

ENVIRONMENTAL ASSESSMENT
FOR
Grissom Air Reserve Base Indoor Firing Range

Draft



PREPARED BY:
U.S. Air Force

October 2022

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1 **COVER SHEET**

2 **ENVIRONMENTAL ASSESSMENT**

3 **INDOOR FIRING RANGE**

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- 8 a. Lead Agency: U.S. Air Force (USAF)
- 9 b. Proposed Action: Construct, operate, and maintain a new indoor small arms firing range and
- 10 potentially demolish the existing outdoor firing range.
- 11 c. Written comments and inquiries regarding this document should be directed to:
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- 16 d. Designation: Draft Environmental Assessment (EA)

17 **Abstract:** Grissom Air Reserve Base (ARB) proposes to construct, operate, and maintain a new indoor

18 small arms firing range and potentially demolish the existing outdoor firing range in order to fulfill the small

19 arms training requirements of Airmen within the 434th Security Forces Squadron (SFS). This EA evaluates

20 the potential environmental impacts associated with two alternatives for this Proposed Action: the Preferred

21 Alternative and the No Action Alternative.

22 Under the Preferred Alternative, the USAF would replace the existing outdoor firing range with a new indoor

23 firing range with sufficient space to complete all small arms training requirements at Grissom ARB. This

24 would obviate the need for Airmen to travel off-site to complete weapons training and qualification and

25 would eliminate existing surface danger zone non-compliance concerns. The Preferred Alternative includes

26 three primary components: construction of the indoor firing range, operation and maintenance of the indoor

27 firing range, and the option to demolish the outdoor firing range (if sufficient funding is available).

28 Under the No Action Alternative, the USAF would retain the deficient existing conditions of the outdoor firing

29 range. No new construction would be performed and the existing facility would not be demolished. The

30 434th SFS would continue training at Grissom ARB, but Airmen would still travel to off-base facilities in

31 order to supplement their training and fulfill required weapons training and qualification.

32 The following environmental resources were analyzed in the EA: visual resources, air quality and climate,

33 noise, earth resources, water resources, biological resources, cultural resources, utilities, socioeconomics

34 and environmental justice, transportation, and hazardous and toxic materials and waste. Resources that

35 would not be meaningfully or measurably affected by the Proposed Action, including airspace and land use

36 and zoning, were dismissed from detailed analysis. Based on the analysis presented in this EA, the USAF

37 has determined that with incorporation of best management practices and minimization measures, the

38 Proposed Action would have no significant impacts on the human or natural environment.

39 This Draft EA and a Draft Finding of No Significant Impact (FONSI) are available on the Grissom ARB 434th

40 Air Refueling Wing website at <https://www.grissom.afrc.af.mil/>.

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ABBREVIATIONS AND ACRONYMS

ACAM	Air Conformity Applicability Model	EIAP	Environmental Impact Analysis Process
ADP	Area Development Plan	EISA	Energy Independence and Security Act
AFI	Air Force Instruction	EJ	Environmental Justice
AFMAN	Air Force Manual	EO	Executive Order
AFPD	Air Force Policy Directive	ERP	Environmental Restoration Program
AICUZ	Air Installations Compatible Use Zones	ESA	Endangered Species Act
APE	Area of Potential Effects	FAA	Federal Aviation Administration
ARB	Air Reserve Base	FPPA	Farmland Protection Policy Act
ARW	Air Refueling Wing	FONSI	Finding of No Significant Impact
AT/FP	Anti-terrorism/ Force Protection	FY	Fiscal Year
BASH	Bird/wildlife Air Strike Hazard	GHG	Greenhouse Gas
BCC	Birds of Conservation Concern	GWP	Global Warming Potential
BMP	Best Management Practice	HAP	Hazardous Air Pollutant
CAA	Clean Air Act	HEPA	High-efficiency Particulate Air
CEQ	Council on Environmental Quality	HTMW	Hazardous and Toxic Materials and Waste
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980	HUD	U.S. Department of Housing and Urban Development
CFR	Code of Federal Regulations	HVAC	Heating, Ventilation, and Air Conditioning
CGP	Construction General Permit	HWMP	Hazardous Waste Management Plan
CH ₄	Methane	IDEM	Indiana Department of Environmental Management
CO	Carbon Monoxide	IDNR	Indiana Department of Natural Resources
CO ₂	Carbon Dioxide	IPaC	Information for Planning and Consultation
CO _{2e}	Carbon Dioxide Equivalent	ISWMP	Integrated Solid Waste Management Plan
CSGP	Construction Stormwater General Permit	L _{eq}	Equivalent Sound Level
CWA	Clean Water Act	lbs	Pounds
dB	Decibel	LID	Low Impact Development
dBA	A-weighted Decibel	LOD	Limits of Disturbance
DNL	Day-Night Sound Level	LQG	Large Quantity Generator
DoD	Department of Defense		
EA	Environmental Assessment		
ECP	Entry Control Point		

MEC	Munitions and Explosives of Concern	SHPO	State Historic Preservation Offices
MSL	Mean Sea Level	SIP	State Implementation Plan
N ₂ O	Nitrous Oxide	SO ₂	Sulfur Dioxide
NAAQS	National Ambient Air Quality Standards	SPCCP	Spill Prevention, Control, and Countermeasure Plan
NAGPRA	Native American Graves Protection and Repatriation Act	SWPPP	Stormwater Pollution Prevention Plan
NEPA	National Environmental Policy Act	T&E	Threatened and Endangered
NHPA	National Historic Preservation Act of 1966	TMDL	Total Maximum Daily Load
NO _x	Nitrous Oxide	µg/m ³	Micrograms per Cubic Meter
NPDES	National Pollutant Discharge Elimination System	UFC	Unified Facilities Criteria
		U.S.	United States
		USACE	United States Army Corps of Engineers
NRCS	Natural Resources Conservation Service	USAF	United States Air Force
O ₃	Ozone	USC	United States Code
Pb	Lead	USDA	United States Department of Agriculture
PCB	Polychlorinated Biphenyl	USEPA	United States Environmental Protection Agency
PM	Particulate Matter		
ppb	Parts per Billion	USFWS	United States Fish and Wildlife Service
ppm	Parts per Million	USGS	United States Geologic Survey
RCRA	Resource Conservation and Recovery Act	VOC	Volatile Organic Compound
ROI	Region of Influence	WOUS	Waters of the U.S.
SDZ	Surface Danger Zone		
SF ₆	Sulfur Hexafluoride		
SFS	Security Forces Squadron		

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1.0 PURPOSE AND NEED

1.1 INTRODUCTION

This environmental assessment (EA) evaluates the potential environmental impacts associated with the United States (U.S.) Air Force's (USAF) Proposed Action to construct, operate, and maintain a new indoor small arms firing range, and demolish the existing outdoor firing range, at Grissom Air Reserve Base (ARB) in order to meet the base's training requirements. Grissom ARB is located in Miami County and Cass County, Indiana (see **Figure 1**).

The USAF prepared this EA in compliance with the National Environmental Policy Act (NEPA) of 1969, as amended (42 U.S. Code [USC] 4321, et seq.); the Council on Environmental Quality (CEQ) regulations for implementing the procedural provisions of NEPA (40 Code of Federal Regulations [CFR] Parts 1500-1508); and the Air Force Environmental Impact Analysis Processes (EIAP) (32 CFR Part 989).

To facilitate public review of this EA, the USAF published this Draft EA and a Draft Finding of No Significant Impact (FONSI) on the Grissom ARB 434th Air Refueling Wing (ARW) website at <https://www.grissom.afrc.af.mil/>.

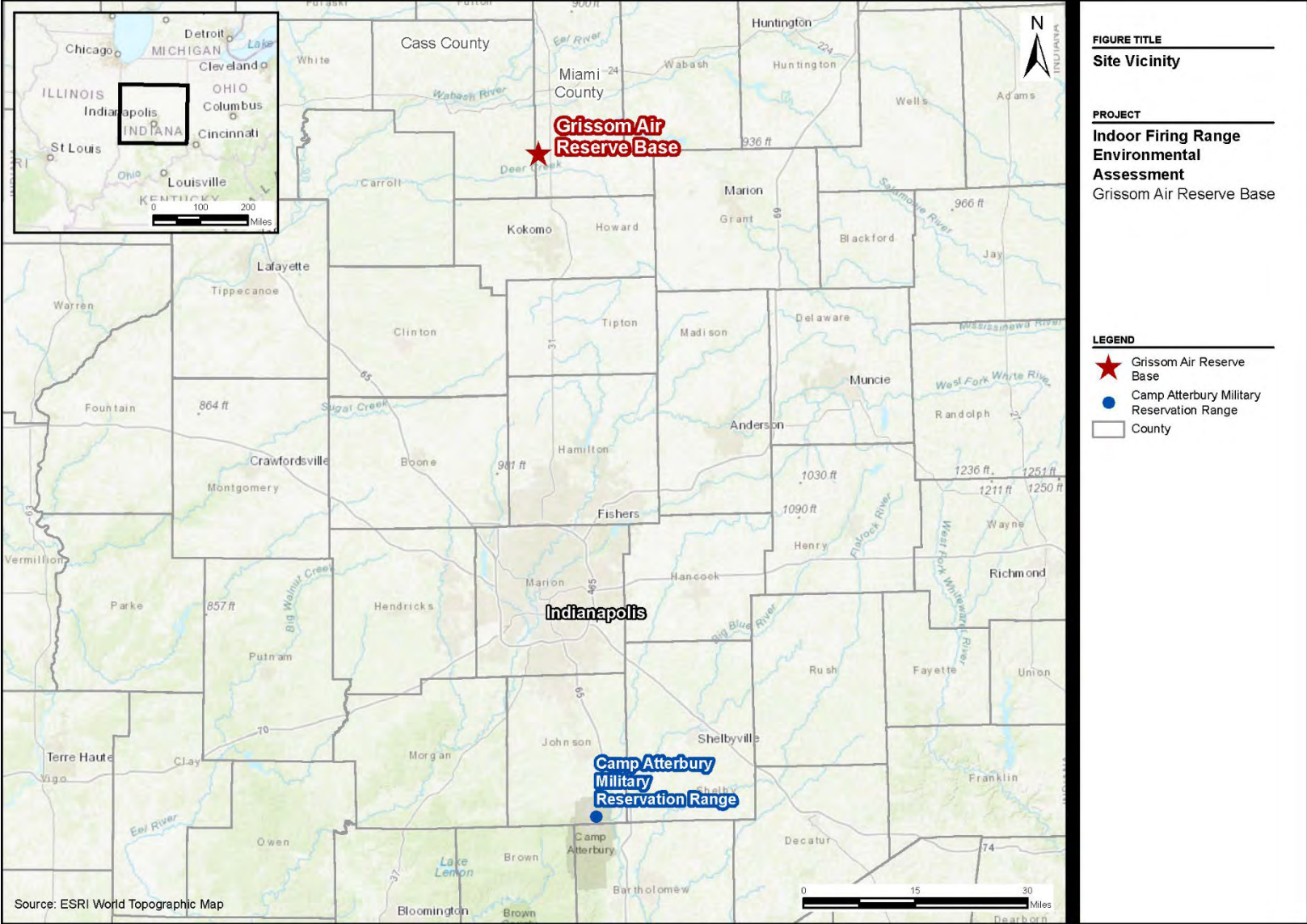
1.2 PURPOSE AND NEED

Grissom ARB is home to the 434th ARW, which has a mission to develop and maintain the operational capability of its units and train reservists for worldwide duty. Additionally, Grissom ARB provides a substantial portion of the Department of Defense's (DoD) aerial refueling capabilities, and is one of only five ARBs nationwide (Grissom ARB, 2022a). The 434th ARW at Grissom ARB consists of three major organizations, which are further comprised of various squadrons, each with its own mission and requirements (Grissom ARB, 2022a). The Proposed Action to construct a new indoor firing range would support mission requirements of the 434th Security Forces Squadron (SFS), which provides force protection to base and deployed personnel and weapons systems, and must be trained and equipped for deployment worldwide (Grissom ARB, 2013).

The 434th SFS is required to train and qualify the equivalent of 1,341 students from 15 different units annually with a variety of small arms, including the use of up to .45 caliber handguns, 12 gauge shotguns, and rifles up to 7.62 mm. An outdoor firing range with 15 firing line positions is currently used for this training; however, this existing range, constructed in 1997, is outdated and has insufficient firing lanes and facility layout. It does not enable training requirements to be met. Given the volume of monthly training requirements and the limited size of the existing outdoor firing range, 89 range days are required to fulfill these requirements, but only 24 range days are typically available due to weapons training constraints posed by weather and lighting requirements. In addition, the existing outdoor firing range is not compliant with minimum surface danger zone (SDZ) distances.

As a result of the condition of the outdoor firing range and these constraints, Grissom ARB has been unable to facilitate all required training for its Airmen on-site. Airmen have been sent to Camp Atterbury Military Reservation Range, approximately 106 miles away, to supplement weapons qualification, although range schedules at Camp Atterbury are not guaranteed and are subject to change (e.g., due to constraints from neighboring ranges or flight activities). Further, transportation of Airmen and explosives requires the use of multiple vehicles and drivers, and may take up to a full training day. Construction of a new, indoor firing range would enable Grissom ARB to meet the training requirements of the 434th SFS on-base: a total of only 48 range days per year would be needed to satisfy training requirements, and transportation to Camp Atterbury would no longer be needed.

Figure 1: Grissom ARB Site Vicinity



The purpose of the Proposed Action, therefore, is to replace the existing deficient outdoor firing range at Grissom ARB with a new, operational indoor firing range to support the small arms training requirements of military and security forces personnel at the base. The new indoor firing range would be a modern facility that supports training regardless of the time of day or outdoor weather conditions, and which eliminates SDZs. The Proposed Action is needed to address training inefficiencies caused by the outdated conditions of the existing outdoor firing range and the increase in training load since the outdoor firing range was constructed, which have resulted in the inability of all Airmen to complete mandatory weapons training at Grissom ARB.

1.3 INTERAGENCY AND INTERGOVERNMENTAL COORDINATION/CONSULTATION

The USAF coordinated with the following federal, state, and local agencies with jurisdiction by law or special expertise over the Proposed Action to inform the range of issues to be addressed in the EA.

- | | |
|--|---|
| • U.S. Army Corps of Engineers (USACE) | • Indiana Department of Natural Resources (IDNR), Division of Fish and Wildlife |
| • U.S. Fish and Wildlife Service (USFWS) | |
| • Federal Aviation Administration (FAA) | • IDNR, Division of Historic Preservation and Archaeology |
| • U.S. Environmental Protection Agency (USEPA) | |
| • U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS) | • IDNR, Division of Nature Preserves |
| • Indiana Department of Environmental Management (IDEM) | • Cass County Planning Department |
| | • Cass County Soil and Water Conservation District |
| | • Miami County Planning Department |
| | • Miami County Soil and Water Conservation |

Coordination letters, and responses received, are consolidated in **Appendix A** and discussed in **Section 3.0**, as appropriate. Grissom ARB's consultation with the Indiana State Historic Preservation Office (SHPO; i.e., the IDNR Division of Historic Preservation and Archaeology) under Section 106 of the National Historic Preservation Act of 1966 (NHPA) is included in **Appendix B**.

Consistent with NHPA implementing regulations (36 CFR Part 800), DoD Instruction 4710.02, *Interactions with Federally-Recognized Tribes*, Air Force Instruction (AFI) 90-2002, *Air Force Interaction with Federally-Recognized Tribes*, and Air Force Manual (AFMAN) 32-7003, *Environmental Conservation*, the USAF is also consulting with federally recognized tribes that are historically affiliated with the geographic region of Grissom ARB regarding the potential for the Proposed Action to affect properties of cultural, historical, or religious significance to the tribes. A record of this consultation is included in **Appendix C**.

1.4 PUBLIC AND AGENCY REVIEW OF THE EA

In accordance with CEQ and USAF NEPA regulations, this Draft EA and Draft FONSI have been made available for a 30-day public review and comment period between October 22, 2022, and November 20, 2022. A Notice of Availability for the Draft EA and Draft FONSI was published in the *Peru Tribune* on October 22, 2022.

The Draft EA and Draft FONSI were published digitally on the Grissom ARB 434th ARW website at <https://www.grissom.afrc.af.mil/>. Printed copies of the Draft EA and Draft FONSI are available for public review at the Peru Public Library, 102 East Main Street, Peru, Indiana 46970.

139 During the Draft EA public review period, written comments may be mailed to Trisha McClain, Biological
140 Scientist, 7104 S. Warthog Street, Grissom ARB, IN 46971; or emailed to trisha.mcclain@us.af.mil. The
141 USAF will only respond to public comments during specified, formal public comment and review periods.

2.0 PROPOSED ACTION AND ALTERNATIVES

2.1 PROPOSED ACTION

The Proposed Action is to construct a new, approximately 23,000 square foot indoor small arms firing range at Grissom ARB to replace the approximately 8,805 square foot existing, outdated, and insufficient outdoor firing range. The Proposed Action includes construction, operation, and maintenance of the indoor firing range, with the option to demolish the outdoor firing range.

2.2 SCREENING OF ALTERNATIVES

The USAF developed selection standards to evaluate specific reasonable alternatives by which to implement the Proposed Action. "Reasonable alternatives" are those that could be utilized to meet the purpose of and need for the Proposed Action. The USAF's selection standards used to evaluate reasonable alternatives include the following:

1. **Standard 1 – Compliance with Training Requirements:** Grissom ARB is currently not able to support all required training for its Airmen, and 434th SFS personnel must travel to Camp Atterbury in order to satisfy these requirements. The USAF evaluated each alternative based on its potential to allow Airmen of the 434th SFS to complete full weapons training and qualification within Grissom ARB, and eliminate the need for off-base training.
2. **Standard 2 – Construction Feasibility:** Soil contamination from lead could be present in the vicinity of the existing outdoor firing range due to past firing activities and projectile remnants. The Proposed Action should be implemented in such a way so as to minimize costs associated with potential site remediation and the amount of clean fill required. Additionally, the amount of surface leveling and fill that would be required to support new construction would vary based on the underlying topography at different sites within Grissom ARB. The USAF evaluated each alternative based on the potential need for remediation and restoration, extent of surface leveling and fill, and associated expenses that would be required in order to address soil contamination and topographic variation prior to constructing a new firing range.
3. **Standard 3 – Continuation of Weapons Qualification:** The premature closure of the outdoor firing range prior to constructing the new indoor firing range would prevent any small arms training from occurring at Grissom ARB, and all such training would need to be completed off-base. Increased transport to Camp Atterbury would further impact Airmen training schedules and result in lost time and additional expense in completing training. Construction and demolition activities, including any unexpected delays in the process, could leave Grissom ARB without a functional small arms range for a lengthy period of time. The USAF evaluated each alternative based on its ability to maintain some small arms training capacity on-base throughout the majority of the Proposed Action.

2.3 EVALUATED ALTERNATIVES

2.3.1 Preferred Alternative

The Preferred Alternative includes construction of a new, approximately 23,000 square foot indoor small arms firing range at Grissom ARB in order to fulfill training requirements of the 434th SFS. If sufficient funding is available, the existing 8,805 square foot outdoor firing range would be demolished. The Preferred Alternative includes three primary components, described below. While the demolition of the existing

outdoor firing range is an optional component of the Proposed Action, this alternative assumes demolition would occur, in order to assess all potential impacts. The overall limits of disturbance (LOD) would encompass approximately 7.6 acres (see **Figure 2**). The entire Project Site is located within the training area at Grissom ARB.

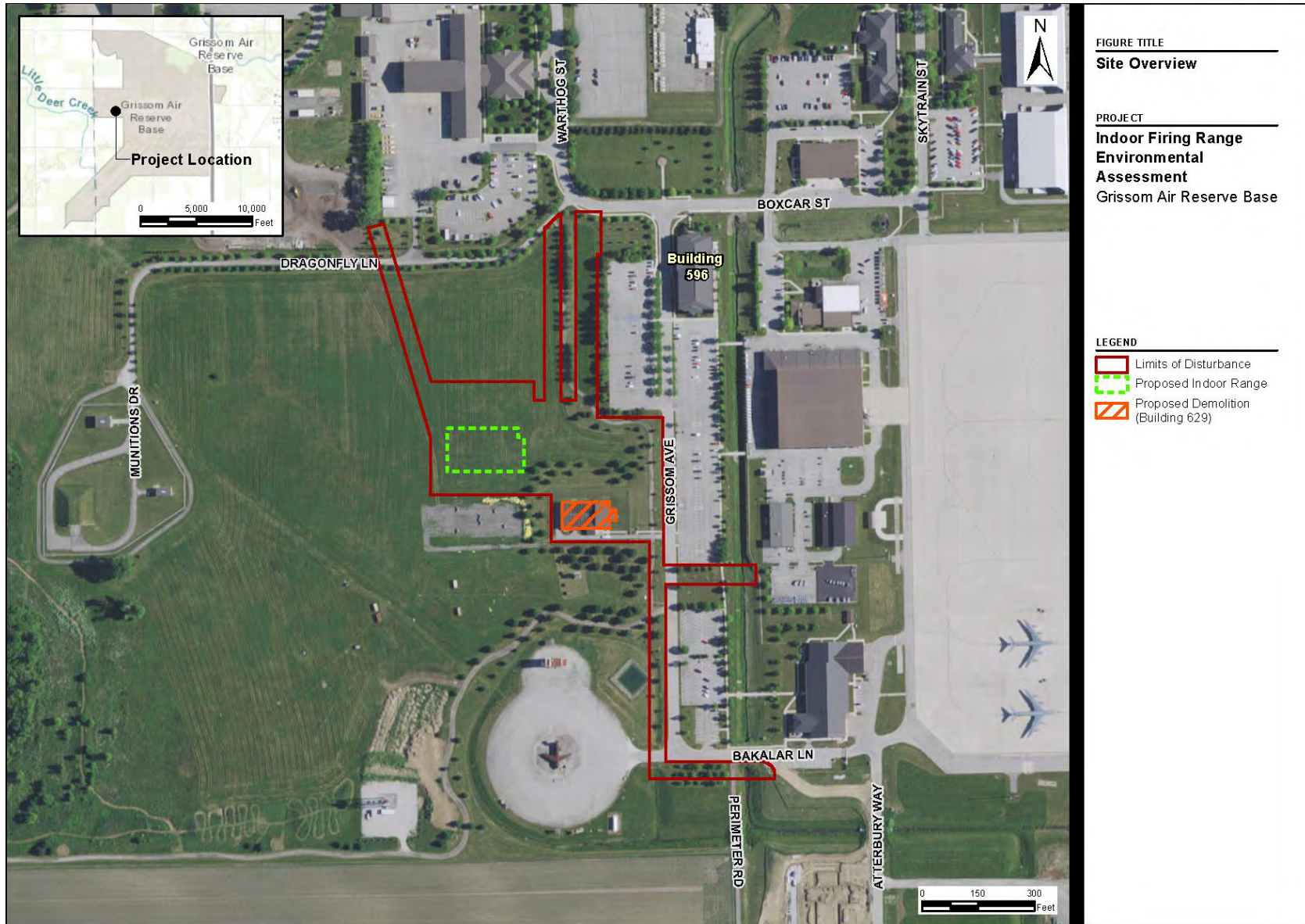
2.3.1.1 Construction of New Indoor Firing Range

The footprint for the indoor firing range encompasses approximately 0.5 acres, west of Grissom Avenue and south of Dragonfly Lane, and is located adjacent to the northwest corner of the existing outdoor firing range. This site is currently undeveloped and consists of a large, maintained grassy area that is vegetated with grass and a few trees. The proposed indoor firing range would be a 21 lane live fire range facility with 25 meter firing lanes to support small arms training. Because the new range would be indoors, it would fully contain all SDZs, thus eliminating the existing SDZ non-compliance concerns associated with the outdoor firing range. The new facility would also include associated administration, classroom, maintenance, weapons cleaning, storage, utility, and building support rooms, as well as restrooms. Site access would be provided off the parking lot along Grissom Avenue, and would circle the proposed facility to provide supplies and maintenance. The access road would be approximately 12 feet wide in order to accommodate fire trucks that may need to access the indoor firing range in an emergency. No new dedicated parking would be provided for the indoor firing range, but ample parking exists in the vicinity of the proposed indoor firing range and a proposed sidewalk connecting Grissom Avenue to the facility would allow pedestrians to reach the indoor firing range. The existing outdoor firing range similarly has no dedicated parking.

The proposed indoor firing range would require various utilities, including an exhaust system; heating, ventilation, and air conditioning (HVAC) system; fire protection; telecommunications; sanitary sewer; natural gas and electric; and water. No utilities are currently present at the Project Site. Utility connections for natural gas, electricity, and water are located along Grissom Avenue and Dragonfly Lane, and telecommunications would tie in to an existing connection at Building 596, located east of Grissom Avenue. A sanitary sewer connection is present at the existing outdoor firing range, and would be explored as a potential tie in point for the proposed new facility. Potential utility corridors are included in the LOD shown in **Figure 2**.

