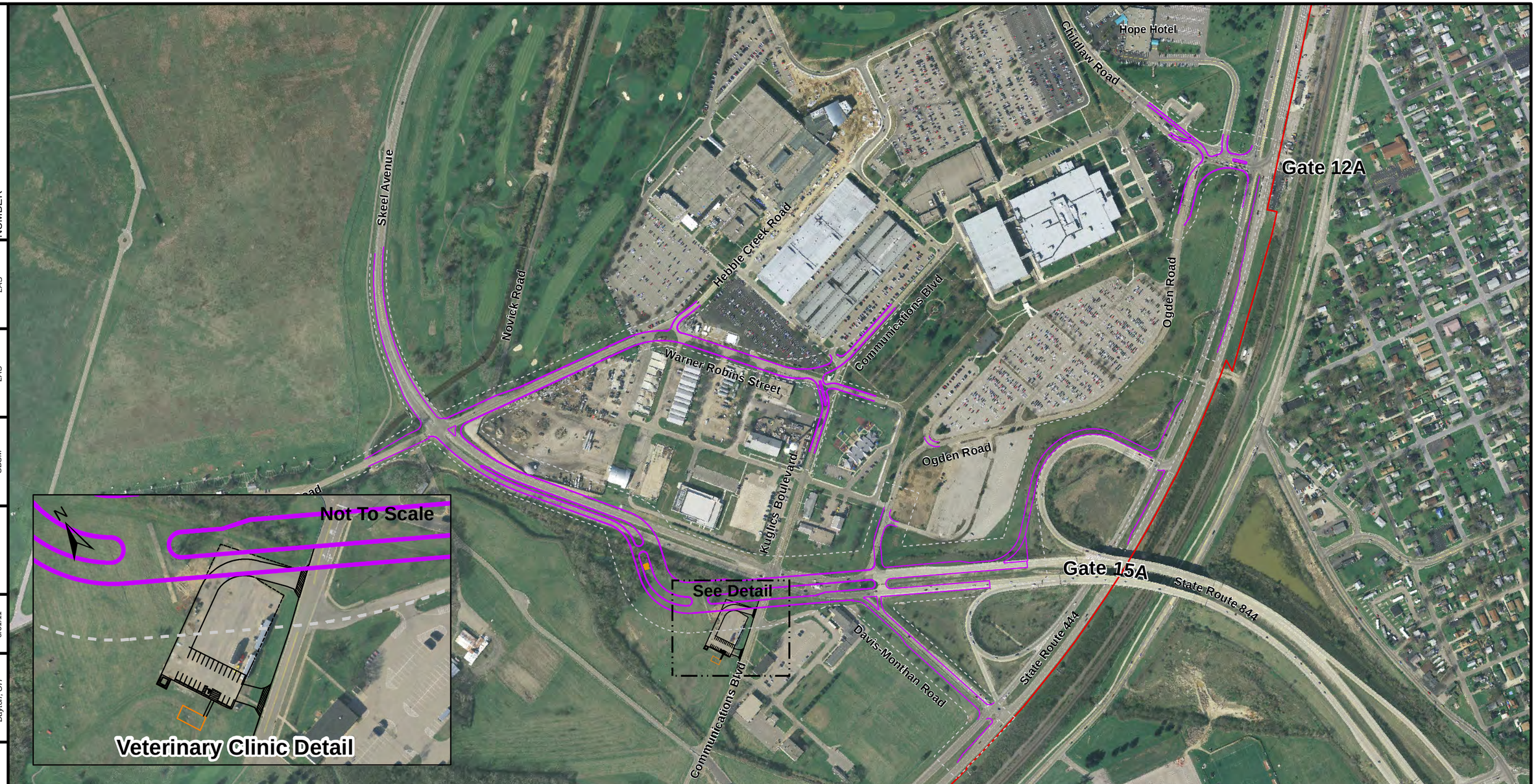
0 335 670 1,340 Feet

WRIGHT-PATTERSON
AIR FORCE BASE,
OHIO

Figure 4

Gate 1A Relocation / Reconfiguration

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Dayton, OH	5/31/11	--	SBSM	LAS	LAS	Gate 15A



Map Document: (Q:\Clients\Wright-Patterson Air Force Base - 88th Air Base Wing\0105787
5/31/2011 -- 12:07:51 PM

Legend

- Installation Area
- Proposed Alignment
- Area of Potential Effect
- Proposed Guard Shack

N

0 312.5 625 1,250 Feet

WRIGHT-PATTERSON
AIR FORCE BASE,
OHIO

Figure 5

Gate 15A Reconfiguration

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Dayton, OH	5/31/11	--	SBSM	LAS	LAS	Gate 26A

Legend

- Installation Area
- Proposed Alignment
- Area of Potential Effect
- Proposed Guard Shack

N

0 130 260 520 Feet

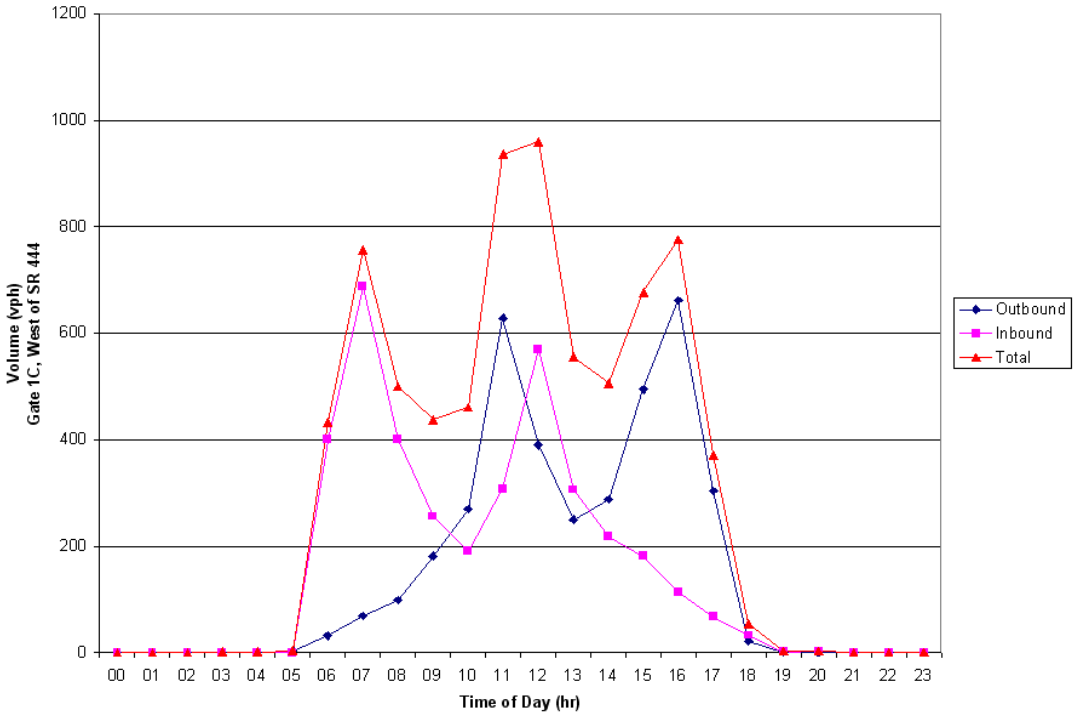
WRIGHT-PATTERSON
AIR FORCE BASE,
OHIO

Figure 6

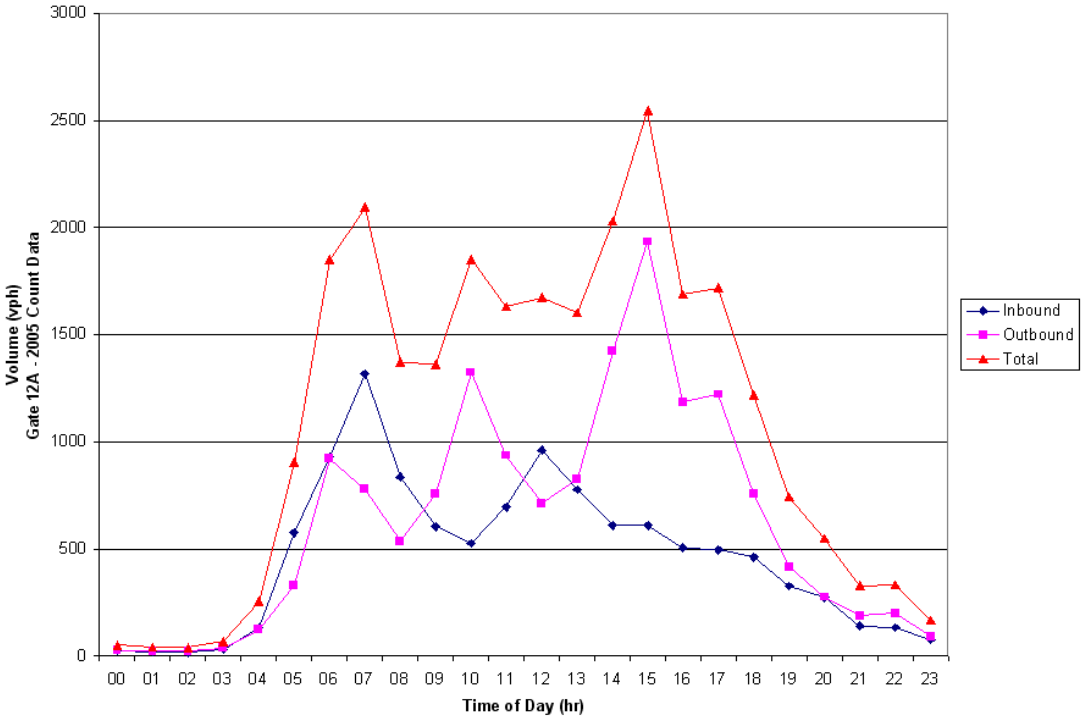
Gate 26A Relocation / Reconfiguration

Map Document: (Q:\Clients\Wright-Patterson Air Force Base - 88th Air Base Wing\0105785A.00 - Task Order for WPAFB SR444 EIS\Development\Reports\Traffic Analysis\GIS\Figure6- Gate 26A.mxd)