Design of the indoor firing range facility would conform to criteria established in the DoD's Unified Facilities Criteria (UFC) 4-179-02, *Small Arms Ranges*. The facility would include anti-terrorism/force protection (AT/FP) and other physical security measures, and would comply with the AT/FP requirements in accordance with DoD's UFC 4-010-01, *DoD Minimum Antiterrorism Standards for Buildings*. The facility design would also comply with requirements under UFC 1-200-02, *High Performance and Sustainable Building Requirements*. The facility would use cost-effective sustainability strategies to reduce energy and water use and reduce waste in design materials and construction practices. A life-cycle cost assessment would be performed to evaluate the building massing, mechanical system options, and potential for renewable energy and water reuse systems.

Figure 2: Site Layout for Preferred Alternative



The architectural design of the proposed indoor firing range would be driven by the functional requirements of an indoor firing range, and the design, including finishes and colors, would meet the Grissom ARB Base Standards for Grissom Blend Industrial Facilities/Facility Group 3 categories to the extent feasible. The indoor firing range and other facility rooms would be contained within one large, rectangular, block-style building with a sloping roof. The firing range and mechanical rooms would be contained at the end of the facility with the tallest roof height, and this section of the facility would have a membrane roof with turned down fascia, concrete walls, brick up to 3 to 4 feet high, and metal siding. The firing range would include airlock vestibules, steel deflector plates, overlapping baffles, bullet traps behind the targets, and a target retrieval system. Fire protection and sound reduction and absorption elements would also be incorporated. The other supporting rooms would be located under the lower portions of the roof, and this section of the building would maintain a low-profile with brick exterior and a standing seam metal roof. The physical design of the facility would also include accessibility elements.

Construction vehicles would likely utilize Grissom Avenue and the asphalt drive to transport materials and equipment to the Project Site. Construction staging areas have not yet been identified, but would likely occur either within the LOD or within adjacent existing parking lots. Construction activities would be broken into various phases: site preparation, to include site clearing, excavation, and grading; extension and installation of utility systems; installation of foundation piles and concrete foundation slab; erection of structural concrete and steel; and modification or extension of roads and pedestrian sidewalks to the new facility. Construction is anticipated to begin in fiscal year (FY) 2023 and be completed within two years.

Construction activities would be conducted in accordance with the applicable requirements of the USEPA National Pollutant Discharge Elimination System (NPDES) and associated permits to manage the quantity and quality of stormwater discharged from the Project Site and minimize the potential for pollution and sedimentation. The project would also comply with applicable requirements of Section 438 of the Energy Independence and Security Act (EISA), which requires federal projects to incorporate, to the maximum extent technically feasible, low impact development (LID) measures to maintain the pre-development hydrology of a site. Such concepts could include, but would not be limited to, permeable pavement, rain gardens, and creation of stormwater management areas.

2.3.1.2 Operation and Maintenance of New Indoor Firing Range

Once completed, Airmen would be able to complete all of their small arms training requirements at the new indoor firing range at Grissom ARB, and would not have to travel to Camp Atterbury to complete training. The indoor firing range would be used as needed to fulfill training requirements, and use would not be constrained by the time of day or weather conditions. The facility would contain its own storage and mechanical rooms to assist with maintenance, and the asphalt drive would be used to access these spaces and perform maintenance on the bullet trap. The facility would be designed to have a 40-year useful life. The Proposed Action does not include any planned changes to the number or type of units to conduct small arms training and qualification at Grissom ARB; rather, it would enable all existing training and qualification requirements to be met on-base.

2.3.1.3 Demolition of Existing Outdoor Firing Range

The Preferred Alternative would include demolition of the existing outdoor firing range, also referred to as Facility 629, on Grissom ARB. Proposed demolition of the outdoor firing range would not occur until the new indoor firing range is operational. The outdoor firing range is located on an approximately 0.2-acre site west of Grissom Avenue and south of Dragonfly Lane. It consists of 15 firing lanes, and various connected paved areas used to access storage for the facility. An asphalt drive also circles the facility and provides access to Grissom Avenue. No defined parking areas are present at the existing outdoor firing range. Demolition would adhere to established practices and waste management and disposal procedures. Lead

contamination (and potentially asbestos and polychlorinated biphenyls [PCBs]) are presumed present within the outdoor firing range, and contractors would adhere to appropriate practices for managing and disposing of hazardous materials during demolition. Lead contamination could also be present in the vicinity of the outdoor firing range due to its open air roof. Ground-disturbing activities occurring within 100 feet of the existing outdoor firing range may require lead sampling to identify and delineate any lead contamination beyond the facility itself.

Construction of the Preferred Alternative would ensure that weapons training for the 434th SFS would be able to be completed at Grissom ARB, eliminating the need for travel to Camp Atterbury to fulfill training requirements. The Preferred Alternative would construct a range of sufficient size for which use would not be constrained by weather or time of day. Moreover, during the construction phase of the Preferred Alternative, current weapons training would continue at Grissom ARB, eliminating the potential for further interruptions to training schedules and additional travel to Camp Atterbury. Finally, construction of the Preferred Alternative is the most feasible given the possibility of soil contamination and the underlying topography, as it would require the least amount of fill material and minimize construction costs. Therefore, the USAF determined that the Preferred Alternative meets each identified selection standard and best achieves the purpose of and need for the Proposed Action.

2.3.2 No Action Alternative

Under the No Action Alternative, Grissom ARB would retain the existing outdated and insufficient outdoor firing range. The outdoor firing range would not be demolished, and no new construction would occur. The 434th SFS would continue training at Grissom ARB, but Airmen would still travel to Camp Atterbury in order to supplement their training and fulfill weapons training and qualifications requirements. While the No Action Alternative would not meet the Proposed Action's purpose and need, it is analyzed in this EA to provide a comparative baseline with the Preferred Alternative.

2.4 ALTERNATIVES ELIMINATED FROM FURTHER CONSIDERATION

The USAF initially considered two additional alternatives to achieve the purpose of and need for the Proposed Action: (1) renovate the existing outdoor firing range; and (2) new construction along Dragonfly Lane. The USAF eliminated these alternatives from further consideration because they did not meet one or more of the selection standards (see **Section 2.2**), as described below.

2.4.1 Renovate the Existing Outdoor Firing Range

The USAF considered renovating the existing outdoor firing range into an enclosed indoor firing range. As part of the renovation, the range orientation would be shifted from its current east/west axis to a north/south axis, facing Dragonfly Lane. The western half of the existing outdoor firing range would remain and would be enclosed, while a build-out to the north would be constructed. Other installations have attempted a similar renovation process, albeit at a significant cost. Additionally, during the renovation of the outdoor firing range, no weapons training would be able to occur at Grissom ARB, and all training would need to be completed off-base at Camp Atterbury, resulting in additional trips and further impacting Airmen training schedules. Lead contamination is also presumed present in the existing outdoor range, and may be present in the vicinity of the range, due to past firing activities and projectile remnants, which would need to be managed prior to or concurrent with the renovation. Completion of site survey and remediation activities would be challenged by ongoing construction and renovation activities at the same site, and would likely add time and expense to the construction schedule.

The USAF determined that renovation of the existing outdoor firing range would result in reduced training opportunities at Grissom ARB during construction, leading to significantly increased travel to Camp

307 Atterbury, and would require site restoration activities concurrent with renovations. Therefore, this
308 alternative did not meet Selection Standards #2 and #3, and thus was eliminated from further consideration.

309 **2.4.2 New Construction along Dragonfly Lane**

310 The USAF considered constructing a new indoor firing range along the southern side of Dragonfly Lane.
311 This location was considered due to plans presented in the Grissom ARB Area Development Plan (ADP)
312 (Grissom ARB, 2020), although the site has a low elevation that would require substantial amounts of fill
313 material, and which would largely increase construction costs. In addition, as the site would be further
314 removed from Grissom Avenue and the existing outdoor firing range, the facility would be unable to utilize
315 parking alongside that road. Placement of the facility at this site would require the construction of additional
316 infrastructure to support site access.

317 The USAF determined that placing the indoor firing range along Dragonfly Lane would result in significant
318 costs to address site elevation and construct additional paved features, impacting construction feasibility.
319 Therefore, this alternative did not meet Selection Standard #2, and thus was eliminated from further
320 consideration.

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 INTRODUCTION

This chapter describes the affected environment and potential environmental consequences for resource areas that could be affected by the Preferred Alternative. Resources dismissed from detailed analysis in the EA, and the justification for their dismissal, are presented in **Table 1**.

Table 1: Resources Dismissed from Detailed Analysis in the EA

Environmental Resource	Justification
Airspace	Construction activities associated with the Proposed Action would have no potential to interfere with airspace operations. The Proposed Action would not create any substantial bird/wildlife air strike hazard (BASH) risks, and the contractor would obtain a Temporary Construction Waiver, if needed, for work within Grissom ARB's Air Installations Compatible Use Zones (AICUZ) prior to starting construction.
Land Use and Zoning	The Proposed Action would occur entirely on-base and has no potential to affect off-base land. Additionally, the Proposed Action is a part of the short-range preferred alternative for the Grissom ARB Training District ADP and is compatible with existing and future land uses on the base (Grissom ARB, 2020).

3.2 VISUAL RESOURCES

Visual resources refer to the visible features on a landscape, both manmade and natural, moving and stationary. Although visual quality is partly subjective, visual characteristics that often render an area less attractive include clashing or incoherent architectural elements; unorganized mixing of open and built spaces; presence of litter; and dead or dying vegetation. Actions that remedy or mitigate such characteristics generally improve visual quality.

The Region of Influence (ROI) for visual resources includes the viewshed from which the Preferred Alternative would be potentially visible. The ROI is generally bounded by Dragonfly Lane to the north, Grissom Ave to the east, S 500 W to the west, and W 800 S to the south.

3.2.1 Affected Environment

The overall visual landscape of the ROI is lightly developed with USAF facilities and open space on Grissom ARB and agricultural land off base. Visibility to the Project Site within the ROI is relatively high, as the Project Site is in an open field. The visibility is mainly limited to military stakeholders on base; however, given the location of the Project Site, the proposed indoor firing range could potentially be visible to the public along the off-base roads near Grissom ARB. Approximately four private residences may have views of the Project Site.

3.2.2 Environmental Consequences

A visual resources impact would be significant if it would introduce discordant elements or remove important (i.e., visually appealing) elements in a previously cohesive and valued viewscape.

3.2.2.1 Preferred Alternative

Construction of the Preferred Alternative would slightly alter viewsheds in the ROI by demolishing infrastructure associated with the existing outdoor firing range on Grissom ARB and by replacing it with a new facility in the open space adjacent to the existing outdoor firing range. Views of the demolition and construction activities would primarily be limited to personnel on-base. While the Project Site is surrounded by open space and a generally flat topography which could allow for visibility of construction work, the base is surrounded by fencing that would block motorist views from surrounding roads. Any construction that may be visible through the fencing would be generally consistent with other views of facility construction that motorists typically experience.

Personnel working at Grissom ARB would have clear views of demolition and construction activities for the duration of the project. These views would be most prominent while traveling along Grissom Avenue to the east and Dragonfly Lane to the north. The Project Site would also be visible from adjacent parking lots and buildings, as there are no trees or other natural or built features to obstruct the Project Site. Proposed demolition and construction activities, however, would be consistent with other proposed development activities under the Grissom ARB Training District ADP, and would not be incongruous on the landscape. Overall, demolition and construction activities occurring under the Preferred Alternative would have *short-term, negligible adverse impacts* on visual resources for personnel within the ROI.

The Preferred Alternative would permanently alter the viewscape in the ROI by constructing a new building in the open space adjacent to the existing outdoor firing range. The proposed indoor firing range would constitute a new built feature on a primarily open, lightly developed landscape; however, the design of the facility would be consistent with the character of other buildings in the viewshed and would meet Grissom ARB design standards. As the existing outdoor firing range would be demolished and replaced with the indoor firing range, construction of the proposed facility therefore would not introduce discordant elements into the ROI. In addition, demolition of the existing outdoor firing range would remove this feature that is outdated and in disrepair, potentially resulting in an improvement in the quality of the viewscape. Overall, the Preferred Alternative would have *long-term, negligible adverse impacts* on visual resources from new construction in an undeveloped area, and *long-term, beneficial impacts* on visual resources from the replacement of the old outdoor firing range with the new, modern indoor firing range.

3.2.2.2 No Action Alternative

Under the No Action Alternative, the proposed indoor firing range at Grissom ARB would not be constructed and there would be *no impacts* to visual resources. No demolition or construction activities would be performed. The viewshed surrounding the Project Site would remain under current conditions.

3.3 AIR QUALITY AND CLIMATE

Air quality conditions at a given location are a function of several factors including the quantity and type of pollutants emitted locally and regionally, as well as the dispersion rates of pollutants in the region. Primary factors affecting pollutant dispersal include wind speed and direction, atmospheric stability, climate and temperature, and topography.

The ROI for air quality is the Wabash Valley Intrastate Air Quality Control Region, which includes 25 counties in Indiana.

3.3.1 Affected Environment

3.3.1.1 Criteria Pollutants

National Ambient Air Quality Standards (NAAQS) are established by the USEPA for six “criteria pollutants” (as listed under Section 108 of the Clean Air Act [CAA] of 1970) (see **Table 2**): carbon monoxide (CO); lead (Pb); nitrogen oxides (NO_x); ozone (O₃); particulate matter (PM), divided into two size classes of 1) aerodynamic size less than or equal to 10 micrometers (PM₁₀), and 2) aerodynamic size less than or equal to 2.5 micrometers (PM_{2.5}); and sulfur dioxide (SO₂). The State of Indiana has adopted the NAAQS to regulate air pollution levels.

The ambient air quality in an area is characterized in terms of whether it complies with the NAAQS. Areas where monitored outdoor air concentrations are within an applicable NAAQS are considered in *attainment* of that NAAQS. If sufficient ambient air monitoring data are not available to make a determination, the area is instead deemed as *attainment/unclassifiable*. Areas where monitored outdoor air concentrations exceed the NAAQS are designated by the USEPA as *nonattainment*. Nonattainment designations for some pollutants (e.g., O₃) can be further classified based on the severity of the NAAQS exceedances. Lastly, areas that have historically exceeded the NAAQS but have since instituted controls and programs that have successfully remedied these exceedances are known as *maintenance* areas.

The General Conformity Rule of the federal CAA mandates that the federal government abide by approved State Implementation Plans (SIP) (i.e., air quality control plans). Air Force Policy Directive (AFPD) 32-70, *Environmental Considerations in Air Force Programs and Activities*, mandates that the USAF comply with all federal, state, and local environmental laws and standards. In accordance with AFPD 32-70, AFMAN 32-7002, *Environmental Compliance and Pollution Prevention*, explains responsibilities and specific details on how to comply with the CAA and other federal, state, and local air quality regulations. This AFMAN provides further and more specific instruction on the requirements of the USAF’s EIAP for air quality promulgated at 32 CFR 989.30, which mandates that EIAP documents, such as this EA, address General Conformity.

According to the USAF’s attainment list provided by the Air Force Civil Engineer Center, Grissom ARB is located in an area that is considered *attainment/unclassifiable* for all criteria pollutants (USAF, 2020). Grissom ARB maintains a federally enforceable state operating permit issued by the state of Indiana; the USAF is responsible for ensuring that any base emissions are compliant with air quality thresholds established within this permit.

3.3.1.2 Climate Change and Greenhouse Gas Emissions

The primary long-lived greenhouse gases (GHGs) directly emitted by human activities are carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride (SF₆). To estimate global warming potential (GWP), all GHGs are expressed relative to a reference gas, CO₂, which is assigned a GWP equal to 1. All six GHGs are multiplied by their GWP and the results are added to calculate the total equivalent emissions of CO₂ (CO₂e). However, the dominant GHG emitted is CO₂, mostly from fossil fuel combustion (approximately 79 percent). This EA considers CO₂e as the representative GHG emission.

Table 2: National and Indiana Ambient Air Quality Standards

Pollutant	Primary/ Secondary	Averaging Time	Level	Form
Carbon Monoxide (CO)	Primary	8-hour	9 parts per million (ppm)	Not to be exceeded more than once per year
		1-hour	35 ppm	
Lead	Primary and Secondary	Rolling 3-month average	0.15 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) ⁽¹⁾	Not to be exceeded
Nitrogen Dioxide (NO ₂)	Primary	1-hour	100 (parts per billion) ppb	98th percentile, averaged over 3 years
	Primary and Secondary	Annual	53 ppb ⁽²⁾	Annual mean
Ozone	Primary and Secondary	8-hour	0.070 ppm ⁽³⁾	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
Particulate matter equal to or less than 2.5 microns in diameter (PM _{2.5})	Primary	Annual	12 $\mu\text{g}/\text{m}^3$	Annual mean, averaged over 3 years
	Secondary	Annual	15 $\mu\text{g}/\text{m}^3$	Annual mean, averaged over 3 years
	Primary and Secondary	24-hour	35 $\mu\text{g}/\text{m}^3$	98th percentile, averaged over 3 years
Particulate matter equal to or less than 10 microns in diameter (PM ₁₀)	Primary and Secondary	24-hour	150 $\mu\text{g}/\text{m}^3$	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide (SO ₂)	Primary	1-hour	75 ppb ⁽⁴⁾	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
	Secondary	3-hour	0.5 ppm	Not to be exceeded more than once per year

⁽¹⁾ In areas designated nonattainment for lead standards prior to the promulgation of the current (2008) standards, and for which implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standards (1.5 $\mu\text{g}/\text{m}^3$ as a calendar quarter average) also remain in effect.

⁽²⁾ The official level of the annual NO₂ standard is 0.053 ppm, equal to 53 ppb, which is shown here for the purpose of a clearer comparison to the 1-hour standard.

⁽³⁾ Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) O₃ standards additionally remain in effect in some areas. Revocation of the previous (2008) O₃ standards and transitioning to the current (2015) standards will be addressed in the implementation rule for the current standards.

⁽⁴⁾ The previous SO₂ standards (0.14 ppm 24-hour and 0.03 ppm annual) will additionally remain in effect in certain areas: (1) any area for which it is not yet 1 year since the effective date of designation under the current (2010) standards, and (2) any area for which an implementation plan providing for attainment of the current (2010) standard has not been submitted and approved and which is designated nonattainment under the previous SO₂ standards or is not meeting the requirements of a SIP call under the previous SO₂ standards (40 CFR 50.4(3)). A SIP call is a USEPA action requiring a state to resubmit all or part of its SIP to demonstrate attainment of the required NAAQS

Source: (USEPA, 2022b)

425 The current level of air emissions from all natural and human activities within a region represent the baseline
 426 emissions for that area. The National Emissions Inventory, updated every 3 years by the USEPA, can be
 427 used to identify the baseline emissions. It contains estimates of annual air emissions by county. The most
 428 recent publicly available inventory data nationally is for calendar year 2020, and for Indiana is 2017. **Table**
 429 **3** presents the baseline GHG emission levels obtained from the 2017 National Emissions Inventory for Cass

and Miami Counties. Nationally, the baseline 2020 GHG emission level is 5,981 million metric tons of CO₂e (USEPA, 2020). **Table 3** also summarizes climate conditions for the ROI.

Table 3: Climate Conditions in the ROI

Climate Feature	Preferred Alternative ¹
General Climate Description	Hot-summer humid continental
Average Annual Precipitation (Inches)	40.5
Wettest Month / Average Monthly Precipitation (inches)	May 4.3
Driest Month / Average Monthly Precipitation (inches)	February 2.6
Annual Mean Temperature (°F)	51.0
Warmest Month / Average Temperature (°F)	July 74.0
Coollest Month / Average Temperature (°F)	January 25.4
Cass County Baseline GHG Emissions (Metric Tons CO ₂ e) ¹	841,160
Miami County Baseline GHG Emissions (Metric Tons CO ₂ e) ¹	301,916

Note: 1. CO₂e = Carbon Dioxide Equivalent
Sources: (Climate-Data.org, 2022)

3.3.1.3 Other Air Quality Considerations

In addition to the criteria pollutants discussed above, Hazardous Air Pollutants (HAPs) also are regulated under the CAA. The USEPA has identified 187 HAPs that are known or suspected to cause health effects in small concentrations. HAPs are emitted by a wide range of man-made and naturally occurring sources, including combustion mobile and stationary sources. However, unlike the NAAQS for criteria pollutants, federal ambient air quality standards do not exist for non-criteria pollutants. Therefore, HAPs are generally regulated through specific air emission permit provisions for stationary sources and HAP emission limits for mobiles sources. The state of Indiana operates an Air Toxics Program to assess HAP problem areas and risks. None of the study areas under this program include Cass and Miami Counties, and no monitoring, modeling, studies, or risk assessments have been performed in either county.

Special goals for visibility in many "Class I Federal areas" were also established by the CAA; these areas generally include national parks, wilderness areas, and international parks. The Regional Haze Rule (40 CFR Part 51) was subsequently enacted in 1999 and requires states to establish goals for improving visibility in national parks and wilderness areas and to develop long-term strategies for reducing emissions of air pollutants that cause visibility impairment. Visibility-impairing pollutants can be transported over great distances; therefore, states are encouraged to work together to develop regional visibility goals and strategies. Visibility-impairing pollutants are emitted by a wide variety of activities and sources, including mobile source fuel combustion, agriculture, and manufacturing. Emissions of these pollutants are regulated by complying with the NAAQS, through state-specific programs, and through specific air emission permit provisions. No visibility impairments exist at Grissom ARB.

3.3.2 Environmental Consequences

Air quality is affected by stationary sources (e.g., boilers, emergency generators, and industrial processes), mobile sources (e.g., motor vehicles, construction equipment, and aircraft), and area sources (e.g., vehicle and aircraft fuel transfer, storage, and dispensing). The nature and magnitude of this Proposed Action are expected to create only localized air quality impacts to the area surrounding the Project Site. The air quality impact analysis follows the EIAP Air Quality Guidelines for criteria pollutants and GHG emissions (Solutio Environmental, 2019). The USAF used the Air Conformity Applicability Model (ACAM) to analyze the potential air quality impacts associated with the Proposed Action, in accordance with AFMAN 32-7002, the EIAP, and the General Conformity Rule (40 CFR 93 Subpart B). The General Conformity Rule does not apply to the Proposed Action as Grissom ARB is in an area considered *attainment/unclassifiable* for all NAAQS. The ACAM report is available in **Appendix D**.

Construction and operational emissions resulting from the Proposed Action were calculated using ACAM. The project emissions are “netted” on an annual basis. The impact analysis must consider the greatest annual emissions associated with the Proposed Action. Construction activities are expected to occur in 2023 and 2024.

Current USAF guidance provides methodology for performing an Air Quality EIAP Level II, Quantitative Assessment, which is an insignificance assessment that can determine if an action poses an insignificant impact on air quality (Solutio Environmental Inc., 2020). An air quality impact is considered insignificant if the action does not cause or contribute to exceedance of one or more of the NAAQS. The USAF defines “insignificance indicators” for each criteria pollutant according to current air quality conditions.

In areas the USAF considers *clearly attainment* (i.e., where all criteria pollutant concentrations are currently less than 95 percent of applicable NAAQS), the insignificance indicators are 250 tons per year (i.e., the USEPA’s Prevention of Significant Deterioration threshold), except for Pb, which is 25 tons per year. Cass County and Miami County are both in *clear attainment* for all criteria pollutants.

The change in climate conditions caused by GHGs is a global effect. The Proposed Action would have no impact on overall global or regional GHG emissions and global climate change. For NEPA disclosure purposes, however, this EA analyzes the potential GHG emissions, as calculated by the ACAM, anticipated under the Proposed Action, which could contribute to climate change.

3.3.2.1 Preferred Alternative

Criteria Pollutants: Construction of the Proposed Action would result in *short-term, insignificant impacts* on air quality. Construction activities would temporarily generate fugitive dust from grading, clearing, and site restoration activities, and criteria pollutant emissions (e.g., volatile organic compounds [VOCs] and NO_x [as precursors of O₃], CO, PM₁₀, and PM_{2.5} [including its precursor SO₂]) and GHG emissions from the use of diesel-powered and gasoline-powered equipment. The construction workforce commute would also contribute to a short-term increase in emissions. Construction period emissions typically depend on expected material quantities, such as clean fill import and off-site disposal of excess or contaminated excavated material, and equipment/vehicle utilization requirements for each project component. The peak emissions construction year is expected to be 2023 for all pollutants. The majority of air emissions associated with the Proposed Action would be temporary in nature (limited to the duration of construction activities) and would be caused by fuel combustion in vehicles and construction equipment, and by dust generated from clearing, grading, site restoration activities, and equipment and vehicles traveling over unpaved areas.

Following construction, ongoing annual emissions would occur from operation of the proposed indoor firing range. These emissions primarily include fuel combustion for space heating (natural gas). Use of the indoor firing range may result in insignificant emissions from the increased firing of frangible rounds. However, building construction would be as specified in UFC 4-179-02, *Small Arms Ranges*, and would include proper ventilation design to remove airborne contaminants within the firing range. Filtration systems, specifically employing a high-efficiency particulate air (HEPA) filter, would be installed to capture particulate and metal emissions and ensure that exhaust air discharged from the range and bullet traps would meet all local, state, and federal air quality requirements pertaining to all applicable pollutants.

Table 4 depicts annual netted emissions for each construction year (2023 and 2024) and for the operational or “steady state” year in which only emissions from facility operation would occur (2025) for the Preferred Alternative. The analysis presented assumes that all construction activities associated with the proposed indoor firing range would occur in 2023. Once the indoor firing range is operational in 2024, the existing outdoor firing range would be demolished. Therefore, 2024 emissions include both demolition emissions and facility operation emissions. All attainment criteria pollutants are *below the insignificance indicators* for both construction and operation of the Proposed Action.

Table 4: Projected Annual Emissions from Proposed Action

Pollutant	Proposed Action Emissions (ton/year) ¹			NEPA Insignificance Indicator (ton/year)	General Conformity De Minimis Threshold (ton/year)	General Conformity Applicability (Yes or No)
	2023	2024	Steady State (Operation)			
VOC	0.387	0.015	0.004	250	N/A	No
NO _x	0.729	0.143	0.081	250		
CO	0.929	0.156	0.068	250		
SO _x	0.002	0.001	0.000	250		
PM ₁₀	2.396	0.049	0.006	250		
PM _{2.5}	0.028	0.008	0.006	250		
Pb	0.000	0.000	0.000	25		
NH ₃	0.001	0.000	0.000	250		
CO ₂ e	217.9	119.5	97.0	N/A		
Not in a regulatory area						

Notes:

1. 2023 and 2024 represent construction years. 2024 includes construction emissions and facility operation emissions.

NO_x = nitrogen oxides, SO_x = sulfur oxides, NH₃ = ammonia, CO₂e = Carbon Dioxide Equivalent, N/A = Not Applicable

Source: ACAM version 5.0.18a, run on October 18, 2022 (**Appendix D**).

As previously stated, Grissom ARB is located in an area considered *attainment/unclassifiable* for all NAAQS. Therefore, General Conformity is not applicable to the Proposed Action, and a General Conformity applicability analysis was not performed for the Preferred Alternative.

Overall, the Preferred Alternative is expected to result in a minor decrease in fuel combustion, as personnel will no longer be required to travel to Camp Atterbury Military Reservation Range, approximately 106 miles away, for weapons qualification. As previously noted, the Preferred Alternative would result in additional

frangible rounds being fired at Grissom ARB on an annual basis. However, under current conditions the minor emissions of particulate matter, NO_x, and lead from these activities are emitted into a facility with a roof not fully enclosed. With the Preferred Alternative, the emissions would be controlled through facility design and the use of HEPA filters, and these emissions to the atmosphere may decrease compared to the current condition.

Therefore, construction and steady state emissions *would not exceed regulatory or insignificance thresholds*, and the potential air quality impact from all criteria pollutants is *insignificant*.

Greenhouse Gas Emissions and Climate Change: As further shown in **Table 4**, CO₂e emissions from construction would be the largest in 2023. **Table 5** depicts the Preferred Alternative's annual construction (2023 and 2024) and steady state GHG emissions increases over the applicable county and national baselines. When compared to the national GHG emissions baseline, the peak construction year is 2023, which is 0.000004 percent of the national baseline.

Table 5: Comparison of Greenhouse Gas Emissions

Alternative	Proposed Action GHG Emissions Increase Over Cass County Baseline ¹			Proposed Action GHG Emissions Increase Over Miami County Baseline ²			Proposed Action GHG Emissions Increase Over National Baseline ³		
	2023	2024	Steady State	2023	2024	Steady State	2023	2024	Steady State
Preferred Alternative	.03%	.01%	.01%	.07%	.04%	.03%	0.000004%	0.000002%	0.000002%

Notes:

1. Cass County, Indiana = 841,160 metric tons of CO₂e.

2. Miami County, Indiana = 301,916 metric tons of CO₂e.

3. Annual national GHG emissions = 5,981 million metric tons of CO₂e.

Sources: (USEPA, 2017; USEPA, 2020); ACAM version 5.0.18a, run on 16 September 2022 (**Appendix D**).

The USAF addresses the potential future impacts of climate change to both current and future USAF facilities by assessing site-specific potential impacts as part of long-range planning, project design, and permitting activities. Potentially relevant long-term climate change areas of concern for the Proposed Action include increases in heavy precipitation and flooding, drought, and extreme heat (USEPA, 2016). However, the Proposed Action would not be constructed in a floodplain, and the proposed facilities would allow training to be conducted indoors, year-round, regardless of weather conditions. Thus, climate change would have *no long-term impacts* on the Proposed Action.

Other Air Quality Considerations: Federal ambient air quality standards do not exist for non-criteria pollutants; therefore, the USAF has not established HAPs insignificance indicators. HAPs are generally regulated through specific air emission permit provisions for stationary sources and HAP emission limits for mobile sources. Grissom ARB may be required either to update existing air quality permits or obtain a new permit for the proposed indoor firing range.

Similarly, there is no specific insignificance indicator established for assessing a Proposed Action's impact on visibility in Class I Federal areas. However, many pollutants responsible for impairing visibility are regulated by NAAQS either directly (e.g., PM_{2.5}) or indirectly (e.g., nitrogen dioxide [NO₂] and SO₂ emissions, which can form visibility-impairing nitrates and sulfates, respectively, once emitted). Because the Proposed Action would result in insignificant increases in criteria pollutants, it is unlikely that the Preferred Alternative would result in adverse impacts on visibility in Class I Federal areas.

3.3.2.2 No Action Alternative

Under the No Action Alternative, there would be *no impact* to air quality as air emissions at the Project Site would remain the same as compared to the existing condition. There would be no increase over baseline GHG emissions. Potential emissions reductions from moving small arms training from outdoors to indoors and eliminating personnel transportation to Camp Atterbury Military Reservation Range would not occur.

3.4 NOISE

Sound is vibrations in the air, which are known as compression waves. Just like a pebble dropped into a pond creates ripples, the compression waves, formed of air molecules pressed together, radiate from a source and decrease with distance. If these vibrations reach a human eardrum at a sufficient rate and intensity, we perceive it as sound. When the sound is unwanted, we refer to it as noise. Generally, sound becomes noise to a listener when it interferes with normal activities. Sound within the range of human hearing is measured on a logarithmic scale, known as the decibel (dB). The human ear does not hear all frequencies equally; the A-weighted decibel scale (dBA) is used to reflect the selective sensitivity of human hearing.

Because the sound pressure level unit of dBA describes a noise level at just one moment and very few noises are constant, other ways of describing noise over extended periods have been developed. One way of describing fluctuating sound is to describe the fluctuating noise heard over a specific time period as if it had been a steady, unchanging sound. For this condition, a descriptor called the “equivalent sound level,” L_{eq} , can be computed. L_{eq} is the constant sound level that, in a given situation and time period (e.g., one hour, denoted by $L_{eq(1)}$, or 24 hours, denoted as $L_{eq(24)}$), conveys the same sound energy as the actual time-varying sound. The Day-Night Sound Level (DNL) refers to a 24-hour average noise level with a 10 dB penalty applied to the noise levels during the hours between 10 PM and 7 AM due to increased sensitivity to noise levels during these hours. Both L_{eq} and DNL were recommended by USEPA as the best descriptors for describing the effects of environmental noise (USEPA, 1974).

The loudest sounds that can be comfortably heard by the human ear have intensities a trillion times higher than those of sounds barely heard. As such, sound is measured in dB, which uses a logarithmic scale that doubles the noise energy every 3 dB. A sound level of 0 dBA is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. Normal speech has a sound level of approximately 60 dBA. Sound levels above 120 dBA begin to be perceived as uncomfortable, while sound levels between 130 and 140 dBA are considered painful. The common sound levels encountered in daily life are shown in **Table 6**.

The sound environment around an air installation such as Grissom ARB is typically described using a measure of cumulative exposure that results from all aircraft operational events. The metric used to account for this is A-weighted DNL and is the standard noise metric used by the U.S. Department of Housing and Urban Development (HUD), FAA, USEPA, and DoD. Since the length and number of events (i.e., the total noise energy) and the time of day play key roles in our perception of noise, to reflect these concerns, USAF uses the DNL metric to describe the cumulative noise exposure that results from all aircraft operations.

To address the potential impacts of aircraft operations on land use, the USAF has defined certain noise zones and provide associated recommendations regarding compatible land uses in in AFI 32-7070, *Air Force Noise Program*, and AFI 32-7063, *Air Installations Compatible Use Zones Program*. In general, residential land uses are not compatible with an outdoor DNL above 65 dBA.

The ROI for noise includes areas within 0.2 mile of the Project Site.

601

Table 6: Common Sound Levels

Sound Source	Sound Pressure Level (dBA)
Air Raid Siren at 50 feet	120
Maximum Levels at Rock Concerts (Rear Seats)	110
On Sidewalk by Passing Heavy Truck or Bus	90
On Sidewalk by Typical Highway	80
On Sidewalk by Passing Automobiles with Mufflers	70
Typical Urban Area	60-70
Typical Suburban Area	50-60
Quiet Suburban Area at Night	40-50
Typical Rural Area at Night	30-40
Isolated Broadcast Studio	20
Audiometric (Hearing Testing) Booth	10
Threshold of Hearing	0

602 **Sources:** Cowan, James P. *Handbook of Environmental Acoustics*, Van Nostrand Reinhold, New York, 1994.
603 Egan, M. David, *Architectural Acoustics*. McGraw-Hill Book Company, 1988.

604 3.4.1 Affected Environment

605 The existing noise conditions around Grissom ARB are contributed from on-installation aircraft operations
606 and traffic on- and off-base. In October 2020, the Air Force Reserve Command completed an AICUZ study
607 focusing on the flying missions at Grissom ARB. According to the study, noise levels at the Project site and
608 ROI are below the 65 dB DNL contour (AFRC, 2020a). Moreover, owing to Grissom ARB's rural location,
609 nearby roadways are small and are not heavily used. Traffic on these external roadways, as well as traffic
610 on roadways within Grissom ARB, is minimal and does not generate excessive or continuous noise. Military
611 operations, training activities, and surrounding facilities on base may also generate noise; however, this
612 noise would be typical of a developed environment.

613 Small arms training at the existing outdoor firing range likely generates noise above 140 dB (Stewart, 2022).
614 This noise is not continuous, as it only occurs while small arms training is occurring, but the noise may be
615 heard up to one mile away (DecibelPro, 2022). While this type of noise is likely considered typical for a
616 military installation, it may disrupt other activities occurring nearby, most notably the Grissom Fire
617 Department, located across Grissom Avenue and near the flight line, as well as other administrative
618 buildings located off Dragonfly Lane. Grissom ARB has not modeled noise for the small arms firing activities.

619 Grissom ARB is located in north-central Indiana off of U.S. Highway 31, approximately 2 miles west of
620 Bunker Hill. As the Project Site is located on the base, there are no sensitive receptors in the ROI with
621 potential to be affected by the Proposed Action (i.e., the nearest private residence is approximately 0.5 mile
622 away).

623 3.4.2 Environmental Consequences

624 Noise from demolition activities, construction equipment operation, and on-road construction vehicles
625 traveling to and from the Project Site has the potential to affect noise levels on base and in the near vicinity.

A noise impact would be significant if it would 1) cause unsafe noise conditions for nearby receptors during construction, or 2) substantially affect normal operations of noise-sensitive receptors during operation of the Proposed Action.

3.4.2.1 Preferred Alternative

Construction and demolition activities associated with the Proposed Action would result in a temporary increase in noise levels within the vicinity of the Project Site, related to use of equipment during demolition of the existing outdoor facility and during construction activities related to construction of the new indoor facility, including site excavation, backfill, material transportation, and building of the physical structure. Equipment such as backhoes, excavators, graders, loaders, and trucks would be used, and would be the primary source of noise during implementation of the Proposed Action. Noise impacts would be the greatest at the Project Site, and would decrease with distance. Buildings located along Grissom Avenue and Dragonfly Lane would be the closest receptors to the Project Site (i.e., within approximately 0.1 mile). As the Project Site and surrounding area are located outside of existing noise contours, noise levels typically exist at ambient levels. **Table 7** provides sound levels typical of demolition and construction equipment up to a distance of 2,500 feet (approximately 0.5 mile). These noise levels would continue to attenuate at further distances from the Project Site.

Table 7: Construction Equipment Noise Levels at Nearest Sensitive Receptors (dBA)

Source	Distance from Source (feet)							
	0	50	100	200	400	1,000	1,700	2,500
Heavy Truck	95	84-89	78-93	72-77	66-71	58-63	54-59	50-55
Dump Truck	108	88	82	76	70	62	58	54
Concrete Mixer	108	85	79	73	67	59	55	51
Jackhammer	108	88	82	76	70	62	58	54
Scraper	93	80-89	74-82	68-77	60-71	54-63	50-59	46-55
Bulldozer	107	87-102	81-96	75-90	69-84	61-76	57-72	53-68
Generator	96	76	70	64	58	50	46	42
Crane	104	75-88	69-82	63-76	55-70	49-62	45-48	41-54
Loader	104	73-86	67-80	61-74	55-68	47-60	43-56	39-52
Grader	108	88-91	82-85	76-79	70-73	62-65	58-61	54-57
Pile driver	105	95	89	83	77	69	65	61
Forklift	100	95	89	83	77	69	65	61

Source: (Tipler, 1976)

Proposed construction and demolition activities are anticipated to be complete within two years, and would be loudest during the initial stages of the Proposed Action (i.e., site preparation and construction of the outer shell of the new range). Demolition of the outdoor firing range, which would occur after the proposed indoor firing range is functioning, would likely be similarly loud, but would be of shorter duration. Although short-term adverse noise impacts are anticipated for on-base receptors during construction and demolition, no sensitive receptors or private residences are located nearby that could be adversely affected. Noise reduction best management practices (BMPs), such as the use of mufflers on construction equipment and vehicles, would minimize noise impacts during implementation of the Proposed Action. Therefore, the demolition and construction activities under the Preferred Alternative would result in *short-term, less-than-significant adverse noise impacts* to the overall noise environment.

Proposed construction of an indoor firing range would reduce noise from small arms firing activities that can currently be heard in the surrounding areas. Under the Proposed Action, small arms training would occur indoors; associated noise would be contained within the indoor firing range and would not be audible outside. The building design for the indoor firing range includes sound reflection reduction features, such as sound proofing and sound absorption elements (USACE, 2022). Incorporation of these features would minimize the amount of audible noise outside of the facility. Therefore, operation of the indoor firing range would result in *long-term, beneficial impacts* to the overall noise environment in the ROI by eliminating an existing loud outdoor source of noise for other buildings and activities on and near Grissom ARB.

3.4.2.2 No Action Alternative

Under the No Action Alternative, the existing outdoor firing range would not be demolished, and the proposed indoor firing range at Grissom ARB would not be constructed. There would be *no impact* to the noise environment. Existing outdoor small arms training and associated impulse noise would continue.

3.5 EARTH RESOURCES

Earth resources include geology, topography, and soils. Geological resources consist of surface and subsurface materials and their properties. Principal geologic factors influencing the ability to support structural development are seismic properties (i.e., potential for subsurface shifting, faulting, or crustal disturbance), soil stability, and topography. Radon is not discussed in this EA as the Proposed Action does not include any below-grade inhabitable structures.

The Farmland Protection Policy Act (FPPA) (7 USC 4201 et seq.) of 1981 states that federal agencies must “minimize the extent to which federal programs contribute to the unnecessary conversion of farmland to nonagricultural uses.” The resources protected by the FPPA include prime and unique farmland, which are categorized by the NRCS based on underlying soil characteristics.

Hydric soils are defined as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part. Under natural conditions, these soils are able to support growth and reproduction of hydrophytic vegetation. Presence of hydric soils is one of the criteria used to identify and delineate wetlands.

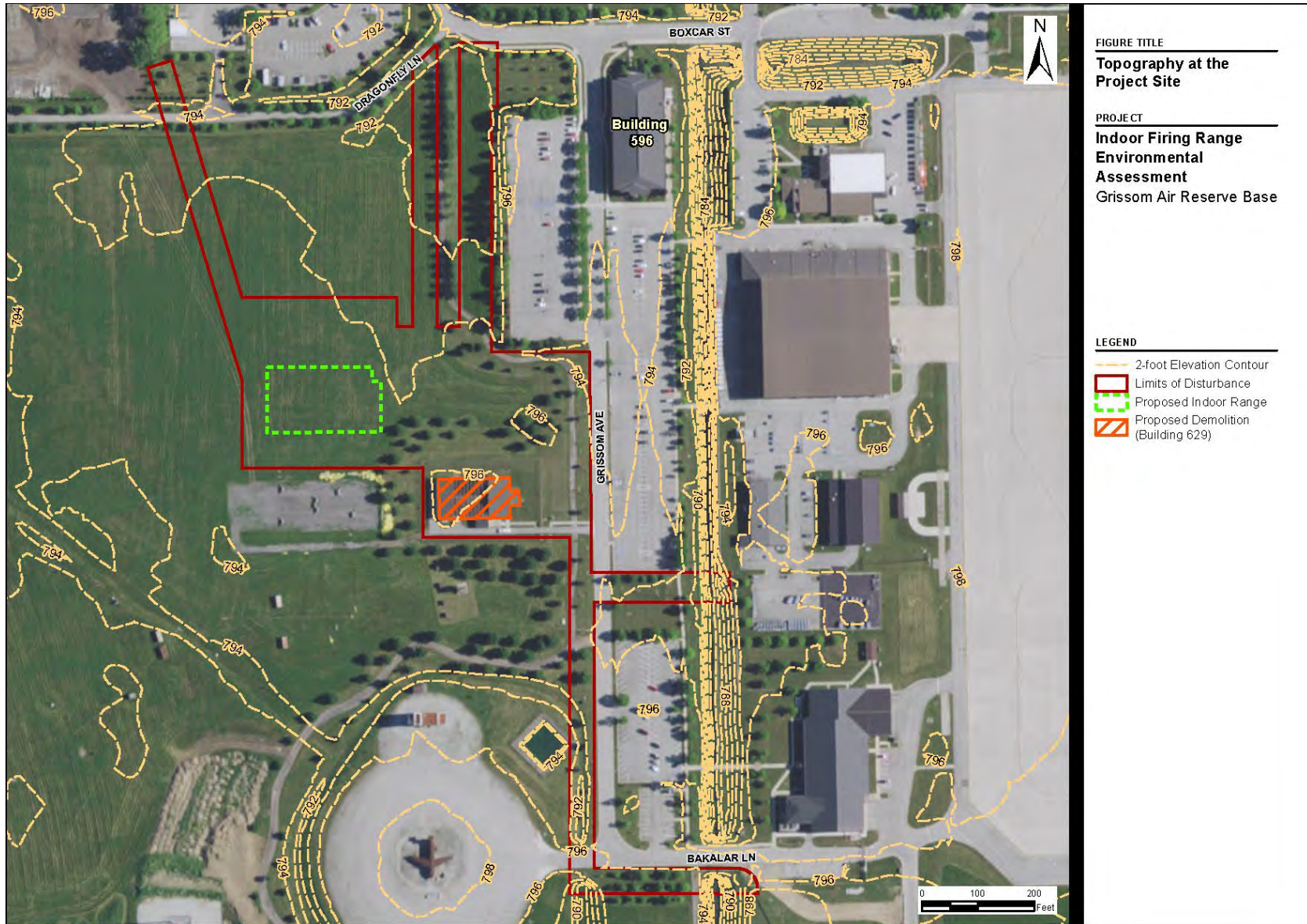
The ROI for earth resources is the Project Site as shown on **Figure 3** and **Figure 4**.

3.5.1 Affected Environment

Geology: The geology associated with Grissom ARB and the surrounding areas is characterized by unconsolidated Pleistocene glacial deposits and recent alluvium underlain by shale, limestone, and dolomite deposited during the Devonian and Silurian Periods. The glacial till consists mainly of calcareous silty clays interspersed with discontinuous layers of sands and gravel. The bedrock in the vicinity of Grissom ARB consists of four rock units: Hamilton Group Limestones (which are absent underlying Grissom ARB), Kokomo Limestone, Liston Creek Limestone, and Mississinewa Shale. The depth to bedrock varies from surface exposures along the nearby Pipe Creek to depths of more than 130 feet (AFRC, 1995). The US Geological Survey (USGS) 2018 Seismic Hazard Map shows the site is at moderate risk of seismic hazard (i.e., hazard level 3 out of 7) (USGS, 2018).

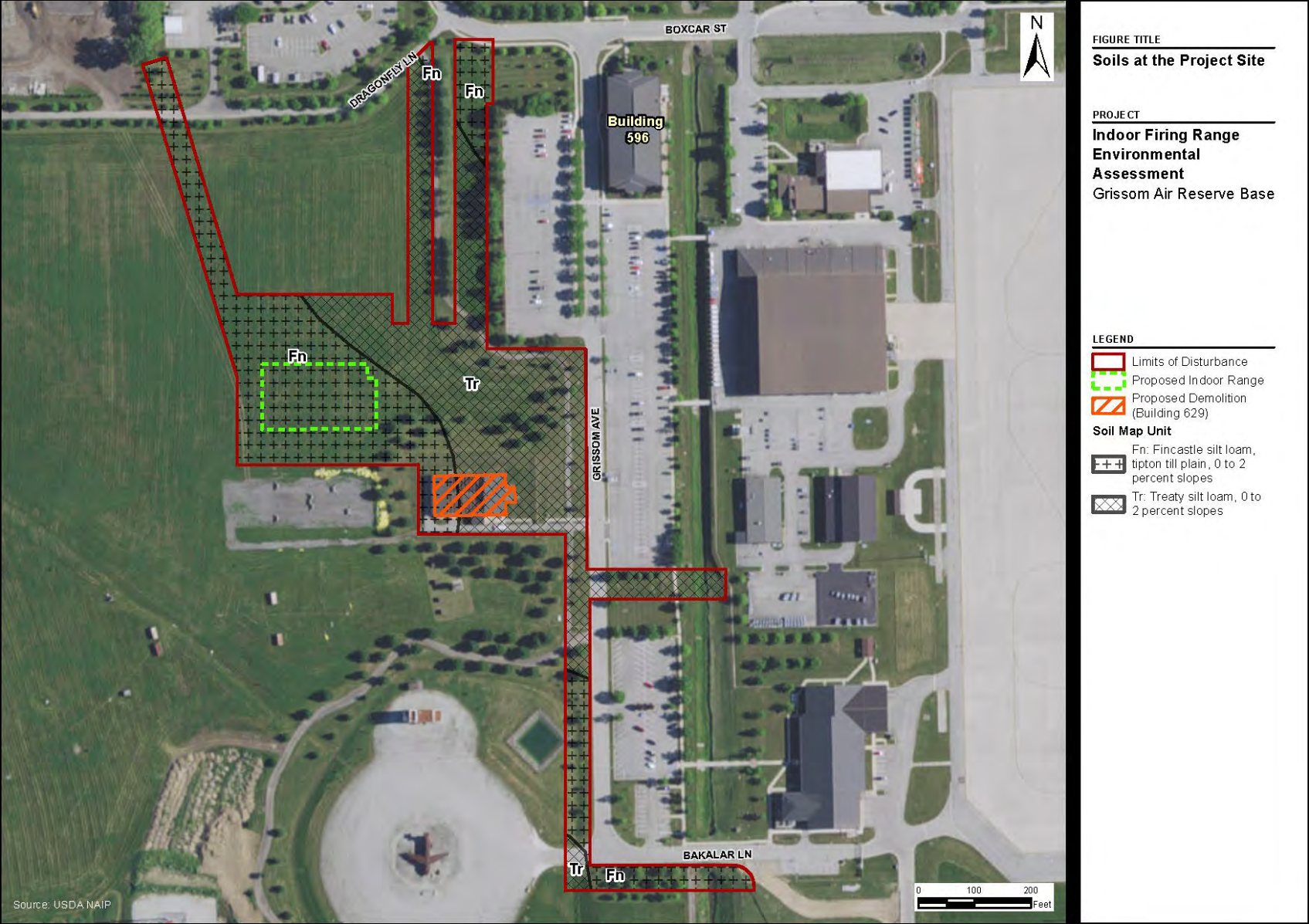
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Figure 3: Topography at the Project Site



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Figure 4: Soils at the Project Site



Topography: The Project Site is located in north-central Indiana, which is characterized by slightly rolling terrain. The area surrounding Grissom ARB is primarily flat farmland. Elevations on the base range from approximately 780 feet above mean sea level (MSL) near the northern base boundary to 810 feet above MSL near the southeastern base boundary (Grissom ARB, 2022b). Topography on the Project Site is relatively flat (see **Figure 3**).