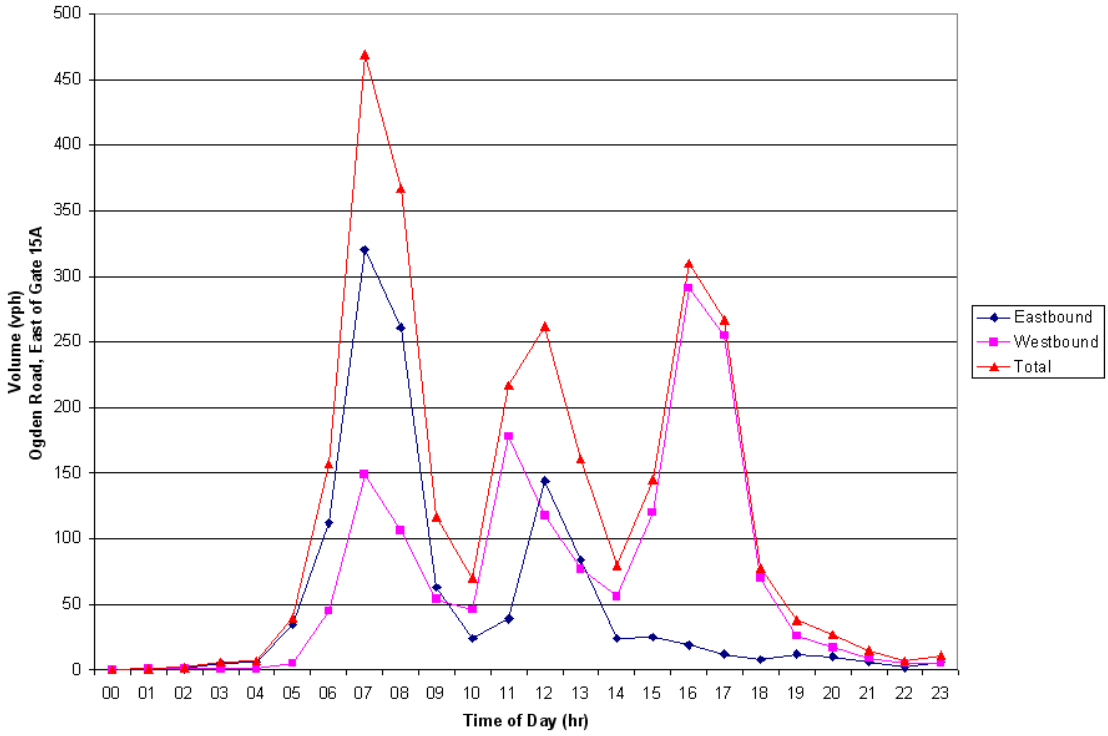
Figure 7 – Hourly Distribution of Volumes