Soils: Soils at Grissom ARB are generally described as deep, nearly level, poorly drained, medium textured soils formed on upland glacial till plains. Surface horizons of these soils have silty loams containing clay, silt, and sand particles (AFRC, 1995). Two soil map units are identified on the Project Site (see **Figure 4** and **Table 8**). Both soil map units are designated as prime farmland if drained, and one unit is considered a hydric soil. The soils in the vicinity (i.e., within 100 feet) of the existing outdoor firing range may be contaminated from lead due to past and current firing activities and projectile remnants. The potential presence of lead and other contaminants, and the management of this potential contamination, is further discussed in **Section 3.12**.

Table 8: Select Soil Characteristics for the LOD

Map Unit Name	Acres	Prime / Unique Farmland	Farmland of Statewide Importance	Hydric	Landform / Description
Fincastle silt loam, tipton till plain, 0 to 2 percent slopes	3.5	Prime Farmland if Drained	No	No	Till plains; somewhat poorly drained soils, depth to water table is 6 to 24 inches. Depth to restrictive feature is 40 to 60 inches (densic material).
Treaty silt loam, 0 to 2 percent slopes	4.0	Prime Farmland if Drained	No	Yes	Swales, water-lain moraines, depressions; poorly drained soils; depth to water table is 0 to 12 inches. Depth to restrictive feature is more than 80 inches.

Source: (NRCS, 2022)

3.5.2 Environmental Consequences

An earth resources impact would be significant if it would 1) expose people or structures to major geological hazards; 2) substantially increase potential occurrences of erosion or sedimentation; or 3) violate the FPPA.

3.5.2.1 Preferred Alternative

During construction and demolition, excavation and soil disturbance/removal would be required to remove infrastructure associated with the existing outdoor firing range, and to construct the building foundation of the proposed indoor facility. Bedrock is not anticipated to be encountered when performing construction and demolition activities, and no geologic hazards are apparent on the Project Site. Further, seismic events occur infrequently at Grissom ARB, and are not expected to interfere with implementation of the Proposed Action. Therefore, *no impacts* to geology are anticipated under the Preferred Alternative.

Although the Project Site is generally flat, minor grading may be necessary to construct the indoor facility. Any such grading would not be anticipated to meaningfully impact the topography of the Project Site or affect surface drainage and runoff patterns. *No impacts* to topography would occur under the Preferred Alternative.

Construction and demolition under the Proposed Action would disturb up to 7.6 acres (i.e., the full LOD). Disturbed soils would be susceptible to runoff and erosion. Since the Project Site would exceed 1 acre of land disturbance, a NPDES Construction General Permit (CGP) would be obtained for the project pursuant

to the Clean Water Act of 1972 (CWA; 33 USC 1251 et seq.). Coverage under the CGP would require development of a Stormwater Pollution Prevention Plan (SWPPP), which would identify potential sources of pollutants, describe all pollution prevention activities that would be implemented on the site, and establish erosion and sediment controls to manage stormwater discharges and minimize sedimentation to the extent practicable. The State of Indiana also requires a Construction Stormwater General Permit (CSGP) for activities disturbing more than 1 acre of land. Similar to the NPDES CGP, the CSGP also requires development of a SWPPP to establish stormwater controls. Construction crews would adhere to best management practices (BMPs) outlined in the SWPPP, and the erosion and sediment controls would be implemented prior to land-disturbing activities and maintained in good working order for the duration of construction. The Proposed Action would result in *short-term, less-than-significant adverse impacts* to soil runoff and erosion.

Construction activities would disturb up to 7.6 acres of prime farmland soils; however, only approximately 0.5 acres would be permanently impacted, as these would be removed to accommodate the footprint of the proposed indoor facility. The loss of these soils would not substantially reduce the amount of prime farmland in the surrounding area, as the region is largely agricultural; moreover, these soils are neither currently used as farmland nor available for farming due to their location on an active ARB, and so no farmland would be taken out of current or future production in order to accommodate the Proposed Action. Therefore, the Preferred Alternative would have *long-term, negligible impacts* on prime farmland soils.

Soil contamination from lead and other contaminants is potentially present near the existing outdoor firing range (see **Section 3.12**). If ground disturbance is planned within 100 feet of the existing outdoor firing range, lead sampling may need to be conducted to identify and delineate potential contamination. Applicable federal and state regulations and guidance would be followed to ensure potential contaminants are not inadvertently dispersed during demolition activities, and that contaminated soil is managed and/or disposed of properly. All fill brought on-site would be clean. Therefore, the disturbance of potentially contaminated soils could result in *short-term, less-than-significant adverse impacts*.

Finally, as part of the site design and in accordance with Section 438 of the EISA, the USAF would ensure the pre-development hydrology of the Project Site would be maintained to the maximum extent technically feasible. This would be accomplished through site grading, the use of LID features, such as stormwater management features, and through site revegetation to prevent erosion. Implementation of these measures would manage long-term soil erosion and sedimentation during operation of the indoor facility, and would minimize the potential for long-term impacts to soils.

3.5.2.2 No Action Alternative

Under the No Action Alternative, the proposed indoor firing range at Grissom ARB would not be constructed, and there would be *no impact* to earth resources.

3.6 WATER RESOURCES

Water resources analyzed in this EA include surface water (including stormwater), wetlands, floodplains, and groundwater. Surface water resources comprise lakes, rivers, and streams and are important for a variety of ecological, economic, recreational, aesthetic, and human health reasons. Wetlands are areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal conditions do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (USACE, 1987). Wetlands serve a variety of functions including flood control, groundwater recharge, maintenance of biodiversity, wildlife habitat, recreational opportunities, and maintenance of water quality. Floodplains are belts of low, level ground on one or both sides of a stream channel and are subject to either periodic or infrequent inundation by flood water. A 100-year floodplain has a 1 percent chance of

inundation in any given year. Groundwater can be defined as subsurface water resources that are interlaid in layers of rock and soil and recharged by surface water seepage. Groundwater is important for its use as a potable water source, agricultural irrigation, and industrial applications.

The ROI for surface waters, wetlands, and floodplains includes the boundaries of the site, as well as the down-gradient waterbodies receiving stormwater runoff within 0.5 mile of the Project Site. The ROI for groundwater includes the portion of the groundwater basin that underlies the Project Site.

3.6.1 Affected Environment

Surface Water: Grissom ARB is located in the Pipe Creek drainage area of the Wabash River Basin in north-central Indiana. Surface water in the vicinity of the base includes Pipe Creek, Little Deer Creek, several drainage ditches, and a lime settling pond located northeast of the cantonment zone (AFRC, 2003). Government Ditch is the closest surface water to the Project Site, located approximately 0.15 miles east of the site (see **Figure 5**).

Stormwater at the base is collected by a system of storm sewers and ditches and flows through various outfalls toward Pipe Creek, a tributary of the Wabash River, located approximately 6 miles to the north. Government Ditch is also used by Grissom ARB as a drainage ditch to collect and transport stormwater. Grissom ARB maintains a SWPPP to manage stormwater on the installation (Grissom ARB, 2021).

Under Section 303(d) of the CWA, states are required to conduct water quality assessments and identify waterbodies that do not meet state water quality standards. Waterbodies not meeting the established thresholds are considered impaired, and a total maximum daily load (TMDL) must be developed to achieve compliance with water quality standards. The IDEM maintains a list of impaired waters across the state; no surface waters near the Project Site are listed as impaired. Pipe Creek, however, is listed as impaired for *Escherichia coli* (i.e., *E. coli*) (IDEM, 2022a).

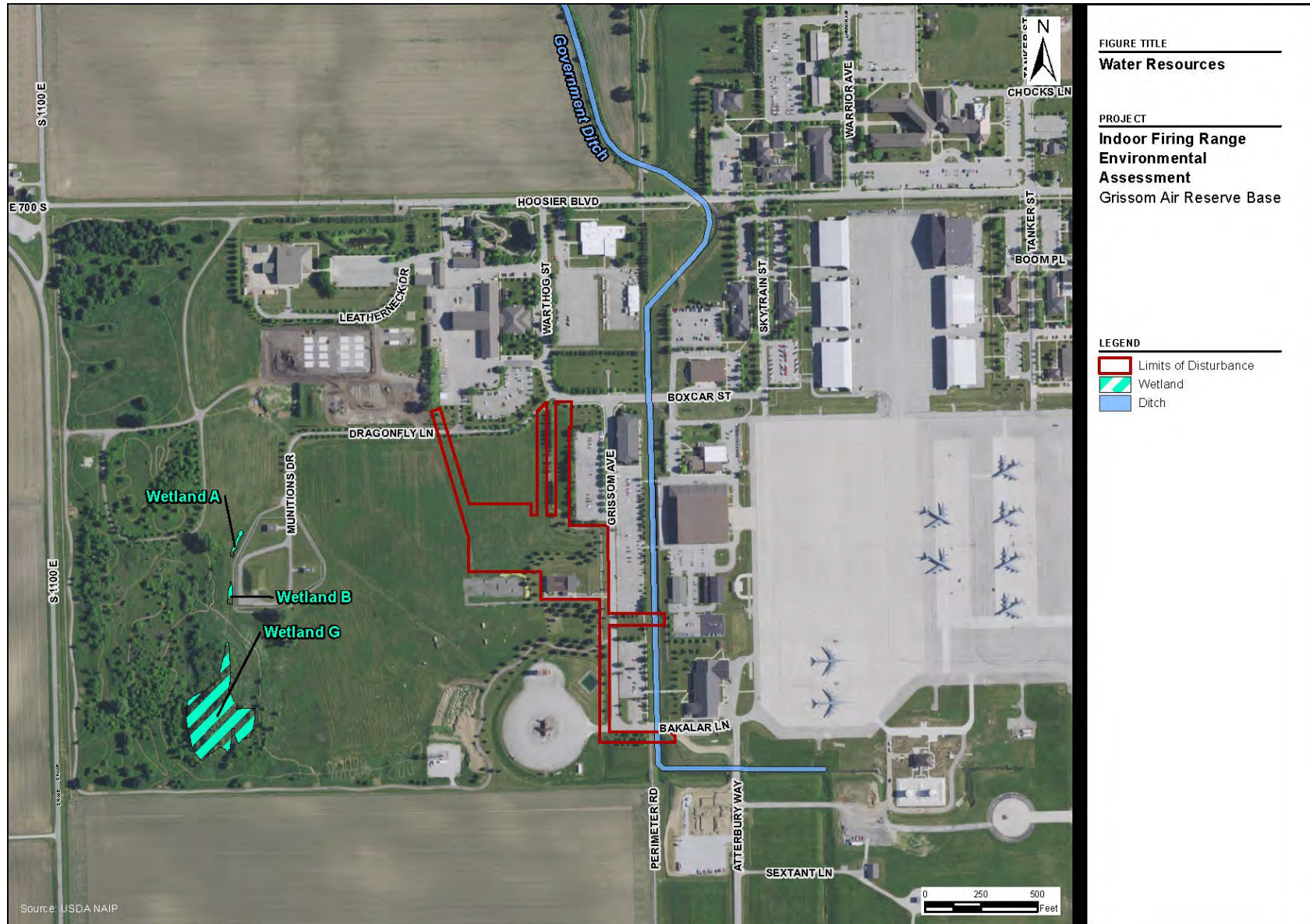
Wetlands: Three emergent wetlands are located approximately 0.2 mile southwest of the Project Site (see **Figure 5**). The largest wetland is approximately 1.1 acres, while the other two are substantially smaller, at approximately 0.04 and 0.02 acre in size (see **Table 9**) (AFRC, 2003; Grissom ARB, 2011). The two smaller wetlands appear to share a hydrologic connection during and following significant rain events, and are also likely to be considered waters of the US (WOUS) under Section 404 of the CWA (Grissom ARB, 2011). The 1.1-acre wetland is also considered a jurisdictional WOUS (Grissom ARB, n.d.).

Table 9: Wetlands Near the Project Site

Wetland	Acreage
Wetland A	0.02 acres
Wetland B	0.04 acres
Wetland G	1.1 acres

Section 404 of the CWA authorizes USACE to issue permits for the discharge of dredge or fill material to WOUS, and Section 401 of the CWA gives the State of Indiana the authority to regulate proposed federally permitted activities that may result in a discharge to WOUS (IDEM, 2022b). Executive Order (EO) 11990, *Protection of Wetlands*, helps to avoid adverse impacts to wetlands by requiring federal agencies to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in all federal activities and projects (USEPA, 2022c).

Figure 5: Surface Waters at the Project Site



Floodplains: No 100- or 500-year floodplains occur at the Project Site, as shown on the Federal Emergency Management Agency Flood Insurance Rate Map panel 18103C0170D (FEMA, 2022).

Groundwater: The water table near Grissom ARB is unconfined; it is seasonally at or above ground level in most locations. The main aquifer in the region is the Liston Creek Limestone. Groundwater flow follows surface topography, flowing in a northeast direction and discharging in Pipe Creek (AFRC, 2003). Grissom ARB relies primarily on groundwater resources for its water supply, and groundwater is pumped from various wells located off-base and then supplied to Grissom ARB from the local utility.

3.6.2 Environmental Consequences

A water resources impact would be significant if it would 1) substantially reduce water availability or interfere with the water supply to existing users; 2) create or contribute to the overdraft of groundwater basins or exceed decreed annual yields of water supply sources; 3) substantially adversely affect surface or groundwater quality; 4) degrade unique hydrologic characteristics; or 5) violate established water resources laws or regulations.

3.6.2.1 Preferred Alternative

Surface Water: Construction of the Preferred Alternative could potentially impact surface waters as the proposed utility connections would cross Government Ditch, which also functions as a stormwater open drainage ditch. Utilities would be routed underneath Government Ditch, and would not result in any fill of this waterbody. Additionally, proposed construction activities would disturb the soil and could result in increased runoff from the Project Site. Construction activities that disturb one or more acres of land are subject to the requirements of the NPDES CGP; since the Proposed Action would impact approximately 7.6 acres, Grissom ARB would obtain a NPDES CGP and develop a site-specific SWPPP, which would identify erosion controls and BMPs to manage stormwater discharges (see **Section 3.5.2.1**). Grissom ARB would also comply with Section 438 of the EISA to manage stormwater runoff, by incorporating LID features into the design and development of the proposed facility, as well as vegetation to provide areas for stormwater infiltration. Therefore, the Preferred Alternative would have *short-term, less-than-significant adverse impacts* on surface waters in the ROI.

Construction would have *no impact* on impaired streams under Section 303(d), as no listed streams are present within the ROI. Although Pipe Creek is downstream of the Project Site and receives stormwater from Grissom ARB, it is not listed as impaired for sediment loads or turbidity, and no discharges of biological material would occur under the Proposed Action that would contain or contribute to *E. coli* contamination.

Wetlands: Although they are located outside of the LOD, the nearby wetlands could be indirectly impacted by increased erosion and sedimentation during construction. However, these impacts would be temporary and would be minimized or avoided through adherence to the SWPPP. Additionally, as no direct fill or dredging of WOUS would occur under the Proposed Action, Grissom ARB would not be required to obtain a permit under Section 404 or Section 401 of the CWA. Therefore, the Preferred Alternative would have *short-term, less-than-significant adverse impacts* on wetlands in the ROI.

Floodplains: As no 100- or 500-year floodplains occur at the Project Site, the Preferred Alternative would have *no impact* on floodplains.

Groundwater: Construction of the Preferred Alternative would not be expected to intersect groundwater resources (e.g., through deep excavation), involve groundwater withdrawals, or intentionally release materials into groundwater resources and aquifers. Potential impacts to groundwater may occur from the accidental spill of petroleum products or other liquids during construction and demolition. With

implementation of BMPs, such as carrying out routine inspections of equipment, maintaining spill-containment materials on-site, and adhering to site-specific hazardous and toxic materials and waste (HTMW) plans, the potential for impacts to groundwater would be minimized, resulting in *short-term, less-than-significant adverse impacts* to groundwater in the ROI.

3.6.2.2 No Action Alternative

Under the No Action Alternative, the proposed indoor firing range at Grissom ARB would not be constructed and the existing outdoor firing range would not be demolished. There would be *no impact* on water resources.

3.7 BIOLOGICAL RESOURCES

Biological resources addressed in this EA consist of vegetation, wildlife, and special status species. Special status species relevant to this EA are those protected under the federal Endangered Species Act of 1973 (ESA), Bald and Golden Eagle Protection Act of 1940, Migratory Bird Treaty Act of 1918, or under applicable state laws or regulations.

The ROI for biological resources includes vegetation present within the boundary of the site and terrestrial wildlife present on-site or within 0.2 mile of the site boundary (i.e., within the noise ROI). There is no potential for aquatic vegetation or wildlife to be affected due to the absence of surface waters within and in the vicinity of the Project Site.

3.7.1 Affected Environment

Vegetation: Grissom ARB is located within the Beech-Maple Forest section of the Eastern Deciduous Forest Province. The temperate deciduous forest vegetation in this province was historically characterized by tall, broadleaf trees that provide a dense and continuous canopy in summer but shed their leaves entirely in winter. However, much of the forest has been logged and replaced with agricultural fields; as a result, the vegetation on Grissom ARB is mostly disturbed grassland and landscaped areas. Most of the undeveloped areas have been seeded with grasses and are mowed regularly. There are no agricultural activities on base (AFRC, 1995).

Wildlife: Native plant and animal species inhabit a few small, wooded areas on base. These wooded areas contain species including beech (*Fagus spp.*), willow (*Salix spp.*), white oak (*Quercus alba*), and sugar maple (*Acer saccharum*); however, the understory of these areas is relatively controlled, which decreases the biological value of this habitat. The vegetation in this understory contains strawberry (*Fragaria vesca*), wild ryegrass (*Elymus triticoides*), sedge (*Cyperus compressus*), climbing rose (*Setiger asp.*), and bittersweet nightshade (*Solanum dulcamara*), and provides ecological diversity and habitat for different plants and wildlife. These areas, however, are not present within the ROI.

Common species on and around Grissom ARB that may occupy the wooded areas include opossum (*Didelphis virginiana*), woodchuck (*Marmota monax*), gray squirrel (*Sciurus carolinensis*), eastern cottontail (*Sylvilagus floridanus*), wood duck (*Aix sponsa*), common snipe (*Gallinago gallinago*), red-tailed hawk (*Buteo jamaicensis*), painted turtle (*Chrysemys picta*), common garter snake (*Thamnophis sirtalis*), and American toad (*Bufo americanus*) (AFRC, 1995). Since the majority of the base property, including the Project Site, is developed, urbanized land and mowed lawns, biological diversity is generally low and limited to animals tolerant of human interaction and influences.

Special Status Species: The USAF initially queried the USFWS Information for Planning and Consultation (IPaC) database to identify federally listed threatened and endangered (T&E) species with the potential to

occur on the Project Site. IPaC identified two federally listed T&E species and one candidate species. The Indiana bat (*Myotis sodalis*) is federally endangered, the northern long-eared bat (*Myotis septentrionalis*) is federally threatened, and the monarch butterfly (*Danaus plexippus*) is a candidate species. A visual survey conducted at Grissom ARB in 2021 by the base Natural Resource Program Manager did not identify any of the federally listed T&E species (AFRC, 2021a).

Subsequently, in September 2022, the USFWS proposed to list the tricolored bat (*Perimyotis subflavus*) as endangered. This species hibernates in caves and mines. During non-hibernating seasons, the species primarily roosts in leaf clusters of deciduous hardwood trees. However, the species has also been known to roost among pine needles, eastern red cedar (*Juniperus virginiana*), and in artificial roosts (barns, under porch roofs, bridges, and concrete bunkers). This species typically forages over water or along forest edges (USFWS, 2021b). While the Project Site contains scattered landscape trees, they are adjacent to an active outdoor shooting range and amid a maintained lawn. The Project Site does not contain, and is not adjacent to, foraging habitat. Therefore, the Project Site has no suitable habitat and this species has no potential to occur at the site.

IPaC also identified four Birds of Conservation Concern (BCC)¹, the bald eagle (*Haliaeetus leucocephalus*), the bobolink (*Dolichonyx oryzivorus*), the red-headed woodpecker (*Melanerpes erythrocephalus*), and the wood thrush (*Hylocichla mustelina*), as having potential to occur on the Project Site. IPaC notes that while the bald eagle is not a BCC in this area, it warrants attention due to the Bald and Golden Eagle Protection Act. The bald eagle prefers forested habitat near large bodies of water; the bobolink's typical habitat is large hayfields and meadows; the red-headed woodpecker resides in open woods, farms, and orchards; while the wood thrush prefers deciduous forests (USFWS, 2022; Animalia, 2022a; Animalia, 2022b; Animalia, 2022c). No suitable habitat exists within the Project Site for these BCCs.

The IDNR maintains a list of state-listed T&E species, as well as state species of special concern. Currently, there are 13 state-listed T&E species for Miami County and 19 T&E species listed for Cass County. The IDNR Indiana Natural Heritage Data Center identified three state-listed species found within 0.5 mile of Grissom ARB: American badger (*Taxidea taxus*), kidneyshell (*Ptychobranhus fasciolaris*), and great St. John's-wort (*Hypericum pyramidatum*). Great St. John's-wort is a state-listed threatened species, while American badger and kidneyshell are listed as species of special concern. No suitable habitat exists on the Project Site for these three species.

3.7.2 Environmental Consequences

A biological resources impact would be significant if it would 1) substantially reduce regionally or locally important habitat; or 2) substantially diminish a regionally or locally important plant or animal species.

No federally listed T&E species have been documented to occur at Grissom ARB, and no suitable habitat exists on base for BCCs, including the bald eagle, or state-listed T&E species and species of special concern. As no special status species or suitable habitat have been identified at Grissom ARB, there is no potential for the Preferred Alternative to result in adverse impacts to this resource. Therefore, this resource is dismissed from further analysis.

USAF sent scoping letters to USFWS and IDNR in order to identify any potential concerns regarding special status species within the ROI. The USFWS conveyed via phone call in August 2022 that they do not provide written letters when no impact to listed species is anticipated, but that they agreed the project would not

¹ The USFWS identifies BCCs with potential to occur on the Project Site. BCCs are defined as "migratory and non-migratory bird species (beyond those already designated as federally threatened or endangered) that represent [the USFWS's] highest conservation priorities" (USFWS, 2021a).

impact federally listed species. No response has been received to date from IDNR. Copies of this correspondence are included in **Appendix A**.

3.7.2.1 Preferred Alternative

Vegetation: Proposed construction and demolition activities occurring under the Preferred Alternative would clear the grassland and landscape vegetation present within the LOD. No woods are present at the Project Site but some scattered trees are located throughout the LOD which may be removed during construction and demolition.

Proposed construction activities would impact vegetation within the LOD, due to various ground-disturbing activities and the presence of construction equipment and vehicles. The majority of ground disturbance would occur in the beginning phases of construction. Site preparation would involve site clearing and grading, which would result in extensive vegetation removal throughout the Project Site. Additionally, limited tree clearing would occur throughout the LOD during the construction phase to facilitate the placement of utilities. Demolition of the existing outdoor firing range would also disturb existing vegetation at the Project Site due to the presence of construction vehicles and removal of cement and other infrastructure associated with the range. Once construction and demolition activities are complete, the Project Site would be revegetated with native plants or landscape vegetation. Grissom ARB is exempt from maintaining an Integrated Natural Resources Management Plan, so any revegetation activities would be specified in construction design plans prior to implementation of the Proposed Action.

Native vegetation communities and wildlife habitats could be impacted by the introduction or encroachment of noxious weeds or invasive species during construction. However, contractors would minimize the introduction or spread of invasive species through the use of BMPs such as cleaning all construction equipment prior to bringing it on-site. The spread of weeds would be managed in accordance with Grissom ARB's Integrated Pest Management Plan. Once construction is complete, the site would be revegetated with native species.

Operation of the indoor firing range would not have any impacts on vegetation, as firing activities would be confined to an indoor space, and no additional ground-disturbing activities would occur. Overall, the Preferred Alternative would result in *short-term, less-than-significant adverse impacts* on vegetation in the ROI.

Wildlife: During construction and demolition, common wildlife species occurring on the Project Site would be physically displaced, and construction noise and increased human activity may also disturb wildlife species located within the ROI. However, the current use of the Project Site to conduct training and firing activities, and other activities, such as landscape maintenance and the use of nearby roadways and buildings, constitute existing disturbances to wildlife within the ROI. Mobile wildlife species, such as birds and small mammals, would likely relocate to areas of similar habitat near the site. Although disturbance, displacement, or inadvertent wildlife mortality from construction impacts would constitute an adverse impact, such impacts would occur at the individual level, rather than the population or species level, and would not inhibit the continued presence of common wildlife populations and species near the Project Site. Ongoing activities within the ROI may have previously limited the use of the Project Site by wildlife, and any wildlife that is present may be accustomed to human activity. In addition, the Preferred Alternative would not create any elements that would encourage additional bird activity near Grissom ARB, thus avoiding any BASH concerns. Therefore, construction and demolition occurring under the Proposed Action would result in *short-term, less-than-significant adverse impacts* to wildlife.

Once construction is complete, common wildlife species may benefit from the cessation of outdoor firing activities, which may have previously posed a noise disturbance to species living in and around the

Project Site. In addition, site revegetation could improve the quality of habitat at the Project Site, and would continue to support common wildlife species at Grissom ARB. Therefore, operation of the Preferred Alternative would have a *long-term, beneficial impact* on wildlife.

3.7.2.2 No Action Alternative

Under the No Action Alternative, the proposed indoor firing range at Grissom ARB would not be constructed, and there would be *no impact* to vegetation in the ROI. Wildlife species at and in the vicinity of the Project Site may continue to be impacted by outdoor firing range activities, which could pose a minor noise disturbance to nearby wildlife. Therefore, the No Action Alternative would have *long-term, less-than-significant adverse impacts* to wildlife.

3.8 CULTURAL RESOURCES

Cultural resources are historic properties as defined by the NHPA; cultural items as defined by the Native American Graves Protection and Repatriation Act (NAGPRA); archaeological resources as defined by the Archaeological Resources Protection Act; sacred sites as defined by EO 13007, *Indian Sacred Sites*, to which access is afforded under the American Indian Religious Freedom Act; and collections and associated records as defined by 36 CFR 79.

Historic properties covered by the NHPA include any prehistoric or historic district, site, building, structure, or object with known or potential significance with regard to pre- or post-American history, architecture, archaeology, engineering, or culture. Section 106 of the NHPA requires federal agencies to consider the effect an undertaking may have on historic properties. The Preferred Alternative is considered an undertaking and is required to comply with Section 106, including consultation with the Indiana SHPO. All Section 106 correspondence with the SHPO for the Preferred Alternative is provided in **Appendix B**.

Consistent with Section 106 of the NHPA, DoD Instruction 4710.02, AFI 90-2002, and AFMAN 32-7003, the USAF is also consulting with seven federally recognized tribes that are historically affiliated with Grissom ARB and the surrounding area regarding the potential for the Preferred Alternative to affect properties of cultural, historical, or religious significance to the tribes. The USAF initiated consultation with each tribe via letter in July 2022; a record of this consultation, including subsequent attempts to contact the tribes, is provided in **Appendix C**. To date, tribes have identified no properties of cultural, historical, or religious significance on the Project Site; however, in letters dated July 21, 2022, and July 25, 2022, the Forest County Potawatomi Community of Wisconsin and the Miami Tribe of Oklahoma, respectively, have requested to act as consulting parties for the Proposed Action.

The ROI for cultural resources is the area of potential effects (APE) as defined by the NHPA. The APE for the undertaking (36 CFR 800.16(d)) consists of the LOD for construction activities and a 0.25-mile (1,320-foot) radius around the boundary of the LOD to account for visual impacts; this buffer generally encompasses the visual resources ROI (see **Section 3.2**). The LOD covers approximately 7.6 acres for a variety of ground-disturbing activities including work on staging and grading areas.

3.8.1 Affected Environment

In 2012, through Section 106 consultation with the SHPO and other stakeholders, USAF determined that there are no above-ground or archaeological sites listed in or eligible for inclusion in the National Register of Historic Places (NRHP) within Grissom ARB (AFRC, 2013).

1014 **3.8.2 Environmental Consequences**

1015 A cultural resources impact would be significant if it would constitute an unresolved adverse effect as
1016 defined in Section 106 of the NHPA (36 CFR 800.5): alteration, directly or indirectly, of any of the
1017 characteristics of a historic property that qualify it for inclusion in the NRHP in a manner that would diminish
1018 the integrity of its location, design, setting, materials, workmanship, feeling, or association.

1019 **3.8.2.1 Preferred Alternative**

1020 The Preferred Alternative would have *no effect*, direct or indirect, on historic properties, as no known historic
1021 properties, either above-ground or archaeological, occur within the ROI. Additionally, the Preferred
1022 Alternative would have *no effect* on tribally significant resources, as none have been identified through tribal
1023 consultation.

1024 In a letter dated August 11, 2022, the Indiana SHPO concurred with the finding of no effect on historic
1025 above-ground or archaeological properties (see **Appendix B**). Grissom ARB contacted seven federally
1026 recognized tribes that are affiliated with Grissom ARB; to date, three responses have been received. The
1027 Forest County Potawatomi Community of Wisconsin and the Miami Tribe of Oklahoma indicated that no
1028 historic sites or properties would be impacted, and asked to serve as consulting parties. The Pokagon Band
1029 of Potawatomi Indians, Michigan and Indiana, noted that the Proposed Action would occur within 1 mile of
1030 documented historic sites, but that no adverse effects to these sites are anticipated. A full record of tribal
1031 consultation is included in **Appendix C**.

1032 Although there are no known archaeological sites, there is the potential for inadvertent archaeological
1033 discoveries while conducting ground-disturbing activities. Should any unanticipated cultural resources be
1034 encountered during construction, demolition, or other activities associated with the Preferred Alternative,
1035 Grissom ARB would immediately cease work and report the discovery to the Indiana SHPO and federally
1036 recognized tribes for consultation on how to proceed.

1037 **3.8.2.2 No Action Alternative**

1038 Under the No Action Alternative, the proposed indoor firing range at Grissom ARB would not be constructed
1039 and the existing outdoor firing range would not be demolished. There would be *no impact* on cultural
1040 resources.

1041 **3.9 UTILITIES**

1042 Utilities include water storage facilities, treatment plants, and delivery systems; supplemental power
1043 generation, transmission, and distribution facilities, including, but not limited to, wind turbines, generators,
1044 substations, and power lines; natural gas transmission and distribution facilities; sewage collection systems
1045 and treatment plants; and communication systems.

1046 The ROI for utilities includes all areas and end users within Grissom ARB that may be impacted from
1047 temporary utility disruptions or an increased demand on utilities. No off-base utility changes are anticipated.

1048 **3.9.1 Affected Environment**

1049 No utilities are currently present at the proposed location of the indoor facility, with the exception of a
1050 stormwater gravity main. The construction of the proposed facility would require connections to existing
1051 utilities at other locations within Grissom ARB. Although no utilities are present on-site, the LOD for the
1052 Proposed Action includes potential utility corridors that could be used to route utilities to the proposed indoor

facility from the locations at which they are already concentrated. Existing utilities are primarily located to the east of the Project Site along Grissom Avenue, and to the north along Dragonfly Lane; these existing lines would serve as potential tie-in points for the proposed facility. Telecommunications for the proposed indoor firing range would be tied into the hand hold at Building 596 off of Dragonfly Lane. The expansion of the existing utilities on Grissom ARB would not require any off-base connections.

3.9.2 Environmental Consequences

A utilities impact would be significant if it would result in prolonged or permanent service disruptions to other utility end users, substantially increase utility demand so as to burden utility providers, or reduce local utility supply to the surrounding communities.

3.9.2.1 Preferred Alternative

Implementation of the Preferred Alternative would increase overall utility usage at Grissom ARB, as the new indoor facility would require utility connections that were not required for operation of the outdoor firing range. All utilities, including electric, water, natural gas, telecommunications, and sanitary sewer, would need to be extended to the site. New utilities placed in support of the operation of the indoor firing range would tie in to existing utilities surrounding the Project Site; most tie in points would be located off Grissom Avenue to the east and Dragonfly Lane to the north, and telecommunications would be tied in to Building 596. Temporary service disruptions to other buildings on Grissom ARB could occur while the new utility infrastructure for the indoor firing range is being connected to the existing systems. However, these disruptions would be minimized by ensuring that existing utilities remain operational until the new utilities are ready to be connected. End users would also be given advance notice of anticipated service disruptions. Therefore, the Preferred Alternative would have *short-term, negligible impacts* on on-base utilities during construction of the indoor firing range. No service disruptions would be anticipated for off-base end users.

Once the indoor firing range is operational, utility demand would increase relative to the existing demand of the outdoor firing range. This higher demand is not anticipated to generate substantially higher demand that would burden utility providers or result in disrupted service to other facilities on base. The indoor firing range would only be used as needed to meet training requirements, but offices contained within the facility may be operational similar to other administrative buildings located on base. Additionally, the building would be designed in accordance with applicable sustainability standards, and measures to reduce energy and water use would likely be incorporated into the facility. As a result, the Preferred Alternative would have *long-term, negligible impacts* on utility usage/demand during operation of the indoor firing range.

3.9.2.2 No Action Alternative

Under the No Action Alternative, the proposed indoor firing range at Grissom ARB would not be constructed, and there would be *no impact* on utilities.

3.10 SOCIOECONOMICS & ENVIRONMENTAL JUSTICE

Socioeconomics refer to the attributes of the human environment, and include demographic and economic characteristics such as age, race, income, and employment. Additionally, EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, directs federal agencies to consider the potential adverse impacts of their activities on children. Environmental Justice (EJ) is the consideration of low-income and minority populations. EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, directs federal agencies to consider the potential adverse impacts of their activities on EJ communities, and requires that impacts that may disproportionately affect these communities be addressed. The CEQ has established criteria for identifying EJ communities of

concern with respect to race and income: minority populations exist where the percentage of minorities exceeds 50 percent or is meaningfully greater than in the general population of the larger surrounding area, and low-income populations exist where there is a substantial discrepancy between a community and surrounding communities with regard to income and poverty status (CEQ, 1997). Information used to aid in the identification of EJ communities can be obtained from the U.S. Census Bureau or via the USEPA's Environmental Justice Screening and Mapping Tool. This tool provides socioeconomic data for Census block groups, based on data from the 2020 American Community Survey (USEPA, 2022a).

The ROI for socioeconomics and EJ includes seven different block groups (USEPA, 2022a). All components of the Preferred Alternative are located within tract 9529, block group 1; however, the other six block groups are adjacent to the block group containing Grissom ARB and are included in the ROI in order to evaluate the socioeconomic impact of the Proposed Action on the surrounding area. Adjacent communities would be most likely to experience impacts from the Preferred Alternative, both with regard to changes in socioeconomic characteristics and potential disproportionate impacts.

3.10.1 Affected Environment

Socioeconomic and EJ data for the ROI, Miami and Cass Counties, and the state of Indiana are presented in **Table 10**.

Table 10: Socioeconomic and EJ Data

Demographic Indicators	ROI	Miami County	Cass County	State of Indiana
Socioeconomic Indicators				
Total Population	9,785	35,684	37,727	6,696,893
Population Change (2010-2020)	-17.9%	-4.4%	-3.4%	4.4%
Median Household Income	\$59,527	\$50,616	\$49,020	\$58,235
Unemployment Rate	4.3%	4.9%	4.4%	4.7%
Population Under 18 Years	19.5%	21.2%	23.1%	23.5%
EJ Indicators				
Population Below Poverty Level	9.2%	15.6%	13.1%	12.9%
Minority Population	14.2%	11.6%	21.0%	21.6%

Sources: (U.S. Census Bureau, 2020b; U.S. Census Bureau, 2020a; USEPA, 2022a)

The state of Indiana had a population increase of 4.4 percent from 2010 to 2020, which is less than the 7.4 percent increase in the U.S. population over the same period (U.S. Census Bureau, 2020b; U.S. Census Bureau, 2010). The population of Miami County decreased by approximately 4.4 percent from 2010 to 2020, while that of Cass County decreased by 3.4 percent over the same period. The ROI experienced a substantially larger decrease in population over that same time period, with a decline of approximately 18 percent. Median household income is slightly higher in the ROI than in Miami and Cass Counties and the

1119 state of Indiana, and the unemployment rate is comparable across all geographies (USEPA, 2022a). The
1120 top industries in both Miami County and Cass County are manufacturing; educational services, health care
1121 and social assistance; and retail trade (U.S. Census Bureau, 2020a).

1122 No individuals, including children, currently live on or occupy the Project Site. The occurrence of children
1123 in the vicinity of the Project Site would not be a frequent or regular presence as it is on an active ARB with
1124 secured entry. The percentage of the population under age 18 in the ROI is similar but lower than those of
1125 Miami County, Cass County, and the state of Indiana.

1126 Given the rural location of the base, there is a low housing density in the vicinity of the base. However, as
1127 the Proposed Action would not result in any change to personnel at Grissom ARB, there would be no
1128 potential for it to affect local housing conditions or result in a housing shortage. Additionally, there are no
1129 retail shops or services or public recreational sites in the immediate vicinity of the Project Site. Therefore,
1130 these socioeconomic components are dismissed from analysis.

1131 The poverty level in the ROI (9.2 percent) is slightly lower than the counties (15.6 percent and 13.1 percent)
1132 and state (12.9 percent). The minority population is lower than 50 percent in the ROI; additionally, the
1133 minority population percentage in the ROI is similar to that of Miami County and lower than those of both
1134 Cass County and the state of Indiana. Therefore, the ROI is not considered an EJ community of concern
1135 with respect to income or race. The USAF confirmed these results using the USEPA's Environmental
1136 Justice Screening and Mapping Tool (USEPA, 2022a).

1137 3.10.2 Environmental Consequences

1138 A socioeconomic impact would be significant if it would 1) substantially alter the location and distribution of
1139 the local population or 2) change current economic conditions in the ROI in a way that would be notable
1140 and harmful for surrounding communities and residents.

1141 As no EJ communities of concern with respect to race or income are present surrounding the Project Site,
1142 there is no potential for the Preferred Alternative to disproportionately impact EJ communities. Therefore,
1143 this resource is dismissed from further analysis.

1144 The total population under 18 years of age does not exceed 20 percent of the overall population in the ROI
1145 and is similar to the proportion in both Miami and Cass Counties. The closest school to the ROI is over 4
1146 miles away, children would not be permitted near an active construction site, and the site would be secured
1147 to prevent unauthorized or accidental access. With site monitoring and access controls in place, and
1148 standard air quality controls in place, the Preferred Alternative would not have the potential to
1149 disproportionately impact off-site children. Therefore, protection of children does not warrant special
1150 consideration under EO 13045 for this Proposed Action, and this resource is dismissed from further
1151 analysis.

1152 3.10.2.1 Preferred Alternative

1153 Implementation of the Preferred Alternative would not adversely affect socioeconomic conditions in the
1154 ROI. Proposed construction and demolition activities would likely be completed by local contractors,
1155 temporarily increasing employment opportunities, personal incomes, and materials purchases within the
1156 nearby communities. If non-local contractors support construction, direct economic benefits associated with
1157 expenditures on lodging, food, and retail would accrue to the local community. Tax revenues associated
1158 with direct and indirect construction expenditures would also benefit local economic conditions. Therefore,

the Preferred Alternative would be anticipated to have a *short-term, beneficial impact* on the economic conditions of surrounding communities during construction and demolition.

Once construction is complete, the indoor firing range would be maintained by existing Grissom ARB personnel. There would also be no change in the number of Airmen based at Grissom ARB. Therefore, there would be *no long-term or ongoing impacts* to socioeconomic conditions in the ROI.

3.10.2.2 No Action Alternative

Under the No Action Alternative, the proposed indoor firing range at Grissom ARB would not be constructed, and there would be *no impact* on socioeconomic conditions in the ROI.

3.11 TRANSPORTATION

This section describes the existing vehicular transportation network surrounding the Project Site. Mass transit, bicycle, and pedestrian infrastructure are not included as the Preferred Alternative would not meaningfully impact them.

The ROI for transportation consists of the roads bordering the Project Site and intersected by the proposed utility corridors, and the roadways providing access to the Project Site, including Hoosier Boulevard, Grissom Avenue, Dragonfly Lane, Bakalar Lane, and Perimeter Road.

3.11.1 Affected Environment

The Project Site is located near the western boundary of Grissom ARB, off Grissom Avenue, a main road providing access to the training area (see **Figure 1**). An existing asphalt drive around the current outdoor firing range is used for access to that range from Grissom Avenue. Current access to the outdoor small arms range is primarily by pedestrian foot traffic. There are no parking areas on-site for the existing facility; personnel accessing the outdoor firing range may park in available spaces along Grissom Avenue and walk to the range. Access to the Project Site for construction workers would likely be via the asphalt drive.

3.11.2 Environmental Consequences

A transportation impact would be significant if the associated increase in construction- or operation-related traffic would exceed the existing capacity of vehicular transportation networks or contribute to a noticeable degradation of existing traffic conditions.

3.11.2.1 Preferred Alternative

Construction and demolition occurring under the Preferred Alternative would result in temporary increases in construction-related traffic at the site that would include workers' personal commuting vehicles and heavy construction vehicles. To manage construction-related traffic, the contractor would implement and adhere to a project-specific transportation management plan for each phase of the Preferred Alternative. As the Project Site is located within Grissom ARB, no lane closures on public roadways outside of the base would occur. Additionally, as the proposed indoor firing range is removed from the surrounding roadways (Grissom Avenue and Dragonfly Lane), no on-base road closures would be required during the majority of construction and demolition activities. Temporary closures of segments of Grissom Avenue, Perimeter Road, and Dragonfly Lane may be required in order to route utilities from surrounding tie-in points to the Project Site. Parking for construction vehicles and personal commuting vehicles would be available at or surrounding the Project Site, so workers do not fill up spaces in nearby parking lots that are needed for base personnel. Overall increases in traffic near the Project Site from construction vehicles would be

temporary and within the capacity of the on-base roadways; these roads are not heavily used as they are not publicly accessible, and construction traffic is not anticipated to impede or prevent the flow of traffic within Grissom ARB. Therefore, construction and demolition would have *short-term, negligible impacts* on transportation.

Once construction is complete and the indoor firing range is operational, no personal vehicles would be able to access the site, and no dedicated parking would be provided. These conditions would be consistent with the existing means of access to the outdoor facility. A new 12-foot-wide access road circling the indoor facility would be used for range supplies, maintenance, and access to the mechanical room. This drive and access would also accommodate fire trucks that may need to access the indoor facility. A sidewalk from the indoor facility would also be built to connect to existing sidewalks along Grissom Avenue, and ensure pedestrian safety while traveling to the facility. As operation of the indoor facility would not modify the existing transportation network within Grissom ARB, the Preferred Alternative would have *no impact* on transportation during operation.

3.11.2.2 No Action Alternative

Under the No Action Alternative, the proposed indoor firing range at Grissom ARB would not be constructed, and there would be *no impact* on the vehicular transportation network on or near the Project Site.

3.12 HAZARDOUS AND TOXIC MATERIALS AND WASTE

This section describes the use and presence of hazardous materials and the generation of hazardous waste at the Project Site. The ROI for HTMW is the Project Site.

HTMW are generally defined as materials or substances that pose a risk (through either physical or chemical reactions) to human health or the environment. Regulated hazardous substances are identified through a number of federal laws and regulations. The most comprehensive list is contained in 40 CFR Part 302, and identifies quantities of these substances that, when released to the environment, require notification to a federal government agency. Hazardous wastes, defined in 40 CFR 261.3, are considered hazardous substances. Generally, hazardous wastes are discarded materials (solids or liquids) not otherwise excluded by 40 CFR 261.4 that exhibit a hazardous characteristic (i.e., ignitable, corrosive, reactive, or toxic), or are specifically identified within 40 CFR Part 261. Petroleum products are specifically exempted from 40 CFR Part 302, but some are also generally considered hazardous substances due to their physical characteristics (especially fuel products), and their ability to impair natural resources.

The DoD Environmental Restoration Program (ERP) was established to provide for the cleanup of environmental contamination at DoD installations. Eligible ERP sites include those contaminated by past defense activities that require cleanup under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), and certain corrective actions required by the Resource Conservation and Recovery Act (RCRA). Non-ERP sites are remediated under the Compliance-Related Cleanup Program. No ERP sites are located at or in the vicinity of the Project Site.

3.12.1 Affected Environment

Hazardous materials at Grissom ARB are used, handled, stored, and managed in accordance with AFMAN 32-7002, *Environmental Compliance and Pollution Prevention, Hazardous Material Management, Chapters 3 and 5*. Grissom ARB maintains several planning documents to manage HTMW on the base. The Hazardous Waste Management Plan (HWMP) contains procedures for managing hazardous wastes and ensures that such procedures comply with applicable federal, state, local, and USAF regulations and requirements (AFRC, 2021b). The Spill Prevention, Control and Countermeasure Plan (SPCCP), which is

implemented in conjunction with the HWMP, describes preparedness and prevention practices, and addresses incident response and emergency responsibilities resulting from spills or discharges of HTMW (AFRC, 2020b). Finally, an Integrated Solid Waste Management Plan (ISWMP) contains guidance for managing municipal solid waste, compostable materials, construction and demolition debris, and industrial solid waste.

Grissom ARB is a large quantity generator (LQG) under RCRA, as it produces more than 2,200 pounds (lbs) of hazardous waste per month. An LQG may accumulate hazardous waste on-site for up to 90 days without a permit. Grissom ARB has a 90-day accumulation site located in Building 688, where hazardous waste is kept before it is transported off-base for proper disposal (AFRC, 2021b). This building is located approximately 0.2 mile northwest of the Project Site, off of Warthog Street.

In addition to Building 688, many buildings in the vicinity of the Project Site have some capacity for HTMW generation, storage, disposal, or monitoring. The existing outdoor firing range contains both a hazardous waste accumulation point as well as a flammables locker, both of which would support firing activities and munitions storage. HTMW functions of other buildings near the Project Site include hazardous waste accumulation points, tanks, flammables lockers, corrosives lockers, cleaning vats, and leak monitoring stations. One potential discharge site is located adjacent to the southern portion of the Project Site by Building 628, although this has not been characterized.

Soil contamination from lead is presumed to be present in the existing outdoor firing range due to past firing activities and the possible remnants of projectiles. Other contaminants associated with past activities may also be present, including asbestos and munitions and explosives of concern (MEC). The soils in the vicinity (i.e., within 100 feet) of the existing outdoor firing range may be contaminated from lead.

3.12.2 Environmental Consequences

An HTMW impact would be significant if it would 1) interrupt, delay, or impede ongoing cleanup efforts; or 2) create new or substantial human or environmental health risks (e.g., soil or groundwater contamination).

3.12.2.1 Preferred Alternative

Operation of construction equipment and vehicles under the Preferred Alternative would create the potential for discharge, spills, and contamination from commonly used products, such as diesel fuel, gasoline, oil, antifreeze, and lubricants, at the Project Site. Even without major release events, multiple minor releases could have potential effects to the environment within the ROI; however, such releases would be addressed via adherence to the SPCCP. All hazardous materials or waste discovered, generated, or used during construction would be handled, containerized, and disposed of in accordance with Grissom ARB's SPCCP and applicable local, state, and federal regulations. Solid waste generated during construction and demolition would be managed and disposed of in accordance with the base ISWMP.

The outdoor firing range itself is presumed to contain contamination from lead, asbestos, and PCBs, and MECs may also be present in the surrounding area. As such, demolition activities would be conducted in accordance with applicable HTMW management and disposal regulations and procedures. Additionally, soils near the outdoor firing range may be contaminated due to past and current firing activities. If any ground disturbing activities would occur within 100 feet of the range footprint, lead sampling may be required to identify and delineate this potential contamination. Subsequently, if contamination is identified at levels that exceed applicable thresholds, the soil would also be managed and/or disposed of in accordance with HTMW regulations. Finally, no ERP sites are located at or within the vicinity of the Project Site. Therefore, demolition activities would have the potential for *short-term, less-than-significant adverse impacts* from HTMW.