A) Gate 1A – West of SR 444



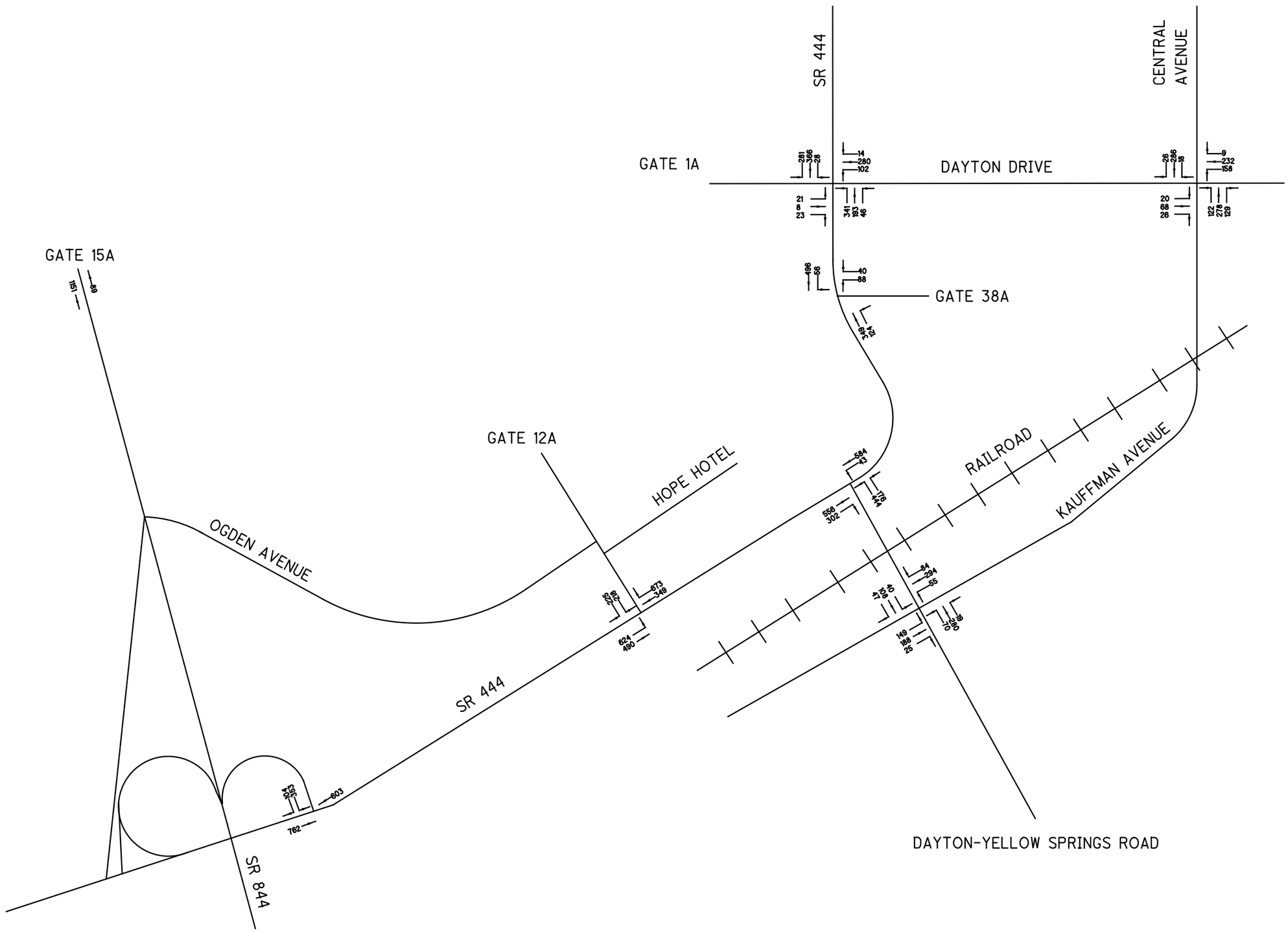
B) Gate 12A



C) Ogden Road East of Gate 15A

Appendix B
Traffic Volume Plates

2010 NO BUILD AM VOLUMES



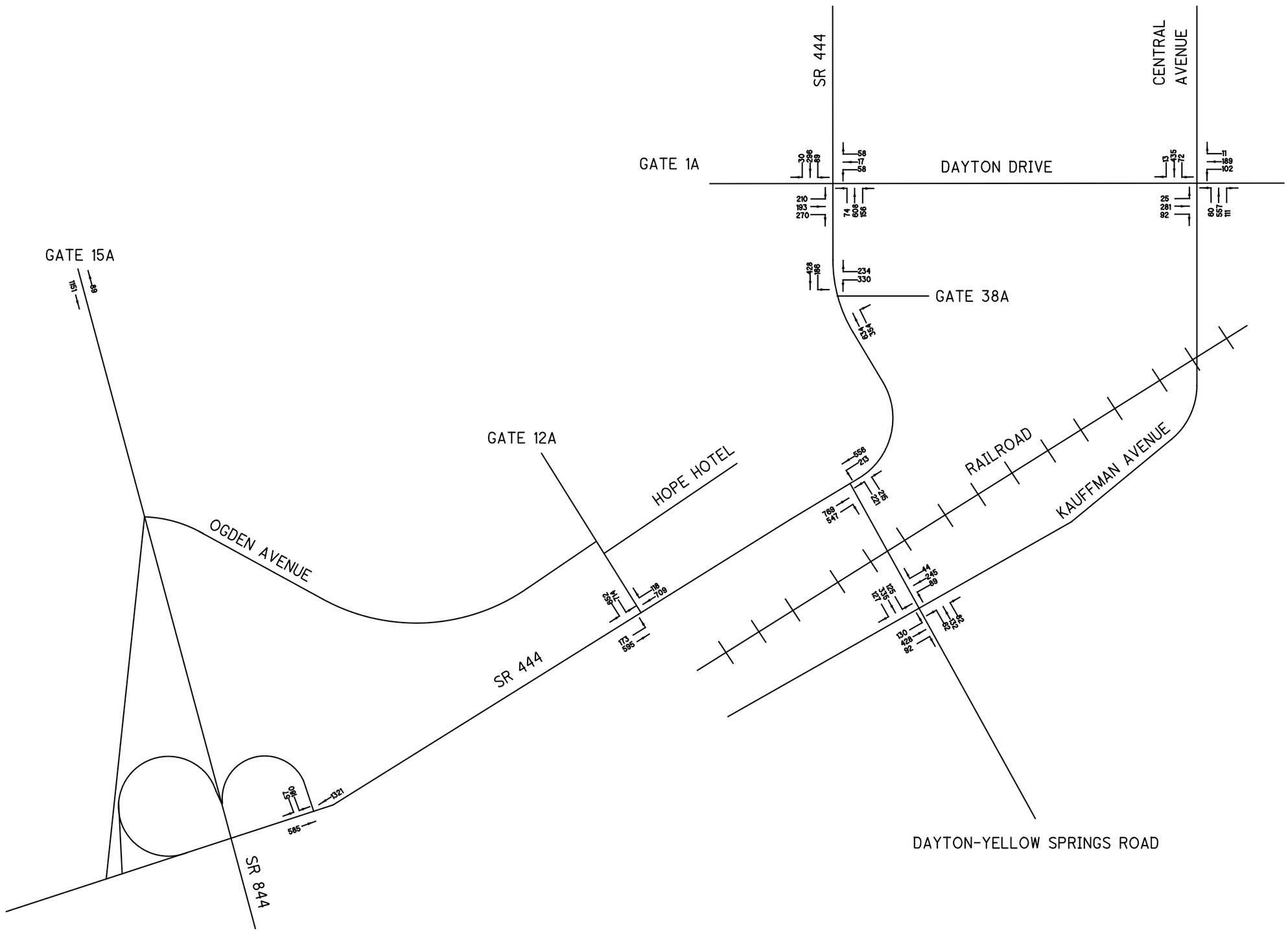
N.T.S.
HORIZONTAL SCALE IN FEET

CALCULATED GWA
CHECKED MSW

2010 NO BUILD AM VOLUMES

LJB Inc. - 3100 Research Blvd. - P.O. Box 20246
Dayton, OH 45420-0246
(937) 299-5000 tel - (937) 299-5100 fax - LJBInc.com

2010 NO BUILD PM VOLUMES



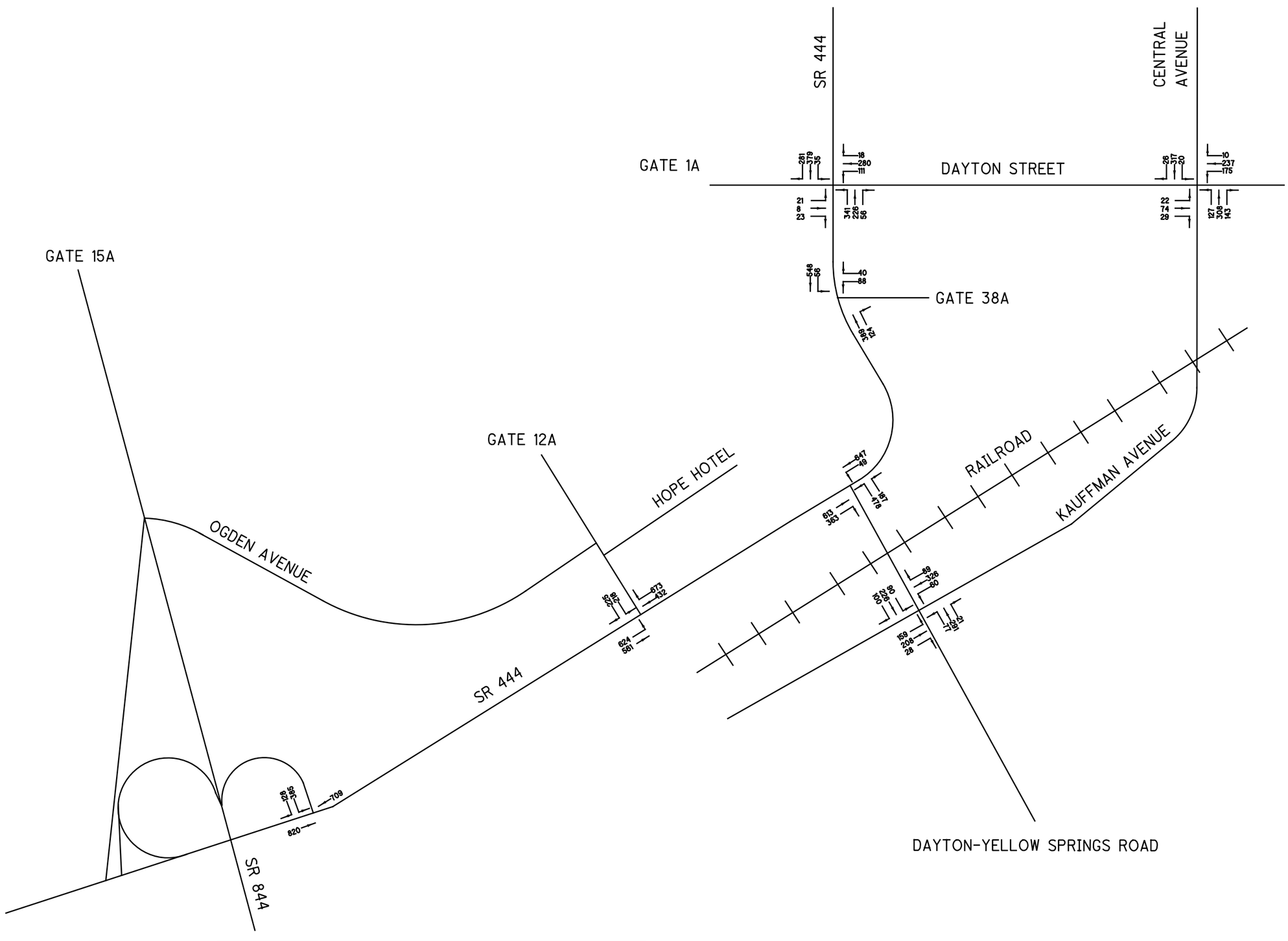
N.T.S.
HORIZONTAL SCALE IN FEET

CALCULATED GWA
CHECKED MSW

2010 NO BUILD PM VOLUMES

LJB Inc. - 3100 Research Blvd. - P.O. Box 20246
Dayton, OH 45420-0246
(937) 299-5000 tel - (937) 299-5100 fax - LJBInc.com