Operation of the indoor firing range would likely result in the generation of munition solid waste from firing activities. Military munitions may be considered solid wastes under RCRA (40 CFR Part 266, Subpart M) and are therefore subject to regulation as hazardous wastes under 40 CFR Part 261. Military munitions considered under RCRA include unused munitions; used and fired munitions that are recovered, collected, and disposed of either on or off a firing range; and used and fired munitions that land off-range. Munitions are not considered solid wastes under RCRA if they are used for their intended purposes, including military training; use in research, development, testing, and evaluation; or recovery and on-range destruction during range clearance activities. Spent projectiles that would be collected and disposed of outside of the indoor firing range would constitute hazardous waste, and would be managed in accordance with RCRA and existing base procedures, including the HWMP. These wastes would be similar to those generated during operation of the outdoor facility, as the same types of small arms would be used. Use of the indoor facility, however, would generate more HTMW than the outdoor facility, as it would enable more training to occur on-base than under current conditions, and would therefore result in additional wastes. Such an increase would still be permissible under Grissom ARB's LQG status, and would not change that status under RCRA. Further, the proposed indoor firing range would contain all waste within the building for routine cleanup; there would be no potential for future contamination outside the facility from firing activities. Due to the training increase under the Preferred Alternative, there would be *long-term, less-than-significant adverse impacts* from HTMW.

Operation of the indoor firing range would also involve the use of HTMW typical of administrative operations and facility maintenance, such as solvents, paints, thinners, cleaning products, and petroleum-based products. Generally, HTMW quantities associated with the operation of the indoor facility would remain small relative to the total quantities used, generated, and disposed of at Grissom ARB, and would be consistent with the quantities generated at other administrative facilities. All such materials would be stored in secured lockers or cabinets when not in use, and would be used by authorized personnel in accordance with label directions. Any hazardous wastes would be transported by licensed contractors to permitted facilities for disposal. The proposed indoor facility would be operated in accordance with existing base plans. Therefore, administrative operations of the indoor facility would result in *long-term, negligible impacts* from HTMW.

3.12.2.2 No Action Alternative

Under the No Action Alternative, Grissom ARB would continue to use the existing outdoor firing range. Projectiles and other discharges from small arms are generated and may be released into the environment during this outdoor training. These activities may have resulted in soil contamination in the vicinity of the outdoor firing range, although this has not been confirmed. Therefore, the No Action Alternative would result in *long-term, less-than-significant adverse impacts* to HTMW.

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4.0 CUMULATIVE EFFECTS

4.1 INTRODUCTION

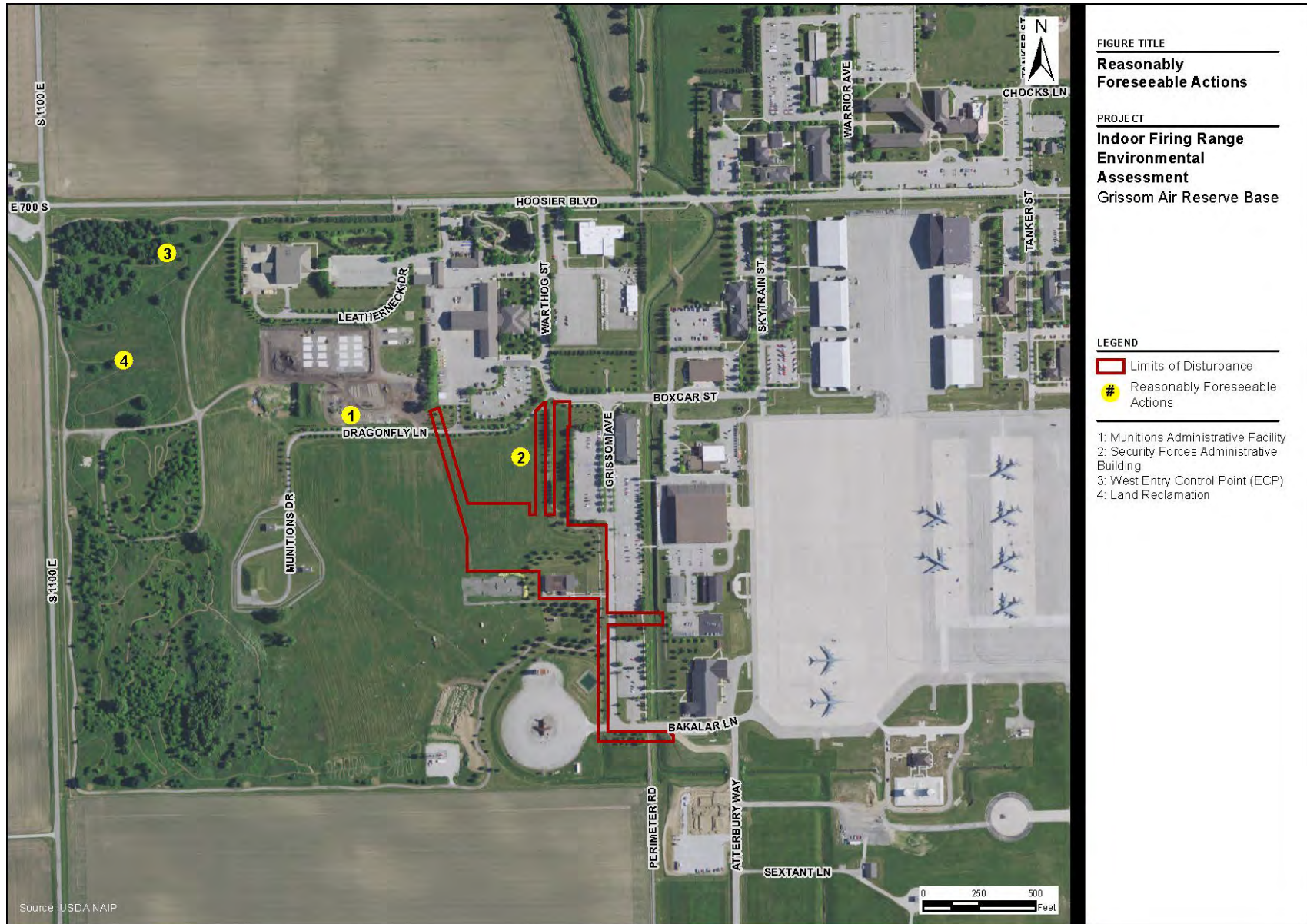
The USAF identified and reviewed past, present, and reasonably foreseeable actions that have or are planned to occur within the Preferred Alternative's ROI, including Grissom ARB and the surrounding off-base areas. Past and present projects are generally addressed within the environmental baseline of the ROI for each resource area; thus, this analysis focuses on reasonably foreseeable future actions in the ROI. The USAF analyzed the potential for the Preferred Alternative to have cumulative effects with these other reasonably foreseeable actions.

Baseline conditions in the ROI generally include development trends, with a focus on expanding the training area at Grissom ARB, which includes the Project Site, and updating infrastructure. Grissom ARB has a short-range and long-range ADP that outlines future proposed projects to support its mission. These projects are listed in **Table 11** and shown in **Figure 6**. Given the property surrounding Grissom ARB is predominantly agricultural, there are no reasonably foreseeable actions off-base that would have the potential to contribute to cumulative impacts with the Proposed Action.

Table 11: Reasonably Foreseeable Actions at Grissom ARB

Project Name	Project Type	Description
1. Munitions Administrative Facility	Institutional; Infrastructure	The short-range Training District ADP includes plans to construct a new munitions administrative facility in a central location to existing and proposed training and firing ranges. Construction would also include new roadways and parking lots.
2. Security Forces Administrative Building	Institutional; Infrastructure	The long-range Training District ADP includes plans to construct a new security forces administrative building adjacent to the munitions administrative building. Construction would also include new roadways and parking lots.
3. West Entry Control Point (ECP)	Institutional	A new ECP would be constructed in the northwest corner of the training area to provide access to Grissom ARB from the adjacent roadway, S 1100 E. This would include construction of a new entry configuration with guard booths and checkpoints, and new internal roadways connecting to Hoosier Boulevard. This project would be constructed under the long-range Training District ADP.
4. Land Reclamation	Environmental	Land currently supporting an on-base landfill located in the northwest corner of the training area would be reclaimed and restored to its natural conditions as part of the long-range Training District ADP.

Figure 6: Reasonably Foreseeable Future Actions



4.2 EVALUATION OF CUMULATIVE EFFECTS

4.2.1 Visual Resources

Short-term, less-than-significant adverse impacts to aesthetics and visual resources may occur during construction of the Preferred Alternative and reasonably foreseeable actions. Construction sites would disrupt visual landscapes throughout the ROI, and may be visible from main roadways off Grissom ARB that run close to the training area. The temporary nature of construction, however, would render these impacts inconsequential. In the long-term, no adverse impacts on visual resources are expected to occur, as the new buildings and infrastructure on Grissom ARB would be consistent with the operational use of the base and would adhere to applicable base design standards.

4.2.2 Air Quality and Climate

Construction of the Preferred Alternative and reasonably foreseeable actions would generate air emissions from the use of construction equipment and vehicles. Construction emissions would be temporary, and long-term emissions resulting from increased firing of infrangible rounds would be insignificant. Emissions from the Preferred Alternative and other reasonably foreseeable actions would not exceed regulatory thresholds or threaten the attainment status of the region, as project-specific compliance with state and federal permitting requirements and implementation of BMPs would further minimize air emissions. These impacts would be *short-term and less-than-significant* due to the temporary and localized nature of construction.

4.2.3 Noise

Construction of the Preferred Alternative and reasonably foreseeable actions would increase noise levels in the ROI. Construction noise is typically considered a minor annoyance, due to its temporary nature. In addition, noise impacts from construction equipment are generally limited to a 0.25-mile buffer as noise attenuates quickly in the ambient environment. While an increase in temporary noise would be experienced by those in the surrounding areas, collective noise would not substantially contribute to the existing soundscape already dominated by airfield activity and training activities. Through project-specific BMPs, the USAF would ensure the Preferred Alternative's cumulative impact on noise when considered with other reasonably foreseeable actions is minimized to the greatest extent practicable. Noise impacts would be *short-term and less-than-significant*.

4.2.4 Earth Resources

The Preferred Alternative and reasonably foreseeable actions would not appreciably alter geological or topographical conditions in the ROI. Bedrock is not known to occur close to the surface within the training area at Grissom ARB, and the base topography is generally flat. Projects would not likely require substantial grading or changes to topography. Construction activities would require vegetation removal and ground-disturbing activities that would result in soil disturbance and erosion. However, the Preferred Alternative would only impact up to 7.6 acres of soils, which would not contribute to significant degradation of soils in the ROI as a whole, when taken into consideration with reasonably foreseeable actions. With implementation of project-specific BMPs, including adherence to applicable construction stormwater permits for each USAF project, the resulting cumulative impact on soils would be *long-term and less-than-significant adverse*.

4.2.5 Water Resources

The Preferred Alternative and reasonably foreseeable actions would result in *short-term, negligible adverse impacts* on water resources, including Government Ditch and wetlands, from increased erosion and sedimentation during construction activities from soil disturbance and stormwater runoff. Proposed construction would also result in an increase in impermeable surfaces, which could result in higher stormwater flow; however, the proposed future land reclamation project may improve on-site hydrology and infiltration at the site of the existing landfill. None of the development projects in the ADP would result in the direct fill or diversion of surface waters or wetlands. Implementation of stormwater management BMPs and compliance with Section 438 of the EISA would maintain cumulative impacts at acceptable levels.

4.2.6 Biological Resources

The Preferred Alternative and reasonably foreseeable actions would result in *short- and long-term, less-than-significant adverse impacts* on biological resources. Under the Preferred Alternative, the currently undeveloped Project Site would be cleared of its grassy vegetation; however, this is not anticipated to affect habitat or common wildlife species in a meaningful way. Wildlife would be temporarily impacted by construction noise and ground disturbance, but may experience beneficial impacts following the completion of construction. Reasonably foreseeable actions, such as land reclamation, may also benefit wildlife, by allowing previously developed or contaminated areas to revegetate and return to a natural condition. Most foreseeable actions involve construction and new development, however, and while wildlife would be temporarily impacted by human activity, species would not experience any long-term effects after construction has been completed. There would be *no cumulative impacts* on special status species, as none have been identified at Grissom ARB, and no suitable habitat is present.

4.2.7 Cultural Resources

Implementation of the Preferred Alternative and reasonably foreseeable actions would have *no effects* on historic and cultural resources in the ROI. No significant cultural resources occur within the entirety of Grissom ARB. The Preferred Alternative and other development projects in the ADP would not introduce any structures to the visual landscape that would be incongruent with the existing viewshed. There is the potential for inadvertent archaeological discoveries while conducting ground-disturbing activities during construction; however, in the event that such resources are inadvertently discovered, the USAF would cease work immediately and notify the appropriate authorities, minimizing the potential for adverse impacts on previously unknown cultural resources.

4.2.8 Utilities

Long-term, less-than-significant adverse impacts to utilities may occur during construction and operation of the Preferred Alternative and reasonably foreseeable actions. No utility connections currently exist at the site of the proposed indoor firing range, with the exception of a stormwater gravity main, and need to be connected from other locations within the project LOD. Additional new construction in previously undeveloped areas would likely also not have utility access, and would need to be tied in elsewhere on base. Minor utility disruptions could occur during construction activities. Additional buildings requiring new utilities, in combination with the Preferred Alternative, would also increase the utility demand on Grissom ARB, although it would not substantially burden local utility providers or supply.

4.2.9 Socioeconomics and Environmental Justice

In the long term, the Preferred Alternative, when taken in consideration with reasonably foreseeable actions, would result in *beneficial impacts* on the local economy. Collective expenditures by temporary construction

workforces would benefit local accommodation, food, and retail industries, as well as accrue local fiscal benefits from associated sales tax revenues. There would be no cumulative effects to the population growth rate or available housing as the Preferred Alternative would not affect these socioeconomic factors.

As no EJ communities of concern with respect to race or income are present within the ROI, there is no potential for the Preferred Alternative and reasonably foreseeable actions to disproportionately impact EJ communities.

4.2.10 Transportation

Implementation of the Preferred Alternative in consideration with reasonably foreseeable actions would result in *short-term, less-than-significant adverse impacts* on vehicular traffic within the training area on Grissom ARB. Building construction adjacent to roadways or other buildings could result in traffic congestion surrounding the project sites and may impede building access or parking for base personnel. In the long term, however, there may be cumulative *beneficial impacts* from the construction of new roadways and parking lots, as well as a new ECP. Specific proposed projects that would construct new transportation features would alleviate traffic and parking competition once the buildings are operational, and would also enhance access to the base by providing a new entryway. Construction of a new ECP may reduce congestion on off-base roads at other entryways; no other off-base transportation impacts would be likely to occur as a result of the Preferred Alternative and reasonably foreseeable actions.

4.2.11 Hazardous and Toxic Materials and Waste

Short-term, less-than-significant adverse impacts on HTMW would occur during construction of the Preferred Alternative and reasonably foreseeable future actions. Construction activities could result in potential discharge, spills, and contamination, as well as encounters with soil contamination. Any construction activities requiring ground disturbance could expose previously unknown sources of hazardous materials. Solid waste generation would also increase temporarily during construction activities. Proper permitting and compliance with applicable base plans regarding hazardous and solid wastes would be in place to prevent exposure and the spread of any identified contamination. *Long-term, beneficial impacts* on HTMW may also occur from implementation of the proposed future landfill reclamation, which would reduce on-base contamination and minimize the potential for the spread of contaminants.

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5.0 LIST OF PREPARERS

1444 5.1 AIR FORCE PREPARERS

Name	Title
Trisha McClain	Biological Scientist
Cory Walters	Environmental Flight Chief
Kerry Van Dyke	Project Designer
MAJ Jonathon Hoover	Judge Advocate
Doug Hays	Chief of Public Affairs

1445 5.2 AECOM PREPARERS

Name	Role	Degree	Years of Experience
Carrie Kyzar	Project Manager, EA review and oversight	M.S. in Environmental Management B.S. in Environmental Science	21
Michael Busam	Deputy Project Manager, EA preparation	B.S. in Environmental Science and Policy	7
Jennifer Warf	Quality Assurance/Quality Control, EA review and oversight	M.S. in Environmental Studies B.A. in Zoology	20
Natalie Kisak	Preparation of EA sections	M.A. in Environmental Science B.A. in Environmental Studies and Public Policy	3
Tara Boyd	Preparation of EA sections	B.A. in Environmental Science and Global Sustainability	1
Allison Carr	Preparation of maps and figures	Master of City Planning B.A. in Geography	3
Sam Hartsfield	Preparation of Air Quality section	M.S. in Environmental Science and Management B.S. in Biology	15

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APPENDIX A:

CONSULTATION WITH FEDERAL, STATE, AND LOCAL AGENCIES

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DEPARTMENT OF THE AIR FORCE
AIR FORCE RESERVE COMMAND



12 July 2022

MEMORANDUM FOR SUBJECT PROJECT STAKEHOLDERS

FROM: 434 ARW/CC

SUBJECT: Environmental Assessment for Proposed New Indoor Firing Range at Grissom Air Reserve Base, Miami County, Indiana

The United States (US) Air Force is preparing an Environmental Assessment (EA) to evaluate the potential environmental impacts resulting from the construction of an indoor small arms firing range at Grissom Air Reserve Base (ARB) to replace the existing outdoor firing range (Proposed Action). The existing outdoor range and location for the proposed indoor range are located within the Grissom ARB training district on the western side of the installation. The proposed indoor range would be located south of Dragonfly Range and northwest of the existing outdoor range (**Attachment 1**).

The proposed indoor small arms firing range at Grissom ARB would be an approximately 23,000 square foot facility. It would be a 21 lane live fire range facility with 25 meter firing lanes, and would also include associated administration, classroom, maintenance, cleaning, storage, utility, and building support rooms. Supporting utilities, sidewalks, access road, and stormwater management features would also be constructed as needed. The proposed firing range would not have defined parking areas. The design of the indoor firing range would meet sustainability requirements under Unified Facilities Criteria (UFC) 1-200-02 and anti-terrorism force protection requirements under UFC 4-010-01. The Proposed Action further includes demolition, lead remediation, and site restoration activities for the approximately 8,805 square foot existing outdoor range. The Air Force is planning lead remediation activities in consultation with the US Army Corps of Engineers.

The 434th Security Forces Squadron (SFS) at Grissom ARB is required to train/qualify the equivalent of 1,341 students from 15 different units annually with a variety of small arms, including handguns, shotguns, and rifles. The Proposed Action would not increase this total throughput of Airmen. Rather, the Proposed Action would enable Grissom ARB to better achieve this requirement: a total of 48 range days per year would be required to satisfy existing training requirements with the proposed indoor range, while use of the existing outdoor range currently requires 89 range days per year.

Due to the aging condition of the existing outdoor range and increased training requirements, Grissom ARB has been unable to facilitate all required training for its Airmen. Airmen have been sent to Camp Atterbury Military Reservation Range in Johnson County, Indiana (approximately 100 miles south) for weapons qualification, although range schedules at Camp Atterbury are not

guaranteed and subject to change. Further, transportation of Airmen and explosives requires the use of multiple vehicles and drivers, and may take up to a full training day. The purpose of this Proposed Action, accordingly, is to construct a new, operational indoor firing range to support the small arms training requirements of military and security forces personnel at Grissom ARB, and provide an updated facility that supports training regardless of the time of day or outdoor weather conditions. The Proposed Action is needed to address training inefficiencies caused by the outdated condition of the existing outdoor firing range and increased training requirements that have resulted in the inability of Airmen to complete mandatory weapons training at Grissom ARB.

The EA will analyze the potential range of environmental impacts that would result from the Proposed Action (i.e., the Preferred Alternative) and the No Action Alternative. The Preferred Alternative includes two components: (1) demolition of the existing outdoor firing range; and (2) construction of a new indoor small arms firing range to replace the outdoor range. The No Action Alternative, which reflects the status quo, will be analyzed as a baseline for comparison of potential effects from the Proposed Action. Under the No Action Alternative, Grissom ARB would retain the existing outdoor firing range and would not construct a new indoor small arms firing range.

The EA will be prepared in compliance with the National Environmental Policy Act (NEPA) of 1969 (42 United States Code 4321, et seq.), the Council on Environmental Quality NEPA Implementing Regulations (40 Code of Federal Regulations [CFR] Parts 1500-1508), and the Air Force Environmental Impact Analysis Process (32 CFR 989).

As part of this EA, we request your assistance in identifying any potential areas of environmental impact to be assessed in this analysis. If you have any specific items of interest about this proposal, please contact Trisha McClain within 30 days of receipt of this letter by email to: trisha.mcclain@us.af.mil; or by mail to: 7104 S. Warthog Street, Grissom ARB, IN 46971-1632.

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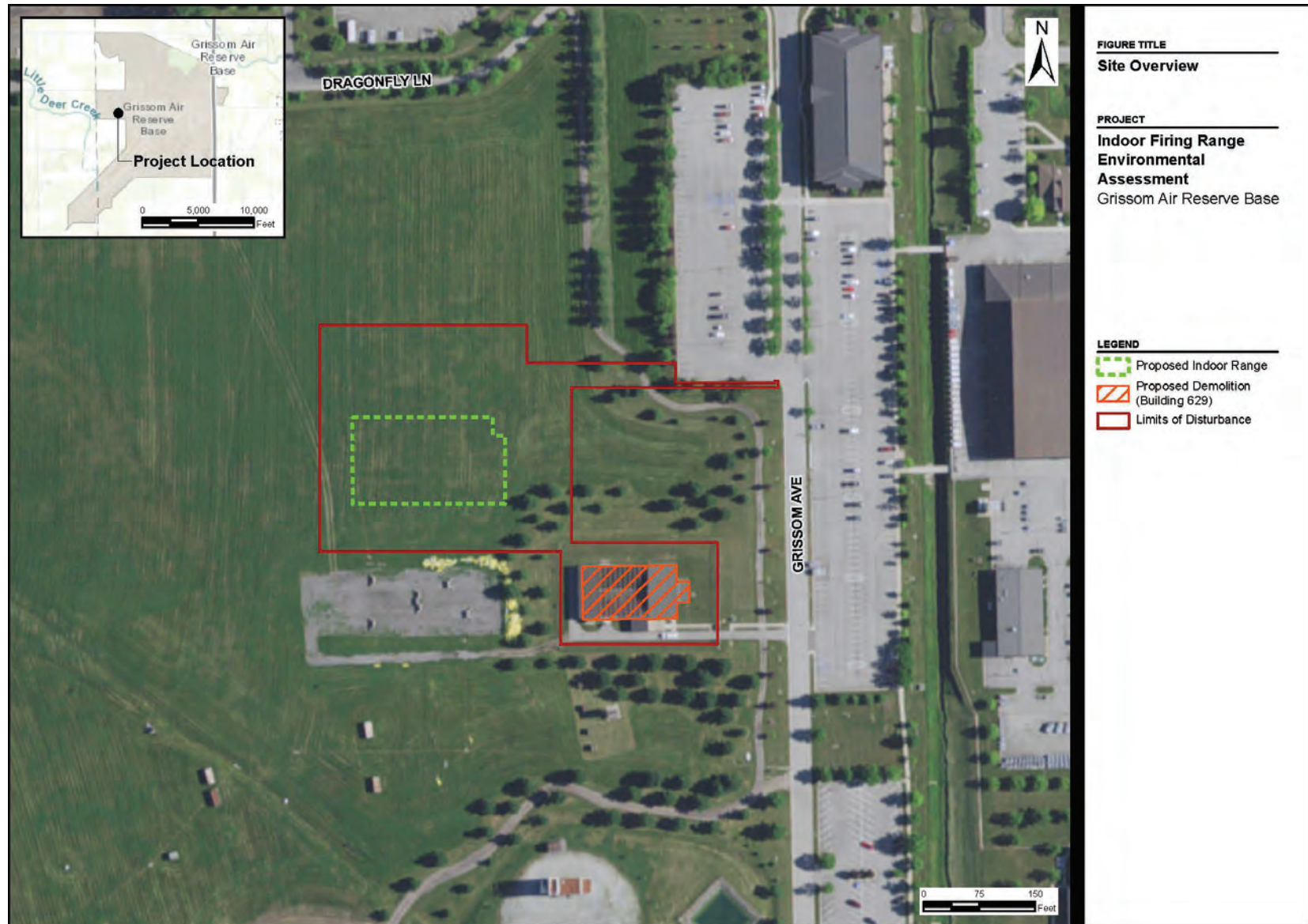
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THOMAS O. PEMBERTON, Colonel, USAF
Commander

1 Attachment:

1. Proposed Action Site Plan

Attachment 1: Proposed Action Site Plan



Kisak, Natalie

From: Busam, Michael
Sent: Monday, August 15, 2022 6:18 AM
To: Kisak, Natalie; Boyd, Tara
Subject: Fwd: Section 106 letter from the Indiana Division of Historic Preservation and Archaeology (demolition of existing outdoor firing range and proposed new indoor firing range at Grissom ARB, Miami Co., DHPA # 29544)

From: MCCLAIN, TRISHA A GS-12 USAF AFRC 434 MSG/CEV <trisha.mcclain@us.af.mil>
Sent: Monday, August 15, 2022 6:15 AM
To: Busam, Michael <Michael.Busam@aecom.com>
Cc: Kyzar, Carrie <carrie.kyzar@aecom.com>; CARTER, CASEY M CIV USAF AFRC HQ AFRC/A4CA <casey.carter.2@us.af.mil>
Subject: [EXTERNAL] RE: Section 106 letter from the Indiana Division of Historic Preservation and Archaeology (demolition of existing outdoor firing range and proposed new indoor firing range at Grissom ARB, Miami Co., DHPA # 29544)

Also, the FWS called and indicated that they changed their procedures. They do not provide a letter if there will be no impact. They stated on the phone they agree that there will not be any impact for the project.

Respectfully,
Trisha McClain
Biological Scientist
434 MSG/CEV
7104 S. Warthog Street
Grissom ARB, IN 46971-1632
Comm: 765-688-4546

APPENDIX B:
NATIONAL HISTORIC PRESERVATION ACT SECTION 106
CONSULTATION

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DEPARTMENT OF THE AIR FORCE
AIR FORCE RESERVE COMMAND



12 July 2022

Colonel Thomas O. Pemberton
Commander, 434th Air Refueling Wing
7207 S. Grissom Avenue
Grissom ARB, IN 46971

Beth McCord
Deputy State Historic Preservation Officer
Division of Historic Preservation & Archaeology
Indiana Department of Natural Resources
402 W. Washington Street, W274
Indianapolis, IN 46204-2739

SUBJECT: Proposed New Indoor Firing Range at Grissom Air Reserve Base, Miami County,
Indiana

Dear Ms. McCord;

The United States (US) Air Force is proposing to construct an indoor small arms firing range at Grissom Air Reserve Base (ARB) to replace the existing outdoor firing range. The project is an undertaking subject to review under the National Historic Preservation Act (NHPA) Section 106 process. A National Environmental Policy Act (NEPA) environmental assessment also is being developed.

Project Details

The Air Force is proposing to construct an indoor small arms firing range at Grissom ARB to replace the existing outdoor firing range (undertaking). The existing outdoor range and location for the proposed indoor range are located within the Grissom ARB training district on the western side of the installation. The proposed indoor range would be located south of Dragonfly Range and northwest of the existing outdoor range. The proposed indoor small arms firing range at Grissom ARB would be an approximately 23,000 square foot facility. It would be a 21 lane live fire range facility with 25 meter firing lanes, and would also include associated administration, classroom, maintenance, cleaning, storage, utility, and building support rooms. Supporting utilities, sidewalks, access road, and stormwater management features would also be constructed as needed. The proposed firing range would not have defined parking areas. The undertaking further includes demolition, lead remediation, and site restoration activities for the approximately 8,805 square foot existing outdoor range. The Air Force is planning lead remediation activities in consultation with the US Army Corps of Engineers. **Figure 1** shows the locations of the existing range and the proposed range.

Steps Taken to Identify the Area of Potential Effects (APE)

The proposed APE for the undertaking (36 Code of Federal Regulations (CFR) 800.16(d)) consists of the limits of disturbance (LOD) for construction and demolition activities and a 0.25-mile (1,320-foot) radius around the boundary of the LOD to account for visual impacts (**Figure 2**).

Potential for Impacts to Historic Properties

In a memorandum dated January 16, 2013, Grissom ARB was granted a waiver from preparing an Integrated Cultural Resources Management Plan (ICRMP) as:

- a. Previous inventories of cultural resources and historic properties were performed according to AFI 32-7065 and documentation of the inventory results are available at [Grissom ARB] and the office of the AFRC Civil Engineer; and
- b. Written concurrence for said waiver has been coordinated with the [Indiana] State Historic Preservation Office Notification and included in the petition letter to the Major Command Civil Engineer for said waiver.

The ICRMP waiver states that if cultural resources or historic properties are discovered in the future that Grissom ARB will re-evaluate the need to prepare and maintain an ICRMP.

Your office's concurrence with the ICRMP waiver was provided in a letter dated July 25, 2012, which stated "we see no reason to disagree with the Department of the Air Force's assessment that there are no sites listed in or eligible for listing in the National Register of Historic Places within Grissom AFB." Per the letter, if any archaeological artifacts or human remains are uncovered during construction, demolition, or earthmoving activities, the Air Force will report the discovery to the Indiana Department of Natural Resources within two (2) business days at 317-232-1646.

Based on the information presented above, we request your concurrence on the proposed APE and a determination of "no historic properties affected" as described in 36 CFR § 800.4(d)(1). Due to the nature and scope of this undertaking, in accordance with 36 CFR 800.2(c), the Air Force is sending duplicate information to American Indian tribal stakeholders. The Air Force will address any comments or concerns therefrom. Please provide your response to Trisha McClain within 30 days of receipt of this letter by email to: trisha.mcclain@us.af.mil; or by mail to: 7104 S. Warthog Street, Grissom ARB, IN 46971-1632.

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THOMAS O. PEMBERTON, Colonel, USAF
Commander

2 Attachments:

1. Figure 1: Proposed Undertaking
2. Figure 2: Proposed Area of Potential Effects

Figure 1: Proposed Undertaking

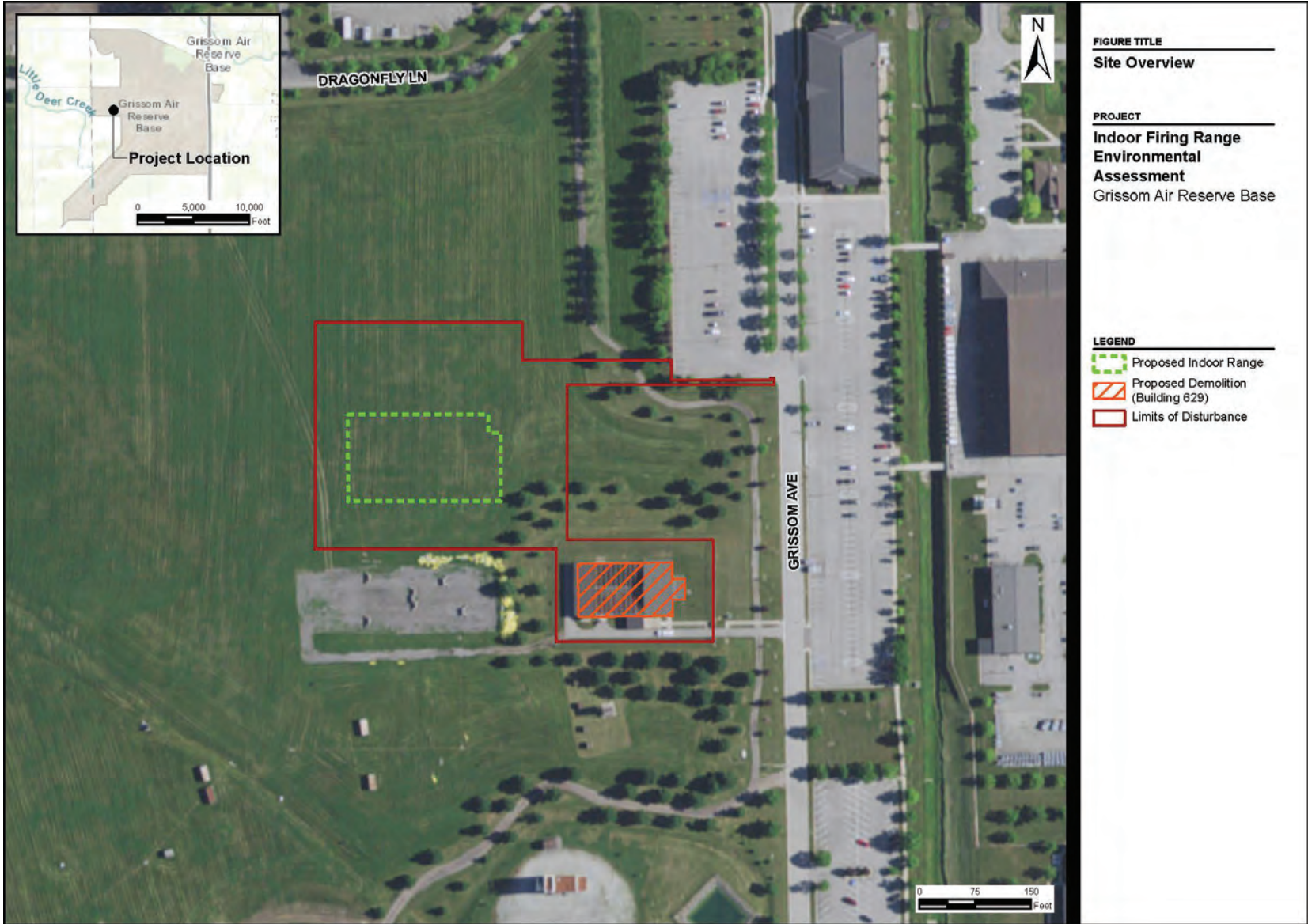
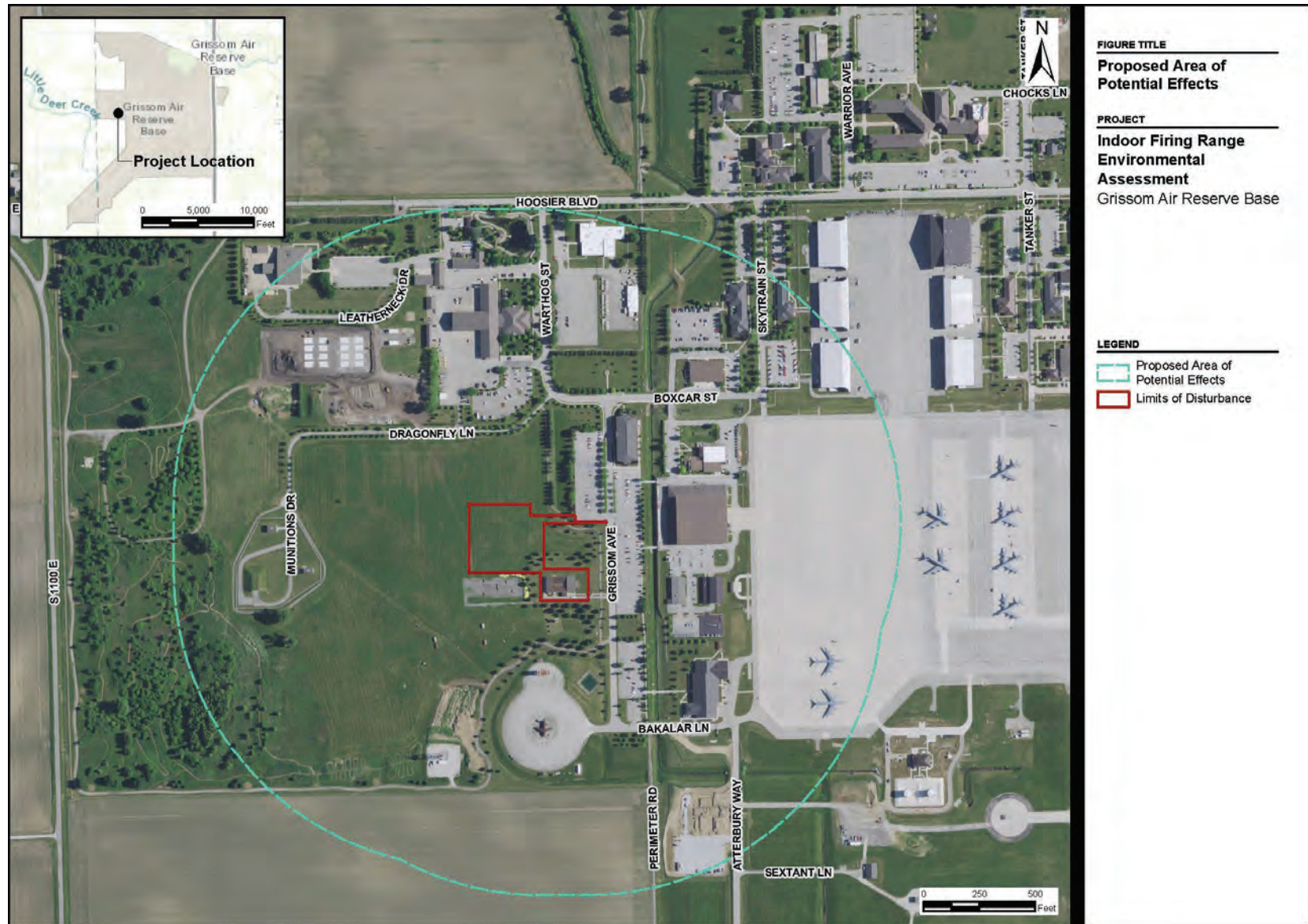


Figure 2: Proposed Area of Potential Effects



Division of Historic Preservation & Archaeology 402 W. Washington Street, W274 Indianapolis, IN 46204-2739
Phone 317-232-1646 Fax 317-232-0693 dhpa@dnr.IN.gov



August 11, 2022

Colonel Thomas Pemberton
USAF Commander
7104 S. Warthog Street
Grissom ARB, IN 46971-1632

Federal Agency: Department of the Air Force

Re: Project information and the U.S. Air Force's finding of "no historic properties affected" for demolition of existing outdoor firing range and construction of a proposed new indoor firing range at Grissom Air Reserve Base (DHPA #29544)

Dear Colonel Pemberton:

Pursuant to Section 106 of the National Historic Preservation Act (54 U.S.C. § 306108) and 36 C.F.R. Part 800, the staff of the Indiana State Historic Preservation Officer ("Indiana SHPO") has conducted an analysis of the materials dated July 14, 2022, and received on July 15, 2022, for the above indicated project at the Grissom Joint Air Reserve Base, Miami County, Indiana.

We concur with the Department of Air Force's July 14, 2022 finding that no historic buildings, structures, districts, objects, or archaeological resources within the area of potential effects will be affected by the above indicated project.

If any prehistoric or historic archaeological artifacts or human remains are uncovered during construction, demolition, or earthmoving activities, state law (Indiana Code 14-21-1-27 and 29) requires that the discovery must be reported to the Department of Natural Resources within two (2) business days. In that event, please call (317) 232-1646. Be advised that adherence to Indiana Code 14-21-1-27 and 29 does not obviate the need to adhere to applicable federal statutes and regulations, including but not limited to 36 C.F.R. 800.

If you have questions about archaeological issues please contact Rachel Sharkey at (317) 234-5254 or rsharkey@dnr.IN.gov. If you have questions about buildings or structures please contact Chad Slider at (317) 234-5366 or cslider@dnr.IN.gov.

Very truly yours,

A handwritten signature in black ink, appearing to read "Beth K. McCord".

Beth K. McCord
Deputy State Historic Preservation Officer

BKM:RAS:CWS:cws

emc: Trisha McClain, USAF

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APPENDIX C:

NATIVE AMERICAN CONSULTATION

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To support this EA, the USAF consulted on a government-to-government basis with tribes that are federally affiliated with Grissom ARB. Tribes were formally requested to participate in the Section 106 process on July 15, 2022. The list of Tribes contacted and summary responses are included in **Table C-1**. Copies of all correspondence are included in the Administrative Record.

Table C-1: Record of Tribal Outreach

Tribe	Consultation Initiated (Emailed Letter)	Follow-up Correspondence (Email)	Follow-up Correspondence (Phone Call)	Summary Response
Citizen Potawatomi Nation, Oklahoma	7/15/2022	8/25/2022	9/12/2022	No response has been received to date.
Forest County Potawatomi Community of Wisconsin	7/15/2022	N/A ¹	N/A	Requests to serve as a consulting party. No historic properties of significance would be affected.
Hannahville Indian Community, Michigan	7/15/2022	8/25/2022	9/12/2022	No response has been received to date.
Miami Tribe of Oklahoma	7/15/2022	N/A	N/A	Requests to serve as a consulting party. No known cultural or historic sites are located at the Project Site.
Peoria Tribe of Indians of Oklahoma	7/15/2022	8/25/2022	9/12/2022	No response has been received to date.
Pokagon Band of Potawatomi Indians, Michigan and Indiana	7/15/2022	8/25/2022	9/12/2022	Proposed work is occurring within 1 mile of sites or features documented in the Pokagon Band Historic Inventory Database. No adverse effects are anticipated.
Prairie Band Potawatomi Nation	7/15/2022	8/25/2022	9/12/2022	No response has been received to date.

Notes: 1. N/A = Not applicable. In these instances, Tribes provided a response following the first consultation attempt, and no follow-up correspondence was required.



DEPARTMENT OF THE AIR FORCE
AIR FORCE RESERVE COMMAND



12 July 2022

MEMORANDUM FOR SUBJECT PROJECT STAKEHOLDERS

FROM: 434 ARW/CC

SUBJECT: Environmental Assessment for Proposed New Indoor Firing Range at Grissom Air Reserve Base, Miami County, Indiana

The United States (US) Air Force is preparing an Environmental Assessment (EA) to evaluate the potential environmental impacts resulting from the construction of an indoor small arms firing range at Grissom Air Reserve Base (ARB) to replace the existing outdoor firing range (Proposed Action). The existing outdoor range and location for the proposed indoor range are located within the Grissom ARB training district on the western side of the installation. The proposed indoor range would be located south of Dragonfly Range and northwest of the existing outdoor range (**Attachment 1**).

The proposed indoor small arms firing range at Grissom ARB would be an approximately 23,000 square foot facility. It would be a 21 lane live fire range facility with 25 meter firing lanes, and would also include associated administration, classroom, maintenance, cleaning, storage, utility, and building support rooms. Supporting utilities, sidewalks, access road, and stormwater management features would also be constructed as needed. The proposed firing range would not have defined parking areas. The design of the indoor firing range would meet sustainability requirements under Unified Facilities Criteria (UFC) 1-200-02 and anti-terrorism force protection requirements under UFC 4-010-01. The Proposed Action further includes demolition, lead remediation, and site restoration activities for the approximately 8,805 square foot existing outdoor range. The Air Force is planning lead remediation activities in consultation with the US Army Corps of Engineers.

The 434th Security Forces Squadron (SFS) at Grissom ARB is required to train/qualify the equivalent of 1,341 students from 15 different units annually with a variety of small arms, including handguns, shotguns, and rifles. The Proposed Action would not increase this total throughput of Airmen. Rather, the Proposed Action would enable Grissom ARB to better achieve this requirement: a total of 48 range days per year would be required to satisfy existing training requirements with the proposed indoor range, while use of the existing outdoor range currently requires 89 range days per year.

Due to the aging condition of the existing outdoor range and increased training requirements, Grissom ARB has been unable to facilitate all required training for its Airmen. Airmen have been sent to Camp Atterbury Military Reservation Range in Johnson County, Indiana (approximately 100 miles south) for weapons qualification, although range schedules at Camp Atterbury are not

guaranteed and subject to change. Further, transportation of Airmen and explosives requires the use of multiple vehicles and drivers, and may take up to a full training day. The purpose of this Proposed Action, accordingly, is to construct a new, operational indoor firing range to support the small arms training requirements of military and security forces personnel at Grissom ARB, and provide an updated facility that supports training regardless of the time of day or outdoor weather conditions. The Proposed Action is needed to address training inefficiencies caused by the outdated condition of the existing outdoor firing range and increased training requirements that have resulted in the inability of Airmen to complete mandatory weapons training at Grissom ARB.

The EA will analyze the potential range of environmental impacts that would result from the Proposed Action (i.e., the Preferred Alternative) and the No Action Alternative. The Preferred Alternative includes two components: (1) demolition of the existing outdoor firing range; and (2) construction of a new indoor small arms firing range to replace the outdoor range. The No Action Alternative, which reflects the status quo, will be analyzed as a baseline for comparison of potential effects from the Proposed Action. Under the No Action Alternative, Grissom ARB would retain the existing outdoor firing range and would not construct a new indoor small arms firing range.

The EA will be prepared in compliance with the National Environmental Policy Act (NEPA) of 1969 (42 United States Code 4321, et seq.), the Council on Environmental Quality NEPA Implementing Regulations (40 Code of Federal Regulations [CFR] Parts 1500-1508), and the Air Force Environmental Impact Analysis Process (32 CFR 989).

As part of this EA, we request your assistance in identifying any potential areas of environmental impact to be assessed in this analysis. If you have any specific items of interest about this proposal, please contact Trisha McClain within 30 days of receipt of this letter by email to: trisha.mcclain@us.af.mil; or by mail to: 7104 S. Warthog Street, Grissom ARB, IN 46971-1632.

PEMBERTON.THOMA 2022.07.14

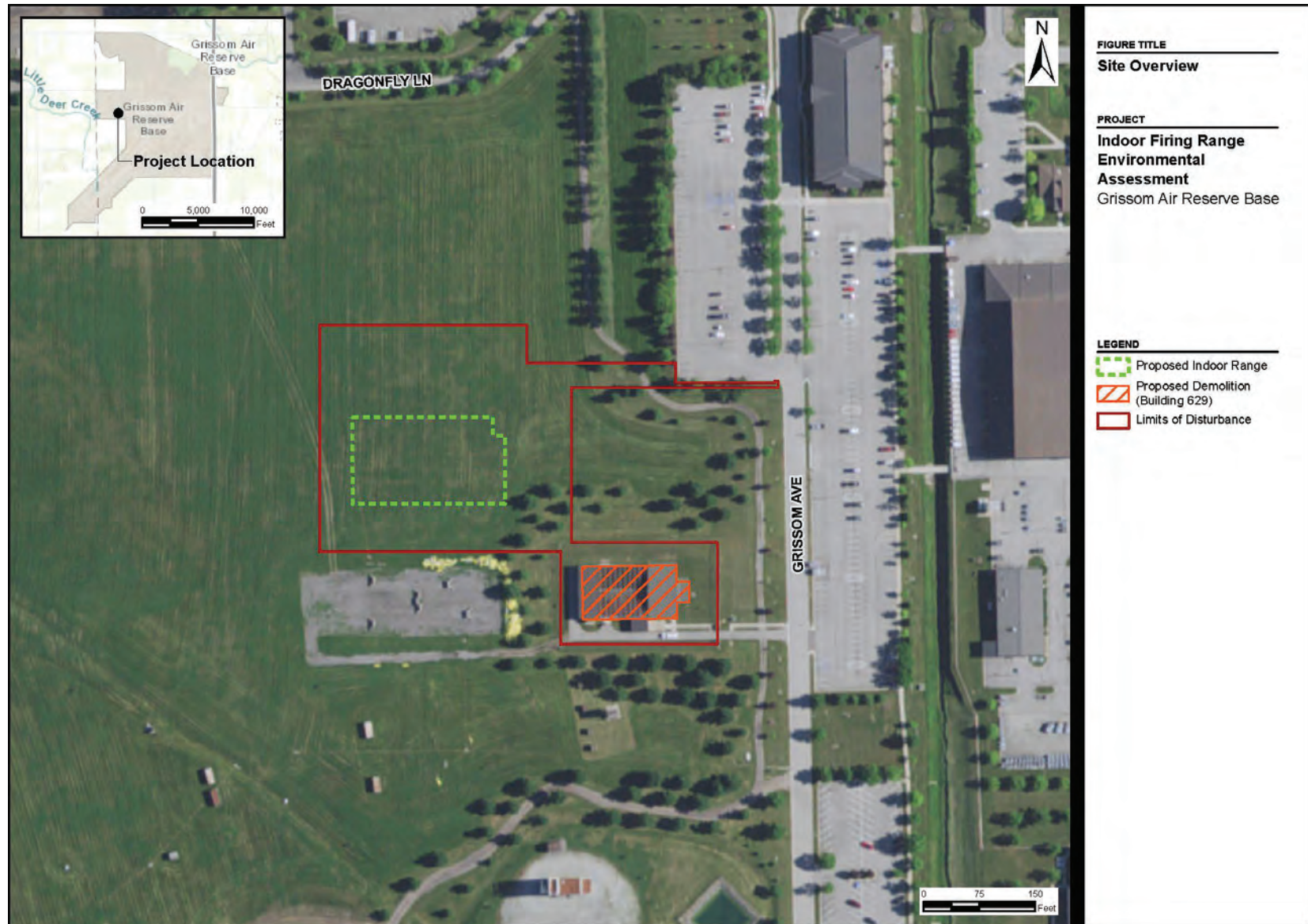
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THOMAS O. PEMBERTON, Colonel, USAF
Commander

1 Attachment:

1. Proposed Action Site Plan

Attachment 1: Proposed Action Site Plan



APPENDIX D:
AIR CONFORMITY APPLICABILITY MODEL RESULTS

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AIR CONFORMITY APPLICABILITY MODEL REPORT

RECORD OF AIR ANALYSIS (ROAA)

1. General Information: The Air Force's Air Conformity Applicability Model (ACAM) was used to perform an analysis to assess the potential air quality impact/s associated with the action in accordance with the Air Force Manual 32-7002, Environmental Compliance and Pollution Prevention; the Environmental Impact Analysis Process (EIAP, 32 CFR 989); and the General Conformity Rule (GCR, 40 CFR 93 Subpart B). This report provides a summary of the ACAM analysis.

a. Action Location:

Base: GRISSOM JARB
State: Indiana
County(s): Cass; Miami
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: Environmental Assessment for Grissom Air Reserve Base Indoor Firing Range

c. Project Number/s (if applicable):

d. Projected Action Start Date: 4 / 2023

e. Action Description:

The Proposed Action is to construct a new, approximately 23,000 square foot indoor small arms firing range at Grissom Air Reserve Base to replace the approximately 8,805 square foot existing, outdated, and insufficient outdoor firing range. The Proposed Action includes:

- Construction, operation, and maintenance of the indoor firing range (23,000 square feet)
- Demolition of the outdoor range (8,805 square feet)
- Utilities installation:
 - o Natural gas (975 linear feet)
 - o Electric (650 linear feet)
 - o Telecom (750 linear feet)
 - o Water (1,650 linear feet)
 - o Sanitary sewer (420 linear feet)
 - o Storm water (585 linear feet)
- Site grading (7.6 acres)
- Access road construction (6,120 square feet)
- Building heating installation and operation
- Soil remediation at existing outdoor firing range

f. Point of Contact:

Name: Paul Sanford
Title: Environmental Planner
Organization: AECOM
Email: paul.sanford@aecom.com
Phone Number: 813-675-6843

2. Air Impact Analysis: Based on the attainment status at the action location, the requirements of the General Conformity Rule are:

_____ applicable
___X___ not applicable

Total net direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the start of the action through achieving "steady state" (i.e., net gain/loss upon action fully implemented) emissions. The ACAM analysis used the latest and most accurate emission estimation techniques available; all

AIR CONFORMITY APPLICABILITY MODEL REPORT

RECORD OF AIR ANALYSIS (ROAA)

algorithms, emission factors, and methodologies used are described in detail in the USAF Air Emissions Guide for Air Force Stationary Sources, the USAF Air Emissions Guide for Air Force Mobile Sources, and the USAF Air Emissions Guide for Air Force Transitory Sources.