2032 NO BUILD AM VOLUMES



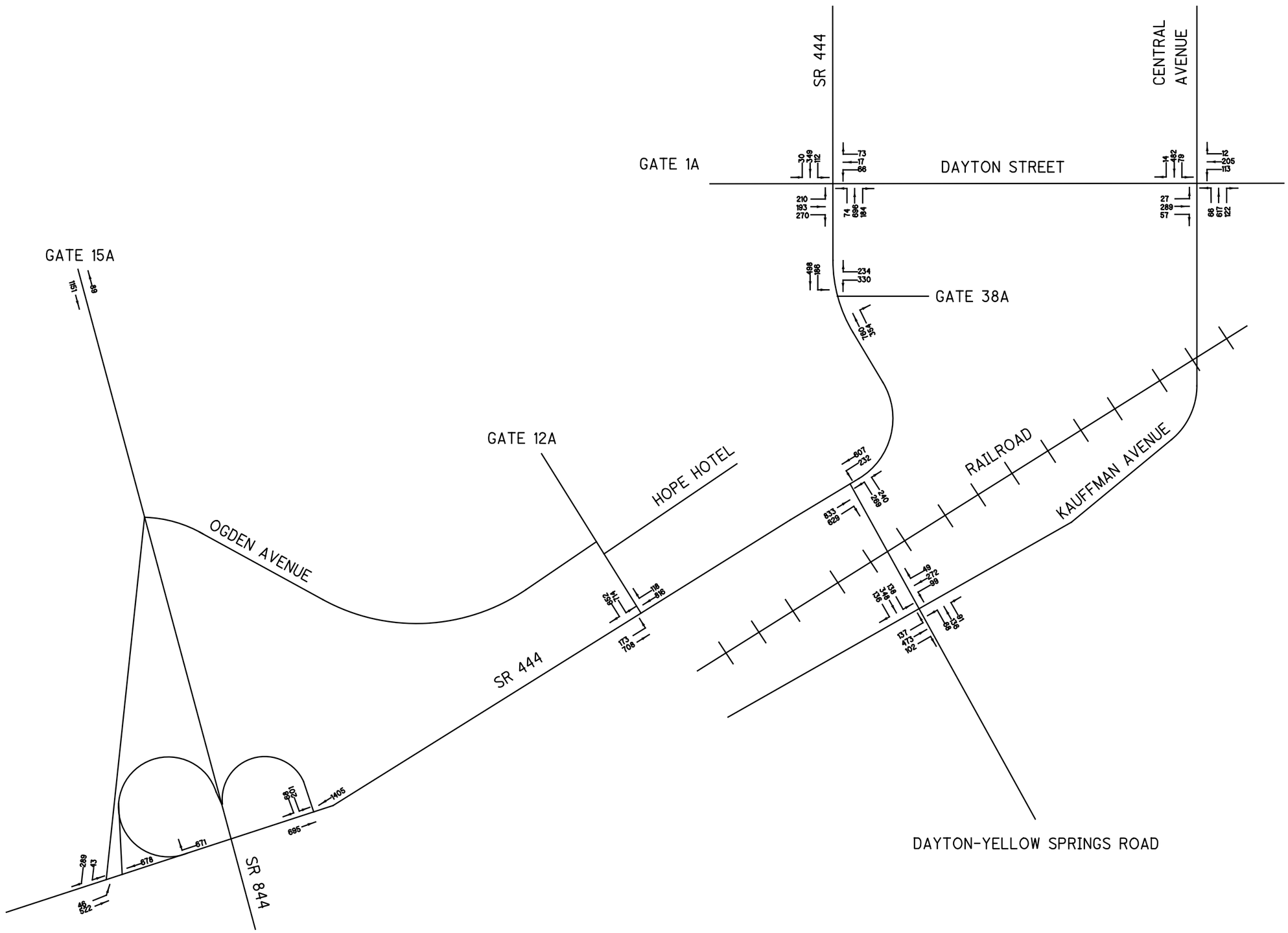
N.T.S.
HORIZONTAL SCALE IN FEET

CALCULATED GWA
CHECKED MSW

2032 NO BUILD AM VOLUMES

LJB Inc. - 3100 Research Blvd. - P.O. Box 20246
Dayton, OH 45420-0246
(937) 259-5000 tel - (937) 259-5100 fax - LJBInc.com

2032 NO BUILD PM VOLUMES



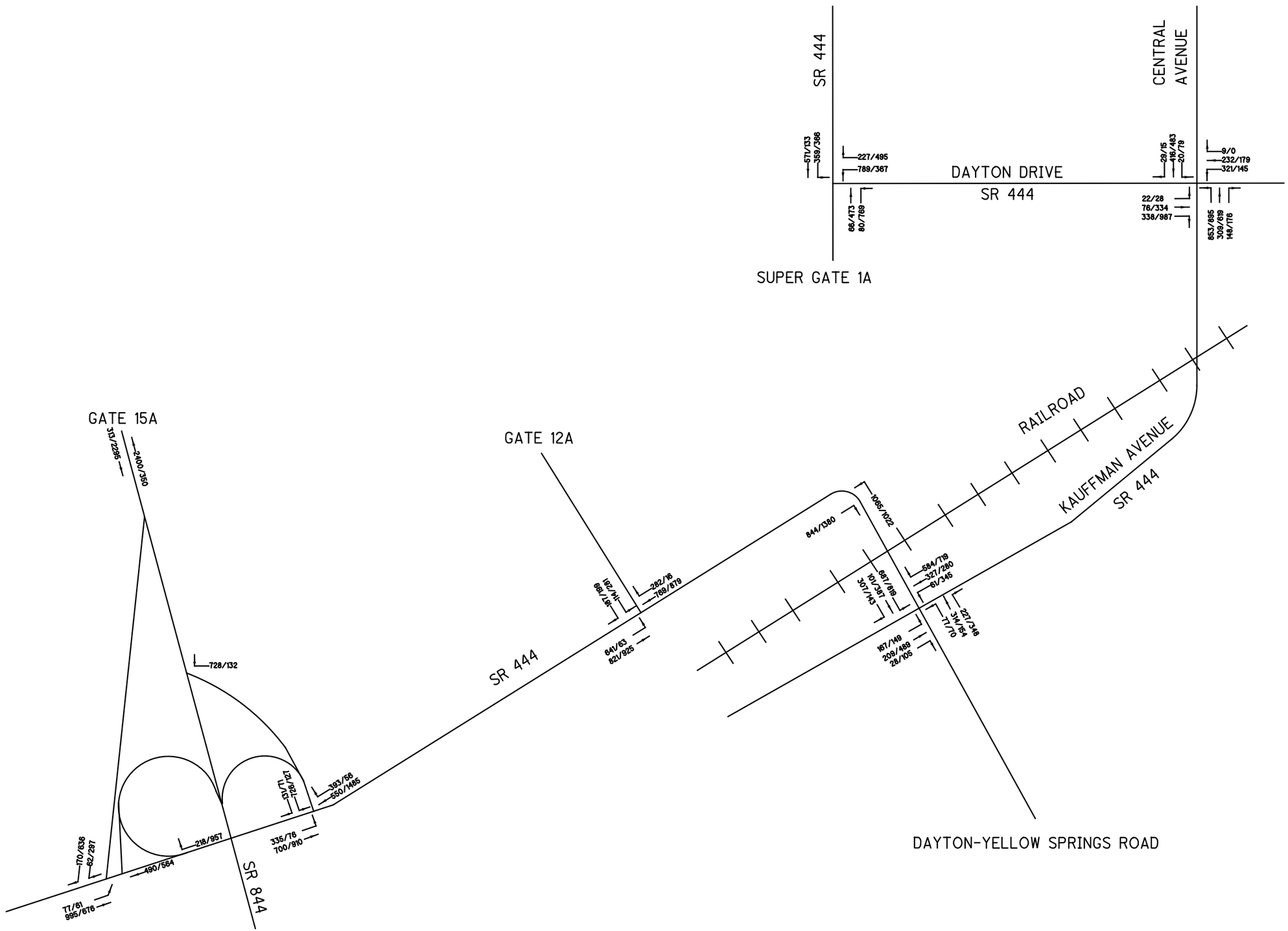
N.T.S.
HORIZONTAL SCALE IN FEET

CALCULATED GWA
CHECKED MSW

2032 NO BUILD PM VOLUMES

LJB Inc. • 3100 Research Blvd. • P.O. Box 20246
Dayton, OH 45420-0246
(937) 259-5000 tel • (937) 259-5100 fax • LJBInc.com

2032 BUILD AM/PM VOLUMES



N.T.S.
HORIZONTAL SCALE IN FEET

CALCULATED GWA
CHECKED MSW

2032 BUILD AM/PM VOLUMES

LJB Inc. - 3100 Research Blvd. - P.O. Box 20246
Dayton, OH 45420-0246
(937) 299-5000 tel - (937) 299-5100 fax - LJBInc.com

Appendix C
Highway Capacity Analysis

HCM Signalized Intersection Capacity Analysis
35: Dayton-Yellow Springs Road & Kauffman Avenue

5/27/2011

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	40	108	47	70	280	19	149	188	25	55	294	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.95		1.00	0.99		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1778		1770	1845		1770	3476		1770	3422	
Flt Permitted	0.44	1.00		0.65	1.00		0.34	1.00		0.60	1.00	
Satd. Flow (perm)	816	1778		1208	1845		636	3476		1126	3422	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	44	120	52	78	311	21	166	209	28	61	327	93
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	44	172	0	78	332	0	166	237	0	61	420	0
Turn Type	pm+pt			Perm			pm+pt			pm+pt		
Protected Phases	1	6			2		7	4		3	8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)	28.8	28.8		21.1	21.1		24.7	18.5		17.7	15.0	
Effective Green, g (s)	29.8	29.8		22.1	22.1		26.7	19.5		19.7	16.0	
Actuated g/C Ratio	0.46	0.46		0.34	0.34		0.41	0.30		0.30	0.25	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	428	815		411	627		387	1043		378	842	
v/s Ratio Prot	0.01	c0.10			c0.18		c0.05	0.07		0.01	c0.12	
v/s Ratio Perm	0.04			0.06			0.13			0.04		
v/c Ratio	0.10	0.21		0.19	0.53		0.43	0.23		0.16	0.50	
Uniform Delay, d1	13.4	10.6		15.1	17.3		12.8	17.1		16.3	21.1	
Progression Factor	0.84	0.84		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.6		1.0	3.2		0.8	0.1		0.2	0.5	
Delay (s)	11.4	9.5		16.2	20.4		13.6	17.2		16.6	21.5	
Level of Service	B	A		B	C		B	B		B	C	
Approach Delay (s)		9.9			19.6			15.7			20.9	
Approach LOS		A			B			B			C	

Intersection Summary			
HCM Average Control Delay	17.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	51.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Volume (vph)	444	176	556	302	43	584
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	3539	1583	1770	3539
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	493	196	618	336	48	649
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	493	196	618	336	48	649
Turn Type		pm+ov		pm+ov	Prot	
Protected Phases	2	3	4	2	3	8
Permitted Phases		2		4		
Actuated Green, G (s)	28.7	34.0	16.0	44.7	5.3	26.3
Effective Green, g (s)	29.7	36.0	17.0	46.7	6.3	27.3
Actuated g/C Ratio	0.46	0.55	0.26	0.72	0.10	0.42
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	809	974	926	1235	172	1486
v/s Ratio Prot	c0.28	0.02	c0.17	0.12	0.03	c0.18
v/s Ratio Perm		0.10		0.09		
v/c Ratio	0.61	0.20	0.67	0.27	0.28	0.44
Uniform Delay, d1	13.3	7.3	21.5	3.2	27.2	13.4
Progression Factor	0.65	0.52	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.2	0.1	3.8	0.5	0.9	0.9
Delay (s)	11.8	3.9	25.3	3.7	28.1	14.3
Level of Service	B	A	C	A	C	B
Approach Delay (s)	9.6		17.7			15.3
Approach LOS	A		B			B

Intersection Summary			
HCM Average Control Delay	14.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	53.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	68	26	158	232	9	122	278	129	18	286	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.96		1.00	0.99		1.00	0.95		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3393		1770	3519		1770	3371		1770	3495	
Flt Permitted	0.59	1.00		0.52	1.00		0.47	1.00		0.49	1.00	
Satd. Flow (perm)	1093	3393		977	3519		884	3371		915	3495	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	22	76	29	176	258	10	136	309	143	20	318	29
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	22	105	0	176	268	0	136	452	0	20	347	0
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	11.5	10.7		18.7	14.3		28.6	24.8		22.6	21.8	
Effective Green, g (s)	13.5	11.7		20.7	15.3		30.6	25.8		24.6	22.8	
Actuated g/C Ratio	0.22	0.19		0.34	0.25		0.50	0.43		0.41	0.38	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	263	654		404	887		516	1433		396	1313	
v/s Ratio Prot	0.00	0.03		c0.04	0.08		c0.02	c0.13		0.00	0.10	
v/s Ratio Perm	0.02			c0.11			0.11			0.02		
v/c Ratio	0.08	0.16		0.44	0.30		0.26	0.32		0.05	0.26	
Uniform Delay, d1	18.6	20.4		14.8	18.4		8.2	11.6		10.9	13.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.1		0.8	0.2		0.3	0.6		0.1	0.5	
Delay (s)	18.7	20.5		15.5	18.6		8.5	12.2		10.9	13.6	
Level of Service	B	C		B	B		A	B		B	B	
Approach Delay (s)		20.2			17.4			11.3			13.5	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM Average Control Delay	14.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	60.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	40.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	21	8	23	102	280	14	341	193	46	28	366	281
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95	1.00	1.00	0.91	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1849		1770	3539	1583	1770	4754	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.62	1.00	
Satd. Flow (perm)	1770	1863	1583	1770	1849		1770	3539	1583	1151	4754	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	23	9	26	113	311	16	379	214	51	31	407	312
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	23	9	26	113	327	0	379	214	51	31	719	0
Turn Type	Split		Perm	Split			Prot		Perm	Perm		
Protected Phases	4	4		8	8		5	2			6	
Permitted Phases			4						2	6		
Actuated Green, G (s)	4.1	4.1	4.1	16.4	16.4		19.4	40.1	40.1	15.7	15.7	
Effective Green, g (s)	5.1	5.1	5.1	17.4	17.4		20.4	41.1	41.1	16.7	16.7	
Actuated g/C Ratio	0.07	0.07	0.07	0.23	0.23		0.27	0.54	0.54	0.22	0.22	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	119	126	107	407	426		478	1924	861	254	1050	
v/s Ratio Prot	0.01	0.00		0.06	c0.18		c0.21	0.06			c0.15	
v/s Ratio Perm			c0.02						0.03	0.03		
v/c Ratio	0.19	0.07	0.24	0.28	0.77		0.79	0.11	0.06	0.12	0.87dr	
Uniform Delay, d1	33.3	33.0	33.4	23.9	27.2		25.6	8.4	8.1	23.6	27.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.8	0.2	1.2	0.4	8.1		8.8	0.0	0.0	0.2	1.9	
Delay (s)	34.1	33.3	34.6	24.3	35.3		34.4	8.4	8.2	23.8	28.9	
Level of Service	C	C	C	C	D		C	A	A	C	C	
Approach Delay (s)		34.2			32.5			23.7			28.7	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	28.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	75.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	59.7%	ICU Level of Service	B
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
35: Dayton-Yellow Springs Road & Kauffman Avenue

5/17/2011

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	125	335	127	62	132	82	130	428	92	89	245	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.96		1.00	0.94		1.00	0.97		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1786		1770	1756		1770	3446		1770	3458	
Flt Permitted	0.46	1.00		0.47	1.00		0.52	1.00		0.31	1.00	
Satd. Flow (perm)	854	1786		884	1756		974	3446		572	3458	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	139	372	141	69	147	91	144	476	102	99	272	49
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	139	513	0	69	238	0	144	578	0	99	321	0
Turn Type	pm+pt			Perm			pm+pt			pm+pt		
Protected Phases	1	6			2		7	4		3	8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)	29.6	29.6		20.8	20.8		19.2	14.6		17.6	13.8	
Effective Green, g (s)	29.6	29.6		20.8	20.8		19.2	14.6		17.6	13.8	
Actuated g/C Ratio	0.47	0.47		0.33	0.33		0.30	0.23		0.28	0.22	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	456	839		292	580		355	799		232	757	
v/s Ratio Prot	0.02	c0.29			0.14		c0.03	c0.17		0.03	0.09	
v/s Ratio Perm	0.12			0.08			0.09			0.09		
v/c Ratio	0.30	0.61		0.24	0.41		0.41	0.72		0.43	0.42	
Uniform Delay, d1	10.0	12.4		15.3	16.3		16.6	22.3		17.5	21.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	3.3		1.9	2.1		0.8	3.3		1.3	0.4	
Delay (s)	10.4	15.7		17.2	18.5		17.3	25.6		18.7	21.6	
Level of Service	B	B		B	B		B	C		B	C	
Approach Delay (s)		14.6			18.2			24.0			20.9	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM Average Control Delay	19.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	63.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	65.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Volume (vph)	221	215	769	547	213	556
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	3539	1583	1770	3539
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	246	239	854	608	237	618
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	246	239	854	608	237	618
Turn Type		pm+ov		pm+ov	Prot	
Protected Phases	2	3	4	2	3	8
Permitted Phases		2		4		
Actuated Green, G (s)	12.8	20.8	16.1	28.9	8.0	29.1
Effective Green, g (s)	13.8	22.8	17.1	30.9	9.0	30.1
Actuated g/C Ratio	0.27	0.44	0.33	0.60	0.17	0.58
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	471	817	1166	1064	307	2052
v/s Ratio Prot	0.14	0.05	c0.24	c0.15	c0.13	0.17
v/s Ratio Perm		0.10		0.23		
v/c Ratio	0.52	0.29	0.73	0.57	0.77	0.30
Uniform Delay, d1	16.2	9.4	15.4	6.4	20.5	5.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0	0.2	4.1	0.7	11.4	0.4
Delay (s)	17.3	9.6	19.5	7.2	31.9	5.9
Level of Service	B	A	B	A	C	A
Approach Delay (s)	13.5		14.4			13.1
Approach LOS	B		B			B

Intersection Summary			
HCM Average Control Delay	13.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	51.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	281	92	102	189	11	60	557	111	72	435	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.96		1.00	0.99		1.00	0.98		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3408		1770	3511		1770	3451		1770	3524	
Flt Permitted	0.61	1.00		0.37	1.00		0.43	1.00		0.24	1.00	
Satd. Flow (perm)	1142	3408		694	3511		809	3451		446	3524	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	28	312	102	113	210	12	67	619	123	80	483	14
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	28	414	0	113	222	0	67	742	0	80	497	0
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	15.7	14.1		19.9	16.2		23.7	21.2		25.7	22.2	
Effective Green, g (s)	17.7	15.1		21.9	17.2		25.7	22.2		27.7	23.2	
Actuated g/C Ratio	0.28	0.24		0.35	0.28		0.41	0.36		0.44	0.37	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	350	823		324	966		386	1226		293	1308	
v/s Ratio Prot	0.00	c0.12		c0.03	0.06		0.01	c0.21		c0.02	0.14	
v/s Ratio Perm	0.02			0.10			0.06			0.10		
v/c Ratio	0.08	0.50		0.35	0.23		0.17	0.61		0.27	0.38	
Uniform Delay, d1	16.3	20.5		14.3	17.5		11.3	16.6		10.8	14.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.5		0.7	0.1		0.2	2.2		0.5	0.8	
Delay (s)	16.4	20.9		14.9	17.6		11.5	18.8		11.3	15.2	
Level of Service	B	C		B	B		B	B		B	B	
Approach Delay (s)		20.7			16.7			18.2			14.7	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM Average Control Delay	17.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	62.5	Sum of lost time (s)	20.0
Intersection Capacity Utilization	52.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	210	193	270	58	17	58	74	608	156	89	296	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95	1.00	1.00	0.91	
Frt	1.00	1.00	0.85	1.00	0.88		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1647		1770	3539	1583	1770	5016	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.39	1.00	
Satd. Flow (perm)	1770	1863	1583	1770	1647		1770	3539	1583	735	5016	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	233	214	300	64	19	64	82	676	173	99	329	33
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	233	214	300	64	83	0	82	676	173	99	362	0
Turn Type	Split		Perm	Split			Prot		Perm	Perm		
Protected Phases	4	4		8	8		5	2			6	
Permitted Phases			4						2	6		
Actuated Green, G (s)	15.3	15.3	15.3	6.7	6.7		3.7	22.9	22.9	14.2	14.2	
Effective Green, g (s)	16.3	16.3	16.3	7.7	7.7		4.7	23.9	23.9	15.2	15.2	
Actuated g/C Ratio	0.27	0.27	0.27	0.13	0.13		0.08	0.40	0.40	0.25	0.25	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	482	507	431	228	212		139	1412	632	187	1273	
v/s Ratio Prot	0.13	0.11		0.04	c0.05		0.05	c0.19			0.07	
v/s Ratio Perm			c0.19						0.11	0.13		
v/c Ratio	0.48	0.42	0.70	0.28	0.39		0.59	0.48	0.27	0.53	0.28	
Uniform Delay, d1	18.3	17.9	19.6	23.6	24.0		26.7	13.4	12.1	19.3	18.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.8	0.6	4.8	0.7	1.2		6.3	0.3	0.2	2.7	0.1	
Delay (s)	19.0	18.5	24.4	24.3	25.1		32.9	13.6	12.4	22.0	18.1	
Level of Service	B	B	C	C	C		C	B	B	C	B	
Approach Delay (s)		21.0			24.8			15.1			18.9	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	18.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	59.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	51.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
35: Dayton-Yellow Springs Road & Kauffman Avenue

5/27/2011

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	90	226	100	77	291	21	159	208	28	60	326	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.95		1.00	0.99		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1777		1770	1844		1770	3476		1770	3425	
Flt Permitted	0.45	1.00		0.46	1.00		0.22	1.00		0.59	1.00	
Satd. Flow (perm)	841	1777		854	1844		406	3476		1099	3425	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	100	251	111	86	323	23	177	231	31	67	362	99
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	100	362	0	86	346	0	177	262	0	67	461	0
Turn Type	pm+pt			Perm			pm+pt			pm+pt		
Protected Phases	1	6			2		7	4		3	8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)	67.4	67.4		55.4	55.4		42.6	32.0		27.9	22.3	
Effective Green, g (s)	68.4	68.4		56.4	56.4		43.6	33.0		29.9	23.3	
Actuated g/C Ratio	0.57	0.57		0.47	0.47		0.36	0.28		0.25	0.19	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	541	1013		401	867		333	956		311	665	
v/s Ratio Prot	0.01	c0.20			c0.19		c0.07	0.08		0.01	c0.13	
v/s Ratio Perm	0.09			0.10			0.12			0.04		
v/c Ratio	0.18	0.36		0.21	0.40		0.53	0.27		0.22	0.69	
Uniform Delay, d1	18.2	13.9		18.7	20.7		28.2	34.1		35.2	45.0	
Progression Factor	0.88	0.87		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	1.0		1.2	1.4		1.6	0.2		0.3	3.1	
Delay (s)	16.1	13.1		20.0	22.1		29.8	34.3		35.5	48.2	
Level of Service	B	B		B	C		C	C		D	D	
Approach Delay (s)		13.7			21.7			32.5			46.6	
Approach LOS		B			C			C			D	

Intersection Summary			
HCM Average Control Delay	29.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Volume (vph)	478	187	613	363	49	647
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	3539	1583	1770	3539
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	531	208	681	403	54	719
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	531	208	681	403	54	719
Turn Type		pm+ov		pm+ov	Prot	
Protected Phases	2	3	4	2	3	8
Permitted Phases		2		4		
Actuated Green, G (s)	59.0	67.5	37.5	96.5	8.5	51.0
Effective Green, g (s)	60.0	69.5	38.5	98.5	9.5	52.0
Actuated g/C Ratio	0.50	0.58	0.32	0.82	0.08	0.43
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	885	970	1135	1352	140	1534
v/s Ratio Prot	c0.30	0.02	c0.19	0.15	0.03	c0.20
v/s Ratio Perm		0.11		0.11		
v/c Ratio	0.60	0.21	0.60	0.30	0.39	0.47
Uniform Delay, d1	21.4	12.1	34.3	2.5	52.5	24.2
Progression Factor	0.66	0.61	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.8	0.1	2.3	0.6	1.8	1.0
Delay (s)	17.0	7.5	36.6	3.1	54.2	25.2
Level of Service	B	A	D	A	D	C
Approach Delay (s)	14.3		24.2			27.2
Approach LOS	B		C			C

Intersection Summary			
HCM Average Control Delay	22.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	22	74	29	175	237	10	127	308	143	20	317	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.96		1.00	0.99		1.00	0.95		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3390		1770	3518		1770	3371		1770	3499	
Flt Permitted	0.38	1.00		0.68	1.00		0.51	1.00		0.44	1.00	
Satd. Flow (perm)	716	3390		1266	3518		943	3371		828	3499	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	24	82	32	194	263	11	141	342	159	22	352	29
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	24	114	0	194	274	0	141	501	0	22	381	0
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	12.9	9.4		25.7	17.2		84.3	75.9		69.1	65.7	
Effective Green, g (s)	14.9	10.4		26.7	18.2		85.3	76.9		71.1	66.7	
Actuated g/C Ratio	0.12	0.09		0.22	0.15		0.71	0.64		0.59	0.56	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	128	294		333	534		771	2160		525	1945	
v/s Ratio Prot	0.01	0.03		c0.06	0.08		c0.02	c0.15		0.00	0.11	
v/s Ratio Perm	0.02			c0.07			0.11			0.02		
v/c Ratio	0.19	0.39		0.58	0.51		0.18	0.23		0.04	0.20	
Uniform Delay, d1	51.3	51.8		42.0	46.8		6.8	9.1		11.7	13.3	
Progression Factor	0.80	0.78		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	0.9		2.6	0.8		0.1	0.3		0.0	0.2	
Delay (s)	41.7	41.1		44.6	47.7		6.9	9.3		11.7	13.5	
Level of Service	D	D		D	D		A	A		B	B	
Approach Delay (s)		41.2			46.4			8.8			13.4	
Approach LOS		D			D			A			B	

Intersection Summary			
HCM Average Control Delay	23.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	43.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	21	8	23	111	280	18	341	226	56	35	379	281
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95	1.00	1.00	0.91	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1846		1770	3539	1583	1770	4761	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.60	1.00	
Satd. Flow (perm)	1770	1863	1583	1770	1846		1770	3539	1583	1111	4761	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	23	9	26	123	311	20	379	251	62	39	421	312
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	23	9	26	123	331	0	379	251	62	39	733	0
Turn Type	Split		Perm	Split			Prot		Perm	Perm		
Protected Phases	4	4		8	8		5	2			6	
Permitted Phases			4						2	6		
Actuated Green, G (s)	5.2	5.2	5.2	26.5	26.5		34.0	73.3	73.3	34.3	34.3	
Effective Green, g (s)	6.2	6.2	6.2	27.5	27.5		35.0	74.3	74.3	35.3	35.3	
Actuated g/C Ratio	0.05	0.05	0.05	0.23	0.23		0.29	0.62	0.62	0.29	0.29	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	91	96	82	406	423		516	2191	980	327	1401	
v/s Ratio Prot	0.01	0.00		0.07	c0.18		c0.21	0.07			c0.15	
v/s Ratio Perm			c0.02						0.04	0.04		
v/c Ratio	0.25	0.09	0.32	0.30	0.78		0.73	0.11	0.06	0.12	0.52	
Uniform Delay, d1	54.7	54.2	54.9	38.3	43.4		38.3	9.4	9.1	31.0	35.3	
Progression Factor	1.00	1.00	1.00	0.60	0.67		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.5	0.4	2.2	0.4	9.0		5.4	0.1	0.1	0.7	1.4	
Delay (s)	56.1	54.6	57.1	23.5	38.2		43.7	9.5	9.2	31.7	36.7	
Level of Service	E	D	E	C	D		D	A	A	C	D	
Approach Delay (s)		56.3			34.2			28.2			36.5	
Approach LOS		E			C			C			D	

Intersection Summary			
HCM Average Control Delay	33.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	60.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
35: Dayton-Yellow Springs Road & Kauffman Avenue

5/17/2011

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	138	348	136	68	136	91	137	473	102	99	272	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.96		1.00	0.94		1.00	0.97		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1784		1770	1751		1770	3445		1770	3459	
Flt Permitted	0.49	1.00		0.44	1.00		0.40	1.00		0.18	1.00	
Satd. Flow (perm)	906	1784		822	1751		746	3445		336	3459	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	153	387	151	76	151	101	152	526	113	110	302	54
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	153	538	0	76	252	0	152	639	0	110	356	0
Turn Type	pm+pt			Perm			pm+pt			pm+pt		
Protected Phases	1	6			2		7	4		3	8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)	67.2	67.2		52.2	52.2		39.1	27.9		36.5	26.6	
Effective Green, g (s)	67.2	67.2		52.2	52.2		39.1	27.9		36.5	26.6	
Actuated g/C Ratio	0.56	0.56		0.44	0.44		0.33	0.23		0.30	0.22	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	579	999		358	762		339	801		221	767	
v/s Ratio Prot	0.02	c0.30			0.14		c0.04	c0.19		0.04	0.10	
v/s Ratio Perm	0.13			0.09			0.10			0.11		
v/c Ratio	0.26	0.54		0.21	0.33		0.45	0.80		0.50	0.46	
Uniform Delay, d1	13.3	16.6		21.1	22.4		30.1	43.4		32.1	40.5	
Progression Factor	0.76	0.76		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	1.7		1.3	1.2		0.9	5.6		1.8	0.4	
Delay (s)	10.3	14.3		22.5	23.5		31.0	49.0		33.8	41.0	
Level of Service	B	B		C	C		C	D		C	D	
Approach Delay (s)		13.4			23.3			45.5			39.3	
Approach LOS		B			C			D			D	

Intersection Summary			
HCM Average Control Delay	31.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	68.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Volume (vph)	269	240	833	629	232	607
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	3539	1583	1770	3539
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	299	267	926	699	258	674
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	299	267	926	699	258	674
Turn Type		pm+ov		pm+ov	Prot	
Protected Phases	2	3	4	2	3	8
Permitted Phases		2		4		
Actuated Green, G (s)	38.8	60.8	44.2	83.0	22.0	71.2
Effective Green, g (s)	39.8	62.8	45.2	85.0	23.0	72.2
Actuated g/C Ratio	0.33	0.52	0.38	0.71	0.19	0.60
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	587	881	1333	1174	339	2129
v/s Ratio Prot	0.17	0.06	c0.26	c0.20	c0.15	0.19
v/s Ratio Perm		0.11		0.24		
v/c Ratio	0.51	0.30	0.69	0.60	0.76	0.32
Uniform Delay, d1	32.2	16.2	31.6	8.8	45.9	11.8
Progression Factor	0.91	0.83	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.1	0.2	3.0	2.2	9.7	0.4
Delay (s)	32.3	13.6	34.6	11.1	55.6	12.2
Level of Service	C	B	C	B	E	B
Approach Delay (s)	23.5		24.5			24.2
Approach LOS	C		C			C

Intersection Summary			
HCM Average Control Delay	24.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	27	289	57	113	205	12	66	617	122	79	482	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	0.99		1.00	0.98		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3452		1770	3511		1770	3451		1770	3524	
Flt Permitted	0.29	1.00		0.52	1.00		0.40	1.00		0.28	1.00	
Satd. Flow (perm)	537	3452		977	3511		754	3451		513	3524	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	30	321	63	126	228	13	73	686	136	88	536	16
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	30	384	0	126	241	0	73	822	0	88	552	0
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	18.6	18.6		23.4	23.4		69.0	64.4		74.8	67.3	
Effective Green, g (s)	19.6	19.6		24.4	24.4		71.0	65.4		76.8	68.3	
Actuated g/C Ratio	0.16	0.16		0.20	0.20		0.59	0.55		0.64	0.57	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	146	564		268	714		494	1881		417	2006	
v/s Ratio Prot	0.01	c0.11		c0.04	0.07		0.01	c0.24		c0.01	0.16	
v/s Ratio Perm	0.02			0.05			0.08			0.12		
v/c Ratio	0.21	0.68		0.47	0.34		0.15	0.44		0.21	0.28	
Uniform Delay, d1	42.9	47.3		43.7	40.9		13.8	16.3		15.4	13.2	
Progression Factor	0.89	0.88		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	3.2		1.3	0.3		0.1	0.7		0.3	0.3	
Delay (s)	39.1	44.7		45.0	41.2		13.9	17.0		15.7	13.5	
Level of Service	D	D		D	D		B	B		B	B	
Approach Delay (s)		44.3			42.5			16.8			13.8	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM Average Control Delay	25.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	54.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	210	193	270	66	17	73	74	696	184	112	349	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95	1.00	1.00	0.91	
Frt	1.00	1.00	0.85	1.00	0.88		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1636		1770	3539	1583	1770	5026	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.28	1.00	
Satd. Flow (perm)	1770	1863	1583	1770	1636		1770	3539	1583	520	5026	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	233	214	300	73	19	81	82	773	204	124	388	33
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	233	214	300	73	100	0	82	773	204	124	421	0
Turn Type	Split		Perm	Split			Prot		Perm	Perm		
Protected Phases	4	4		8	8		5	2			6	
Permitted Phases			4						2	6		
Actuated Green, G (s)	27.4	27.4	27.4	12.3	12.3		8.5	65.3	65.3	51.8	51.8	
Effective Green, g (s)	28.4	28.4	28.4	13.3	13.3		9.5	66.3	66.3	52.8	52.8	
Actuated g/C Ratio	0.24	0.24	0.24	0.11	0.11		0.08	0.55	0.55	0.44	0.44	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	419	441	375	196	181		140	1955	875	229	2211	
v/s Ratio Prot	0.13	0.11		0.04	c0.06		c0.05	0.22			0.08	
v/s Ratio Perm			c0.19						0.13	c0.24		
v/c Ratio	0.56	0.49	0.80	0.37	0.55		0.59	0.40	0.23	0.54	0.19	
Uniform Delay, d1	40.3	39.5	43.1	49.5	50.5		53.3	15.4	13.8	24.7	20.5	
Progression Factor	1.00	1.00	1.00	0.55	0.56		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.6	0.8	11.6	1.2	3.6		6.1	0.6	0.6	8.9	0.2	
Delay (s)	41.9	40.3	54.7	28.4	32.0		59.5	16.0	14.4	33.6	20.7	
Level of Service	D	D	D	C	C		E	B	B	C	C	
Approach Delay (s)		46.6			30.5			19.0			23.7	
Approach LOS		D			C			B			C	

Intersection Summary			
HCM Average Control Delay	29.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	55.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
35: Dayton-Yellow Springs Road & Kauffman Avenue/SR 444

5/17/2011

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	687	101	307	77	314	227	167	209	28	61	327	584
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.89		1.00	0.94		1.00	0.98		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1652		1770	1746		1770	3477		1770	3199	
Flt Permitted	0.10	1.00		0.50	1.00		0.12	1.00		0.57	1.00	
Satd. Flow (perm)	191	1652		934	1746		224	3477		1062	3199	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	763	112	341	86	349	252	186	232	31	68	363	649
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	763	453	0	86	601	0	186	263	0	68	1012	0
Turn Type	pm+pt			Perm			pm+pt			pm+pt		
Protected Phases	1	6			2		7	4		3	8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)	70.0	70.0		34.0	34.0		38.3	32.3		33.7	30.0	
Effective Green, g (s)	71.0	71.0		35.0	35.0		40.3	33.3		35.7	31.0	
Actuated g/C Ratio	0.59	0.59		0.29	0.29		0.33	0.28		0.30	0.26	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	530	969		270	505		164	957		341	820	
v/s Ratio Prot	c0.38	0.27			0.34		c0.07	0.08		0.01	c0.32	
v/s Ratio Perm	c0.46			0.09			0.31			0.05		
v/c Ratio	1.44	0.47		0.32	1.19		1.13	0.27		0.20	1.64dr	
Uniform Delay, d1	36.6	14.2		33.7	43.0		36.8	34.4		31.3	45.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	208.4	1.6		3.1	103.9		110.9	0.2		0.3	115.9	
Delay (s)	245.0	15.9		36.7	146.9		147.7	34.5		31.6	160.9	
Level of Service	F	B		D	F		F	C		C	F	
Approach Delay (s)		159.6			133.1			81.4			152.7	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM Average Control Delay	141.9	HCM Level of Service	F
HCM Volume to Capacity ratio	1.40		
Actuated Cycle Length (s)	121.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	118.9%	ICU Level of Service	H
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	22	76	338	321	232	9	853	309	148	20	416	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.88		1.00	0.99		1.00	0.95		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3105		1770	3519		1770	3367		1770	3505	
Flt Permitted	0.46	1.00		0.21	1.00		0.22	1.00		0.29	1.00	
Satd. Flow (perm)	858	3105		389	3519		414	3367		532	3505	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	24	84	376	357	258	10	948	343	164	22	462	32
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	24	460	0	357	268	0	948	507	0	22	494	0
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	21.9	16.0		40.0	29.1		70.0	62.3		15.7	13.0	
Effective Green, g (s)	23.9	17.0		41.0	30.1		71.0	63.3		17.7	14.0	
Actuated g/C Ratio	0.20	0.14		0.34	0.25		0.59	0.53		0.15	0.12	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	223	440		363	883		844	1776		117	409	
v/s Ratio Prot	0.01	0.15		c0.16	0.08		c0.50	0.15		0.01	0.14	
v/s Ratio Perm	0.02			c0.17			c0.17			0.02		
v/c Ratio	0.11	1.68dr		0.98	0.30		1.12	0.29		0.19	1.21	
Uniform Delay, d1	42.4	51.5		44.2	36.5		30.4	15.8		44.3	53.0	
Progression Factor	0.41	0.40		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	49.3		42.5	0.2		70.7	0.4		0.8	114.4	
Delay (s)	17.6	69.8		86.7	36.6		101.1	16.2		45.1	167.4	
Level of Service	B	E		F	D		F	B		D	F	
Approach Delay (s)		67.2			65.3			71.5			162.2	
Approach LOS		E			E			E			F	

Intersection Summary			
HCM Average Control Delay	84.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	103.8%	ICU Level of Service	G
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	789	227	66	80	359	571
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.91
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	3539	1583	1770	5085
Flt Permitted	0.95	1.00	1.00	1.00	0.71	1.00
Satd. Flow (perm)	1770	1583	3539	1583	1317	5085
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	877	252	73	89	399	634
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	877	252	73	89	399	634
Turn Type		custom		Perm	Perm	
Protected Phases			2			6
Permitted Phases	8	8		2	6	
Actuated Green, G (s)	64.6	64.6	45.4	45.4	45.4	45.4
Effective Green, g (s)	65.6	65.6	46.4	46.4	46.4	46.4
Actuated g/C Ratio	0.55	0.55	0.39	0.39	0.39	0.39
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	968	865	1368	612	509	1966
v/s Ratio Prot			0.02			0.12
v/s Ratio Perm	c0.50	0.16		0.06	c0.30	
v/c Ratio	0.91	0.29	0.05	0.15	0.78	0.32
Uniform Delay, d1	24.4	14.7	23.0	23.9	32.4	25.8
Progression Factor	0.30	0.19	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.4	0.1	0.1	0.5	11.5	0.4
Delay (s)	11.6	2.9	23.1	24.4	43.9	26.2
Level of Service	B	A	C	C	D	C
Approach Delay (s)	9.6		23.8			33.0
Approach LOS	A		C			C

Intersection Summary			
HCM Average Control Delay	21.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	76.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
35: Dayton-Yellow Springs Road & Kauffman Avenue/SR 444

5/27/2011

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	819	387	143	70	154	348	149	489	105	345	280	719
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.96		1.00	0.90		1.00	0.97		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1787		1770	1669		1770	3445		1770	3157	
Flt Permitted	0.11	1.00		0.44	1.00		0.17	1.00		0.15	1.00	
Satd. Flow (perm)	201	1787		824	1669		324	3445		276	3157	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	910	430	159	78	171	387	166	543	117	383	311	799
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	910	589	0	78	558	0	166	660	0	383	1110	0
Turn Type	pm+pt			Perm			pm+pt			pm+pt		
Protected Phases	1	6			2		7	4		3	8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)	70.0	70.0		32.0	32.0		27.0	22.0		40.0	30.0	
Effective Green, g (s)	71.0	71.0		33.0	33.0		29.0	23.0		41.0	31.0	
Actuated g/C Ratio	0.59	0.59		0.28	0.28		0.24	0.19		0.34	0.26	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	563	1057		227	459		151	660		269	816	
v/s Ratio Prot	c0.46	0.33			0.33		0.06	0.19		c0.17	0.35	
v/s Ratio Perm	c0.50			0.09			0.21			c0.32		
v/c Ratio	1.62	0.56		0.34	1.22		1.10	1.00		1.42	1.95dr	
Uniform Delay, d1	35.5	14.9		34.8	43.5		43.9	48.5		33.4	44.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	285.5	2.1		4.1	115.6		102.3	35.0		211.0	170.1	
Delay (s)	321.0	17.0		38.9	159.1		146.3	83.5		244.5	214.6	
Level of Service	F	B		D	F		F	F		F	F	
Approach Delay (s)		201.6			144.4			96.1			222.2	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM Average Control Delay	180.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.51		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	127.4%	ICU Level of Service	H
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	28	334	987	145	179	0	895	619	176	79	483	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.89		1.00	1.00		1.00	0.97		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3143		1770	3539		1770	3422		1770	3523	
Flt Permitted	0.60	1.00		0.14	1.00		0.20	1.00		0.24	1.00	
Satd. Flow (perm)	1109	3143		261	3539		363	3422		452	3523	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	31	371	1097	161	199	0	994	688	196	88	537	17
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	31	1468	0	161	199	0	994	884	0	88	554	0
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	50.5	39.0		34.1	27.6		59.5	46.3		23.7	15.5	
Effective Green, g (s)	51.5	40.0		36.1	28.6		60.5	47.3		25.7	16.5	
Actuated g/C Ratio	0.43	0.33		0.30	0.24		0.50	0.39		0.21	0.14	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	580	1048		173	843		652	1349		198	484	
v/s Ratio Prot	0.01	c0.47		c0.06	0.06		c0.51	0.26		0.03	0.16	
v/s Ratio Perm	0.01			0.22			c0.26			0.06		
v/c Ratio	0.05	2.08dr		0.93	0.24		1.52	0.66		0.44	1.14	
Uniform Delay, d1	21.1	40.0		52.7	36.9		36.6	29.7		49.5	51.8	
Progression Factor	0.43	0.55		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.0	183.9		48.5	0.1		243.8	2.5		1.6	87.1	
Delay (s)	9.1	205.8		101.2	37.0		280.4	32.2		51.1	138.8	
Level of Service	A	F		F	D		F	C		D	F	
Approach Delay (s)		201.8			65.7			163.6			126.8	
Approach LOS		F			E			F			F	

Intersection Summary			
HCM Average Control Delay	163.2	HCM Level of Service	F
HCM Volume to Capacity ratio	1.41		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	125.9%	ICU Level of Service	H
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	367	495	473	769	366	133
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.91
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	3539	1583	1770	5085
Flt Permitted	0.95	1.00	1.00	1.00	0.42	1.00
Satd. Flow (perm)	1770	1583	3539	1583	786	5085
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	408	550	526	854	407	148
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	408	550	526	854	407	148
Turn Type		custom		Perm	Perm	
Protected Phases			2			6
Permitted Phases	8	8		2	6	
Actuated Green, G (s)	42.0	42.0	68.0	68.0	68.0	68.0
Effective Green, g (s)	43.0	43.0	69.0	69.0	69.0	69.0
Actuated g/C Ratio	0.36	0.36	0.57	0.57	0.57	0.57
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	634	567	2035	910	452	2924
v/s Ratio Prot			0.15			0.03
v/s Ratio Perm	0.23	c0.35		c0.54	0.52	
v/c Ratio	0.64	0.97	0.26	0.94	0.90	0.05
Uniform Delay, d1	32.1	37.9	12.7	23.5	22.5	11.2
Progression Factor	0.29	0.36	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	6.1	0.3	18.2	23.6	0.0
Delay (s)	9.4	19.8	13.0	41.7	46.1	11.2
Level of Service	A	B	B	D	D	B
Approach Delay (s)	15.3		30.8			36.8
Approach LOS	B		C			D

Intersection Summary			
HCM Average Control Delay	26.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	74.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			