“Insignificance Indicators” were used in the analysis to provide an indication of the significance of potential impacts to air quality based on current ambient air quality relative to the National Ambient Air Quality Standards (NAAQSs). These insignificance indicators are the 250 ton/yr Prevention of Significant Deterioration (PSD) major source threshold for actions occurring in areas that are “Clearly Attainment” (i.e., not within 5% of any NAAQS) and the GCR de minimis values (25 ton/yr for lead and 100 ton/yr for all other criteria pollutants) for actions occurring in areas that are “Near Nonattainment” (i.e., within 5% of any NAAQS). These indicators do not define a significant impact; however, they do provide a threshold to identify actions that are insignificant. Any action with net emissions below the insignificance indicators for all criteria pollutant is considered so insignificant that the action will not cause or contribute to an exceedance on one or more NAAQSs. For further detail on insignificance indicators see chapter 4 of the Air Force Air Quality Environmental Impact Analysis Process (EIAP) Guide, Volume II - Advanced Assessments.

The action’s net emissions for every year through achieving steady state were compared against the Insignificance Indicator and are summarized below.

Analysis Summary:

2023

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.387	250	No
NOx	0.729	250	No
CO	0.929	250	No
SOx	0.002	250	No
PM 10	2.396	250	No
PM 2.5	0.028	250	No
Pb	0.000	25	No
NH3	0.001	250	No
CO2e	217.9		

2024

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.015	250	No
NOx	0.143	250	No
CO	0.156	250	No
SOx	0.001	250	No
PM 10	0.049	250	No
PM 2.5	0.008	250	No
Pb	0.000	25	No
NH3	0.000	250	No
CO2e	119.5		

2025 - (Steady State)

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.004	250	No

AIR CONFORMITY APPLICABILITY MODEL REPORT RECORD OF AIR ANALYSIS (ROAA)

NO_x	0.081	250	No
CO	0.068	250	No
SO_x	0.000	250	No
PM 10	0.006	250	No
PM 2.5	0.006	250	No
Pb	0.000	25	No
NH₃	0.000	250	No
CO_{2e}	97.0		

None of estimated annual net emissions associated with this action are above the insignificance indicators, indicating no significant impact to air quality. Therefore, the action will not cause or contribute to an exceedance on one or more NAAQSs. No further air assessment is needed.

Sanford, Paul

Digitally signed by Sanford, Paul

Date: 2022.10.18 10:15:20 -04'00'

Paul Sanford, Environmental Planner

DATE

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location

Base: GRISSOM JARB
State: Indiana
County(s): Cass; Miami
Regulatory Area(s): NOT IN A REGULATORY AREA

- Action Title: Environmental Assessment for Grissom Air Reserve Base Indoor Firing Range

- Project Number/s (if applicable):

- Projected Action Start Date: 4 / 2023

- Action Purpose and Need:

Purpose: Replace the existing deficient outdoor firing range at Grissom Air Reserve Base with a new, operational indoor firing range to support the small arms training requirements of military and security forces personnel at the base. The new indoor range would be a modern facility that supports training regardless of the time of day or outdoor weather conditions, and which eliminates surface danger zones.

Need: Address training inefficiencies caused by the outdated conditions of the existing outdoor firing range and the increase in training load since the outdoor range was constructed, which have resulted in the inability of all Airmen to complete mandatory weapons training at Grissom Air Reserve Base.

- Action Description:

The Proposed Action is to construct a new, approximately 23,000 square foot indoor small arms firing range at Grissom Air Reserve Base to replace the approximately 8,805 square foot existing, outdated, and insufficient outdoor firing range. The Proposed Action includes:

- Construction, operation, and maintenance of the indoor firing range (23,000 square feet)
- Demolition of the outdoor range (8,805 square feet)
- Utilities installation:
 - o Natural gas (975 linear feet)
 - o Electric (650 linear feet)
 - o Telecom (750 linear feet)
 - o Water (1,650 linear feet)
 - o Sanitary sewer (420 linear feet)
 - o Storm water (585 linear feet)
- Site grading (7.6 acres)
- Access road construction (6,120 square feet)
- Building heating installation and operation
- Soil remediation at existing outdoor firing range

- Point of Contact

Name: Paul Sanford
Title: Environmental Planner
Organization: AECOM
Email: paul.sanford@aecom.com
Phone Number: 813-675-6843

- Activity List:

Activity Type		Activity Title
2.	Construction / Demolition	Construct New Indoor Firing Range
3.	Heating	Construct New Indoor Firing Range
4.	Construction / Demolition	Demolish Existing Outdoor Firing Range

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

Emission factors and air emission estimating methods come from the United States Air Force's Air Emissions Guide for Air Force Stationary Sources, Air Emissions Guide for Air Force Mobile Sources, and Air Emissions Guide for Air Force Transitory Sources.

2. Construction / Demolition

2.1 General Information & Timeline Assumptions

- Activity Location

County: Cass; Miami

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Construct New Indoor Firing Range

- Activity Description:

Construct a new, approximately 23,000 square foot indoor small arms firing range at Grissom Air Reserve Base to replace the approximately 8,805 square foot existing, outdated, and insufficient outdoor firing range.

- Construction, operation, and maintenance of the indoor firing range (23,000 square feet)

- Utilities installation:

 - o Natural gas (975 linear feet)

 - o Electric (650 linear feet)

 - o Telecom (750 linear feet)

 - o Water (1,650 linear feet)

 - o Sanitary sewer (420 linear feet)

 - o Storm water (585 linear feet)

- Site grading (7.6 acres)

- Access road construction (6,120 square feet)

- Activity Start Date

Start Month: 4

Start Month: 2023

- Activity End Date

Indefinite: False

End Month: 10

End Month: 2023

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.387016
SO _x	0.002103
NO _x	0.728942
CO	0.929494
PM 10	2.396232

Pollutant	Total Emissions (TONs)
PM 2.5	0.027765
Pb	0.000000
NH ₃	0.001113
CO ₂ e	217.9

2.1 Site Grading Phase

2.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date

Start Month: 4

Start Quarter: 1

Start Year: 2023

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Phase Duration

Number of Month: 0

Number of Days: 20

2.1.2 Site Grading Phase Assumptions

- General Site Grading Information

Area of Site to be Graded (ft²): 328680

Amount of Material to be Hauled On-Site (yd³): 0

Amount of Material to be Hauled Off-Site (yd³): 6087

- Site Grading Default Settings

Default Settings Used: Yes

Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	1	8
Graders Composite	1	8
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	8
Tractors/Loaders/Backhoes Composite	3	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Excavators Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0614	0.0013	0.2820	0.5096	0.0117	0.0117	0.0055	119.71
Graders Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0757	0.0014	0.4155	0.5717	0.0191	0.0191	0.0068	132.91
Other Construction Equipment Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0483	0.0012	0.2497	0.3481	0.0091	0.0091	0.0043	122.61
Rubber Tired Dozers Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

Emission Factors	0.1830	0.0024	1.2623	0.7077	0.0494	0.0494	0.0165	239.49
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH₄	CO_{2e}
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH₃	CO_{2e}
LDGV	000.225	000.002	000.151	003.587	000.005	000.004		000.025	00315.615
LDGT	000.239	000.003	000.252	004.070	000.007	000.006		000.026	00406.489
HDGV	000.860	000.006	001.006	014.722	000.028	000.025		000.052	00893.074
LDDV	000.086	000.001	000.098	003.228	000.003	000.002		000.008	00325.645
LDDT	000.127	000.001	000.228	002.624	000.004	000.003		000.009	00366.896
HDDV	000.142	000.004	002.771	001.629	000.058	000.053		000.033	01309.684
MC	002.317	000.003	000.691	013.137	000.024	000.021		000.053	00389.105

2.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM10_{FD} = (20 * ACRE * WD) / 2000$$

PM10_{FD}: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Work Days (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Work Days (days)

H: Hours Worked per Day (hours)

EF_{POL}: Emission Factor for Pollutant (lb/hour)

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)

HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

2.2 Trenching/Excavating Phase

2.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date

Start Month: 5
Start Quarter: 1
Start Year: 2023

- Phase Duration

Number of Month: 0
Number of Days: 20

2.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information

Area of Site to be Trenched/Excavated (ft²): 32400
Amount of Material to be Hauled On-Site (yd³): 824
Amount of Material to be Hauled Off-Site (yd³): 3235

- Trenching Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipmen Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
--	------	------	------	------	------	------	----

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

POVs	0	0	0	0	0	100.00	0
------	---	---	---	---	---	--------	---

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Excavators Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0614	0.0013	0.2820	0.5096	0.0117	0.0117	0.0055	119.71
Graders Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0757	0.0014	0.4155	0.5717	0.0191	0.0191	0.0068	132.91
Other Construction Equipment Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0483	0.0012	0.2497	0.3481	0.0091	0.0091	0.0043	122.61
Rubber Tired Dozers Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.1830	0.0024	1.2623	0.7077	0.0494	0.0494	0.0165	239.49
Tractors/Loaders/Backhoes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO _{2e}
LDGV	000.225	000.002	000.151	003.587	000.005	000.004		000.025	00315.615
LDGT	000.239	000.003	000.252	004.070	000.007	000.006		000.026	00406.489
HDGV	000.860	000.006	001.006	014.722	000.028	000.025		000.052	00893.074
LDDV	000.086	000.001	000.098	003.228	000.003	000.002		000.008	00325.645
LDDT	000.127	000.001	000.228	002.624	000.004	000.003		000.009	00366.896
HDDV	000.142	000.004	002.771	001.629	000.058	000.053		000.033	01309.684
MC	002.317	000.003	000.691	013.137	000.024	000.021		000.053	00389.105

2.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM10_{FD} = (20 * ACRE * WD) / 2000$$

PM10_{FD}: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Work Days (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

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WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)
HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)
HC: Average Hauling Truck Capacity (yd³)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

2.3 Building Construction Phase

2.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 6
Start Quarter: 1
Start Year: 2023

- Phase Duration

Number of Month: 3
Number of Days: 10

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2.3.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial
Area of Building (ft²): 23000
Height of Building (ft): 15
Number of Units: N/A

- Building Construction Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

2.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0754	0.0013	0.5027	0.3786	0.0181	0.0181	0.0068	128.79
Forklifts Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0258	0.0006	0.1108	0.2145	0.0034	0.0034	0.0023	54.454
Generator Sets Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0320	0.0006	0.2612	0.2683	0.0103	0.0103	0.0028	61.065

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Tractors/Loaders/Backhoes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO ₂ e
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879
Welders Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO ₂ e
Emission Factors	0.0242	0.0003	0.1487	0.1761	0.0067	0.0067	0.0021	25.657

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO ₂ e
LDGV	000.225	000.002	000.151	003.587	000.005	000.004		000.025	00315.615
LDGT	000.239	000.003	000.252	004.070	000.007	000.006		000.026	00406.489
HDGV	000.860	000.006	001.006	014.722	000.028	000.025		000.052	00893.074
LDDV	000.086	000.001	000.098	003.228	000.003	000.002		000.008	00325.645
LDDT	000.127	000.001	000.228	002.624	000.004	000.003		000.009	00366.896
HDDV	000.142	000.004	002.771	001.629	000.058	000.053		000.033	01309.684
MC	002.317	000.003	000.691	013.137	000.024	000.021		000.053	00389.105

2.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Work Days (days)

H: Hours Worked per Day (hours)

EF_{POL}: Emission Factor for Pollutant (lb/hour)

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.42 / 1000): Conversion Factor ft³ to trips (0.42 trip / 1000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Work Days (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

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$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{WT} : Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase

$$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$$

VMT_{VT} : Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft²)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft³ to trips (0.38 trip / 1000 ft³)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{VT} : Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

2.4 Architectural Coatings Phase

2.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date

Start Month: 10
Start Quarter: 1
Start Year: 2023

- Phase Duration

Number of Month: 0
Number of Days: 5

2.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information

Building Category: Non-Residential
Total Square Footage (ft²): 23000
Number of Units: N/A

- Architectural Coatings Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

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- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO _{2e}
LDGV	000.225	000.002	000.151	003.587	000.005	000.004		000.025	00315.615
LDGT	000.239	000.003	000.252	004.070	000.007	000.006		000.026	00406.489
HDGV	000.860	000.006	001.006	014.722	000.028	000.025		000.052	00893.074
LDDV	000.086	000.001	000.098	003.228	000.003	000.002		000.008	00325.645
LDDT	000.127	000.001	000.228	002.624	000.004	000.003		000.009	00366.896
HDDV	000.142	000.004	002.771	001.629	000.058	000.053		000.033	01309.684
MC	002.317	000.003	000.691	013.137	000.024	000.021		000.053	00389.105

2.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

$$VMT_{WT} = (1 * WT * PA) / 800$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

1: Conversion Factor man days to trips (1 trip / 1 man * day)

WT: Average Worker Round Trip Commute (mile)

PA: Paint Area (ft²)

800: Conversion Factor square feet to man days (1 ft² / 1 man * day)

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)

BA: Area of Building (ft²)

2.0: Conversion Factor total area to coated area (2.0 ft² coated area / total area)

0.0116: Emission Factor (lb/ft²)

2000: Conversion Factor pounds to tons

2.5 Paving Phase

2.5.1 Paving Phase Timeline Assumptions

- Phase Start Date

Start Month: 9

Start Quarter: 1

Start Year: 2023

- Phase Duration

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Number of Month: 0

Number of Days: 5

2.5.2 Paving Phase Assumptions

- General Paving Information

Paving Area (ft²): 6120

- Paving Default Settings

Default Settings Used: Yes

Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.5.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Excavators Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0614	0.0013	0.2820	0.5096	0.0117	0.0117	0.0055	119.71
Graders Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0757	0.0014	0.4155	0.5717	0.0191	0.0191	0.0068	132.91
Other Construction Equipment Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0483	0.0012	0.2497	0.3481	0.0091	0.0091	0.0043	122.61
Rubber Tired Dozers Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.1830	0.0024	1.2623	0.7077	0.0494	0.0494	0.0165	239.49
Tractors/Loaders/Backhoes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

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	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO ₂ e
LDGV	000.225	000.002	000.151	003.587	000.005	000.004		000.025	00315.615
LDGT	000.239	000.003	000.252	004.070	000.007	000.006		000.026	00406.489
HDGV	000.860	000.006	001.006	014.722	000.028	000.025		000.052	00893.074
LDDV	000.086	000.001	000.098	003.228	000.003	000.002		000.008	00325.645
LDDT	000.127	000.001	000.228	002.624	000.004	000.003		000.009	00366.896
HDDV	000.142	000.004	002.771	001.629	000.058	000.053		000.033	01309.684
MC	002.317	000.003	000.691	013.137	000.024	000.021		000.053	00389.105

2.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Work Days (days)

H: Hours Worked per Day (hours)

EF_{POL}: Emission Factor for Pollutant (lb/hour)

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

PA: Paving Area (ft²)

0.25: Thickness of Paving Area (ft)

(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd³ / 27 ft³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Work Days (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

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EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$$\text{VOC}_P = (2.62 * \text{PA}) / 43560$$

VOC_P: Paving VOC Emissions (TONs)

2.62: Emission Factor (lb/acre)

PA: Paving Area (ft²)

43560: Conversion Factor square feet to acre (43560 ft² / acre)² / acre)

3. Heating

3.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Cass; Miami

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Construct New Indoor Firing Range

- Activity Description:

Install and operate heating for 23,000-square foot indoor firing range

- Activity Start Date

Start Month: 1

Start Year: 2024

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.004434
SO _x	0.000484
NO _x	0.080610
CO	0.067712
PM 10	0.006126

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.006126
Pb	0.000000
NH ₃	0.000000
CO ₂ e	97.0

3.2 Heating Assumptions

- Heating

Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method

Area of floorspace to be heated (ft²):

23000

Type of fuel:

Natural Gas

Type of boiler/furnace:

Commercial/Institutional (0.3 - 9.9 MMBtu/hr)

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Heat Value (MMBtu/ft³): 0.00105
Energy Intensity (MMBtu/ft²): 0.0736

- Default Settings Used: Yes

- Boiler/Furnace Usage

Operating Time Per Year (hours): 900 (default)

3.3 Heating Emission Factor(s)

- Heating Emission Factors (lb/1000000 scf)

VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO ₂ e
5.5	0.6	100	84	7.6	7.6			120390

3.4 Heating Formula(s)

- Heating Fuel Consumption ft³ per Year

$$FC_{HER} = HA * EI / HV / 1000000$$

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method

HA: Area of floorspace to be heated (ft²)

EI: Energy Intensity Requirement (MMBtu/ft²)

HV: Heat Value (MMBTU/ft³)

1000000: Conversion Factor

- Heating Emissions per Year

$$HE_{POL} = FC * EF_{POL} / 2000$$

HE_{POL}: Heating Emission Emissions (TONs)

FC: Fuel Consumption

EF_{POL}: Emission Factor for Pollutant

2000: Conversion Factor pounds to tons

4. Construction / Demolition

4.1 General Information & Timeline Assumptions

- Activity Location

County: Cass; Miami

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Demolish Existing Outdoor Firing Range

- Activity Description:

- Demolition of the outdoor range (8,805 square feet)
- Soil remediation at existing outdoor firing range

- Activity Start Date

Start Month: 3

Start Month: 2024

- Activity End Date

Indefinite: False

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End Month: 5
End Month: 2024

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.010519
SO _x	0.000206
NO _x	0.062806
CO	0.087804
PM 10	0.042642

Pollutant	Total Emissions (TONs)
PM 2.5	0.002221
Pb	0.000000
NH ₃	0.000129
CO ₂ e	22.4

4.1 Demolition Phase

4.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date

Start Month: 3
Start Quarter: 1
Start Year: 2024

- Phase Duration

Number of Month: 0
Number of Days: 10

4.1.2 Demolition Phase Assumptions

- General Demolition Information

Area of Building to be demolished (ft²): 8805
Height of Building to be demolished (ft): 5

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
--	------	------	------	------	------	------	----

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POVs	50.00	50.00	0	0	0	0	0
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4.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0357	0.0006	0.2608	0.3715	0.0109	0.0109	0.0032	58.544
Rubber Tired Dozers Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO _{2e}
LDGV	000.213	000.002	000.124	003.458	000.005	000.004		000.024	00308.146
LDGT	000.222	000.003	000.215	003.855	000.007	000.006		000.026	00398.015
HDGV	000.832	000.006	000.915	013.979	000.027	000.024		000.052	00900.304
LDDV	000.081	000.001	000.085	003.091	000.002	000.002		000.008	00314.673
LDDT	000.084	000.001	000.128	002.129	000.003	000.003		000.009	00358.105
HDDV	000.126	000.004	002.560	001.565	000.049	000.045		000.032	01278.785
MC	002.318	000.003	000.689	013.002	000.024	000.021		000.054	00389.237

4.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM10_{FD} = (0.00042 * BA * BH) / 2000$$

PM10_{FD}: Fugitive Dust PM 10 Emissions (TONs)

0.00042: Emission Factor (lb/ft³)

BA: Area of Building to be demolished (ft²)

BH: Height of Building to be demolished (ft)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Work Days (days)

H: Hours Worked per Day (hours)

EF_{POL}: Emission Factor for Pollutant (lb/hour)

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building being demolish (ft²)

BH: Height of Building being demolish (ft)

(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd³ / 27 ft³)

0.25: Volume reduction factor (material reduced by 75% to account for air space)

HC: Average Hauling Truck Capacity (yd³)

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(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)

VMT_{VE} : Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL} : Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT} : Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Work Days (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)

VMT_{WT} : Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL} : Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

4.2 Site Grading Phase

4.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date

Start Month: 5

Start Quarter: 1

Start Year: 2024

- Phase Duration

Number of Month: 0

Number of Days: 2

4.2.2 Site Grading Phase Assumptions

- General Site Grading Information

Area of Site to be Graded (ft²): 9696

Amount of Material to be Hauled On-Site (yd³): 0

Amount of Material to be Hauled Off-Site (yd³): 0

- Site Grading Default Settings

Default Settings Used: Yes

Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

4.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO _{2e}
LDGV	000.213	000.002	000.124	003.458	000.005	000.004		000.024	00308.146
LDGT	000.222	000.003	000.215	003.855	000.007	000.006		000.026	00398.015
HDGV	000.832	000.006	000.915	013.979	000.027	000.024		000.052	00900.304
LDDV	000.081	000.001	000.085	003.091	000.002	000.002		000.008	00314.673
LDDT	000.084	000.001	000.128	002.129	000.003	000.003		000.009	00358.105
HDDV	000.126	000.004	002.560	001.565	000.049	000.045		000.032	01278.785
MC	002.318	000.003	000.689	013.002	000.024	000.021		000.054	00389.237

4.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM10_{FD} = (20 * ACRE * WD) / 2000$$

PM10_{FD}: Fugitive Dust PM 10 Emissions (TONs)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

20: Conversion Factor Acre Day to pounds(20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Work Days (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Work Days (days)

H: Hours Worked per Day (hours)

EF_{POL}: Emission Factor for Pollutant (lb/hour)

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)

HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Work Days (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

4.3 Trenching/Excavating Phase

4.3.1 Trenching / Excavating Phase Timeline Assumptions

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Phase Start Date

Start Month: 5
Start Quarter: 1
Start Year: 2024

- Phase Duration

Number of Month: 0
Number of Days: 7

4.3.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information

Area of Site to be Trenched/Excavated (ft²): 9696
Amount of Material to be Hauled On-Site (yd³): 1077
Amount of Material to be Hauled Off-Site (yd³): 1077

- Trenching Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipmen Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

4.3.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

Tractors/Loaders/Backhoes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO _{2e}
LDGV	000.213	000.002	000.124	003.458	000.005	000.004		000.024	00308.146
LDGT	000.222	000.003	000.215	003.855	000.007	000.006		000.026	00398.015
HDGV	000.832	000.006	000.915	013.979	000.027	000.024		000.052	00900.304
LDDV	000.081	000.001	000.085	003.091	000.002	000.002		000.008	00314.673
LDDT	000.084	000.001	000.128	002.129	000.003	000.003		000.009	00358.105
HDDV	000.126	000.004	002.560	001.565	000.049	000.045		000.032	01278.785
MC	002.318	000.003	000.689	013.002	000.024	000.021		000.054	00389.237

4.3.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM10_{FD} = (20 * ACRE * WD) / 2000$$

PM10_{FD}: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Work Days (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Work Days (days)

H: Hours Worked per Day (hours)

EF_{POL}: Emission Factor for Pollutant (lb/hour)

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)

HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT} : Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Work Days (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)

VMT_{VE} : Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL} : Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons