BEDDOWN OF A FOREIGN MILITARY SALES (FMS) PILOT TRAINING CENTER (PTC) AT EBBING AIR NATIONAL GUARD BASE, ARKANSAS OR SELFRIDGE AIR NATIONAL GUARD BASE, MICHIGAN

DRAFT ENVIRONMENTAL IMPACT STATEMENT

VOLUME I

AUGUST 2022

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PRIVACY ADVISORY

The Draft Environmental Impact Statement (EIS) is provided for public comment in accordance with the National Environmental Policy Act (NEPA), Council on Environmental Quality Regulations for Implementing NEPA (Title 40 Code of Federal Regulations [CFR] §§ 1500–1508), and the Department of the Air Force (DAF) regulations at 32 CFR § 989, *Environmental Impact Analysis Process (EIAP)*.

The EIAP provides an opportunity for public input on DAF decision making, allows the public to offer inputs on alternative ways for the DAF to accomplish what it is proposing, and solicits comments on the DAF's analysis of environmental effects.

Public commenting allows the DAF to make better-informed decisions. Letters or other written or oral comments provided may be published in the EIS. As required by law, substantive comments provided will be addressed in the EIS and made available to the public. Providing personal information is voluntary. Private addresses will be compiled to develop a mailing list for those requesting copies of the EIS. However, only the names of the individuals making comments and specific comments will be disclosed. Personal information, home addresses, telephone numbers, and email addresses will not be published in the EIS.

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COVER SHEET

Environmental Impact Statement for the
Beddown of a Foreign Military Sales (FMS) Pilot Training Center (PTC) at
Ebbing Air National Guard Base, Arkansas or Selfridge Air National Guard Base, Michigan

Responsible Agencies: Department of the Air Force (DAF); U.S. Air Force Air Education and Training Command (AETC).

Cooperating Agency: Federal Aviation Administration (FAA)

Affected Location: Ebbing Air National Guard (ANG) Base and Fort Smith Regional Airport (FSRA), Arkansas, or Selfridge ANG Base, Michigan.

Report Designation: Draft Environmental Impact Statement (EIS).

Point of Contact: FMS PTC EIS Project Manager, AFCEC/CZN, 2261 Hughes Avenue, Suite 155, JBSA Lackland, TX 78236-9853, (210) 710-3277

Public Comments Due: 17 October 2022

Abstract: The DAF is proposing to establish a permanent Foreign Military Sales (FMS) Pilot Training Center (PTC) at a single location. This EIS addresses two alternative locations: at Ebbing Air National Guard (ANG) Base, Arkansas (i.e., the Preferred Alternative) or Selfridge ANG Base, Michigan (Alternative 2). The DAF is the lead agency and FAA is serving as a Cooperating Agency because the scope of the DAF's Proposed Action and alternatives involve activities under FAA's jurisdiction by law and special expertise. This Draft EIS was prepared pursuant to the National Environmental Policy Act, Title 42 of the United States Code §§ 4321–4347, the Council on Environmental Quality Regulations, Title 40, Code of Federal Regulations (CFR) §§ 1500–1508, 32 CFR § 989, *Environmental Impact Analysis Process (EIAP)*, and FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*.

The DAF's Proposed Action involves consolidated FMS training for foreign nations, which includes F-35 aircraft for various foreign nations and Republic of Singapore Air Force (RSAF) F-16 aircraft. Under the DAF's Proposed Action, the DAF would establish a permanent FMS PTC at a single location to accommodate up to 36 aircraft (24 F-35 aircraft and 12 F-16 RSAF aircraft relocated from Luke Air Force Base, Arizona), utilizing existing facilities to the maximum extent practicable to meet FMS requirements. The DAF's Preferred Alternative is to locate the FMS PTC at Ebbing ANG Base, Arkansas, with a reasonable alternative to the Preferred Alternative at Selfridge ANG Base, Michigan (Alternative 2). Both the Preferred Alternative and Alternative 2 would include the beddown of F-35 and F-16 aircraft; military construction projects; facilities sustainment, restoration, and modernization projects; and personnel increases. The number of personnel would increase under the Preferred Alternative and Alternative 2. The beddown would not require changes to airspace configuration to support the Preferred Alternative or Alternative 2. The DAF has selected Ebbing ANG Base as the Preferred Alternative because Ebbing ANG Base previously accommodated F-16 aircraft and can accommodate the Proposed Action with minimal renovation, new construction, and displacement of current mission(s) to meet critical F-16 and F-35 timing; additionally, existing airspace provides superior capacity compared to that available for Selfridge ANG Base. This EIS analyzes the impacts associated with implementation of the Preferred Alternative and Alternative 2, to include use of respective airfields and airspace, as well as the No Action Alternative.

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SUMMARY

S.1. INTRODUCTION

The Department of the Air Force (DAF) Proposed Action, described in detail in Chapter 2, *Description of the Proposed Action and Alternatives*, is to establish a permanent Foreign Military Sales (FMS) Pilot Training Center (PTC) at a single location within the Continental United States (CONUS). The DAF's Proposed Action would involve consolidation of F-35 FMS training activities and the Republic of Singapore Air Force (RSAF) F-16 aircraft operations at a single location, construction of new or renovation of existing infrastructure to support FMS training and RSAF operations, and the integration of up to 24 FMS F-35 aircraft and 12 RSAF F-16 aircraft relocated from Luke Air Force Base (AFB), Arizona. Alternatives for implementing the DAF's Proposed Action consist of Ebbing Air National Guard (ANG) Base, Arkansas (the Preferred Alternative) and Selfridge ANG Base, Michigan (Alternative 2).

The DAF is the lead agency for the DAF's Proposed Action and is responsible for the scope and content of this Environmental Impact Statement (EIS). The Federal Aviation Administration (FAA) is serving as a Cooperating Agency because the scope of the DAF's Proposed Action involves activities under their jurisdiction by law and for which they have special expertise.

S.2. PURPOSE AND NEED

The purpose of the DAF's Proposed Action is to establish a permanent FMS PTC by initially providing beddown of up to 36 total aircraft at a single location within the CONUS. The need for the DAF's Proposed Action is to provide a centralized location for FMS training and pilot production. Multiple nations have agreements with the DAF to purchase F-35 aircraft; this drives the need for a location suitable for initial F-35 training before returning to their home country. The RSAF is among the nations purchasing F-35s and plans to base a number of their aircraft in the United States for an indefinite period; the RSAF also desires to consolidate its pilot training. This drives the need for relocation of 12 F-16s from Luke AFB, Arizona, to the FMS PTC location.

Because the DAF's Preferred Alternative includes construction of infrastructure necessary to support the FMS PTC beddown within the Fort Smith Regional Airport (FSRA)[1] boundary, the City of Fort Smith (the Airport Sponsor) would need to submit a request to FAA's Office of Airports for approval of changes to their Airport Layout Plan. Therefore, the purpose of FAA's Office of Airports action is to evaluate the City of Fort Smith request to change the Airport Layout Plan. The need for FAA's Office of Airports action is to consider the impacts of the DAF's proposed construction of the aircraft barrier arresting kits at FSRA and to meet its statutory obligations under 49 United States Code (U.S.C.) § 47101.

[1] The official location ID for Fort Smith Regional Airport is "FSM." However, to avoid confusion between the acronyms for the DAF's Proposed Action, "FMS PTC," and the location ID for Fort Smith Regional Airport, "FSRA" is used throughout this EIS when referring to the airport.

S.3. OVERVIEW OF PROPOSED ACTION AND ALTERNATIVES

The FMS PTC would accommodate up to 36 total aircraft (12 F-16 and 24 F-35 aircraft), utilizing existing facilities to the maximum extent practicable to meet FMS requirements. Two F-35 simulator training facilities would be constructed. The F-16 aircraft are anticipated to arrive in calendar year (CY) 2023. The first F-35 aircraft are anticipated to arrive in CY 2024. The FMS PTC would host various countries; in the near term, these countries include Poland and Finland. Additional foreign sales are ongoing. Aircraft increases above 24 F-35s may require further analysis and a supplemental EIS. The actual number of F-35s present at the FMS PTC at any one time may vary based on customer need. However, the maximum number of F-35s located at the FMS PTC is not expected to exceed 24, with the program of record of 36 total aircraft expected to be met by CY 2029, which is based on the current anticipated schedule with dates possibly subject to change.

Facility construction and upgrades would include the modification and renovation of several buildings, construction of F-35 simulator training facilities and new sunshades, and construction of two BAK-12 aircraft barrier arresting kits. All flight operations would take place within existing airspace. No additions to or alterations of airspace are associated with this Proposed Action. The DAF has selected Ebbing ANG Base as the preferred alternative because Ebbing ANG Base previously accommodated F-16 aircraft and can accommodate the DAF's Proposed Action with minimal renovation, new construction, and displacement of current mission(s) to meet critical F-16 and F-35 timing. Additionally, existing airspace provides superior capacity compared to that available for Selfridge ANG Base.

S.3.1 Preferred Alternative (Ebbing ANG Base)

The 188th Wing (188 WG) of the Arkansas Air National Guard (ARANG) is a tenant at FSRA in Fort Smith, Arkansas, located in Sebastian County. The 188 WG occupies approximately 140 acres of land leased from FSRA. Approximately 20 acres of this leased land are on the southeastern side of FSRA and are separate from the 120-acre main installation. The 188 WG's current mission is to support domestic training and contingency operations for the MQ-9 Reaper remotely piloted aircraft (the "Reaper").

S.3.1.1 Aircraft Operations

Table S-1 provides a summary of aircraft operations for Ebbing ANG Base and FSRA airfield.

Table S-1. Current and Proposed Aircraft Operations at Fort Smith Regional Airport, Arkansas [(a)]

Aircraft Operation Type	Current (2019)	No Action (2029)		Proposed (2029)	
		Ops	% Change Over Current	Ops	% Change Over No Action
Civilian Aircraft	26,545	28,321	6.69%	28,321	0%
Transient Military Aircraft	7,921	9,006	13.70%	9,006	0%
Blue Air Aircraft	0	948	100.00%	948	0%
Proposed FMS/RSAF F-35	0	0	0%	14,004	100%
Proposed RSAF F-16	0	0	0%	11,700	100%
Total Aircraft Operations	**34,466**	**38,275**	**11.05%**	**63,979**	**67.16%**

Source: (AETC, 2021–2022)
Key: % = percent; EA = Environmental Assessment; FMS = Foreign Military Sales; Ops = operations; RSAF = Republic of Singapore Air Force
Note: a. Current data from Final Runway Extension EA Appendix D Table 2 (Garver, 2022)

No new airspace or airspace adjustments would be required under the Preferred Alternative. There are several available airspace areas within the required distance for both the F-16 and F-35 missions. The primary airspace that would be used is Hog Military Operations Area (MOA)[2] and Shirley MOA. To enhance missions in Hog and Shirley MOAs, a corridor called the "Pig Path" between the two airspaces may be requested by the 188 WG 24 hours prior to use and would be authorized by Air Traffic Control. Military Training Routes[3] (MTRs) that would be utilized for flight training consist of Visual Routes[4] (VR) routes VR-189, VR-1102, VR-1103, VR-1104, VR-1113, VR-1130, and VR-1182. The Instrument Routes[5] (IR) routes consist of IR-117, IR-120, IR-121, and IR-164.

The 188 WG's primary range is Razorback Range, encompassed by Restricted Area (R-) 2401 and R-2402; it is 15 nautical miles (NM) to the center point of the range from Fort Smith. R-2401A and R-2402A/B/C are scheduled by the 188 WG through Fort Chaffee (U.S. Army). The Arkansas Army National Guard has scheduling authority for R-2401A/B and R-2402A. The Arkansas Air National Guard (ARANG) has scheduling authority for R-2402B/C. Razorback Range includes conventional (a bomb circle and strafe pits) and tactical targets. Full-scale inert weapons are authorized, including precision-guided munitions. Additional targets are available for use on the conjoined Fort Chaffee live-artillery impact area. The range is certified for day and night operations and the use of combat lasers. Razorback and the Fort Chaffee live-artillery impact area are considered the primary ranges to be utilized by FMS PTC aircraft for purposes of analysis.

S.3.1.2 Personnel/Manpower

Under the Preferred Alternative, there would be an overall increase in personnel at Ebbing ANG Base. There would be about 384 additional personnel (an increase of approximately 30 percent), as well as about 800 associated dependents added to the local community. The increase of personnel related to the FMS PTC beddown and associated range support is still being determined based on the total aircraft on-base at any one time.

S.3.1.3 Facility Requirements

Renovations to existing facilities, changes in facility use, and new facilities would all be required to support the FMS mission. Approximately 450,000 square feet of ground disturbance would be involved, to include development of new facilities and installation of aircraft barrier arresting kits on one of the runways at FSRA.

S.3.2 Alternative 2 (Selfridge ANG Base)

The 127th Wing (127 WG) of the Michigan ANG is located at Selfridge ANG Base in Harrison Township, Macomb County, Michigan, approximately 20 miles north of Detroit, Michigan, on the shore of Lake St. Clair (**Figure 1.2-3**, Selfridge ANG Base Area Map). Selfridge ANG Base occupies approximately 3,077 acres and is a Joint Military Community home to many diversified

[2] A MOA is airspace designated outside of Class A airspace, to separate or segregate certain nonhazardous military activities from Instrument Flight Rules (IFR) traffic and to identify for Visual Flight Rules (VFR) traffic where these activities are conducted.
[3] Generally, MTRs are established below 10,000 feet mean sea level (MSL) for operations at speeds in excess of 250 knots.
[4] VFR means that the aircraft may operate without the use of instrumentation during nice and clear weather. Clouds, heavy precipitation, low visibility, and otherwise adverse weather conditions should be avoided under VFR.
[5] IFR implies that the flight may operate in cloudy or otherwise adverse weather conditions using instruments only.

Department of Defense and Department of Homeland Security units, including the Air National Guard, Army, Navy, Marine Corps, Coast Guard and Customs and Border Protection, and Border Patrol. The 127 WG is the host unit at Selfridge ANG Base. The 127 WG's federal mission is to provide trained, equipped, and motivated airlift, fighter, and support resources serving the community, state, and nation.

The 127 WG also maintains a state mission of protecting life and property and preserving peace, order, and public safety. These missions are accomplished through emergency relief support during natural disasters such as floods, earthquakes, and forest fires, search and rescue operations, support to civil defense authorities, maintenance of vital public services, and counterdrug operations. The 127 WG supports two DAF major commands—Air Combat Command and Air Mobility Command—flying two distinctly different missions in the A-10 Thunderbolt II, a close air support aircraft, and KC-135 Stratotanker, an aerial refueler with global reach.

S.3.2.1 Aircraft Operations

Table S-2 provides a summary of aircraft operations for at Selfridge ANG Base under Alternative 2.

Table S-2. Current, No Action Alternative, and Alternative 2 Aircraft Operations at Selfridge ANG Base

Aircraft Type	Current (2020) and No Action Projected (2029) Annual Aircraft Operations	Alternative 2 Annual Aircraft Operations	% Increase From Current Operations
A-10	4,280	4,280	0%
KC-135	2,400	2,400	0%
Other military aircraft	13,575	13,575	0%
Transient Aircraft	536	536	0%
Proposed FMS/RSAF F-35	0	14,004	100%
Proposed RSAF F-16	0	11,700	100%
Total Aircraft Operations	**20,791**	**46,495**	**123.63%**

Source: (AETC, 2021–2022)
Key: % = percent; ANG = Air National Guard; FMS = Foreign Military Sales; RSAF =Republic of Singapore Air Force

No new airspace or airspace adjustments are proposed as part of Alternative 2. The 127 WG primarily uses the Michigan ANG Alpena Combat Readiness Training Center airspace (approximately 100 by 180 NM). The airspace includes Steelhead, Pike East, Pike West, and Grayling (temporary) MOAs, two range complexes (R-4201A/B and R 4207), and numerous air-to-air refueling tracks and is locally coordinated. Additionally, the Lumberjack, Firebird, Steelhead, and Garland Air Traffic Control Assigned Airspace (ATCAAs) expand the altitude available in the overall Alpena area.

Selfridge ANG Base flying operations use the Alpena Special Use Airspace (SUA) Complex for close air support training. Joint Tactical Air Controller (JTAC) support is provided by one assigned instructor/evaluator, as well as U.S. Services and foreign partners training at Alpena/Grayling Range. Ranges located within the Alpena airspace are R-4201A/B (Grayling Range) and R-4207 (Upper Lake Huron), which are approximately 150 NM from Selfridge ANG Base. The R-4201A/B range has scoring systems and impact areas for live weapons up to 500 pounds and inert weapons, such as the Guided Bomb Unit (GBU)-10/12/31 and strafe. The

4201A/B range is F-35 and F-16 with targeting pod laser operations certified. Additionally, the R-4201A/B range provides access to JTACs and coordinated attacks with the ANG Artillery Range and is in close proximity to multiple target areas. The R-4207 range is overwater (20 by 50 NM), located in the Alpena airspace, and approved for inert ordnance only. Floating targets are available to be placed on the surface of the R-4207 range in appropriate designated impact areas. Munitions authorized are the same as on the R-4201A/B range, such as the GBU-10/12/31 and laser-guided Joint Direct Attack Munition (JDAM). Additionally, the Alpena Combat Readiness Training Center is a Joint Staff (J7) Joint National Training Capability (JNTC) Certified Training site that typically hosts several joint training exercises per year.

S.3.2.2 Personnel/Manpower

The number of personnel required at Selfridge ANG Base under Alternative 2 would be the same as described under the Preferred Alternative, representing a relative increase in base personnel of approximately 20 percent. The increase of personnel related to the FMS PTC beddown and associated range support is still being determined based on the total aircraft on base at any one time

S.3.2.3 Facility Requirements

Renovations to existing facilities, changes in facility use, and new facilities would all be required to support the FMS mission. Approximately 260,000 square feet of ground disturbance would be involved, to include development of new facilities and installation of aircraft barrier arresting kits.

S.3.3 No Action Alternative

Under the No Action Alternative, the DAF would not beddown the FMS mission at Ebbing ANG Base or Selfridge ANG Base. The FMS mission, to include the RSAF F-16 squadron, would remain at Luke AFB, Arizona. The No Action Alternative would negatively impact the DAF and Pooled Partner (multiple FMS nation partners) F-35A's ability to train effectively as airspace and F-35 simulator availability at Luke AFB move toward full capacity.

S.4. ENVIRONMENTAL CONSEQUENCES

The following environmental resources were not analyzed in detail in this EIS because the potential for impacts would either not be significant (based on context and intensity or potential impacts), or there would be little to no potential for impacts based on the scope of the action, resulting in neutral effects or no effects: Airspace; Hazardous Materials and Waste/Solid Waste; Safety; Infrastructure; Soils and Geology; Natural Resources and Energy; and Visual Effects.

S.4.1 No Action Alternative

The affected environment under the No Action Alternative reflects actions that are expected to have occurred by CY 2029 at both locations. These are described in Section 3.12, *Preferred Alternative, Cumulative Impacts,* and Section 4.12, *Alternative 2, Cumulative Impacts,* of this EIS. Implementation of the No Action Alternative (i.e., no beddown of the FMS PTC at either Ebbing ANG Base or Selfridge ANG Base) would not result in any additional impacts outside those described under Cumulative Impacts for either location.

S.4.2 Preferred Alternative and Alternative 2

Detailed analysis for both alternatives was conducted for the following resource areas. In the context of this discussion, "airspace" refers to SUA, which includes Restricted Areas, MTRs, MOAs, and ATCAAs, while "installation" includes the area surrounding the installation and associated airfield, the immediate airspace and, in the case of the Preferred Alternative, FSRA.

S.4.2.1 Noise

Preferred Alternative (Ebbing ANG Base)

Time-averaged noise levels under airspace would remain below 65 decibels (dB). Up to an additional 7,855 acres of land affected by 65 dB day-night average sound level (DNL) or greater and up to an additional 12,654 people affected by 65 dB DNL or greater. Potential mitigations being considered would result in the number of acres affected by 65 dB DNL or greater being reduced by as much as 15 percent and the number of people being reduced by as much as 20 percent relative to the unmitigated scenario depending on afterburner usage. As more information is gained via public and agency input throughout the NEPA process, mitigation measures will be further refined and the final approved set will be detailed in the Final EIS and Record of Decision (ROD).

Alternative 2 (Selfridge ANG Base)

Time-averaged noise levels would remain below 65 dB. Up to an additional 7,171 acres of land affected by 65 dB DNL or greater and up to an additional 18,799 people affected by 65 dB DNL or greater. Potential mitigations being considered would result the number of acres and the number of people affected by 65 dB DNL or greater being reduced by as much as 16 percent relative to the unmitigated scenario depending on afterburner usage. Mitigation measures will be further refined based on public and agency inputs, and the final approved set will be detailed in the Final EIS and ROD.

S.4.2.2 Land Use

Preferred Alternative (Ebbing ANG Base)

Beneath the airspace, undeveloped areas would have low-to-moderate adverse effects on low-to-moderately noise-sensitive land uses and areas. Low-level overflights may have a minor-to-moderate adverse impact on persons engaged in outdoor recreational activities. There may be moderate-to-high adverse impact on some wilderness users and their experience of primitive recreation. Total off-base land exposed to noise levels of 65 dB DNL and greater would expand from 202 acres to 8,062 acres. Residential land exposure would increase from 11 acres to 1,821 acres. Mitigations would be required and will be detailed in the Final EIS and ROD.

Under potential mitigations being considered the total off-base/airport residential land area (acres) exposed to noise levels exceeding 65 dB DNL would be reduced by between 6% and 14% depending on afterburner usage relative to the same unmitigated scenarios; residential acres exposed to noise levels exceeding 70 dB DNL would be reduced by between 11% and 19% depending on afterburner usage relative to the same unmitigated scenarios; residential acres exposed to noise levels exceeding 75 dB DNL would be reduced by between 50% and 58 % depending on afterburner usage relative to the same unmitigated scenarios; residential land area exposed to more than 80 dB DNL would be reduced from one acre to zero under all mitigated afterburner scenarios.

Alternative 2 (Selfridge ANG Base)

Impacts beneath the airspace would be similar to the Preferred Alternative. Projected noise levels in the areas under the restricted airspace associated with Camp Grayling Joint Military Training Complex would increase by 5 to 9 A-weighted decibels (dBA) onset rate-adjusted monthly day-night average sound level (L_{dnmr})/DNL to levels up to 66 dBA L_{dnmr}/65 dB DNL. Levels greater than 65 dBA L_{dnmr}/DNL are not compatible with noise-sensitive uses. There may be moderate-to-high adverse impact on some wilderness users and their experience of primitive recreation. Total off-base land exposed to noise levels of 65 dB DNL and greater would increase to 7,170 acres. Residential land exposure would increase by 2,177 acres.

Under potential mitigations being considered the total off-base/airport residential land area (acres) exposed to noise levels exceeding 65 dB DNL would be reduced by between 3% and 9% depending on afterburner usage relative to the same unmitigated scenarios; residential acres exposed to noise levels exceeding 70 dB DNL would be reduced by between 21% and 26% depending on afterburner usage relative to the same unmitigated scenarios; residential acres exposed to noise levels exceeding 75 dB DNL would be reduced by between 11% and 34% depending on afterburner usage relative to the same unmitigated scenarios; no residential land areas would be exposed to more than 80 dB DNL under any mitigated or unmitigated scenario.

S.4.2.3 Socioeconomics

Preferred Alternative (Ebbing ANG Base)

The Preferred Alternative does not involve socioeconomic factors under airspace. There would be a less than 1 percent increase in local population surrounding the installation. Some beneficial impacts may occur due to additional population. Potential decrease in property values could occur (0.2 to 2.0 percent per dB increase). The estimated number of housing units within the 65 dB DNL or greater noise contours under the Preferred Alternative increase over the No Action from 18 to between 2,579 and 3,014 depending on afterburner scenario. Noise mitigations under consideration by the DAF would result in a decrease of total affected housing units by between 12% to 20% versus unmitigated noise.

Alternative 2 (Selfridge ANG Base)

Alternative 2 does not involve socioeconomic factors under airspace. There would be a 0.13 percent increase in local population surrounding the installation. Some beneficial impacts may occur due to additional population. Potential decrease in property values could occur (0.2 to 2.0 percent per dB increase). The estimated number of housing units within the 65 dB DNL or greater noise contours under the Alternative 2 increase over the No Action from 0 to between 5,855 and 6,099 depending on afterburner scenario. Noise mitigations under consideration by the DAF would result in a decrease of total affected housing units by between 10% to 16% versus unmitigated noise.

S.4.2.4 Environmental Justice

Preferred Alternative (Ebbing ANG Base)

The Preferred Alternative would result in disproportionately high and adverse human health or environmental effects on minority populations surrounding the installation and FSRA. The Preferred Alternative would also result in environmental health risks and safety risks that may disproportionately affect children, and the elderly. Mitigations would be required and will be

detailed in the Final EIS and ROD. Noise mitigations under consideration by the DAF would result in approximately 7% to 15% less minority population affected and between 13% and 21% low-income population affected by 65 dB DNL depending on afterburner scenario as compared to unmitigated noise. Similarly, potential noise mitigations would result in an estimated reduction of between 9% and 19% children and between 14% and 21% elderly potentially affected depending on afterburner scenario as compared to unmitigated noise.

Alternative 2 (Selfridge ANG Base)

Impacts would generally be the same as the Preferred Alternative. Mitigations would be required and will be detailed in the Final EIS and ROD. Noise mitigations under consideration by the DAF would result in approximately 12% to 18% less minority population affected and between 13% and 22% low-income population affected by 65 dB DNL depending on afterburner scenario as compared to unmitigated noise. Similarly, potential noise mitigations would result in an estimated reduction of between 10% and 18% children and between 9% and 15% elderly potentially affected depending on afterburner scenario as compared to unmitigated noise.

S.4.2.5 Cultural Resources

Preferred Alternative (Ebbing ANG Base)

There would be no effects to archaeological resources or traditional cultural properties, and no adverse effects to architectural resources under the airspace or on and surrounding the installation. Consultation with Native American Tribes and the Arkansas State Historic Preservation Officer (SHPO) is underway. In a letter dated January 21, 2022, the Oklahoma SHPO found that the Preferred Alternative would result in no historic properties affected below the airspace in Oklahoma. Noise mitigations under consideration by the DAF would result in previously surveyed resource SB 1673, a house with unknown National Register of Historic Places status, falling outside the 65 dB DNL noise contours, and thus outside the area of potential effect for potential noise impacts.

Alternative 2 (Selfridge ANG Base)

There would be no effects to archaeological resources or traditional cultural properties, and no adverse effects to architectural resources under the airspace or on and surrounding the installation. Consultation with Native American Tribes is underway. On July 21, 2022, the Michigan SHPO concurred with a finding of no adverse effects. Noise mitigations under consideration by the DAF would result in no change to the number of resources within 65 dB DNL or greater noise contours.

S.4.2.6 Biological Resources

Preferred Alternative (Ebbing ANG Base)

There would be minor impacts to wildlife under the airspace and on/near the installation due to noise. Construction activities would result in minor impacts to vegetation and wildlife on the installation. The Preferred Alternative may affect, but is not likely to adversely affect, federally listed species. Endangered Species Act Section 7 consultation with the U.S. Fish and Wildlife Service (USFWS) is ongoing. Any potential mitigations identified as a result of consultation with the USFWS under ESA Section 7 will be identified in the Final EIS and ROD.

Alternative 2 (Selfridge ANG Base)

Impacts to biological resources would generally be similar to the Preferred Alternative and may affect, but is not likely to adversely affect, federally listed species. Section 7 consultation with the USFWS is ongoing. The DAF completed Section 7 consultation for Alternative 2 under the ESA with the USFWS on May 12, 2022. The USFWS concurred with the DAF's effects determinations.

S.4.2.7 Water Resources

Preferred Alternative (Ebbing ANG Base)

There would be no interaction with the resource under the airspace. Construction activities would result in increased surface water runoff and potential for soil erosion, thus resulting in direct and indirect minor impacts to surface water, groundwater, and wetlands. However, these impacts would be minimized through required design elements, permit-related BMPs, and installation management practices. There is the potential for construction projects to occur in wetlands, and a field wetland delineation would be required for airfield construction prior to ground-disturbance activities. There would be no impacts to floodplains.

Alternative 2 (Selfridge ANG Base)

Impacts to surface water and groundwater would be similar in scope to the Preferred Alternative, and would be minimized through required design elements, permit-related BMPs, and installation management practices. Development activities would occur within the 100-year floodplain. Compliance with federal and local standards and design features to avoid impedance of floodwater conveyance, decrease of floodplain capacity, or increase of flood elevations would prevent or minimize potential impacts. There would be no impacts to wetlands.

S.4.2.8 Air Quality

Preferred Alternative (Ebbing ANG Base)

There would be no exceedances of significance indicator thresholds or National Ambient Air Quality Standards (NAAQS) under the Preferred Alternative. Implementation of noise mitigations, which include altering flight profiles, would not have any notable effect on air emissions. Emissions of all criteria pollutants would remain below significance indicator thresholds, and there would be no significant impacts to air quality.

Alternative 2 (Selfridge ANG Base)

Air emissions would be somewhat similar to those of the Preferred Alternative. However, because Selfridge ANG Base is in a maintenance area, nitrogen oxide (NO_x) emissions from Alternative 2 would exceed the conformity threshold of 100 tons per year. The NO_x emissions increase would trigger the requirement for a positive general conformity determination before any final decision could be made to implement Alternative 2 at Selfridge ANG Base. This determination would ensure that the alternative would conform to the applicable State Implementation Plan for reduction of air quality impacts.

Implementation of noise mitigations, which include altering flight profiles, would decrease emissions slightly for carbon monoxide (CO); however, there would be a slight increase in annual emissions in the ROI for all other criteria pollutants versus the unmitigated scenarios.

The significance indicator threshold for NO_x would continue to be exceeded. Because the NO_x emissions would exceed the indicator threshold by around 50 percent, significant reductions in annual flight operations may be required to ensure conformity with the Michigan State Implementation Plan.

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AIR EDUCATION AND TRAINING COMMAND

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ABBREVIATIONS AND ACRONYMS

§	Section
127 WG	127th Wing
188 WG	188th Wing
ACAM	Air Conformity Applicability Model
AEDT	Aviation Environment Design Tool
AFB	Air Force Base
AFI	Air Force Instruction
AGE	aerospace ground equipment
AGFC	Arkansas Game and Fish Commission
AGL	above ground level
AICUZ	Air Installations Compatible Use Zones
ALP	Airport Layout Plan
ANG	Air National Guard
ANSI	American National Standards Institute
APE	Area of Potential Effects
APHC	U.S. Army Public Health Center
APHIS	Animal and Plant Health Inspection Service
APZ	accident potential zone
ARANG	Arkansas Air National Guard
ATC	Air Traffic Control
ATCAA	Air Traffic Control Assigned Airspace
BAK-12	aircraft barrier arresting kit 12
BASH	Bird Aircraft Strike Hazard
BCC	Birds of Conservation Concern
BCR	Bird Conservation Region
BMP	best management practice
BOOMAP	noise modeling software
C&D	construction and demolition
CDNL	C-weighted day-night average sound level
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CGJMTC	Camp Grayling Joint Military Training Complex
CO	carbon monoxide
COC	Community of Comparison
CONUS	Continental United States
CRTC	Combat Readiness Training Center
CWA	Clean Water Act
CY	calendar year
CZ	clear zone
DAF	Department of the Air Force
dB	decibels
dBA	A-weighted decibels
dBC	C-weighted decibels
dBP	peak sound level
DNL	day-night average sound level
DNR	Department of Natural Resources
DoD	Department of Defense
DoDI	Department of Defense Instruction
DTMB	Department of Technology, Management and Budget
EA	Environmental Assessment
EGLE	Environment, Great Lakes, and Energy
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
EISA	Energy Independence and Security Act
EO	Executive Order
ERP	Environmental Restoration Program
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FL	Flight Level
FMS	Foreign Military Sales
FSRA	Fort Smith Regional Airport
GBU	Guided Bomb Unit
GHG	greenhouse gas
HAP	hazardous air pollutant
HVAC	heating, ventilation, and air conditioning
HWMP	Hazardous Waste Management Plan
I-	Interstate
ID	identification number
IFR	Instrument Flight Rules
INRMP	Integrated Natural Resources Management Plan
IR	Instrument Route
ISD	Intermediate School District
ISWMP	Integrated Solid Waste Management Plan
J7	Joint Staff
JBSA	Joint Base San Antonio
JDAM	Joint Direct Attack Munition
JNTC	Joint National Training Capability
JTAC	Joint Tactical Air Controller
LBP	lead-based paint
L_{dnmr}	onset rate-adjusted monthly day-night average sound level
L_{eq}	equivalent noise level
L_{eq24}	24-hour equivalent noise level
L_{eq-8hr}	8-hour equivalent noise level
LID	Low Impact Development
L_{max}	maximum noise level
LOA	Letter of Offer and Agreement
MOA	Military Operations Area
MR_NMAP	noise modeling software
MSA	Metropolitan Statistical Area
MSL	mean sea level
MTR	Military Training Route
MX	Maintenance

NAAQS	National Ambient Air Quality Standards
NADWC	National All Domain Warfighting Center
NCP	Noise Compatibility Plan
NEI	National Emissions Inventory
NEPA	National Environmental Policy Act
NGB	National Guard Bureau
NHPA	National Historic Preservation Act
NIPTS	noise-induced permanent threshold shift
NLR	noise-level reduction
NM	nautical miles
NO_2	nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRHP	National Register of Historic Places
OLDCC	Office of Local Defense Community Cooperation
OSHA	Occupational Safety and Health Administration
PAA	Primary Aircraft Assigned
PFAS	per- and polyfluoroalkyl substances
PFOA	perfluorooctanoic acid
PFOS	perfluorooctane sulfonate
P.L.	Public Law
$PM_{2.5}$	particulate matter with a diameter less than or equal to 2.5 microns
PM_{10}	particulate matter with a diameter less than or equal to 10 microns
PSD	Prevention of Significant Deterioration
PTC	Pilot Training Center
PUD	planned unit development
R-	Restricted Area
RAs	Restricted Areas
REPI	Readiness and Environmental Protection Integration
ROD	Record of Decision
ROI	region of influence
RPZ	runway protection zone
RSAF	Republic of Singapore Air Force
RSS	relocatable simulation shelter
RWY	Runway
SEL	sound exposure level
SFB	Space Force Base
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SO_2	sulfur dioxide
Stat.	Statutes
STOVL	Short Take-Off and Vertical Landing
SUA	Special Use Airspace
SWPPP	Stormwater Pollution Prevention Plan
U.S.	United States
U.S.C.	United States Code
UFC	Unified Facilities Criteria
USACE	U.S. Army Corps of Engineers
USCB	U.S. Census Bureau
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
VFR	Visual Flight Rules
VOC	volatile organic compound
VR	Visual Route
WDA	Workforce Development Area
WHMP	Wildlife Hazard Management Plan
YDNL	Yearly DNL

1. PURPOSE OF AND NEED FOR THE PROPOSED ACTION

1.1 INTRODUCTION

The Department of the Air Force (DAF) Proposed Action, described in detail in Chapter 2, *Description of the Proposed Action and Alternatives*, is to establish a permanent Foreign Military Sales (FMS) Pilot Training Center (PTC) at a single location within the Continental United States (CONUS). The Proposed Action would involve consolidation of F-35 FMS training activities and Republic of Singapore Air Force (RSAF) F-16 aircraft operations at a single location, construction of new infrastructure or renovation of existing infrastructure to support FMS training and RSAF operations, and the integration of up to 24 FMS F-35 aircraft and 12 RSAF F-16 aircraft relocated from Luke Air Force Base (AFB), Arizona. Alternatives for implementing the Proposed Action consist of Ebbing Air National Guard (ANG) Base, Arkansas (the Preferred Alternative) and Selfridge ANG Base, Michigan (Alternative 2). **Figure 1.2-1** shows the overall location of both alternatives, while **Figure 1.2-2** and **Figure 1.2-3** provide the regional setting of both alternatives.

The DAF is the lead agency for the Proposed Action and is responsible for the scope and content of this Environmental Impact Statement (EIS). The Federal Aviation Administration (FAA) is serving as a Cooperating Agency because the scope of the Proposed Action involves activities under their jurisdiction by law and for which they have special expertise. FAA's authorities and special expertise is based on its statutory responsibilities under the Airport and Airway Improvement Act of 1982 (49 United States Code [U.S.C.] Section [§] 47101) and Section 163 of the 2018 FAA Reauthorization Act. The DAF coordinated with FAA during the development of this document to meet each agency's distinct obligations under the National Environmental Policy Act (NEPA) (42 U.S.C. §§ 4321–4374) and to support the decision making process of both agencies.

This Draft EIS assesses the potential environmental, social, economic, historic, and cultural impacts of the Proposed Action and alternatives and was prepared in accordance with NEPA, the 2022 Council on Environmental Quality (CEQ) regulations for implementing NEPA (40 Code of Federal Regulations [CFR] §§ 1500–1508), the Air Force Environmental Impact Analysis Process, promulgated at 32 CFR § 989 et seq., and as applicable, FAA Order 1050.1F, *Environmental Impacts Policy and Procedures*.

1.2 BACKGROUND

The FMS program creates a mechanism for the United States (U.S.) Government to provide both military articles and services, such as training, to other countries for their defense. Two of the aircraft currently involved in the FMS program are the F-16 and F-35. Currently, Luke AFB, Arizona, supports the RSAF F-16 squadron. Due to incoming F-35As to Luke AFB and the *F-35A Training Basing Final EIS Record of Decision* (ROD) Number 2 limits, the RSAF F-16 squadron needs to depart by June 2023 (USAF, 2013). In addition, the RSAF has signed a Letter of Offer and Agreement (LOA) to initially purchase four F-35B Short Take-Off and Vertical Landing (STOVL) aircraft, with an option for eight additional aircraft.

Figure 1.2-1. Ebbing ANG Base and Selfridge ANG Base Regional Map

Source: (USAF, 2022)

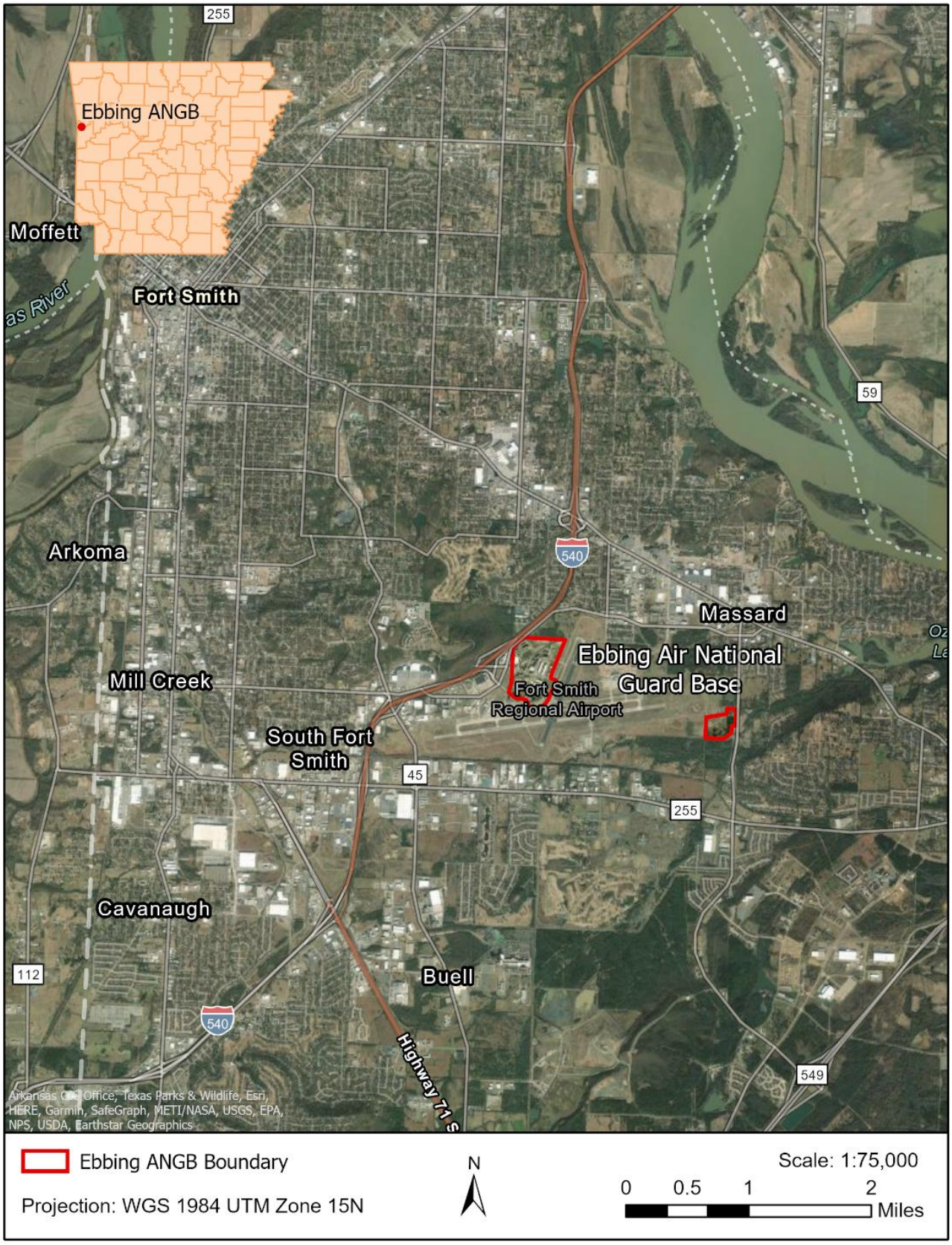

Figure 1.2-2. Ebbing ANG Base Area Map

Source: (USAF, 2022)

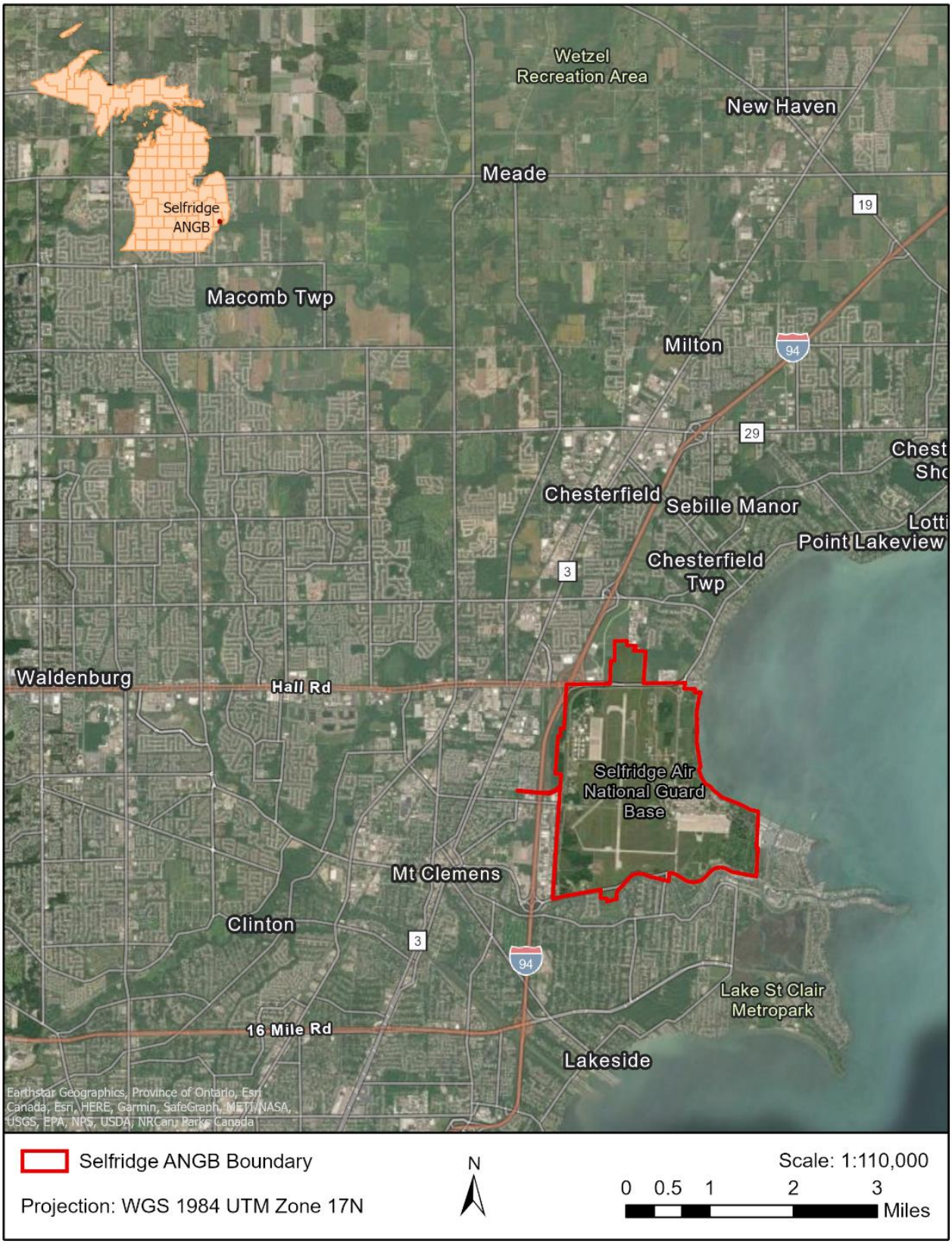

Figure 1.2-3. Selfridge ANG Base Area Map

Source: (USAF, 2022)

Additionally, the RSAF has requested to co-locate their F-16s and future F-35s at one location. In January 2020, Poland signed an LOA to purchase 32 F-35As, with 8 programmed for pilot training. Poland's first aircraft arrival is anticipated in calendar year (CY) 2024. Finland expects to sign an LOA soon and plans to start training in 2025 with six F-35As. At a minimum, FMS PTC requirements must include sufficient ramp space for up to 20 Primary Assigned Aircraft (PAA) by 2023, 26 PAA by 2025, 30 PAA by 2026, and potentially 36 PAA by 2030.

1.3 PURPOSE AND NEED FOR THE PROPOSED ACTION

The purpose of the Proposed Action is to establish a permanent FMS PTC, initially providing beddown of up to 36 total aircraft at a single location within the CONUS. The need for the Proposed Action is to provide a centralized location for FMS training and pilot production. Multiple nations have agreements with the DAF to purchase F-35 aircraft; this drives the need for a location suitable for initial F-35 training before returning to their home country. The RSAF is among the nations purchasing F-35s and plans to base a number of their aircraft in the United States for an indefinite period; the RSAF also desires to consolidate its pilot training. This drives the need for relocation of 12 F-16s from Luke AFB, Arizona, to the FMS PTC location.

Because the DAF's Proposed Action under the Preferred Alternative includes construction of infrastructure necessary to support the FMS PTC beddown within the Fort Smith Regional Airport (FSRA)[6] boundary (i.e., aircraft barrier arresting kits at both ends of one runway), the City of Fort Smith (i.e., the Airport Sponsor) would need to submit a request to FAA's Office of Airports for approval of changes to their Airport Layout Plan (ALP) to account for the construction of the aircraft barrier arresting kits. Therefore, the purpose of FAA's Office of Airports action is to evaluate the City of Fort Smith's request to change the ALP, which would allow construction of the arresting barriers, and make a determination whether to approve the change to the ALP, consistent with provisions under the Airport and Airway Improvement Act of 1982 (49 U.S.C. § 47101) and relevant implementing regulations. The need for FAA's Office of Airports action is to consider the impacts of the DAF's proposed construction of the aircraft barrier arresting kits at FSRA and meet its statutory obligations under 49 U.S.C. § 47101. This additional FAA action is not required if Alternative 2 is selected because Selfridge ANG Base is not located on a civilian airport.

1.4 NEPA AND OTHER COMPLIANCE REQUIREMENTS

Under NEPA, federal agencies are required to examine the environmental impacts of their proposed actions within the United States and its territories. A document prepared pursuant to NEPA and its implementing regulations, 40 CFR §§ 1500–1508, provides an assessment of the potential effects a major federal action may have on the human environment. Major federal actions include activities that federal agencies fully or partially fund, regulate, conduct or approve. The DAF proposal to establish a permanent FMS PTC and FAA's consideration whether to approve requested changes to a civil airport sponsor's ALP are major federal actions, requiring analysis under NEPA.

[6] The official location ID for Fort Smith Regional Airport is "FSM." However, to avoid confusion between the acronyms for the DAF's Proposed Action, "FMS PTC," and the location ID for Fort Smith Regional Airport, "FSRA" is used throughout this EIS when referring to the airport.

In addition, the DAF and FAA must identify all applicable environmental protection laws and regulations and Executive Orders (EOs) necessary to implement a proposed action and alternatives. Therefore, the DAF and FAA, to the fullest extent possible, integrate the requirements of NEPA with other required statutory and regulatory processes (e.g., consultations, permitting) so that all processes run concurrently, rather than consecutively. Although NEPA does not preclude separate compliance with other requirements, integrating and addressing these requirements aligns with the CEQ regulations to reduce paperwork and delays in the environmental review process, see 40 CFR §§ 1500.4(m) and 1500.5(i). Chapter 3, *Preferred Alternative (Ebbing ANG Base)*, and Chapter 4, *Alternative 2 (Selfridge ANG Base)*, address the laws, regulations, and permits/consultations applicable to the DAF and FAA proposed actions.

The DAF is required to manage floodplains and wetlands per Air Force Manual 32-7003, *Environmental Conservation*, which includes the DAF guidance for compliance with EO 11988, *Floodplain Management*, and EO 11990, *Protection of Wetlands*. The DAF has identified the potential for wetland disturbance at Ebbing ANG Base (and FSRA), Arkansas, and floodplain disturbance at Selfridge ANG Base, Michigan, from the Preferred Alternative and Alternative 2, respectively, as described in Chapter 2.

1.4.1 Irreversible and Irretrievable Commitment of Resources

The CEQ's regulations for implementing NEPA require environmental analyses under an EIS to identify "...any irreversible and irretrievable commitments of resources that would be involved in the Proposed Action should it be implemented" (40 CFR § 1502.16). Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects the uses of these resources have on future generations. Irreversible effects primarily result from the use or destruction of a specific resource (e.g., energy and minerals) that cannot be replaced within a reasonable time frame. Building construction material such as gravel and gasoline usage for construction equipment would constitute the consumption of nonrenewable resources.

Irretrievable resource commitments also involve the loss in value of an affected resource that cannot be restored as a result of the action. Training operations would involve consumption of nonrenewable resources, such as gasoline used in vehicles and jet fuel used in aircraft. Use of training ordnance would involve commitment of chemicals and other materials. None of these activities would be expected to substantially affect environmental resources, because the relative consumption of these materials is expected to change negligibly.

The primary irretrievable impacts that would be associated with the implementation of the Preferred Alternative and Alternative 2 would involve the use of energy, labor, materials and funds, and the conversion of some lands from a semi-improved condition through the construction of buildings and facilities on the installation. Irretrievable impacts would occur as a result of construction, facility operation, and maintenance activities. Direct losses of biological productivity and the use of natural resources from these impacts would be inconsequential given the already disturbed nature of the installation environments.

1.4.2 Unavoidable Adverse Impacts

NEPA requires identification of any unavoidable adverse impacts (40 CFR § 1502.16(a)(2)). Based on the analyses presented in Chapters 3 and 4, implementing the Preferred Alternative or Alternative 2 would result in the following unavoidable environmental impacts.

- An aircraft mishap could introduce hazardous materials into the environment; mishap impacts would be mitigated by Standard Operating Procedures that identify potential hazardous materials, protect responding personnel and the environment, and provide guidelines for the ultimate cleanup and disposal of the crash residues.
- FMS PTC beddown activities are projected to result in disturbance and/or noise within areas not previously or recently subjected to these effects. Some of these noise effects could be considered adverse or annoying to potentially affected individuals.
- Air emissions would occur from aircraft use and use of mobile equipment during construction activities.

While these effects could be mitigated to some degree, the only way to avoid the impacts altogether would involve implementation of the No Action Alternative.

1.4.3 Short-Term Uses and Maintenance and Enhancement of Long-Term Productivity

NEPA requires an analysis of the relationship between a project's short-term impacts on the environment and the effects that these impacts may have on the maintenance and enhancement of the long-term productivity of the affected environment (40 CFR § 1502.16(a)(3)). Impacts that narrow the range of beneficial uses of the environment are of particular concern. Choosing one option may reduce future flexibility in pursuing other options or committing a resource to a certain use may eliminate the possibility for other uses of that resource.

The Preferred Alternative would be limited to utilization of existing airspace in the manner it is intended, result in increases in noise exposure around each alternative location, result in increased base personnel and associated dependents at each alternative location, and involve ground disturbance associated with development within each installation boundary.

Utilization of existing airspace for FMS PTC training would result in the long-term use of said airspace; however, this would not be expected to affect the long-term productivity of the airspace affected. The airspace would be scheduled and managed according to current practices, with any proposed additional future uses of the airspace evaluated to ensure capacity and productivity of the resource.

Increases in noise adjacent to the alternative locations are projected to result in disturbance and/or noise within areas not previously or recently subjected to these effects. Some of these noise effects could be considered adverse or annoying to potentially affected individuals. While noise events would be short-term and temporary (i.e., when F-16s and F-35s are training), this could have long-term effects on underlaying land uses within the airspace immediately surrounding the installations. Mitigations as outlined in Sections 3.3 and 4.3, *Noise*, and Sections 3.4 and 4.4, *Land Use*, could serve to mitigate these long-term effects.

Increases in base personnel and dependents within the local communities would have long-term economic effects on the economy, although minimal. The long-term increased population and regional expenditures would result in the continuation of the ongoing increase in regional housing stock and housing costs and increased commercial activity.

The construction projects associated with the Preferred Alternative and Alternative 2 would have short-term effects in the immediate vicinity and would represent a long-term commitment to either a new, substantial flying mission (Preferred Alternative) or an addition to current flying missions (Alternative 2). The initial surge in construction would be expected to contribute to the

respective region's short-term economic productivity. Development activities would not be expected to result in either short-term or long-term loss of quality habitat, because development activities are proposed for semi-improved developed areas within active military installations.

1.5 INTERGOVERNMENTAL AND STAKEHOLDER COORDINATION

NEPA requirements help ensure that environmental information is made available to the public during the decision-making process and prior to actions being taken. CEQ NEPA regulations that were issued in 2020 state, "Agencies shall use an early and open process to determine the scope of issues for analysis in an environmental impact statement, including identifying the significant issues and eliminating from further study non-significant issues." EO 12372, *Intergovernmental Review of Federal Programs*, as amended by EO 12416, *Intergovernmental Review of Federal Programs*, requires federal agencies to provide opportunities for input from elected officials of state and local governments that would be directly affected by a federal proposal.

1.5.1 Cooperating Agencies

The Office of Airports, on behalf of FAA, is serving as a Cooperating Agency for this EIS pursuant to 40 CFR § 1501.8 (see Volume II, **Appendix A**, *Public and Agency Involvement*, for a copy of the Cooperating Agency letter). FAA has jurisdiction by law and special expertise relating to the DAF's Proposed Action under the Preferred Alternative where there is a military use of a civil airport. FAA authorities and special expertise is based on its statutory responsibilities under the Airport and Airway Improvement Act of 1982 (49 U.S.C. § 47101) and relevant implementing regulations, as well as Section 163 of the 2018 FAA Reauthorization Act. In addition, FAA provides leadership in planning and developing a safe and efficient national airport system to satisfy the needs of the aviation interests of the United States, with consideration for economics, environmental issues, local proprietary rights, and safeguarding the public investment.

Because the DAF's Proposed Action under the Preferred Alternative includes construction of infrastructure necessary to support the FMS PTC beddown within the FSRA boundary FAA's Office of Airports may receive a request from the City of Fort Smith for approval of changes to their ALP. At that time, FAA would be responsible for environmental review under NEPA and may rely on the information and analyses in this EIS for its decision-making purposes. Therefore, FAA's Office of Airports proposed action would be a direct outcome of responding to the City of Fort Smith's request for approval to update the ALP. As such, FAA's Office of Airports, in accordance with 40 CFR §§ 1501.8 and 1505.2, intends to adopt this EIS and sign a ROD associated with its decision whether to approve the City of Fort Smith's request to change the ALP.

2. DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

2.1 PROPOSED ACTION

The DAF proposes to establish a permanent FMS PTC at a single location within the CONUS, consolidating pilot training for foreign nations. The FMS PTC would accommodate up to 36 total aircraft (12 F-16 and 24 F-35 aircraft), utilizing existing facilities to the maximum extent practicable to meet FMS requirements. Two F-35 simulator training facilities would be constructed. The F-16 aircraft are anticipated to arrive in CY 2023. The first F-35 aircraft are anticipated to arrive in CY 2024. The FMS PTC would host various countries; in the near term, these countries include Poland and Finland. Additional foreign sales are ongoing. Aircraft increases above 24 F-35s may require further analysis and a supplemental EIS.

The actual number of F-35s present at the FMS PTC at any one time may vary based on customer need, but the maximum number of F-35s located at the FMS PTC is not expected to exceed 24, with the program of record of 36 total aircraft expected to be met by CY 2029 (based on current anticipated schedule); however, dates may be subject to change. The findings in this EIS are based on the number and types of aircraft described in this chapter. The EIS and eventual ROD would limit the FMS base to the aircraft numbers and types analyzed. Should the total number of aircraft exceed 36 or the types of aircraft change, then supplemental NEPA analysis would be required prior to project implementation.

Facility construction and upgrades would include the modification and renovation of several buildings, construction of F-35 simulator training facilities and new sunshades, and construction of two BAK-12 aircraft barrier arresting kits. All flight operations would take place within existing airspace. No additions to or alterations of airspace are associated with this Proposed Action. Aircraft, aircraft operations, personnel, and facility requirements for each alternative are described in the following subsections. The DAF has selected Ebbing ANG Base as the preferred alternative because Ebbing ANG Base previously accommodated F-16 aircraft and can accommodate the Proposed Action with minimal renovation, new construction, and displacement of current mission(s) to meet critical F-16 and F-35 timing; additionally, existing airspace provides superior capacity compared to that available for Selfridge ANG Base. **Table 2.1-1** provides a summary of the F-35 training activities associated with the FMS PTC.

Table 2.1-1. Proposed Action FMS F-16 and F-35 Training Activities

Major Mission	Training Activities	Airspace Type
Basic Fighter Maneuvers	G-force awareness, maneuverability, break turns, high-angle-of-attack maneuvering, acceleration maneuvering, gun tracking, offensive and defensive positioning, air refueling, and stall recovery	MOAs and ATCAAs
Surface Attack Tactics	Single to multiple aircraft attacking a wide range of simulated ground targets using different ingress and egress methods, delivery tactics, ordnance types, angles of attack, and combat scenarios	MOAs, ATCAAs, and Ras (over weapons delivery ranges)
Air Combat Maneuvers	Multi-aircraft formations and tactics, systems check, G-force awareness, two-versus-four and four-versus-six aircraft intercepts, combat air patrol, defense of airspace sector from composite force attack, intercept and destroy bomber aircraft, and avoid adversary fighters	MOAs and ATCAAs
Close Air Support	Air support for ground-based offensive and defensive operations, work with Joint Terminal Attack Controllers, and use Surface Attack Tactics and Basic Surface Attack components	MOAs, ATCAAs, and Ras (over weapons delivery ranges)

Table 2.1-1. Proposed Action FMS F-16 and F-35 Training Activities

Major Mission	Training Activities	Airspace Type
Air Combat Tactics	Multi-aircraft and multi-adversary defense and combat air patrol, defense of airspace sector from composite force attack, intercept and destroy bomber aircraft, avoid adversary fighters, strike-force rendezvous and protection, and supersonic engagement	MOAs and ATCAAs

Key: ATCAA = Air Traffic Control Assigned Airspace; FMS = Foreign Military Sales; MOA = Military Operations Area; Ras = Restricted Areas

2.2 PREFERRED ALTERNATIVE (EBBING ANG BASE, ARKANSAS)

2.2.1 Aircraft Operations

Airfield – For purposes of analysis, Ebbing ANG Base (and FSRA) is identified as the airfield for primary use under the FMS PTC Preferred Alternative. Primary use indicates that the airfield would receive substantial use by FMS PTC aircraft on a daily basis. While predominant FMS PTC training operations would occur at Ebbing ANG Base, training activities would not be limited to using only those areas. FMS PTC aircraft may conduct operations at other airfields within the nationwide and auxiliary airfield network, which can be defined as occasional use. Occasional use means that these locations would generally receive only infrequent use by FMS PTC aircraft. As a result, these potential use locations are not addressed in this EIS but are instead covered by NEPA documents for the other airfields.

FSRA has two runways, Runway (RWY) 8/26 (8,017 by 150 feet) and RWY 2/20 (5,001 by 150 feet). A project to extend RWY 8/26 by 1,300 feet is currently planned for completion in CY 2023. The RSAF F-16 and FMS F-35 training missions would be additive to the 188th Wing's (188 WG's) operational support to MQ-9 sorties[7] (currently the 188 WG has no flying assets based at FSRA; however, transient military aircraft, such as the C-130 from the 314th Airlift Wing, do occasionally visit Ebbing ANG Base) and other commercial and civilian users of FSRA (**Figure 2.2-1**). Daily use of the FSRA runway would require deconfliction with FSRA commercial operations.

Airspace – No new airspace or airspace adjustments would be required under the Preferred Alternative. There are several available airspace areas within the required distance for both the F-16 and F-35 missions (**Figure 2.2-2**). The primary airspace that would be used are the Hog Military Operations Area (MOA)[8] and the Shirley MOA. To enhance missions in Hog and Shirley MOAs, a corridor called the "Pig Path" between the two airspaces may be requested by the 188 WG 24 hours prior to use and would be authorized by Air Traffic Control. Chaff/flares are authorized in Hog and Shirley MOAs, and supersonic flight has occurred above Flight Level[9] (FL) 300. Military Training Routes[10] (MTRs) that would be utilized are depicted in **Figure 2.2-2**. MTRs that would be utilized for flight training consist of Visual Routes[11] (VR) routes VR-189, VR-1102, VR-1103, VR-1104, VR-1113, VR-1130, and VR-1182.

[7] A sortie, in this context, is an operational flight by one aircraft.

[8] A MOA is airspace designated outside of Class A airspace, to separate or segregate certain nonhazardous military activities from Instrument Flight Rules (IFR) traffic and to identify for Visual Flight Rules (VFR) traffic where these activities are conducted.

[9] FL is an aircraft's altitude at standard air pressure, expressed in hundreds of feet (FL 300 = 30,000 feet).

[10] Generally, MTRs are established below 10,000 feet mean sea level (MSL) for operations at speeds in excess of 250 knots.

[11] VFR means that the aircraft may operate without the use of instrumentation during nice and clear weather. Clouds, heavy precipitation, low visibility, and otherwise adverse weather conditions should be avoided under VFR.

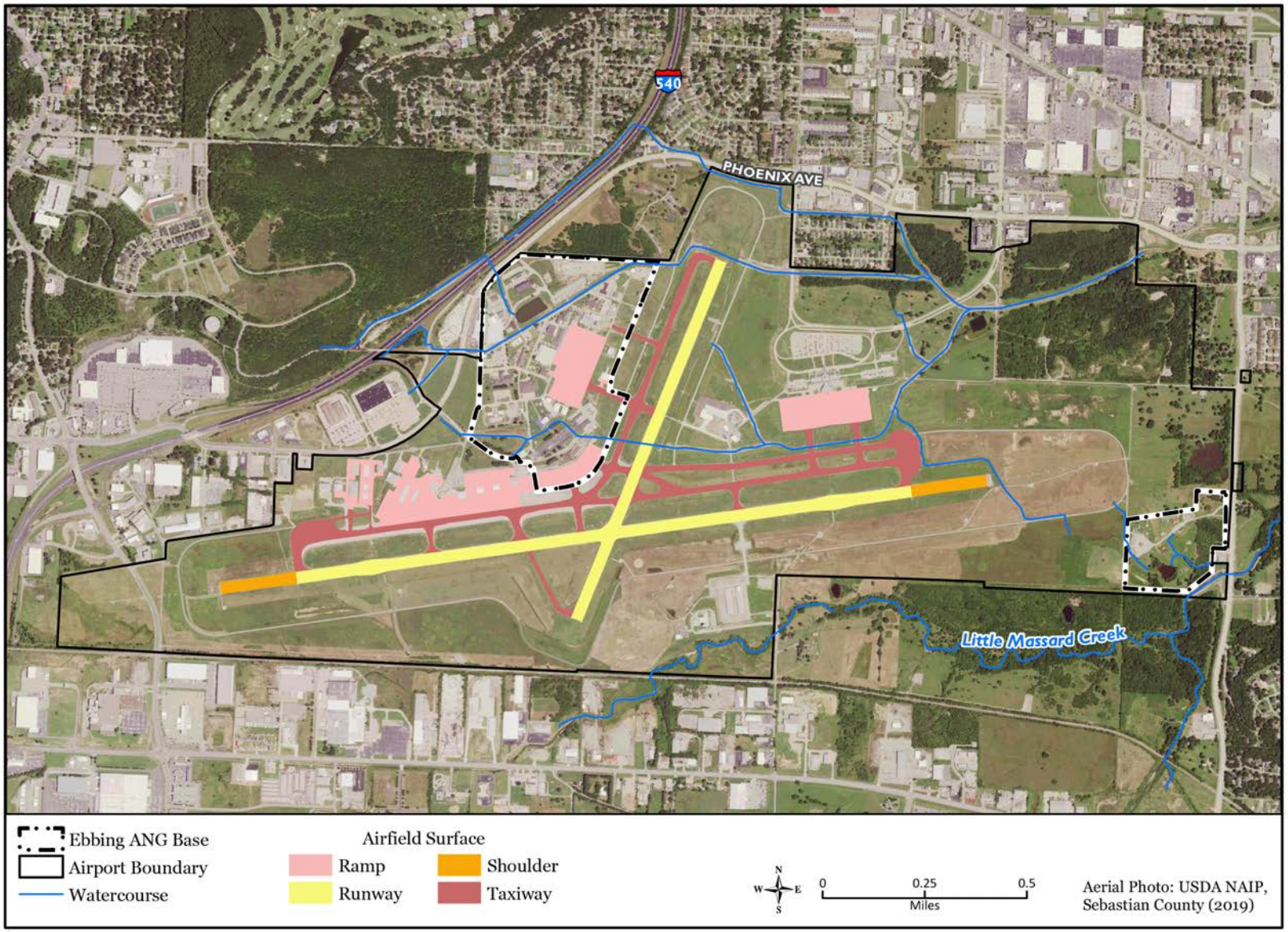

Figure 2.2-1. Ebbing ANG Base/FSRA Airfield Surface Map

Sources: (Ebbing ANG Base, 2021; ESRI Data & Maps, 2019a; USDA-FSA-APFO, National Agriculture Imagery Program, Sebastian County, AR, 2019a)

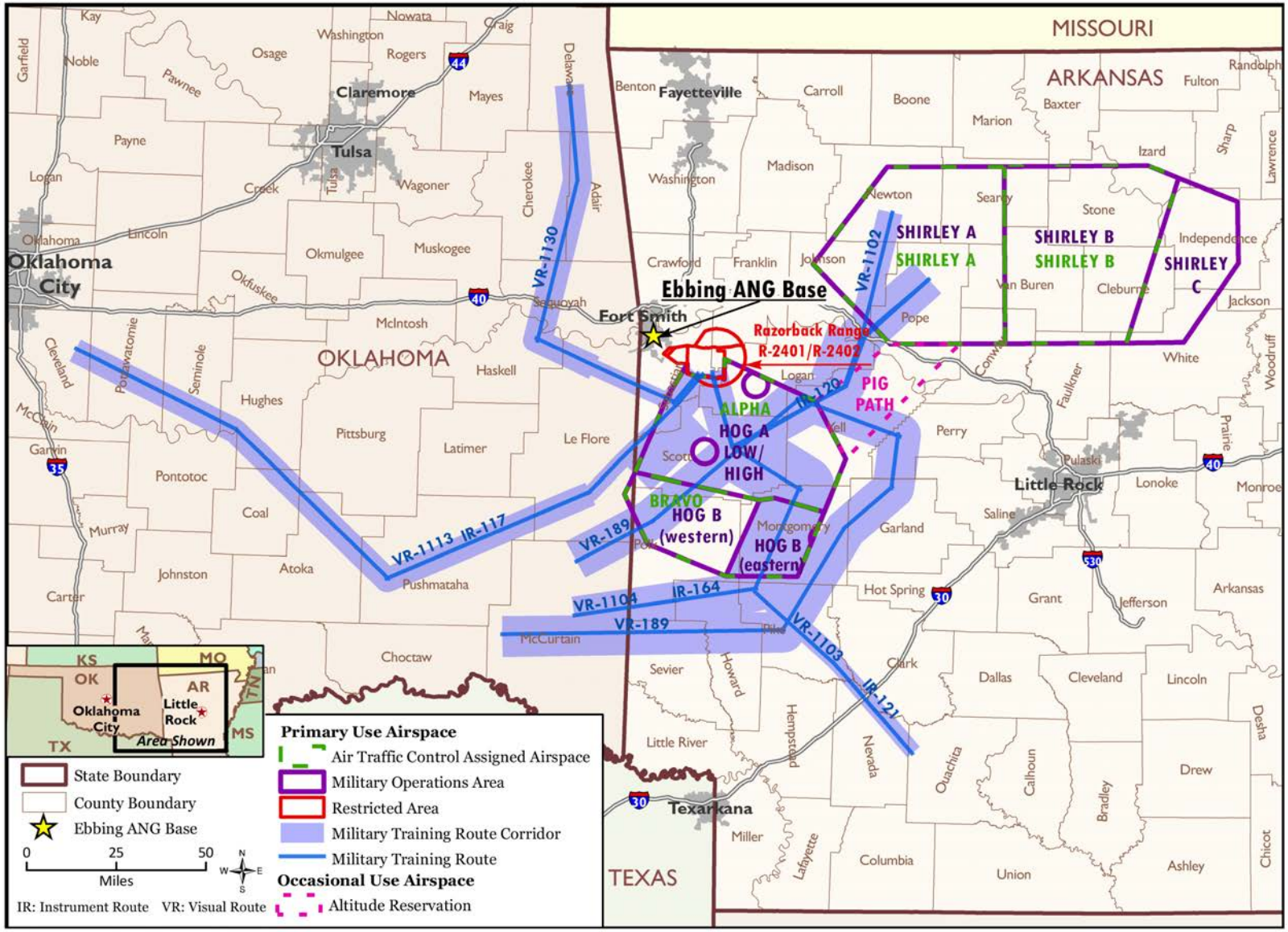

Figure 2.2-2. Ebbing ANG Base Operational Airspace and Ranges

Sources: (Ebbing ANG Base, 2021; ESRI Data & Maps, 2019a; ESRI Data & Maps, 2019b; ESRI Data & Maps, 2019c; USCB, 2018a; FAA, 2021a; FAA, 2021b)

Instrument Routes[12] (IR) consist of IR-117, IR-120, IR-121, and IR-164. For purposes of analysis within this EIS, with the exception of the Pig Path, the airspace described constitutes the primary use airspace units that would be utilized under the Preferred Alternative. Primary training activities would consist of those as described in **Table 2.1-1**. While predominant FMS PTC training operations would occur in the primary use airspace, FMS PTC aircraft training would not be limited to using only those areas. The FMS PTC aircraft may conduct operations in other SUA within the nationwide SUA, Air Traffic Control Assigned Airspace (ATCAA), and MTRs, which can be categorized as occasional use. Occasional use airspace would generally receive only infrequent use by FMS PTC aircraft. Occasional use airspace would include training areas outside the operational range of F-35 and F-16 aircraft, such as airspaces associated with Fort Polk, Louisiana, and Nellis AFB, Nevada. FMS PTC aircraft would travel to distant locations about once per year to conduct training. Training at these locations would be conducted in accordance with local flying guidance and would be similar to regularly occurring operations by locally based and other transient aircraft. Operations on the "Pig Path" would be relatively infrequent and would consist primarily of FMS PTC aircraft transiting between the Hog and Shirley MOA airspace complexes. Because operations in these and other occasional use airspaces throughout the nation would be infrequent, transitory, and/or would occur in the context of similar ongoing operations, operations in occasional use airspace are not addressed in this EIS but are instead covered by NEPA documents for the other airfields.

Ranges – The 188 WG's primary range is Razorback Range, encompassed by Restricted Area (R-) 2401 and R-2402; it is 15 nautical miles (NM) to the center point of the range from Fort Smith. R-2401A and R-2402A/B/C are scheduled by the 188 WG through Fort Chaffee (U.S. Army). The Arkansas Army National Guard owns R-2401A/B and R-2402A. The Arkansas Air National Guard (ARANG) owns R-2402B/C. The Arkansas Army National Guard (Fort Chaffee Range Control) schedules the Restricted Airspace surrounding Razorback Range via an agreement. The 188 WG coordinates the airspace for that training with the Arkansas Army National Guard on an everyday basis. Razorback Range includes conventional (a bomb circle and strafe pits) and tactical targets. Razorback Range is seamlessly integrated with the Hog MOA. Full-scale inert weapons are authorized, including precision-guided munitions. Additional targets are available for use on the conjoined Fort Chaffee live-artillery impact area. The range is certified for day and night operations and the use of combat lasers. Razorback and the Fort Chaffee live-artillery impact area are considered the primary ranges to be utilized by FMS PTC aircraft for purposes of analysis. Some ranges are managed by other Department of Defense (DoD) commands, which receive priority scheduling for their training purposes and may be used on an occasional basis for FMS PTC training. Occasional use of ranges, such as ranges associated with Fort Polk, Louisiana, would be similar to regularly occurring operations by local and other transient units and are not addressed in this EIS.

Operations – The following provides information regarding aircraft operations under the Preferred Alternative.

Table 2.2-1 lists the current and proposed civilian, transient, and military aircraft operations at FSRA. Operations at the FSRA include a contractor-based adversary aircraft service firm, Blue

[12] IFR implies that the flight may operate in cloudy or otherwise adverse weather conditions using instruments only.

Air, that started in 2022. Blue Air provides support to the U.S. Army in the region, including the Hog MOAs.

Table 2.2-1. Current and Proposed Aircraft Operations at Fort Smith Regional Airport, Arkansas [(a)]

Aircraft Operation Type	Current (2019)	No Action (2029)		Proposed (2029)	
		Ops	% Change Over Current	Ops	% Change Over No Action
Civilian Aircraft	26,545	28,321	6.69%	28,321	0%
Transient Military Aircraft	7,921	9,006	13.70%	9,006	0%
Blue Air Aircraft	0	948	100.00%	948	0%
Proposed FMS/RSAF F-35	0	0	0%	14,004	100%
Proposed RSAF F-16	0	0	0%	11,700	100%
Total Aircraft Operations	**34,466**	**38,275**	**11.05%**	**63,979**	**67.16%**

Sources: (AETC, 2021–2022; Garver, 2022)
Key: % = percent; EA = Environmental Assessment; FMS = Foreign Military Sales; Ops = operations; RSAF = Republic of Singapore Air Force
Note:
a. Current data from Final Runway Extension EA Appendix D Table 2 (Garver, 2022)

Table 2.2-2 shows the current and Preferred Alternative airspace altitudes, supersonic authorization, and aircraft operations for Ebbing ANG Base (and FSRA). FMS and RSAF aircraft would conduct missions and training programs necessary to fulfill their multi-role responsibilities. Due to their enhanced capabilities and based on individual mission scenarios, current aircraft and FMS/RSAF using the Hog and Shirley MOAs/ATCAAs would activate multiple contiguous SUA units rather than individual components, such as a single MOA. For example, pilots may schedule and use two or more MOAs and their overlying ATCAAs for one training activity. "Other" non-FMS related DoD aircraft that may use the airspace include, but are not limited to, of F-18s, B-52s, C-17s, and various helicopters.

The differences in utilization of the existing airspace include use of higher altitudes overall, combined use of existing airspace, and generally higher altitudes for supersonic flights that occur. The F-35s would be expected to fly more of the time at higher altitudes, operating more than 90 percent of the time above 10,000 feet mean sea level (MSL), with the remaining 10 percent distributed between 500 feet above ground level (AGL) to 10,000 feet MSL, depending on the training activity as identified in **Table 2.2-1**. This would result in the F-35 aircraft conducting most of their operations in the ATCAAs and higher altitude regimes of the airspace. The proposed 4,190 F-35 operations equate to about 3,276 hours annually, or 12.6 hours per day. Regardless of the altitude structure and percent use, FMS and RSAF aircraft (as do existing military aircraft) would adhere to all established floors and ceilings of airspace units.

In addition to MOAs, ATCAAs, and Restricted Areas, low-level MTRs would be used in F-35 training events. **Table 2.2-3** lists the current and total proposed sortie-operations on the MTRs to be used by FMS F-35s and RSAF F-16s and other military aircraft.

Table 2.2-4 identifies the current and Preferred Alternative night operations for Ebbing ANG Base and FSRA.

Table 2.2-2. Current and Proposed Airspace Altitudes, Supersonic Activity, and Operations (Preferred Alternative – Ebbing ANG Base)

Airspace Unit	Floor (feet MSL) [a]	Ceiling (feet MSL)	Supersonic Conducted (Y/N)	Current Airspace Operations	Blue Air	Proposed FMS F-35 Airspace Operations	Proposed RSAF F-16 Airspace Operations	Proposed Total Airspace Operations
Hog A MOA	100 feet AGL	To BNI 18,000	N	1,476	431	1,983	1,160	6,976
Hog A ATCAA	18,000	29,000	Y, above FL 300					
Hog B MOA	100 feet AGL excluding below 6,000 west of line running roughly north-south through center of MOA [b]	To BNI 18,000	N					
Hog B ATCAA	18,000	29,000	Y, above FL 300					
R-2401A/B (Razorback Range)	Surface	30,000	N	1,926				
R-2402 A/B/C (Razorback Range)	Surface	30,000	N					
Shirley A MOA	11,000	To BNI 18,000	N	427	0	2,207	1,340	4,925
Shirley B MOA	11,000	To BNI 18,000	N	307				
Shirley C MOA	11,000	To BNI 18,000	N	79				
Shirley ATCAA	18,000	29,000	Y, above FL 300	565				

Source: (AETC, 2021–2022)

Key: AGL = above ground level; ANG = Air National Guard; ATCAA = Air Traffic Control Assigned Airspace; BNI = but not including (all MOAs extend to 18,000 feet MSL unless otherwise noted); FL = Flight Level; MOA = Military Operations Area; MSL = mean sea level; N = no; R- = Restricted Area; SUA = Special Use Airspace; Y = yes

Note:

a. MSL is the elevation (on the ground) or altitude (in the air) of an object, relative to the average sea level. The elevation of a mountain, for example, is marked by its highest point and is typically illustrated as a small circle on a topographic map with the MSL height shown in either feet or meters or both. Because aircraft fly across vast landscapes, where points above the ground can and do vary, MSL is used to denote the "plane" on which the floors and ceilings of SUA are established and the altitude at which aircraft must operate within that SUA.

b. Hog B MOA excludes areas west of a line running roughly-north to south from 34 degrees 40 minutes 58 seconds north of the equator and 95 degrees 50 minutes 18 seconds west of the prime meridian to 34 degrees 22 minutes 30 seconds north of the equator and 94 degrees 0 minutes 1 second west of the prime meridian at altitudes up to 6,000 feet MSL.

Table 2.2-3. Current and Proposed Total Proposed Military Training Route Use (Preferred Alternative – Ebbing ANG Base)

MTR	Min/Max Altitudes	Min/Max Width	Aircraft Type [a]	Current Annual Sortie - Operations	Total Projected Annual Sortie-Operations
VR189	500 feet AGL/ 5,000 feet MSL	5 NM each side of centerline	F-35	0	8
			F-16	0	30
			Others	86	86
			Total	**86**	**124**
VR1102	100 feet AGL/ 1,500 feet MSL	3 to 8 NM each side of centerline	F-35	0	2
			F-16	0	10
			Others	4	4
			Total	**4**	**16**
VR1103	100 feet AGL/ 1,500 feet MSL	2 to 8 NM each side of centerline	F-35	0	2
			F-16	0	30
			Others	40	40
			Total	**40**	**72**
VR1104	100 feet AGL/ 1,500 feet MSL	3 to 8 NM each side of centerline	F-35	0	2
			F-16	0	20
			Others	11	11
			Total	**11**	**33**
VR1113	Surface to 1,000 feet AGL/1,500 MSL	2 to 10 NM each side of centerline	F-35	0	6
			F-16	0	20
			Others	51	51
			Total	**51**	**77**
VR1130	500 to 1,000 feet AGL/1,500 feet MSL	2 to 5 NM each side of centerline	F-35	0	4
			F-16	0	20
			Others	12	12
			Total	**12**	**36**
IR117	Surface to 500 feet AGL/4,000 feet MSL	2 to 10 NM each side of centerline	F-35	0	4
			F-16	0	20
			Others	76	76
			Total	**76**	**100**
IR120	100 to 1,000 feet AGL/5,000 feet MSL	3 to 8 NM each side of centerline	F-35	0	2
			F-16	0	10
			Others	0	0
			Total	**0**	**12**
IR121	100 feet AGL/4,000 feet MSL	2 to 8 NM each side of centerline	F-35	0	2
			F-16	0	30
			Others	588	588
			Total	**588**	**620**
IR164	100 feet AGL/4,000 feet MSL	3 to 8 NM either side of centerline	F-35	0	8
			F-16	0	20
			Others	0	0
			Total	**0**	**28**

Key: AGL = above ground level; ANG = Air National Guard; Max = maximum; Min = minimum; MSL = mean sea level; MTR = Military Training Route; N = no; NM = nautical miles; Y = yes
Source: (BRRC, 2022a)
Note:
a. "Others" includes F-18, Cessna 182, C-130J, T-1, T-38, and similar aircraft types.

Table 2.2-4. Current and Proposed Night Operations at Ebbing ANG Base (Preferred Alternative) and FSRA

Operations	Percent Operations After 10:00 p.m. and Prior to 7:00 a.m.				Percent Change (Airfield/Airspace)
	Current/No Action		Proposed (CY 2029)		
	Airfield	Airspace	Airfield	Airspace	
Civilian Operations	4%	-	4%	-	0.0/0.0 %
Military Operations	2%	2%	4%	2.3%	2.0/0.3 %
Total Operations	**4%**	**2%**	**4%**	**2.3%**	**0.0/0.3 %**

Source: (AETC, 2021–2022)
Key: % = percent; CY = calendar year

Chaff and Flare Use – Flares are expected to be regularly expended by F-16s and F-35s during missions conducted at the FMS PTC, to include during night missions; chaff would only be expended by F-16s. This applies to all 188 WG–owned airspace (the Hog MOA/ATCAA, Shirley MOA/ATCAA, and restricted airspace around Razorback Range). Chaff and flares are currently authorized in all this airspace, with certain restrictions. The Hog A MOA and Hog B MOA allow for flares above 2,000 feet AGL and above 6,000 feet MSL in the Hog B MOA. In the Shirley MOA, use of flares is allowed above 11,000 feet MSL. RR-188 chaff is authorized in both the Hog and Shirley MOAs/ATCAAs and in R-2401A and R-2402A/B/C. Restricted airspace above/surrounding Razorback Range (R-2401A/B and R-2402A/B/C) allows for flares above 1,000 feet AGL when "Fire Danger Low" conditions are in place. When "Fire Danger Mod" conditions exist, use must be above 2,000 feet AGL. Based on data from the past 8 years for the Hog and Shirley MOAs/ATCAAs, annual countermeasure use averages 12,716 flares and 9,185 chaff cartridges. Countermeasure use in the restricted airspace above Razorback Range (R-2401A and R-2402A) averages 7,004 flares and 3,058 chaff cartridges. While these amounts are primarily associated with fighter aircraft, other aircraft may dispense countermeasures during operations and exercises, including illumination flares. **Table 2.2-5** lists countermeasures expected to be expended by F-16s and F-35s during missions conducted at the FMS PTC, including night missions.

Table 2.2-5. Proposed Munitions and Countermeasure Use (Preferred Alternative – Ebbing ANG Base)

Munition Type	Projected Annual FMS F-35 Usage		Projected Annual RSAF F-16 Usage	Range Permitted
	FMS FTU	RSAF		
GBU-12 (FSWD) [a]	48 (Inert)	16 (Live) [a]	16	Fort Polk, LA
GBU-31 (FSWD)	48 (Inert)	34 (Inert)	34	R-2401/2402
BDU-33			500	R-2401/2402
BDU-50/56			16/16	R-2401/2402
20-millimeter TP (PGU-27 and M56)			15,000	R-2401/2402
25-millimeter TP (PGU-23)	13,000	15,000		R-2401/2402
RR-188 Training Chaff			30,000	Authorized Airspace
M-206 and MJU-7/B Training Flares			7,000	Authorized Airspace
MJU-61/B Training Flares	8,000	7,000		Authorized Airspace

Source: (AETC, 2021–2022)
Key: ANG = Air National Guard; BDU = Bomb Dummy Unit; FMS = Foreign Military Sales; FTU = Formal Training Unit; GBU = Guided Bomb Unit; LA = Louisiana; MJU = Mobile Jettison Unit; PGU = Precision Guided Unit; R- = Restricted Area; RR = Radar Reflective; RSAF = Republic of Singapore Air Force; TP = Training Practice; FSWD = Full Scale Weapons Delivery
Note: Noise analysis is presented in Section 3.3.4, *Noise, Preferred Alternative Environmental Consequences*.
a. It is expected that any live-fire training would be conducted during formal training exercises conducted remotely from Ebbing ANG Base.

Munitions – Razorback Range (R-2401/2402) contains varied target sets for supporting laser and air-to-ground weapons training. Live weapons are not permitted in the Razorback Range. It is expected that any live-fire training would be conducted during formal training exercises conducted remotely from Ebbing ANG Base. Munitions expected to be expended by F-16s and F-35s during missions conducted at the FMS PTC, to include during night missions, are listed in **Table 2.2-5**.

2.2.2 Personnel/Manpower

Under the Preferred Alternative, there would be an overall increase in personnel at Ebbing ANG Base. The increase of personnel related to the FMS PTC beddown and associated range support is still being determined based on the total aircraft on base at any one time. **Table 2.2-6** provides the manpower estimates for operations, maintenance, and maintenance training system requirements for the FMS PTC beddown.

Table 2.2-6. Anticipated Proposed Increase in Number of Personnel at Ebbing ANG Base (Preferred Alternative)

Mission	Proposed			Total	Ebbing ANG Base Current Personnel	Ebbing ANG Base Percent Change Personnel
	Type Personnel	Personnel	Dependents			
F-16/F-35	Security Forces	24	72	1,185	1,281	~30%
F-16	DAF	5	15			
F-16	DAF Civilian	91	180			
F-16	RSAF Pilots/MX	180	300			
F-35	DAF	16	30			
F-35	Contractor MX	60	180			
F-35/F-16	Medical	8	24			
Total		**384**	**801**			

Source: (AETC, 2021–2022)
Key: ~ = approximately; % = percent; ANG = Air National Guard; DAF = Department of the Air Force; MX = maintenance; RSAF = Republic of Singapore Air Force

2.2.3 Facility Requirements

FMS PTC facilities under the Preferred Alternative at Ebbing ANG Base would be developed near Ramp 1. The planned layout of facilities that are being considered for use is provided in **Figure 2.2-3**. Renovations to existing facilities, changes in facility use, and new facilities would all be required to support the FMS mission. The existing ramp condition is suitable to support a low aircraft intake with considerations for Foreign Object Damage Prevention. All runways are tested every 5 years, with an Airfield Pavement Condition Report generated. RWY 07-25 is 8,017 feet by 150 feet, with a 1,000-foot overrun located on both runway ends and a grooved, asphalt surface. The previously installed barrier arresting kit, or BAK-14 arresting barrier, has been removed. An arresting barrier is required for both F-35 and F-16 operations, and the BAK-12 arresting barrier is the only system currently approved for both types of aircraft. Therefore, a BAK-12 would be installed until other barriers are approved for both aircraft types. RWY 01/19 is 5,001 feet by 150 feet, with a grooved, asphalt surface.

Total ramp space available is 672,867 square feet, with Ramp 1 (Main) comprising 468,576 square feet. Ramp 2, also referred to as Contingency Deployment Parking, is 204,291 square feet. Ramp 2 was the traditional overflow or contingency ramp for aircraft for the former 188 WG and allows parking for 18 uncovered aircraft.

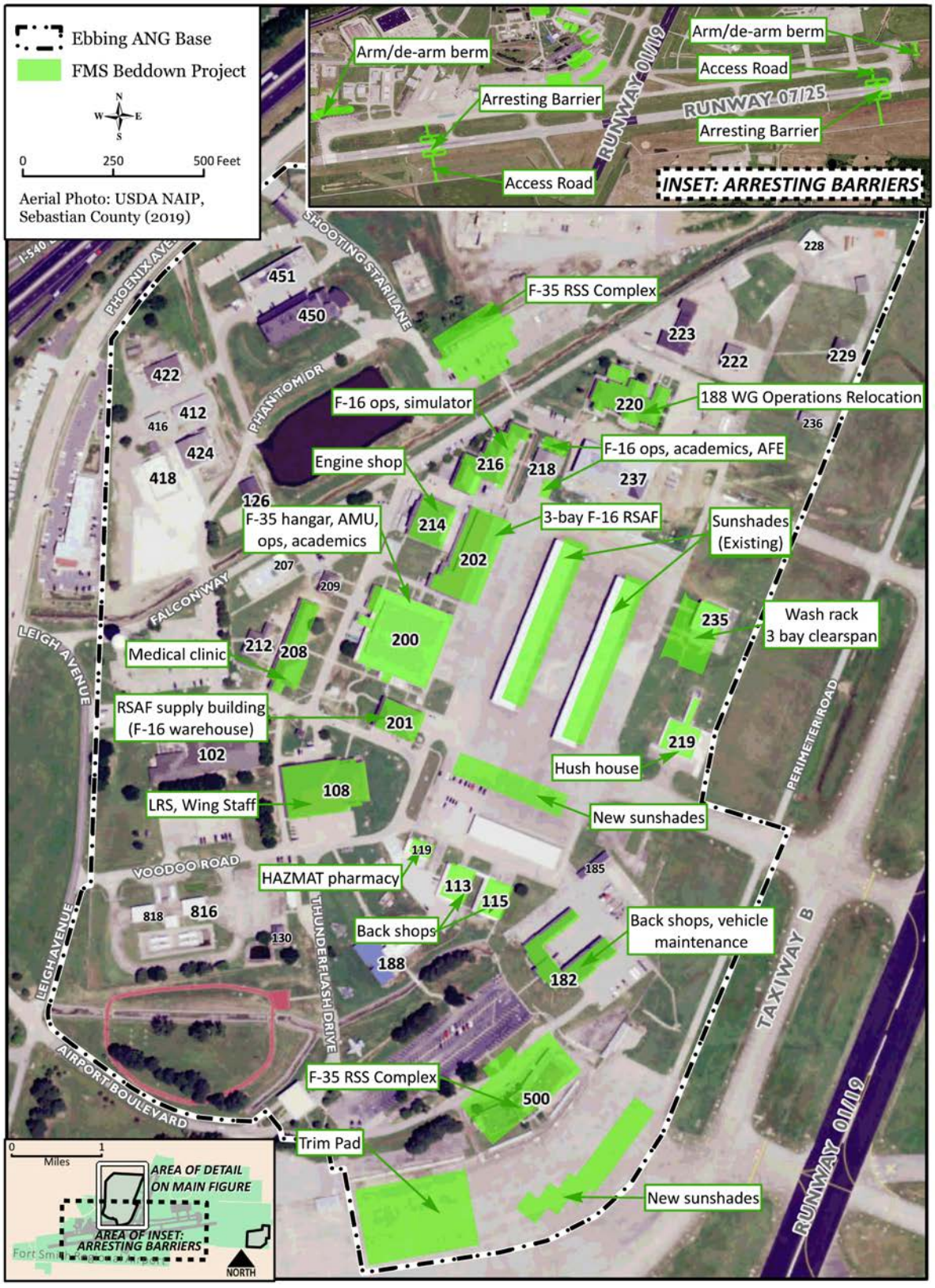

Figure 2.2-3. Preferred Alternative Planned Facility Layout (Ebbing ANG Base)

Sources: (Ebbing ANG Base, 2021; USDA-FSA-APFO, National Agriculture Imagery Program, Sebastian County, AR, 2019a)

Because Fort Smith hosted several flight operations over the last decade, adequate facilities are available with some required renovation or reconfiguration of space. New construction requires a four-to-eight-bay F-35 flight simulator training facility. A DAF strategic basing team determined that addition of a newly built facility would be more efficient than reconfiguring an existing facility, due to specialized communication and heating, ventilation, and air conditioning (HVAC) requirements. Construction of an up to 50,000-square foot F-35 simulator training facility is proposed south of Building 182. Construction would likely be phased to allow facility space as required. Alteration/additions to the north side of Building 216 would involve construction of a small F-16 simulator and an additional F-35 simulator training facility to accommodate the RSAF's permanent training presence at Ebbing Field.

Table 2.2-7 provides the approximate square footage and level of renovation required for each project considered in the Preferred Alternative at Ebbing ANG Base.

Table 2.2-7. Proposed Construction and Renovation Projects at Ebbing ANG Base (Preferred Alternative)

Fort Smith Building Number	Proposed Use	Required Facility Square Footage	Description	Total Area of New Ground Disturbance (Square Feet)	New Impervious Surface (Square Feet)
108	LRS	28,923	Interior renovations only	0	0
119	Hazardous Storage facility (HAZMART)	2,400	Interior renovations only – restore LOX facilities to include liquid nitrogen	0	0
182	Back shops, vehicle maintenance	15,872	AGE – interior renovations only (return to original use)	0	0
113/115	Back shops	13,440	Back shop – interior renovations only (return to original use)	0	0
Communications, HVAC, and electrical upgrade				0	0
200	F-35 hangar, AMU, ops, academics	60,514	Full interior and exterior renovation of hanger (utilities, electrical, communications, roof, security upgrade) – hydrazine canister storage	0	0
201	Supply building (F-16 warehouse)	9,545	Interior renovations only – from fire department use to warehouse	0	0
202	3-bay hangar	29,087	Hangar – interior renovation only (return to original use)	0	0
208	Medical clinic	Add 2,750	Add/alter construction – communications and medical	2,750	2,750
214	Engine shop	12,200	Interior renovation (return to original use)	0	0
216	F-16 ops, F-16 simulator, F-35 simulator training complex	16,824	Interior renovation	0	0
218	F-16 ops, academics, AFE	8,000	Additions to Building 218	8,000	8,000
219	Hush house	2,600	New door – interior/exterior renovation	0	0

Table 2.2-7. Proposed Construction and Renovation Projects at Ebbing ANG Base (Preferred Alternative)

Fort Smith Building Number	Proposed Use	Required Facility Square Footage	Description	Total Area of New Ground Disturbance (Square Feet)	New Impervious Surface (Square Feet)
New build/500	F-35 RSS Complex	Up to 100,000	Partial RSS or new construction or a combination of both to accommodate simulators and training	100,000	100,000
Sunshades	F-16 existing	9 spots	Electrical upgrades to align with solar photovoltaic system	0	0
Sunshades	F-35 existing	9 spots	Electrical upgrades to align with solar photovoltaic system	0	0
Sunshades	F-35 new	13 spots	New construction to allow appropriate distance	0	0
Arresting barrier & access road	F-35/F-16	N/A	New pit installation at both ends of runway	50,000	50,000
F-16 trim pad		N/A	Include blast deflector	0	0
Arm/de-arm berm (pads in place)		N/A	Addition of soil to create berm	Up to 1,000	Up to 1,000
Wash rack 3-bay ClearSpan		40.000	New construction	Up to 40,000	Up to 40,000
220	Mission communications	5,000	Renovation for 188 Operations relocation	0	0
108	Wing staff	5,000	Add/alter for 15 personnel – chaplain, Inspector General, Safety, SARC, ADC, PHA	6,250	6,250
New build	RSAF F-35	Up to 50,000	Simulators and Training	42,000	42,000

Source: (AETC, 2021–2022)

Key: ADC = Area Defense Council; AFE = aircrew flight equipment; AGE = aerospace ground equipment; AMU = Aircraft Maintenance Unit; ANG = Air National Guard; HAZMAT = hazardous materials; HVAC = heating, ventilation, and air conditioning; LOX = liquid oxygen; LRS = Logistics Readiness Squadron; N/A = not applicable; ops = operations; PHA = Periodic Health Assessment; RSS = relocatable simulation shelter; SARC = Sexual Assault Response Coordinator

The buildings identified in **Table 2.2-7** are described below.

- **Building 108:** Building 108 is currently used for the Logistics Readiness Squadron. It contains 32,369 square feet and was constructed in 1980. The facility contains warehouse space of 23,037 square feet, shed space of 2,000 square feet, and open space of 7,332 square feet.
- **Buildings 113 and 115:** Building 113 was built in 1972 and Building 115 was built in 1976. These facilities contain several maintenance functions—airframe/power plant/general, avionics, weapons, tool crib, alternate mission equipment, maintenance, storage, and aerospace ground equipment (AGE).
- **Building 119:** Building 119 contains 2,400 square feet and was built in 1987. This facility is the current Hazardous Storage facility (HAZMART).

- **Building 182:** Building 182 contains 9,500 square feet and was built in 2007. This facility is an AGE/vehicle maintenance facility with areas usable for vehicle maintenance, a heated vehicle parking shed, a refueling vehicle shop (R-11), vehicle maintenance, precision measurement equipment laboratory, AGE/support equipment, a six-vehicle-bay shop, covered storage, and open storage.
- **Building 200:** Building 200 is a two-story hangar containing 60,514 total square feet that was built in 1955 and remodeled in 2008. The first floor area is 25,514 square feet and has a large aircraft maintenance dock capable of parking five F-35s. The hangar floor is certified for aircraft weight and balance operations. Upgrades included geothermal HVAC, aircraft electrical power, compressed air, and a fire suppression system. The aqueous film-forming foam fire suppression system would be upgraded in the future. The second floor is 18,958 square feet and available for classrooms and maintenance administration.
- **Building 202:** Building 202 is a three-bay hangar containing 29,087 square feet and was built in 2009. This facility would be used for RSAF F-16s and has room to park three F-16s. All bays are alternate aircraft maintenance use areas and certified for aircraft weight and balance operations. The space contains a fuel cell maintenance area of 8,514 square feet, a corrosion control area of 8,142 square feet, and a weapons load area of 7,209 square feet.
- **Building 208:** This building is the existing medical clinic and is proposed for 2,750 square feet of additional construction to accommodate increased communications and medical support.
- **Building 214:** Building 214 contains 12,200 square feet. It was built in 1974 and is designed as an engine shop. The space includes an administrative office, bearing room, tool room, classroom, and breakroom. This facility has an overhead hoist and an area for equipment maintenance.
- **Building 216:** Building 216 contains 16,824 square feet and was built in 1978. This facility previously held an F-16 simulator and could serve as an F-16 simulator facility for the RSAF This building would be renovated to accommodate an F-16 simulator.
- **Building 218:** Building 218 contains 8,000 square feet of space and was built in 1982. It is designed as an operations facility. Building 218 is proposed for an additional 8,000 square feet of F-16–related facility additions.
- **Building 219:** Building 219 contains 2,600 square feet of space and was built in 1982. This facility is an aircraft engine-run noise suppressor, commonly referred to as a hush house. It is designed for aircraft engine test runs as a non-destructive inspection alternate location and an alternate aircraft maintenance area. Required renovation includes a new door.
- **Building 220:** Building 220 is 19,862 square feet and was built in 1975.

Twenty-four sunshade covered parking spaces currently exist in the Ramp 1 area. Eighteen (three 3-bay) sunshade spaces are currently in place and can be reused for F-16 or F-35 aircraft parking. Nine covered spaces (three 3-bay) do not allow parking of F-35s because they do not meet aircraft separation requirements. Removal and replacement with three F-35 three-bay sunshades would ensure the Ramp 1 area is configured in accordance with separation requirements for all aircraft. Eighteen of the F-35-designated covered spaces would use Wi-Fi–connected Autonomic Logistics Information System communication kiosks, thereby reducing the need for underground connections. Electrical power for sunshades would be part of a

planned solar array addition (**Figure 2.2-3**). Staging areas would be utilized for materials and equipment; the exact location of staging areas has yet to be determined. However, previously disturbed areas or areas already paved would be utilized to the greatest extent possible.

2.3 ALTERNATIVE 2: SELFRIDGE ANG BASE

The DAF has designated Selfridge ANG Base, Michigan, as a reasonable alternative to the Preferred Alternative. This alternative would include beddown of F-35 FMS training for foreign nations and beddown of the RSAF F-16 squadron from Luke AFB, Arizona. The FMS PTC at Selfridge ANG Base would be able to accommodate up to 36 aircraft (up to 24 F-35s and 12 F-16s) with infrastructure to meet requirements. Facility construction and upgrades would include the modification and renovation of several buildings, construction of two F-35 simulator facilities, and new sunshades. All flight operations would take place within existing airspace. No additions to, or alterations of, airspace are associated with this alternative. Aircraft, aircraft operations, personnel, and facility requirements are described in the following subsections (Section 2.3.1, *Alternative 2 Aircraft Operations*, through Section 2.3.3, *Alternative 2 Facility Requirements*).

2.3.1 Aircraft Operations

Airfield – Selfridge ANG Base has one runway (RWY 1/19, 9,000 by 150 feet) without an aircraft arresting system (**Figure 2.3-1**). Barriers are required for F-16 and F-35 operations and would need to be installed. Flying operations for both the F-16 and F-35 training would need to deconflict with U.S. Coast Guard, Department of Homeland Security, Army National Guard, and ANG A-10 and KC-135 aircraft operations located at Selfridge ANG Base. There is no civilian air traffic with which to deconflict at Selfridge ANG Base. There is sufficient ramp space for both the RSAF F-16 and the F-35As and F-35Bs of multiple countries. Thirty-six open parking spots are readily available for the F-16s and F-35s. The Selfridge ANG airfield is considered the primary use location, similar to that described under the Preferred Alternative in Section 2.2, *Preferred Alternative Aircraft Operations*. Occasional use of other airfields as part of training activities is not addressed in this EIS. Within the Selfridge ANG Base airfield southern Clear Zone, a zone where no occupied uses should occur, there are 23 acres of incompatible residential development.

Airspace – No new airspace or airspace adjustments would be required under Alternative 2. Selfridge ANG Base utilizes four overland/water MOAs/ATCAAs and two weapons delivery (restricted area) ranges for daily training operations as depicted in **Figure 2.3-2**. The 127th Wing (127 WG) primarily uses the Michigan ANG Alpena Combat Readiness Training Center (CRTC) airspace (approximately 100 by 180 NM). The airspace includes Steelhead, Pike East, Pike West, and Grayling (temporary) MOAs, two range complexes (R-4201A/B and R-4207), and numerous air-to-air refueling tracks and locally coordinated. Additionally, the Lumberjack, Firebird, Steelhead, and Garland ATCAAs expand the altitude available in the overall Alpena area. Lumberjack and Firebird ATCAAs all have ceilings of FL 500, and the Alpena SUA Complex does have the ability and procedures to schedule and receive FAA approvals to activate those ATCAA extensions up to FL 500. MOA/Restricted Area altitude floors are between surface and 6,000 feet MSL, while the upper altitude limits of the ATCAAs/R-4207 are between FL 250 and FL 450. Expenditure of chaff and flares and supersonic speeds above FL 300 over water are authorized, depending on the area, and conducted in accordance with Air Force Instructions (AFIs).

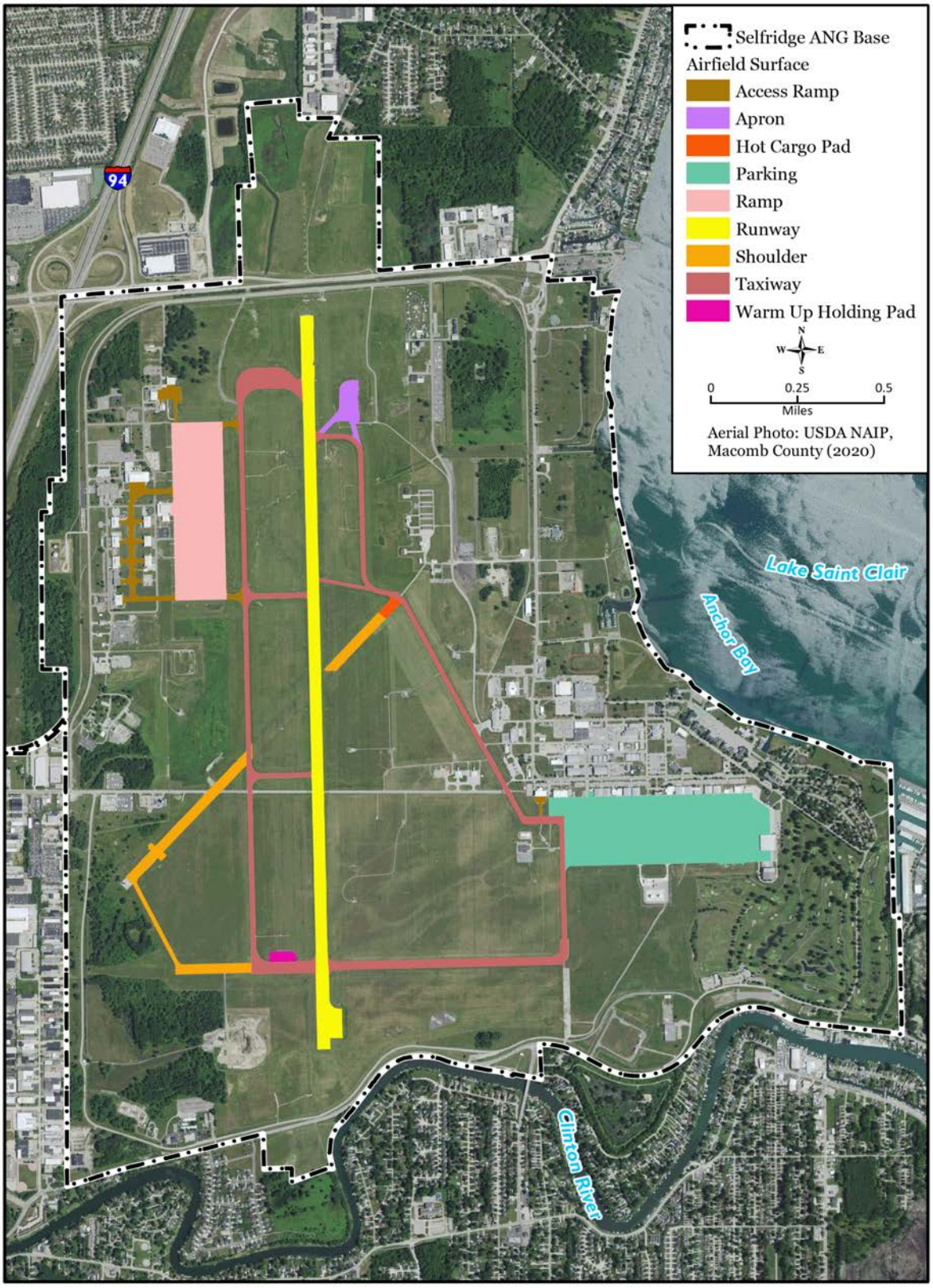

Figure 2.3-1. Selfridge ANG Base Airfield Surface Map

Sources: (Selfridge ANG Base, 2021; USGS, 2020; ESRI Data & Maps, 2019a)

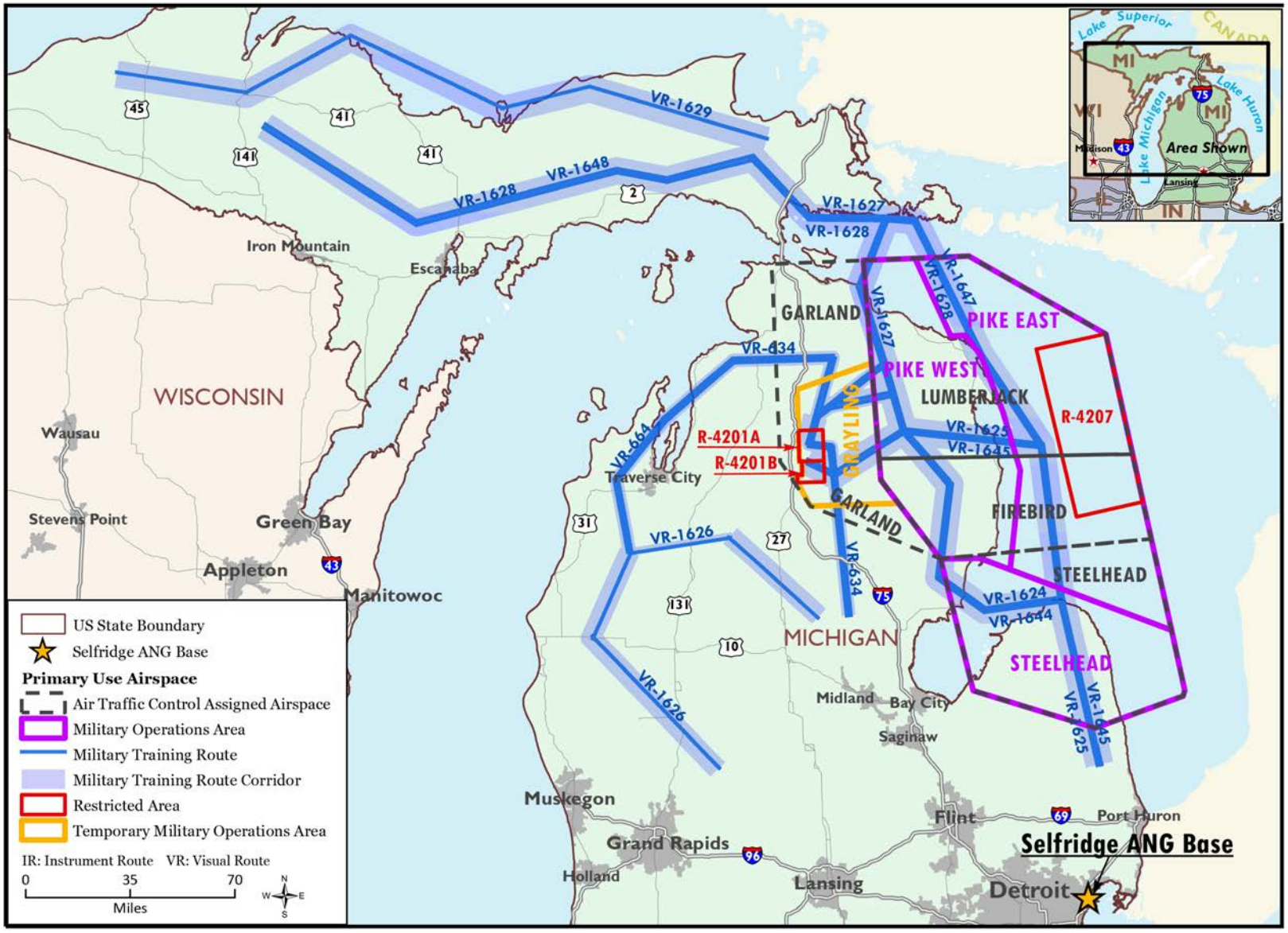

Figure 2.3-2. Selfridge ANG Base Operational Airspace and Ranges

Sources: (ESRI Data & Maps, 2019a; ESRI Data & Maps, 2019c; USCB, 2018a; FAA, 2021a; FAA, 2021b)

The CRTC airspace is scheduled by the Michigan ANG, ensuring availability of this airspace for the 127 WG. The airspace is also fully instrumented (air combat maneuvering instrumentation using multiple sensor types) with live Range Training Officer capability. The Alpena SUA Complex also has Joint Threat Emitters continually in place below the airspace complex. Overwater airspace is generally not useable during the winter months due to cold weather and/or rescue capability. Michigan's SUA complex is located within the National All Domain Warfighting Center (NADWC). The NADWC hosts multiple events/exercises each year, including the largest joint exercise in the reserve component—Northern Strike. Exercise Northern Strike occurs annually and is focused on advanced, contested, all-domain training. As a leader in developing agile combat employment concepts for the DAF, the NADWC hosts Agile Rage exercises within the Michigan SUA complex. Additionally, the Alpena CRTC is a Joint Staff (J7) Joint National Training Capability (JNTC) Certified Training site.

Primary training activities would consist of those as described in **Table 2.1-1**. The airspaces described above constitute the primary airspace units that would be utilized by FMS PTC aircraft, similar to that described for the Preferred Alternative in Section 2.2. While the majority of FMS PTC training operations would occur in the primary use airspace, FMS PTC aircraft training would not be limited to using only those areas. The FMS PTC aircraft may conduct operations in any other training airspaces within the nation (e.g., airspace associated with Nellis AFB, Nevada) on an occasional basis. Occasional use of other airspace units would be similar to regularly occurring operations at these locations by locally based and other transient aircraft. Because occasional use by FMS PTC aircraft would not be a substantive departure from ongoing usage, occasional use training activities are not addressed in this EIS.

Ranges – Selfridge ANG Base flying operations use the Alpena SUA Complex for close air support training. Joint Tactical Air Controller (JTAC) support is provided by one assigned instructor/evaluator, as well as U.S. Services and foreign partners training at Alpena/Grayling Range. Ranges located within the Alpena airspace are R-4201A/B (Grayling Range) and R-4207 (Upper Lake Huron), both approximately 150 NM from Selfridge ANG Base. R-4201A/B has scoring systems and impact areas for live weapons up to 500 pounds and inert weapons such as the Guided Bomb Unit (GBU)-10/12/31 and strafe. Due to the relatively small size of R-4201A/B (approximately 7 by 15 NM), delivery parameters for precision-guided munitions are artificially constrained in heading and delivery altitudes. R-4201A/B is F-35 and F-16 with targeting pod laser operations certified. Additionally, R-4201A/B provides access to JTACs and coordinated attacks with the ANG Artillery Range and is in close proximity to multiple target areas. R-4207 is an overwater range (20 by 50 NM) located in the Alpena airspace and is approved for inert ordnance only. Floating targets are available to be placed on the surface of R-4207 in appropriate designated impact areas. Munitions authorized are the same as on the R-4201A/B range, such as the GBU-10/12/31 and laser-guided Joint Direct Attack Munition (JDAM).

The ranges described above constitute the primary ranges that would be utilized by FMS PTC aircraft, similar to that described for the Preferred Alternative in Section 2.2, *Aircraft Operations*. Occasional use of other DoD ranges (e.g., Nevada Test and Training Range, Mountain Home AFB) as part of training activities could occur anywhere and is not addressed in this EIS but are instead covered by NEPA documents for the other airfields.

Operations – The following provides information regarding aircraft operations under Alternative 2. **Table 2.3-1** lists the current and projected No Action Alternative (as of CY 2029) annual aircraft operations at Selfridge ANG Base, as well as the proposed Alternative 2 annual aircraft

operations associated with the proposed beddown. Projected annual aircraft operations at Selfridge ANG Base under the No Action Alternative are anticipated to be the same as current annual aircraft operations.

Table 2.3-1. Current, No Action Alternative, and Alternative 2 Aircraft Operations at Selfridge ANG Base

Aircraft Type	Current (2020) and No Action Projected (2029) Annual Aircraft Operations	Alternative 2 Annual Aircraft Operations	% Increase From Current Operations
A-10	4,280	4,280	0%
KC-135	2,400	2,400	0%
Other military aircraft	13,575	13,575	0%
Transient Aircraft	536	536	0%
Proposed FMS/RSAF F-35	0	14,004	100%
Proposed RSAF F-16	0	11,700	100%
Total Aircraft Operations	**20,791**	**46,495**	**123.63%**

Source: (AETC, 2021–2022)
Key: % = percent; ANG = Air National Guard; FMS = Foreign Military Sales; RSAF =Republic of Singapore Air Force

Table 2.3-2 provides the airspace altitudes, supersonic authorization, and current and proposed operations for Selfridge ANG Base. FMS and RSAF aircraft would conduct missions and training programs necessary to fulfill their multi-role responsibilities. Due to their enhanced capabilities and based on individual mission scenarios, current aircraft and FMS/RSAF using the Selfridge airspace complex of MOAs/ATCAAs may activate multiple contiguous SUA units rather than individual components, such as a single MOA. For example, pilots may schedule and use two or more MOAs and their overlying ATCAAs for one training activity.

The differences in utilization of the existing airspace include use of higher altitudes overall, combined use of existing airspace, and generally higher altitudes for supersonic flights that occur. The F-35s would be expected to fly more of the time at higher altitudes, operating more than 90 percent of the time above 10,000 feet MSL, with the remaining 10 percent distributed between 500 feet AGL to 10,000 feet MSL, depending on the training activity as identified in **Table 2.3-1**. This would result in the F-35 aircraft conducting most of their operations in the ATCAAs and higher altitude regimes of the airspace. The proposed 4,128 F-35 operations equate to about 3,240 hours annually, or 12.5 hours per day. Regardless of the altitude structure and percent use, FMS and RSAF aircraft (as do existing military aircraft) would adhere to all established floors and ceilings of airspace units.

Table 2.3-2. Current and Alternative 2 Airspace Altitudes, Supersonic Activity, and Operations (Selfridge ANG Base)

Airspace Unit	Floor (Feet MSL) [(a)]	Ceiling (Feet MSL)	Supersonic Conducted (Y/N)	Current [(b)] Airspace Operations	FMS F-35 Airspace Operations	RSAF F-16 Airspace Operations	Proposed Total Airspace Operations
Pike East MOA	300 feet AGL	To BNI 18,000	Y, above FL 100 15 NM from shore	12,283	4,128	2,500	18,911
Pike West MOA	6,000	To BNI 18,000	N				
Steelhead MOA	6,000	To BNI 18,000	Y, above FL100 15 NM from shore				
Steelhead ATCAA	18,000	To BNI 35,000	Y, above FL 100 15 NM from shore				
R-4201A	Surface	23,000	N				

Table 2.3-2. Current and Alternative 2 Airspace Altitudes, Supersonic Activity, and Operations (Selfridge ANG Base)

Airspace Unit	Floor (Feet MSL) [(a)]	Ceiling (Feet MSL)	Supersonic Conducted (Y/N)	Current [(b)] Airspace Operations	FMS F-35 Airspace Operations	RSAF F-16 Airspace Operations	Proposed Total Airspace Operations
(Grayling Air-to-Ground Range)							
R-4201B (Grayling Air-to-Ground Range)	Surface	9,000	N				
R-4207	Surface	45,000	Y, above FL 100 15 NM from shore				
Firebird ATCAA	18,000	35,000	Y, above FL 300				
Garland ATCAA	18,000	27,000	N				
Grayling MOA	18,000	45,000	Y, above FL300				
Lumberjack ATCAA	18,000	35,000	Y, above FL300				

Source: (AETC, 2021–2022)

Key: AGL = above ground level; ANG = Air National Guard; ATCAA = Air Traffic Control Assigned Airspace; BNI = but not including (all MOAs extend to 18,000 feet MSL unless otherwise noted); EA = Environmental Assessment; FMS = Foreign Military Sales; MOA = Military Operations Area; MSL = mean sea level; N = no; NM = nautical miles; R- = Restricted Area; RSAF = Republic of Singapore Air Force; SUA = Special Use Airspace; Y = yes

Notes: a. MSL is the elevation (on the ground) or altitude (in the air) of an object, relative to the average sea level. The elevation of a mountain, for example, is marked by its highest point and is typically illustrated as a small circle on a topographic map with the MSL height shown in either feet or meters or both. Because aircraft fly across vast landscapes, where points above the ground can and do vary, MSL is used is denote the "plane" on which the floors and ceilings of SUA are established and the altitude at which aircraft must operate within that SUA.

b. Source: (Michigan ANG, 2021)

In addition to MOAs, ATCAAs, and Restricted Areas, low-level MTRs would be used in F-35 training events. **Table 2.3-3** lists the current and total proposed sortie-operations on the MTRs to be used by FMS F-35s and RSAF F-16s and other military aircraft.

Table 2.3-3. Current and Alternative 2 Military Training Route Use (Selfridge ANG Base)

MTR	Min/Max Altitudes	Min/Max Width	Aircraft Type	Current Annual Sortie - Operations	Total Projected Annual Sortie-Operations
VR634/VR664	500 feet AGL/1500–4000 feet MSL	2 NM either side of centerline	F-35	0	4
			F-16	12	58
			A-10	8	8
			Others	31	31
			Total	**51**	**101**
VR1624/VR1644	100–500 feet AGL/1500 feet MSL	2 to 4 NM either side of centerline	F-35	0	18
			F-16	10	107
			A-10	75	75
			Others	19	19
			Total	**104**	**219**
VR1625/VR1645	500 feet AGL/1500 feet MSL	4 NM either side of centerline	F-35	0	18
			F-16	0	10
			A-10	8	8
			Others	4	4
			Total	**12**	**40**
VR1626	Surface to 500 feet AGL/1500 feet MSL	1 to 3 NM either side of centerline	F-35	0	0
			F-16	0	6
			A-10	0	0

Table 2.3-3. Current and Alternative 2 Military Training Route Use (Selfridge ANG Base)

MTR	Min/Max Altitudes	Min/Max Width	Aircraft Type	Current Annual Sortie - Operations	Total Projected Annual Sortie-Operations
			Others	6	6
			Total	**6**	**12**
VR1627/VR1647	Surface to 500 feet AGL/1500 feet MSL	2 to 4 NM either side of centerline	F-35	0	0
			F-16	0	13
			A-10	3	3
			Others	11	11
			Total	**14**	**27**
VR1628/VR1648	100/500 feet AGL/1500 feet MSL	4 NM either side of centerline	F-35	0	0
			F-16	2	23
			A-10	0	0
			Others	23	23
			Total	**25**	**46**
VR1629	Surface/1500 feet MSL	4 NM either side of centerline	F-35	0	0
			F-16	0	15
			A-10	3	3
			Others	13	13
			Total	**16**	**31**

Source: (BRRC, 2022a)
Key: AGL = above ground level; ANG = Air National Guard; Max = maximum; Min = minimum; MSL = mean sea level; MTR = Military Training Route; NM = nautical miles

Table 2.3-4 identifies the current and Alternative 2 night operations at Selfridge ANG Base. Overall night operations would represent a lower percentage of operations with the beddown of the FMS PTC and the RSAF missions as compared with current levels.

Table 2.3-4. Alternative 2 Comparison of Current and Proposed Night Operations

Operations	Percent Operations After 10:00 p.m. and Prior to 7:00 a.m.				Percent Change (Airfield/Airspace)
	Current		Proposed (CY 2029)		
	Airfield	Airspace	Airfield	Airspace	
Military operations	7%	9%	5%	6%	-2%/-3%

Sources: (AETC, 2021–2022; BRRC, 2022a)
Key: - = minus; % = percent; CY = calendar year

Countermeasure (Chaff and Flare) Use – Flares are expected to be regularly expended by F-16s and F-35s during missions conducted at the FMS PTC, to include during night missions; chaff would only be expended by F-16s. Use of chaff and flares are permitted in all airspace units identified in **Figure 2.3-2**. Flares are not permitted to be released below 2,000 feet AGL over non-government-owned or -controlled property. Annual countermeasure use averages 7,900 flares and 5,103 chaff cartridges. Countermeasures expected to be utilized are listed in **Table** 2.3-5.

Munitions – Grayling Air-to-Ground Range (R-4201A/B) contains varied target sets for supporting laser and air-to-ground weapons training and is authorized for the use of 500-pound and GBU-12 munitions. Munitions expected to be expended by F-16s and F-35s during missions conducted at the FMS PTC, to include during night missions, are listed in **Table 2.3-5**. **Table** 2.3-5 summarizes the proposed munitions and countermeasure use for Alternative 2.

Table 2.3-5. Alternative 2 Munitions and Countermeasure Use (Selfridge ANG Base)

Munition Type	Projected Annual FMS F-35 Usage		Projected Annual RSAF F-16 Usage	Range Permitted
	FMS FTU	RSAF		
GBU-12 (FSWD)	48 (inert)	16 (live)	16 (inert)	R-4201A/B
GBU-31 (FSWD)	48 (inert)	34 (inert)	34 (inert)	R-4201A/B
BDU-33			500	R-4201A/B
BDU-50/56			16/16	R-4201A/B
20-millimeter TP			15,000	R-4201A/B
25-millimeter TP (PGU-23)	13,000	15,000		R-4201A/B
RR-188 Training Chaff			30,000	Authorized Airspace
M-206 and MJU-7/B Training Flares			7,000	Authorized Airspace
MJU-61/B Training Flares	8,000	7,000		Authorized Airspace

Source: (AETC, 2021–2022)
Key: ANG = Air National Guard; BDU= Bomb Dummy Unit; FMS = Foreign Military Sales; FTU= Formal Training Unit; GBU = Guided Bomb Unit; MJU = Mobile Jettison Unit; PGU = Precision Guided Unit; R- = Restricted Area; RR = Radar Reflective; RSAF = Republic of Singapore Air Force; TP = Training Practice; FSWD = Full Scale Weapons Delivery
Note: Noise analysis is presented in Section 4.3.4, *Alternative 2 Environmental Consequences*.

2.3.2 Personnel/Manpower

Under Alternative 2, there would be an overall increase in personnel at Selfridge ANG Base. The increase of personnel related to the FMS PTC beddown is still being determined based on the total aircraft on base at any one time. **Table 2.3-6** provides the manpower estimates for operations, maintenance, and maintenance training system requirements for the FMS PTC.

Table 2.3-6. Alternative 2 Increase in Number of Personnel at Selfridge ANG Base

Mission	Alternative 2			Total	Selfridge ANG Current Personnel	Selfridge ANG Base Percent Change Personnel
	Type Personnel	Personnel	Dependents			
F-16/F-35	Security Forces	24	72	1,185	1,927	~20%
F-16	DAF	5	15			
F-16	DAF Civilian	91	180			
F-16	RSAF Pilots/MX	180	300			
F-35	DAF	14–16	30			
F-35	Contractor MX	60	180			
F-35/F-16	Medical	8	24			
	Total	**384 [(a)]**	**801**			

Source: (AETC, 2021–2022)
Key: ~ = approximately; % = percent; ANG = Air National Guard; DAF = Department of the Air Force; MX = maintenance; RSAF = Republic of Singapore Air Force
Note: a. A small number of additional personnel would be required to support range activities. The exact number of personnel required for this support has not been determined.

2.3.3 Facility Requirements

The proposed development to support the FMS PTC under this alternative is to beddown the F-16 on the East Ramp and the F-35 on the West Ramp side of the base (**Figure 2.3-3**). Facilities renovations, changes in use of facilities, and construction of new facilities would be required in support of the FMS mission. **Figure 2.3-4** shows the proposed layout for the FMS PTC F-16 portion on the East Ramp side. **Figure 2.3-5** shows the proposed layout for the FMS PTC F-35 portion on the West Ramp side.

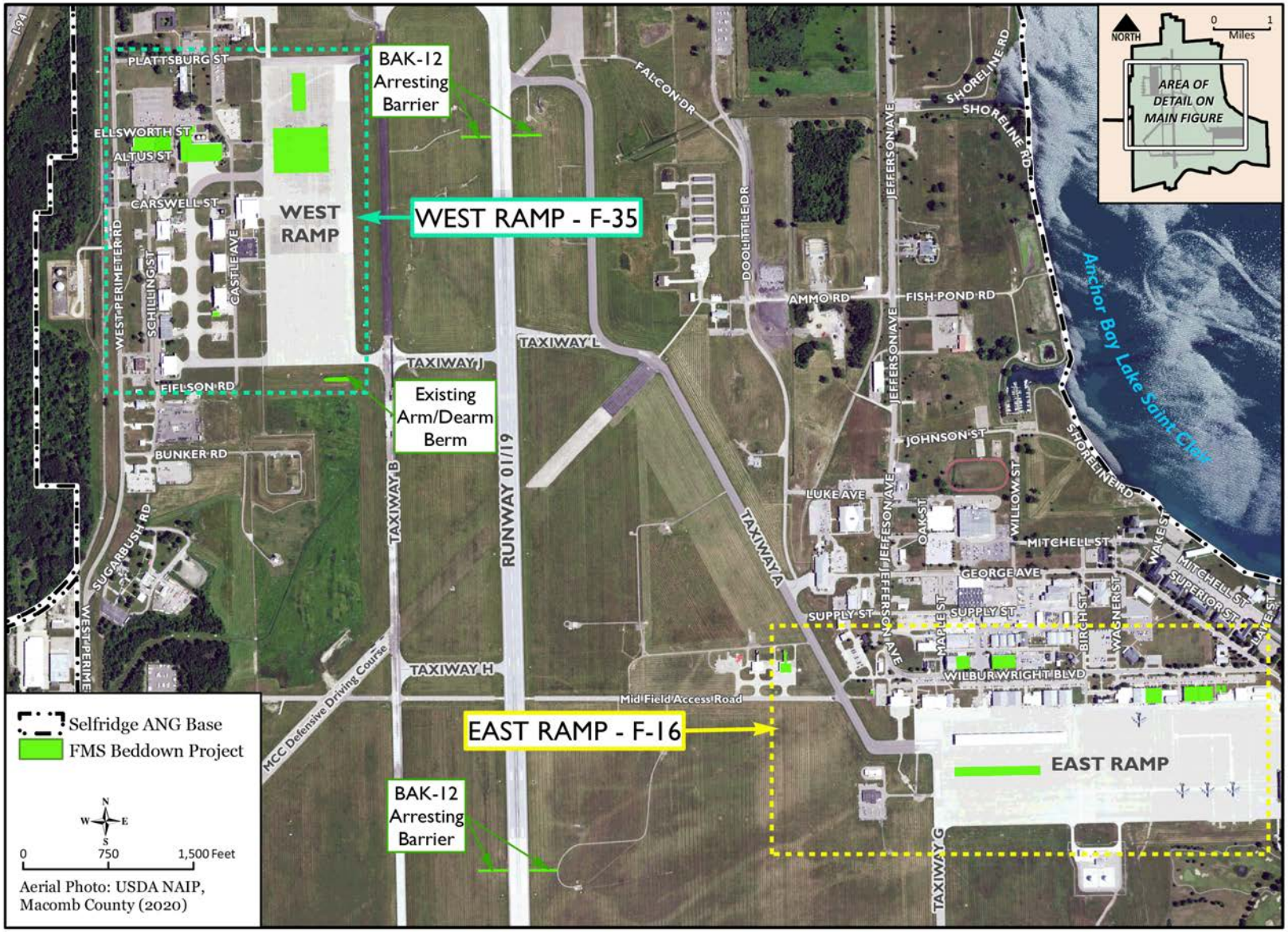

Figure 2.3-3. Alternative 2 Project Overview at Selfridge ANG Base (East and West Ramp)

Sources: (Selfridge ANG Base, 2021; USDA-FSA-APFO, 2020)

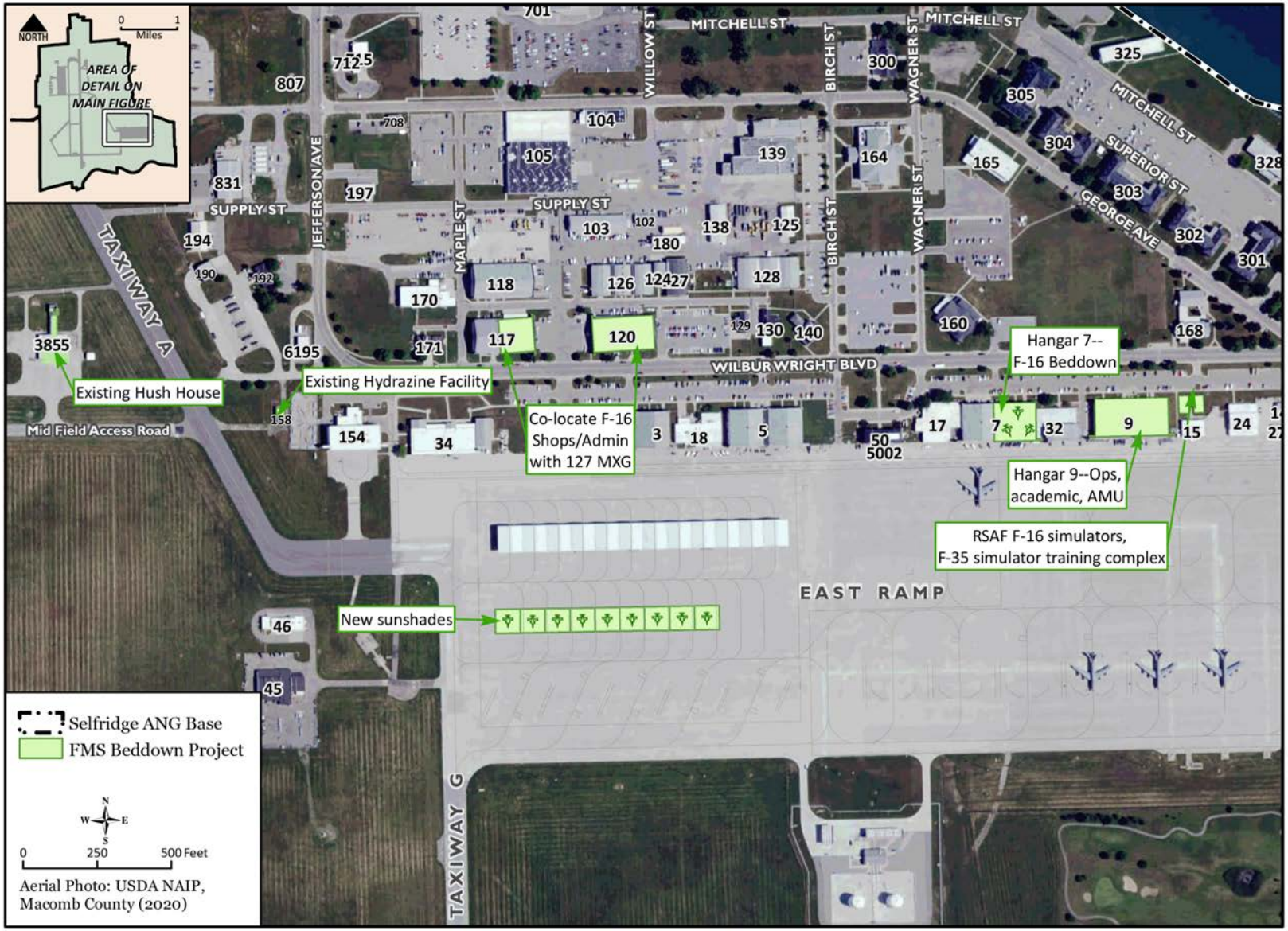

Figure 2.3-4. Proposed Facility Layout for Alternative 2 – East Ramp at Selfridge ANG Base

Sources: (Selfridge ANG Base, 2021; USDA-FSA-APFO, 2020)

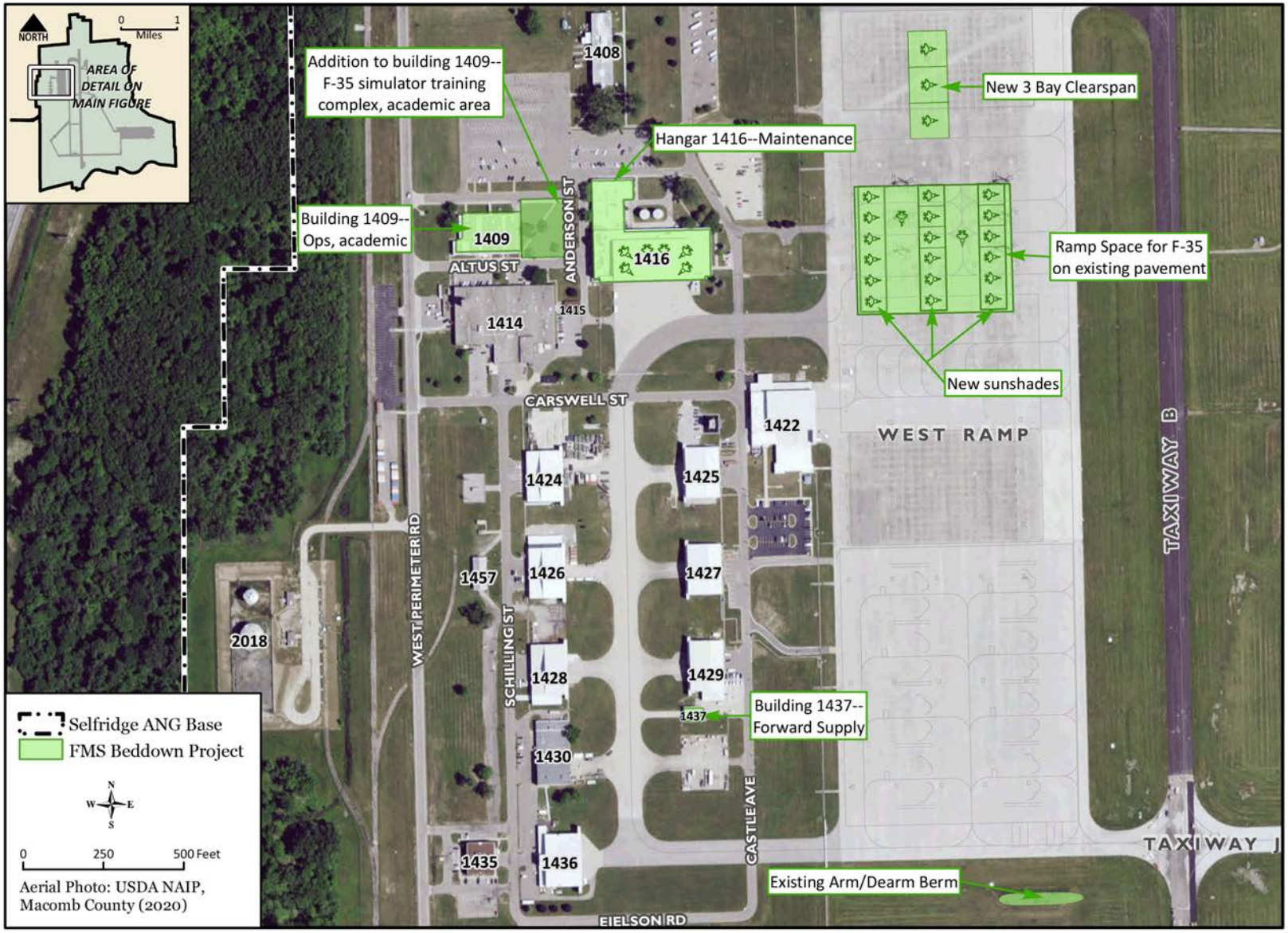

Figure 2.3-5. Proposed Facility Layout for Alternative 2 – West Ramp at Selfridge ANG Base

Sources: (Selfridge ANG Base, 2021; USDA-FSA-APFO, 2020)

The addition of RSAF F-16s on the East Ramp and F-35A/Bs on the West Ramp would utilize existing facilities at Selfridge ANG Base. Renovations to some facilities and an addition to Building 1409 to house an F-35 simulator would also be required. The F-16 simulator can be housed in two relocatable simulation shelters (RSSs) located near Hangar 9. Future construction would be considered for another F-35 simulator training facility to support the RSAF. The use of facilities adjacent to the existing runway and consolidation of maintenance and operations facilities would force displacement of several tenant units.

In order to utilize the facilities on Selfridge ANG Base, several functions would need to be relocated. These relocations could take place with minimal construction cost due to an excess of authorized space in many areas of the base. Approximately 30 individuals would change their work locations. Additionally, the Michigan Army National Guard, the current occupant of Hangar 1416, is relocating off Selfridge ANG Base to the west side of the state, independently of the FMS PTC action.

Staging areas would be utilized for materials and equipment; the exact location of staging areas has yet to be determined. However, previously disturbed areas or areas already paved would be utilized to the greatest extent possible.

East Ramp facilities are detailed below.

- **Hangar 9:** Hangar 9 contains 39,504 square feet and was constructed in 1932. It is used as a Deployment Processing Facility. The building is suitable for FMS F-16 squadron operations, classrooms for flying training, aircraft egress system maintenance, and maintenance debrief areas. Renovations would include a 7,000-square foot vault to include an auditorium for 30 people and six briefing rooms capable of holding 8 people each. Also included are mission planning areas for four planning systems, a room for Range Training Officer operations, and a room for Link-16 datalink operations. Areas outside the vault would include a 30-person conference room and an area/room to hold computer terminals for 30 aircrew members. The ANG Armory/Air Terminal/Mobility function would be relocated to Buildings 105 and 139.
- **F-16 Simulators:** Two RSSs would be located to the east of Hangar 9 and would house four networked training devices plus a Unit Training Device that would require pads and power.
- **Hangar 7:** Hangar 7 contains 14,000 square feet and was constructed in 1932. Hangar 7 is appropriate to house F-16 maintenance functions. The ANG Logistics Readiness Squadron Warehouse would be relocated to Building 105.
- **Sunshades/Parking:** Nine required sunshades would be located southwest of Hangar 7 on Charlie Row.
- **Building 158:** Building 158 contains 811 square feet and was built in 1992. It is a hydrazine facility.
- **Buildings 117/120:** The F-16 shops would be collocated with the 127th Maintenance Group at this location. Some minor interior renovations are anticipated.

West Ramp facilities requiring renovation/modification are detailed below.

- **Building 1409:** Building 1409 is 23,173 square feet and was built in 1960. Building 1409 is currently used as a Navy Operations Support Center. The Navy Operations Support Center would be relocated from Building 1409 to Building 1425. Renovations are needed to provide F-35 squadron operations with country-specific sensitive, compartmented information

facility areas as required by the FMS F-35 program. Building 1409 would also require a 150,000-square foot addition to provide additional academic areas. A portion of the addition would provide for the FMS F-35 simulator requirement estimated at 20,000 square feet. Simulators require specialized HVAC, communication, and electrical and are most effectively accommodated with new construction. The addition would be located at the east end of Building 1409.

- **Hangar 1416:** Hangar 1416 contains 87,585 square feet and was constructed in 1981. Hangar 1416 is currently used as an Army Chinook Hangar. The Army Chinook unit is scheduled to relocate. Six F-35s would be able to park in the hangar. Renovations would include upgrades to electrical, HVAC, and security as required for F-35 aircraft and upgrades/reconfiguration of Maintenance (MX) Operations, aircraft egress system maintenance, the Aircraft Maintenance Unit, maintenance debrief area, alternate mission equipment maintenance (to include appropriate Autonomic Logistics Information System configuration), and storage.
- **3-Bay ClearSpan**: 40,000 hangar for providing aircraft cover located to the north of the sunshade area.
- **Sunshades/Parking**: Eighteen required sunshades would be located east of Building 1416 in three rows of six. The exact placement of sunshades would need to account for taxiway clearance.
- **Building 1437**: Building 1437 contains 224 square feet and was built in 1987. The Army Ground Vehicle Systems Center Laboratory would be relocated to Building 500.

Table 2.3-7 provides the approximate square footage and level of renovation required for Alternative 2 on the East Ramp and West Ramp.

Table 2.3-7. Proposed Construction and Renovation Projects at Selfridge ANG Base

Selfridge Building Number	Proposed Use	Required Facility Square Footage	Description	Total Area of New Ground Disturbance (Square Feet)	New Impervious Surface (Square Feet)
Aircraft Barrier Arresting Kits				29,000	29,000
East Ramp (F-16)					
Hangar 9	Ops, academic, AMU	39,504	Interior renovation only	0	0
RSS 4-bay (new build)	RSAF F-16 simulators and F-35 simulator training complex	Up to 50,000	New site prep for simulator training complex	50,000	50,000
Building 158	Hydrazine	811	Interior renovation only	0	0
Buildings 117/120	F-16 back shops	12,000/25,000	Interior renovation only	0	0
New sunshades	F-16	9 spots	New construction	0	0
West Ramp (F-35)					
Hangar 1416	Maintenance	87,585	Interior renovation to FRD requirements	0	0
Building 1409	Ops, academic	23,173	Add/alter	30,000	30,000
Addition to building 1409 (new build)	F-35 simulator training complex, academic area	Up to 150,000	New site prep and RSS install	150,000	150,000
Building 1437	Forward supply	2,413	Interior renovation only	0	0

Table 2.3-7. Proposed Construction and Renovation Projects at Selfridge ANG Base

Selfridge Building Number	Proposed Use	Required Facility Square Footage	Description	Total Area of New Ground Disturbance (Square Feet)	New Impervious Surface (Square Feet)
New sunshades	F-35	18 spots	New construction with Wi-Fi kiosks	0	0
New build	3-Bay ClearSpan	40,000	New construction	0	0
F-16 trim pad	N/A	Already in place			
Arm/de-arm berm (pads in place)	N/A				

Source: (AETC, 2021–2022)

Key: AMU = Aircraft Maintenance Unit; ANG = Air National Guard; FRD = Facility Requirements Document; N/A = not applicable; ops = operations; RSAF = Republic of Singapore Air Force; RSS = relocatable simulation shelter

2.4 ALTERNATIVE SELECTION PROCESS

Considering alternatives helps to avoid unnecessary impacts and allows for an analysis of reasonable ways to achieve the stated purpose. CEQ requires that all reasonable alternatives to proposed actions be examined. To be considered reasonable, an alternative must be suitable for decision making, capable of implementation, and sufficiently satisfactory with respect to meeting the purpose of and need for the action. According to 40 CFR § 1508.1, reasonable alternatives mean a reasonable range of alternatives that are technically and economically feasible, meet the purpose and need for a proposed action, and, where applicable, meet the goals of the applicant. The following requirements must be present or reasonably attainable to meet the purpose of and need for the Proposed Action.

2.4.1 Beddown Alternative Selection Standards

The DAF conducted an enterprise-wide search for reasonable installations that could meet the requirements for the FMS PTC, which includes both RSAF F-16 and FMS F-35 missions. Based on the enterprise evaluation, the DAF determined that (1) Joint Base San Antonio (JBSA)-Lackland, (2) Selfridge ANG Base, (3) Ebbing ANG Base, (4) Buckley Space Force Base (SFB), and (5) Hulman Field ANG Base could potentially meet the requirements for the Proposed Action. The requirements were identified as follows.

1. **Mission:** The action must not result in major operational constraints to existing and proposed missions. The proposed FMS beddown must allow both the RSAF F-16 squadron and the FMS F-35 aircraft to maintain the ability to operate and train without affecting the existing mission. Weather and airspace operations must also be acceptable.
2. **Capacity:** The proposed location for the Proposed Action must have the capacity to handle the additional aircraft and mission requirements. This includes enough hanger space, facilities, ramp space, parking, runway areas, and all the services, units, and personnel provided by the host base that allow the base and the operational units on it to operate.
3. **Cost:** The proposed location features facilities that can be reutilized, requiring minimal renovation and limiting the requirement for new construction.

Table 2.4-1 summarizes the results of the primary requirements evaluation.

Table 2.4-1. Alternative Evaluation of Primary Requirements

Potential Alternative	Selection Standards		
	1	2	3
Alternative 1: Joint Base San Antonio	√	X	X
Alternative 2: Selfridge ANG Base, Michigan	√	√	√
Alternative 3: Ebbing ANG Base, Arkansas	√	√	√
Alternative 4: Buckley SFB, Colorado	X	X	X
Alternative 5: Hulman Field ANG Base, Indiana	X	√	√

Source: (AETC, 2021–2022)
Key: ANG = Air National Guard; SFB = Space Force Base

Per the requirements of 32 CFR § 989, selection standards were then developed to identify alternatives for meeting the purpose of and need for the FMS PTC beddown components of this EIS. The DAF identified reasonable alternatives based on selection standards that represent capabilities required of each installation, to a reasonable degree, in order to qualify as an alternative. Selection standards can be qualitative and/or quantitative criteria that aid the DAF in selecting the best installation for a given mission. Selection standards change depending on the mission and may be based on historical experience, numerical analysis, stated mission requirements, and/or military judgment. Installations not meeting all selection standards were not carried forward for consideration.

Based on the above selection standards, the Secretary of the Air Force determined that Ebbing ANG Base and Selfridge ANG Base would meet the locational requirements of the Proposed Action; therefore, they were carried forward for detailed analysis.

2.4.2 Beddown Alternatives Not Carried Forward for Analysis

Joint Base San Antonio, Texas – The JBSA alternative required considerable new construction and renegotiation of existing leases from the City of San Antonio to accomplish several displaced functions and taxiway requirements to allow current mission. This option would also require acquiring property to accommodate F-35 facilities. Following the site survey at JBSA-Lackland, the DAF determined that basing these missions there was infeasible due to the high risk in meeting the required timeline due to the large number of required new construction and renovation projects. In addition, the cost to beddown at JBSA-Lackland was 4 to 5.5 times higher than the lowest cost alternative. For these reasons, JBSA-Lackland was not carried forward for further analysis.

Buckley SFB, Colorado – Security concerns required considerable new construction to deconflict with existing mission security requirements, which would affect the ability to meet the F-16 mission timeline. Following the site survey at Buckley SFB, the DAF determined that basing these missions there was infeasible due to mission incompatibilities and inadequate airspace for both the F-16 and F-35 aircraft. In addition, meeting the required timeline was determined to be high risk due to the large number of required new construction and renovation projects. Finally, Buckley SFB was found to be the highest cost option. For these reasons, Buckley SFB was not carried forward for further analysis.

Hulman Field ANG Base, Indiana – Considerable new build requirements were needed to accommodate the additional missions, negatively affecting the ability to meet the F-16 mission timeline. Existing facilities could not support joint use maintenance and logistic requirements

without affecting the existing mission and requiring considerable new construction. Following the site survey at Hulman Field, the DAF determined that basing these missions there was infeasible due to the closest airspace not meeting the minimum size requirements and the air-to-ground ranges not meeting live-drop requirements. In addition, meeting the required timeline was determined to be high risk due to the large number of required new construction and renovation projects. Finally, the cost to beddown at Hulman Field was 2.5 times higher than the lowest cost alternative. For these reasons, Hulman Field was not carried forward for further analysis.

2.4.3 Site-Specific Project Alternative Selection Standards

Ebbing ANG Base, Arkansas – Project site selection and facilities selected for use by the FMS program minimized displacing 188 WG personnel and optimized available area and existing base functions.

Selfridge ANG Base, Michigan – Project site selection and facilities selected for use by the FMS program minimized displacing Selfridge base personnel and optimized available area and existing base functions. The separation of the RSAF from the other FMS countries would allow mission deconfliction and phased construction.

2.4.4 Site-Specific Alternatives Not Carried Forward for Analysis

Ebbing ANG Base, Arkansas – The FMS program considered full new construction of the RSAF F-16 program south of the taxiway. However, this option did not meet the desired RSAF arrival timeline.

Selfridge ANG Base, Michigan – The FMS program was assessed for location on either the east or west side to segregate from the current National Guard Bureau (NGB) mission. This alternative was not carried forward because it would require excessive new building and required accommodation to share back shop locations.

2.5 NO ACTION ALTERNATIVE

In accordance with 32 CFR § 989.8(d), the DAF is defining the No Action Alternative as not implementing the Proposed Action. Under the No Action Alternative, the DAF would not consolidate and relocate the FMS training activities to Ebbing ANG Base or Selfridge ANG Base to establish a permanent PTC at a single location.

The No Action Alternative would negatively impact the DAF's and multiple FMS nation partners' ability to train effectively as airspace and F-35 simulator availability at Luke AFB move toward full capacity.

Although the No Action Alternative would not meet the purpose and need of the Proposed Action, the CEQ regulations for implementing NEPA (14 CFR § 1502.14(c)) require consideration and analysis of a no action alternative for the purposes of presenting a comparative analysis to the action alternatives. The No Action Alternative, consistent with CEQ regulations and the DAF and FAA policy, 32 CFR Part 989 and FAA Order 1050.1, respectively, serves as a baseline against which the impacts of the Preferred Alternative and Alternative 2 are compared and contrasted in this DEIS.

Therefore, for purposes of comparative analysis in this EIS, the No Action Alternative represents the conditions for CY 2029 that would be anticipated if the Preferred Alternative/Alternative 2 were not implemented.

- Ebbing ANG Base No Action Alternative – For Ebbing ANG Base (and FSRA), the No Action Alternative represents the projected operational tempo at Ebbing ANG Base for CY 2029 and the completion of the FSRA improvements and civilian aircraft operations for CY 2029, as reflected in **Table 2.2-1**, and airspace use in **Table 2.2-2**.
- Selfridge ANG Base No Action Alternative – For Selfridge ANG Base, the No Action Alternative represents the projected operational tempo at Selfridge ANG Base for CY 2029 as reflected in **Table 2.3-1** for the airfield and **Table 2.3-2** for associated airspace.

2.6 ENVIRONMENTAL COMPARISON OF ALTERNATIVES

Table 2.6-1 provides a summary comparison of the environmental consequences associated with the Preferred Alternative, Alternative 2, and the No Action Alternative. Each alternative is compared for each of the environmental resources evaluated in Chapters 3 and 4. General criteria for categorizing the degree of impacts to resource/issue areas are summarized below and are presented relative to individual resource/issue areas under the Preferred Alternative, Alternative 2, and the No Action Alternative.

- ***Beneficial –*** These impacts generally result in some benefit or overall improvement to the resource impacted by the action. Such impacts may include a reduction in air emissions or restoration of habitats; the scope of the impact is directly related to the potentially affected environment and the degree of effects. Elimination of air emissions or restoration of large areas of disturbed wetland may be considered significant beneficial impacts, while a small reduction in air emissions or restoration of a small pocket of wetlands may be considered beneficial but not relatively significant. Other than providing benefits to foreign military partner training capabilities and minor economic benefits associated with development activities and introduction of additional personnel to the area, the DAF has not identified any significant beneficial impacts under either alternative.
- ***Adverse –*** Adverse impacts generally result in detriment or degradation of the impacted resource and the degree or level of impact. The DAF has identified the potential for adverse impacts for several resource areas. Adverse impacts can either be significant or not significant.
    - ***Significant –*** Physical aspects are easily perceptible and typically endure over the medium-to-long term, with a regional affected environment and a high degree of effects; however, significant impacts can occur potentially over the short term under the local or regional affected environment given a high degree of effects. Significant adverse impacts are typically not recoverable over the short term and require long-term recovery processes with extensive mitigation or revision of the Proposed Action to avoid or minimize impacts. An example of a significant adverse impact would be substantive increases in noise over noise-sensitive areas that exceed established threshold criteria.
    - ***Not Significant –*** These impacts can be short- to long-term impacts under any potentially affected environment or degree of effects. Impacts that are adverse but not significant are typically recoverable or manageable with mitigations or via

implementation of standard management actions (e.g., implementation of existing management plan requirements) required to minimize the level of impact or manage the potential for impact, with the extent of mitigations or management actions dependent on the identified affected environment and degree of the impact. Examples of adverse impacts that are not significant may include short-term increases in particulate air emissions from construction activities that are mitigated through implementation of dust control measures or increases in the amount of hazardous wastes generated, which are managed via the installation Hazardous Waste Management Plan.

- ***Neutral or No Effect –*** This category is based on whether there is no interaction with the resource (i.e., no effect) or whether the impacts have a low degree of effect such that they are imperceptible regardless of the affected environment (i.e., neutral impact). Such neutral impact is recoverable over the short term without mitigation and results in no overall perceptible change to the resource.

Based on preliminary analysis of the Preferred Alternative and Alternative 2 relative to the scope of the activities within the respective affected environments, as well as consideration of previous analysis for similar actions, it was determined that the environmental resources listed here do not present a potential for interaction or significant environmental impact under either the Preferred Alternative or Alternative 2. These following environmental resources or requirements have not been carried forward for detailed analysis in this EIS due to either lack of interaction with the resource or inapplicability of the requirement: Department of Transportation Act Section 4(f), farmlands, and coastal resources.

In the context of **Table 2.6-1** "airspace" refers to Special Use Airspace (SUA), which includes Restricted Areas, MTRs, MOAs, and ATCAAs, while "installation" includes the area surrounding the installation and associated airfield (to include the FSRA and the immediate airspace).

Table 2.6-1. Summary Comparison of Environmental Consequences

Resource Evaluated	Preferred Alternative (Ebbing ANG Base) (and FSRA)	Alternative 2 (Selfridge ANG Base)	No Action	
			Ebbing ANG Base (and FSRA)	Selfridge ANG Base
Noise	Airspace: *No Significant Impacts* – Time-averaged noise levels would remain below 65 dB. (Section 0) Installation: *Significant Impacts* – Up to an additional 7,855 acres of land affected by 65 dB DNL or greater and up to an additional 12,654 people affected by 65 dB DNL or greater. *Mitigations evaluated*. (Section 0/3.3.5) The potential mitigation scenarios being considered would reduce DNL relative to unmitigated operational scenarios in some areas while other areas would see a minor increase. The total off-base/airport land area exposed to noise levels exceeding 65 dB DNL would be reduced by 10%, 12%, and 15% relative to unmitigated afterburner usage scenarios, respectively. The estimated number of residents exposed to noise levels greater than 65 dB DNL would be reduced by 11%, 15%, and 20% relative to unmitigated afterburner usage scenarios, respectively.	Airspace: *No Significant Impacts* – Time-averaged noise levels would remain below 65 dB. (Section 4.3.4) Installation: *Significant Impacts* – Up to an additional 7,171 acres of land affected by 65 dB DNL or greater and up to an additional 18,799 people affected by 65 dB DNL or greater. *Mitigations evaluated*. (Sections 4.3.4/4.3.5) The potential mitigation scenarios being considered would reduce DNL relative to unmitigated operational scenarios in some areas while other areas would see a minor increase. The total off-base/airport land area exposed to noise levels exceeding 65 dB DNL would be reduced by 11%, 14%, and 16% relative to unmitigated afterburner usage scenarios, respectively. The estimated number of residents exposed to noise levels greater than 65 dB DNL would be reduced by 9%, 13%, and 16% relative to unmitigated afterburner usage scenarios, respectively.	Airspace: *Neutral Effect* (Section 3.3.3) Installation: *Neutral Effect* (Section 3.3.3)	Airspace: *Neutral Effect* (Section 4.3.3) Installation: *Neutral Effect* (Section 4.3.3)
Land Use	Airspace: *No Significant Impacts* – Undeveloped areas would have low-to-moderate adverse effects on low-to-moderately noise-sensitive land uses and areas. Low-level overflights may have a minor-to-moderate adverse impact on persons engaged in outdoor recreational activities. There may be moderate-to-high adverse impact on some wilderness users and their experience of primitive recreation. (Section 3.4.4) Installation: *Significant Impacts* – Total off-base land exposed to noise levels of 65 dB DNL and greater would expand from 202 acres to 8,062 acres. Residential land exposure would increase from 11 acres to 1,821 acres. *Mitigations*	Airspace: *No Significant Impacts* – In quiet areas, noise increases may have minor-to-moderate impacts on uses that benefit from quiet surroundings. Projected noise levels in the areas under the restricted airspace associated with Camp Grayling Joint Military Training Complex would increase by 5 to 9 dBA L_{dnmr}/DNL to levels up to 66 L_{dnmr}/65 dB DNL. Levels greater than 65 dBA L_{dnmr}/DNL are not compatible with noise-sensitive uses. There may be moderate-to-high adverse impact on some wilderness users and their experience of primitive recreation. (Section 3.4.4) Installation: *Significant Impacts* – Total off-base land exposed to noise levels of 65 dB DNL and	Airspace: *Neutral Effect* (Section 3.4.3) Installation: *Neutral Effect* (Section 3.4.3)	Airspace: *Neutral Effect* (Section 4.4.3) Installation: *Neutral Effect* (Section 4.4.3)

Table 2.6-1. Summary Comparison of Environmental Consequences

Resource Evaluated	Preferred Alternative (Ebbing ANG Base) (and FSRA)	Alternative 2 (Selfridge ANG Base)	No Action	
			Ebbing ANG Base (and FSRA)	Selfridge ANG Base
	evaluated. (Sections 3.4.4/3.4.5). The total off-base/airport residential land area (acres) exposed to noise levels exceeding 65 dB DNL would be reduced by between 6% and 14% depending on afterburner usage relative to the same unmitigated scenarios; residential acres exposed to noise levels exceeding 70 dB DNL would be reduced by between 11% and 19% depending on afterburner usage relative to the same unmitigated scenarios; residential acres exposed to noise levels exceeding 75 dB DNL would be reduced by between 50% and 58 % depending on afterburner usage relative to the same unmitigated scenarios; residential land area exposed to more than 80 dB DNL would be reduced from one acre to zero under all mitigated afterburner scenarios.	greater would increase to 7,170 acres. Residential land exposure would increase by 2,177 acres. *Mitigations evaluated*. (Sections 4.4.4/4.4.5). The total off-base/airport residential land area (acres) exposed to noise levels exceeding 65 dB DNL would be reduced by between 3% and 9% depending on afterburner usage relative to the same unmitigated scenarios; residential acres exposed to noise levels exceeding 70 dB DNL would be reduced by between 21% and 26% depending on afterburner usage relative to the same unmitigated scenarios; residential acres exposed to noise levels exceeding 75 dB DNL would be reduced by between 11% and 34% depending on afterburner usage relative to the same unmitigated scenarios; no residential land areas would be exposed to more than 80 dB DNL under any mitigated or unmitigated scenario.		
Socioeconomics	Airspace: *No Effect* – Preferred Alternative does not involve socioeconomic factors under airspace. (Section 3.2) Installation: *No Significant Impacts* – There would be a less than 1 percent increase in local population. Some beneficial impacts may occur due to additional population. Potential decrease in property values could occur (0.2 to 2.0 percent per dB increase). (Section 3.5.4). The estimated number of housing units within the 65 dB DNL or greater noise contours for the 5%, 50%, and 95% afterburner scenarios under the Preferred Alternative increase over the No Action from 18 to between 2,579 and 3,014. Depending on the mitigation scenario, the total affected housing units decrease by between 12% to 20% versus unmitigated noise.	Airspace: *No Effect* – Alternative 2 does not involve socioeconomic factors under airspace. (Section 4.2) Installation: *No Significant Impacts* – There would be a 0.13 percent increase in local population. Some beneficial impacts may occur due to additional population. Potential decrease in property values could occur (0.2 to 2.0 percent per dB increase). (Section 4.5.4). The estimated number of housing units within the 65 dB DNL or greater noise contours for the 5%, 50%, and 95% afterburner scenarios under Alternative 2 increase over the No Action from 0 to between 5,855 and 6,099. Depending on the mitigation scenario, the total affected housing units decrease by between 10% to 16% versus unmitigated noise.	Airspace: *Neutral Effect* (Section 3.5.3) Installation: *Neutral Effect* (Section 3.5.3)	Airspace: *Neutral Effect* (Section 4.5.3) Installation: *Neutral Effect* (Section 4.5.3)

Table 2.6-1. Summary Comparison of Environmental Consequences

Resource Evaluated	Preferred Alternative (Ebbing ANG Base) (and FSRA)	Alternative 2 (Selfridge ANG Base)	No Action	
			Ebbing ANG Base (and FSRA)	Selfridge ANG Base
Environmental Justice	Airspace: *No Significant Impacts* – Time-averaged noise for populations under airspace would remain below impact thresholds. (Section 3.2) Installation: *Significant Impact* – The Preferred Alternative would result in disproportionately high and adverse human health or environmental effects on minority populations. The Preferred Alternative would also result in environmental health risks and safety risks that may disproportionately affect children, and impacts to the elderly would be significant. Noise mitigations under consideration by the DAF would result in approximately 7% to 15% less minority population affected and between 13% and 21% low-income population affected by 65 dB DNL depending on afterburner scenario as compared to unmitigated noise. Similarly, potential noise mitigations would result in an estimated reduction of between 9% and 19% children and between 14% and 21% elderly potentially affected depending on afterburner scenario as compared to unmitigated noise	Airspace: *No Significant Impacts* – Time-averaged noise for populations under airspace would remain below impact thresholds. (Section 4.2) Installation: *Significant Impact* – Alternative 2 would result in disproportionately high and adverse human health or environmental effects on minority populations. Alternative 2 would also result in environmental health risks and safety risks that may disproportionately affect children, and impacts to the elderly would be significant. Noise mitigations under consideration by the DAF would result in approximately 12% to 18% less minority population affected and between 13% and 22% low-income population affected by 65 dB DNL depending on afterburner scenario as compared to unmitigated noise. Similarly, potential noise mitigations would result in an estimated reduction of between 10% and 18% children and between 9% and 15% elderly potentially affected depending on afterburner scenario as compared to unmitigated noise.	Airspace: *Neutral Effect* (Section 3.6.3) Installation: *Neutral Effect* (Section 3.6.3)	Airspace: *Neutral Effect* (Section 4.6.3) Installation: *Neutral Effect* (Section 4.6.3)
Cultural Resources	Airspace: *No Significant Impact* – There would be no effects to archaeological resources or traditional cultural properties, and no adverse effects to architectural resources. Consultation with Native American Tribes and the Arkansas SHPO is underway. In a letter dated January 21, 2022, the Oklahoma SHPO found that the Preferred Alternative would result in no historic properties affected below the airspace in Oklahoma (see Volume II, **Appendix A**, Sections A.2.1.1 & A.3.1) (Section 3.7.4). Installation: *No Significant Impacts* – There would	Airspace: *No Significant Impact* – There would be no effects to archaeological resources or traditional cultural properties, and no adverse effects to architectural resources. Consultation with Native American Tribes is still in process. On July 21, 2022, the Michigan SHPO concurred with a finding of no adverse effects below the airspace (see Volume II, **Appendix A**, Sections A.2.1.2 & A.3.2) (Section 4.7.4). Installation: *No Significant Impacts* – There would be no effects to archaeological or traditional cultural properties and no adverse	Airspace: *Neutral Effect* (Section 3.7.3). Installation: *Neutral Effect* (Section 3.7.3).	Airspace: *Neutral Effect* (Section 4.7.3). Installation: *Neutral Effect* (Section 4.7.3).

Table 2.6-1. Summary Comparison of Environmental Consequences

Resource Evaluated	Preferred Alternative (Ebbing ANG Base) (and FSRA)	Alternative 2 (Selfridge ANG Base)	No Action	
			Ebbing ANG Base (and FSRA)	Selfridge ANG Base
	be no effects to archaeological or traditional cultural properties and no adverse effects to architectural resources. Consultation with Native American Tribes and the Arkansas SHPO is still in process (see Volume II, **Appendix A**, Sections A.2.1.1 & A.3.1) (Section 3.7.4).	effects to architectural resources. Consultation with Native American Tribes is still in process. On July 21, 2022, the Michigan SHPO concurred with a finding of no adverse effects within or near the installation (See Volume II, **Appendix A**, Sections A.2.1.2 & A.3.2) (Section 4.7.4).		
Biological Resources	Airspace: *No Significant Impacts* – There would be minor impacts to wildlife. Project may affect but is not likely to adversely affect federally listed species. Endangered Species Act (ESA) Section 7 consultation with the USFWS regarding the Preferred Alternative is ongoing. (Section 3.8.4) Installation: *No Significant Impacts* – There would be minor impacts to vegetation and wildlife. Project may affect but is not likely to adversely affect federally listed species. (Section 3.8.4) ESA Section 7 consultation with the USFWS regarding the Preferred Alternative is ongoing. Any potential mitigations identified as a result of consultation with the USFWS under ESA Section 7 will be identified in the Final EIS and ROD.	Airspace: *No Significant Impacts* – There would be minor impacts to wildlife. USFWS concurred that Alternative 2 may affect but is not likely to adversely affect federally listed species. (Section 4.8.4) Installation: *No Significant Impacts* – There would be minor impacts to vegetation and wildlife. The USFWS concurred that Alternative 2 may affect but is not likely to adversely affect federally listed species. (Section 4.8.4)	Airspace: *Neutral Effect* (Section 3.8.3) Installation: *Neutral Effect* (Section 3.8.3)	Airspace: *Neutral Effect* (Section 4.8.3) Installation: *Neutral Effect* (Section 4.8.3)
Water Resources/Floodplains	Airspace: *No Effect* – There would be no interaction with the resource under the airspace. (Section 3.2) Installation: *No Significant Impacts* – Impacts to surface water, groundwater, and wetlands would be minimized through required design elements, permit-related BMPs, and installation management practices. There is the potential for construction projects to be located in wetlands; a wetland delineation would need to occur and, based on that delineation, a Clean Water Act Section 404 permit and 401 Water Quality Certification might need to be attained prior to	Airspace: *No Effect* – There would be no interaction with the resource under the airspace. (Section 4.2) Installation: *No Significant Impacts* – Impacts to surface water and groundwater would be minimized through required design elements, permit-related BMPs, and installation management practices. Development activities would occur within the 100-year floodplain; compliance with federal and local standards and design features to avoid impedance of floodwater conveyance, decrease of floodplain capacity, or increase of flood elevations would serve to avoid	Airspace: *Neutral Effect* (Section 3.2) Installation: *Neutral Effect* (Section 3.9.3)	Airspace: *Neutral Effect* (Section 4.2) Installation: *Neutral Effect* (Section 4.9.3)

Table 2.6-1. Summary Comparison of Environmental Consequences

Resource Evaluated	Preferred Alternative (Ebbing ANG Base) (and FSRA)	Alternative 2 (Selfridge ANG Base)	No Action	
			Ebbing ANG Base (and FSRA)	Selfridge ANG Base
	ground-disturbance activities. There would be no impacts to floodplains. (Section 3.9)	or minimize potential impacts. There would be no impacts to wetlands. (Section 4.9)		
Air Quality	Airspace: *No Significant Impacts* – There would be no exceedances of significance indicator thresholds. (Section 3.10.4) Installation: *No Significant Impacts* – There would be no exceedances of NAAQS. (Section 3.10.4). Implementation of noise mitigations, which include altering flight profiles, would not have any notable effect on air emissions.	Airspace: *No Significant Impacts* – There would be no exceedances of significance indicator thresholds. (Section 4.10.4) Installation: *Significant Impacts* – Air emissions would be somewhat similar to those of the Preferred Alternative. However, because Selfridge ANG Base is in a maintenance area, NO_x emissions from Alternative 2 would exceed the conformity threshold of 100 tons per year. The NO_x emission increase would trigger the requirement for a positive general conformity determination before any final decision could be made to implement Alternative 2 at Selfridge ANG Base, which would ensure that the alternative would conform to the applicable SIP and would result in less than significant air quality impacts. (Section 4.10.4). The significance indicator threshold for NO_x would continue to be exceeded under mitigated noise scenarios. Significant reductions in annual flight operations may be required to ensure conformity with the Michigan SIP.	Airspace: *Neutral Effect* (Section 3.4.3) Installation: *Neutral Effect* (Section 3.10.3)	Airspace: *Neutral Effect* (Section 4.4.3) Installation: *Neutral Effect* (Section 4.10.3)
Airspace	*Neutral Effect* (Section 3.2)	*Neutral Effect* (Section 4.2)	*Neutral Effect* (Section 3.2)	*Neutral Effect* (Section 4.2)
Hazardous Materials and Waste/Solid Waste	Airspace: *No Significant Impacts* – Use of chaff and flares within airspace have been shown to pose no adverse impacts to human health and the environment. (Section 3.2) Installation: *No Significant Impacts* – The Preferred Alternative would not violate applicable laws or regulations regarding hazardous materials and/or solid waste management, involve a contaminated site, produce an	Airspace: *No Significant Impacts* – Use of chaff and flares within airspace have been shown to pose no adverse impacts to human health and the environment. (Section 4.2) Installation: *No Significant Impacts* – Alternative 2 would not violate applicable laws or regulations regarding hazardous materials and/or solid waste management, involve a contaminated site, produce an appreciably different quantity or type	Airspace: *Neutral Effect* (Section 3.2) Installation: *Neutral Effect* (Section 3.2)	Airspace: *Neutral Effect* (Section 4.2) Installation: *Neutral Effect* (Section 4.2)

Table 2.6-1. Summary Comparison of Environmental Consequences

Resource Evaluated	Preferred Alternative (Ebbing ANG Base) (and FSRA)	Alternative 2 (Selfridge ANG Base)	No Action	
			Ebbing ANG Base (and FSRA)	Selfridge ANG Base
	appreciably different quantity or type of hazardous waste, generate an appreciably different quantity or type of solid waste or use a different method of collection or disposal and/or exceed local capacity, or adversely affect human health and the environment, (Section 3.2)	of hazardous waste, generate an appreciably different quantity or type of solid waste or use a different method of collection or disposal and/or exceed local capacity, or adversely affect human health and the environment. (Section 4.2)		
Safety	Airspace/Installation: *No Significant Impacts* – There would be no substantive increase in safety concerns based on mishap rates, proposed flight hours, and previous analysis of flight safety associated with the F-35 and F-16 aircraft. (Section 3.2)	Airspace/Installation: *No Significant Impacts* – There would be no substantive increase in safety concerns based on mishap rates, proposed flight hours, and previous analysis of flight safety associated with the F-35 and F-16 aircraft. (Section 4.2). The 23 acres of incompatible residential development within the Selfridge ANG Base airfield southern Clear Zone would remain unchanged.	Airspace: *Neutral Effect* (Section 3.2) Installation: *Neutral Effect* (Section 3.2)	Airspace: *Neutral Effect* (Section 4.2) Installation: *Neutral Effect* (Section 4.2)
Infrastructure	Airspace: *No Effect* – There would be no interaction with this resource under the airspace. (Section 3.2) Installation: *No Significant Impacts* – Existing utility and transportation infrastructure and capacity is adequate to accommodate increase in demand and use associated with the Preferred Alternative. (Section 3.2)	Airspace: Airspace: *No Effect* – There would be no interaction with the resource under this airspace. (Section 4.2) Installation: *No Significant Impacts* – Existing utility and transportation infrastructure and capacity is adequate to accommodate increase in demand and use associated with Alternative 2. (Section 4.2)	Airspace: *Neutral Effect* (Section 3.2) Installation: *Neutral Effect* (Section 3.2)	Airspace: *Neutral Effect* (Section 4.2) Installation: *Neutral Effect* (Section 4.2)
Soils and Geology	Airspace: *No Effect* – There would be no interaction with this resource under the airspace. (Section 3.2) Installation: *No Significant Impacts* – Proposed development projects involve ground disturbance of more than 1 acre. A National Pollutant Discharge Elimination System permit would be required. Potential soil erosion impacts would be minimized to less than significant through implementation of permit requirements designed to avoid, minimize, or mitigate soil erosion from construction-related activities (e.g., development	Airspace: *No Effect* – There would be no interaction with this resource under the airspace. (Section 4.2) Installation: *No Significant Impacts* – Proposed development projects involve ground disturbance of more than 1 acre. A National Pollutant Discharge Elimination System permit would be required. Potential soil erosion impacts would be minimized to less than significant through implementation of permit requirements designed to avoid, minimize, or mitigate soil erosion from construction-related activities (e.g., development	Airspace: *Neutral Effect* (Section 3.2) Installation: *Neutral Effect* (Section 3.2)	Airspace: *Neutral Effect* (Section 4.2) Installation: *Neutral Effect* (Section 4.2)

Table 2.6-1. Summary Comparison of Environmental Consequences

Resource Evaluated	Preferred Alternative (Ebbing ANG Base) (and FSRA)	Alternative 2 (Selfridge ANG Base)	No Action	
			Ebbing ANG Base (and FSRA)	Selfridge ANG Base
	of Soil Erosion and Sedimentation Plans and Stormwater Pollution Prevention Plans, use of sediment erosion control mechanisms, etc.). (Section 3.2)	of Soil Erosion and Sedimentation Plans and Stormwater Pollution Prevention Plans, use of sediment erosion control mechanisms, etc.). (Section 4.2)		
Natural Resources and Energy	*No Significant Impacts* – Construction, operation, and maintenance activities associated with the Preferred Alternative and Alternative 2 would consume natural resources and use energy supplies. The addition of up to 36 aircraft at either location would not be expected to cause demand to exceed available or future supplies of these resources, and impacts to local and/or regional energy supplies would not be expected to be significant (Sections 3.2/4.2).		*Neutral Effect* (Sections 3.2/4.2)	
Visual Effects	*No Significant Impacts* – Overall, potential visual impacts associated with aircraft, expendable use, and installation development at either location are not expected to be significant, and visual impacts are not discussed in detail in this document (Sections 3.2/4.2).		*Neutral Effect* (Sections 3.2/4.2)	

Key: ANG = Air National Guard; BMP = best management practice; CO = carbon monoxide; dB = decibels; dBA = A-weighted decibels; DNL = day-night average sound level; EIS = Environmental Impact Statement; L_{dnmr} = onset rate-adjusted monthly day-night average sound level; NAAQS = National Ambient Air Quality Standards; NO_x = nitrogen oxides; SHPO = State Historic Preservation Officer; SIP = State Implementation Plan; SUA = Special Use Airspace; U.S. = United States; USFWS = U.S. Fish and Wildlife Service

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3. PREFERRED ALTERNATIVE (EBBING ANG BASE)

This chapter provides an overview of Ebbing ANG base, addresses the affected environment and environmental consequences, including analysis of issues with potential significance at Ebbing ANG Base (and FSRA) and associated airspace relative to the Preferred Alternative, and briefly addresses issues with the potential for no or *de minimis* impacts (meaning too small to be meaningful or taken into consideration). Section 3.2, *Preferred Alternative – Issues/Resources Not Carried Forward for Detailed Analysis*, discusses those issues/resources where, based on preliminary analysis or previous analyses, the impacts are expected to be *de minimis* or not significant and do not warrant more detailed analysis.

Within the context of the analysis in this chapter, mitigations are those actions identified by the DAF, either through consultation with regulatory agencies or independently, that are specific to implementation of the Preferred Alternative that would serve to avoid, minimize, rectify, reduce or eliminate, or compensate for significant impacts. Actions associated with permits required to implement the Preferred Alternative (such an as National Pollutant Discharge Elimination System [NPDES] permits requiring a Stormwater Pollution Prevention Plan [SWPPP]) are not considered mitigations within this context; however, they are considered within the context of the analyses as these do serve to manage or minimize impacts.

3.1 EBBING ANG BASE OVERVIEW

The 188 WG of the ARANG is a tenant at FSRA in Fort Smith, Arkansas, located in Sebastian County. The 188 WG occupies approximately 140 acres of land leased from FSRA. Approximately 20 acres of this leased land are on the southeastern side of FSRA and are separate from the 120-acre main installation area (**Figure 1.2-2**, Ebbing ANG Base Area Map). The 188 WG's current mission is to support domestic training and contingency operations for the MQ-9 Reaper remotely piloted aircraft (the "Reaper") (ARANG, 2020).

During a national emergency, the President of the United States may order the 188 WG to active duty. The primary federal mission of the 188 WG is to achieve and maintain the level of operational readiness that would provide trained and equipped, combat-ready tactical units capable of global deployment and ready for immediate integration into the active DAF to ensure air offense, air defense, or joint action with ground forces. At the state level, upon orders from the Governor of Arkansas, the 188 WG is available to assist local authorities in the event of a disaster, a disturbance, or other emergency. The 188 WG is capable of supporting rescue and relief operations, aiding in recovery from natural disasters, and protecting the citizens of Arkansas and their property (ARANG, 2020).

3.2 PREFERRED ALTERNATIVE – ISSUES/RESOURCES NOT CARRIED FORWARD FOR DETAILED ANALYSIS

Based on review of the details of the Preferred Alternative, taking into account previous NEPA analysis,[13] and the Ebbing ANG Base (and FSRA) and SUA affected environment, potential impacts associated with the following issues and/or resources have been determined to not be significant under the Preferred Alternative (**Table 3.2-1**). In the context of **Table 3.2-1** and within this chapter, "airspace" refers to SUA, which includes Restricted Areas, MTRs, MOAs, and ATCAAs, while "installation" includes the area surrounding the installation and associated airfield (to include the FSRA and immediate airspace).

Table 3.2-1. Preferred Alternative Specific Issues/Resources Not Carried Forward for Detailed Analysis

Resource Area	Affected Environment Interaction		Summary of Rationale for No Detailed Analysis
	Installation	Airspace	
Socioeconomics	Yes	No	Socioeconomic impacts with respect to the installation are addressed in detail in Section 3.5.4. With regards to airspace, the socioeconomic aspect of potential impacts to lands underlying SUA was not evaluated because SUA use would be consistent with ongoing actions, and there would be no development or other socioeconomic-related activities occurring under the airspace because of the Preferred Alternative. Therefore, the ROI for socioeconomics was considered to consist only of the installations themselves. Noise analysis presented in Section 3.3 (*Noise*) show that while there may be some noise level increases in certain areas, aircraft in the MOAs and Restricted Areas are typically flying at high altitudes, with noise levels ranging from less than 45 dB L_{dnmr} to 64.6 dB L_{dnmr} under all airspace units. The F-35 typically flies at higher altitudes, and with only 12 F-16 aircraft (which typically fly lower than the F-35), single-event noise exposure within the SUA would be infrequent. Overall, noise levels associated with the Preferred Alternative would be relatively consistent with existing conditions and should not significantly impact socioeconomic resources under airspace.
Environmental Justice	Yes	No	Environmental justice impacts with respect to the installation are addressed in detail in Section 3.6.4. With regards to airspace, the environmental justice aspect of potential impacts to lands underlying SUA was not evaluated because noise levels associated with the Preferred Alternative would be relatively consistent with existing conditions and, in populated areas, would remain below recommended land use thresholds. Therefore, potential impacts associated with noise to any low income, minority, children, or elderly living beneath these airspace areas would not be expected to be significant.
Airspace	Yes	Yes	There are no formal airspace change proposals at this time. Airspace would be utilized and scheduled as per existing conditions. Airspace is adequate for training purposes and can accommodate additional FMS PTC aircraft (see Section 2.4, *Alternative Selection Process*). While there would be increased military aircraft presence in these airspace units, sortie operations in each airspace area would continue to be scheduled and managed by the 188 WG and controlled by the Memphis Air Route Traffic Control Center per those regulatory and local operating procedures that separate military flights to/from and

[13] 40 CFR § 1509.1(f)(1) requires that the lead agency identify and eliminate from detailed study the issues that are not significant or have been covered by prior environmental review(s), narrowing the discussion of these issues in the statement to a brief presentation of why they will not have a significant effect on the human environment or providing a reference to their coverage elsewhere.

Table 3.2-1. Preferred Alternative Specific Issues/Resources Not Carried Forward for Detailed Analysis

Resource Area	Affected Environment Interaction		Summary of Rationale for No Detailed Analysis
	Installation	Airspace	
			within these training airspace areas from all other nonparticipating IFR air traffic in the affected region. VFR aircraft following see and avoid procedures would remain clear of all aircraft and the Restricted Areas. Impacts on joint airspace uses by both military and civilian aircraft would be expected to be minimal. This resource area has not been carried forward for further, detailed analysis under the Preferred Alternative.
Hazardous Materials and Waste/Solid Waste	Yes	Yes	Utilization of typical aerospace hazardous materials and resulting generation of hazardous waste would not affect installation generator status or result in significant impacts. Toxic substances such as asbestos would be managed according to the Base Asbestos Management Plan (ANG, 2006). A Preliminary Assessment/Site Inspection was completed in December 2021 and results indicate that a Remedial Investigation/Feasibility Study (RI/FS) will be required to further study sites of concern. The RI/FS will be executed using Defense ERP funding. While there currently are no ERP sites located at Ebbing ANG Base (ARANG, 2022), the RI/FS will further characterize types and levels of contamination that are present and may yield formally designated ERP sites in the future. If encountered during C&D-related excavations, storage, transport, and disposal of contaminated groundwater and soils would be conducted in accordance with applicable federal, state, and local regulations; DAF policy and regulations; and base policies. PFOS and PFOA are members of a family of emerging contaminants known as PFAS that are directly related to the former use of AFFF, a fire suppressing agent that was used by the DoD. Ebbing ANG Base will follow the intent of AFGM 2019-32-01, *AFFF-Related Waste Management Guidance*, to manage waste streams containing PFAS. Use of chaff and flares has been shown to have no significant impacts to the environment (USAF, 2021; USAF, 2020a; USAF, 2014; USAF, 2003). Impacts associated with solid waste from additional personnel and during construction would not result in additional hardships on local solid waste landfills. Contractors would be required to comply with federal, state, and local regulations for the collection and disposal of municipal solid waste from the base. C&D debris, including debris contaminated with hazardous waste, ACM, LBP, or other hazardous components, would be managed in accordance with AFMAN 32-7002 and the installation's ISWMP and HWMP. ERP sites would be managed according to DAF and NGB protocols and federal, state, and local regulations. This resource area has not been carried forward for further, detailed analysis under the Preferred Alternative.
Safety	Yes	Yes	According to AFSEC, the average annual Class A and Class B mishap[14] rate over the last 10 years for the F-16 is 1.81 and 1.24 per 100,000 flight hours, respectively (AFSEC, 2022a). For the F-35, the average annual Class A and Class B mishap rate over the last 10 years is 2.22 (for both) per 100,000 flight hours, respectively (AFSEC, 2022b). The total number of flying hours per year for all F-16 aircraft is projected at 3,000, while the total number of flying hours for all F-35 aircraft is projected at 3,240. Based on these numbers, the potential for

[14] Class A – This event is one that results in fatality, permanent total disability, damage greater than or equal to $2.5 million and/or a destroyed aircraft (excluding unmanned aircraft systems/unmanned aerial vehicles Groups 1, 2, or 3). Class B – The event is one that results in permanent partial disability, hospitalization for inpatient care, and/or damage greater than $600,000 but less than $2.5 million.

Table 3.2-1. Preferred Alternative Specific Issues/Resources Not Carried Forward for Detailed Analysis

Resource Area	Affected Environment Interaction		Summary of Rationale for No Detailed Analysis
	Installation	Airspace	
			aircraft mishaps is low, and standard airfield safety procedures would be implemented as per previous F-16 and A-10 flying missions at Ebbing ANG Base. This resource area has not been carried forward for further, detailed analysis under the Preferred Alternative. Runway Protection Zone compatibility and BASH are addressed in Section 3.4, *Land Use*, and Section 3.8, *Biological Resource*, respectively.
Infrastructure	Yes	No	Infrastructure usage and changes would be consistent with installation development plans and would not involve substantive changes in utility use or infrastructure changes outside the boundary of Ebbing ANG Base (and FSRA). Most development projects associated with the Preferred Alternative involve renovations to existing buildings, and construction of a few new facilities within developed portions of the installation has readily available utility and transportation connections. Additionally, infrastructure changes and use would be comparable to that experienced under previous F-16 and A-10 flying missions. Utility use and impacts to transportation would be minimal, given the anticipated increase in personnel and dependents associated with the FMS PTC. Existing utility infrastructure and road networks (to include the base entry at Leigh Avenue/Phoenix Avenue) have the capacity to accommodate the volume associated with the addition of approximately 30 percent more personnel, as well as temporary increases associated with the transient nature of foreign military training units, without stressing the existing local and regional systems or significantly affecting level of service. Therefore, impacts associated with infrastructure under the Preferred Alternative would not be considered significant, and this resource area has not been carried forward for further, detailed analysis under the Preferred Alternative.
Visual Resources	Yes	Yes	The Preferred Alternative would not cause any physical changes on the ground underlying training airspace and at ranges. Therefore, an analysis of impacts of lasting physical changes to the visual environment under the training airspace was not conducted. The size, orientation, and appearance of proposed new structures conform with surrounding visual context of airfield and industrial-type uses. Surroundings off base areas are visually separated from the construction sites by distance and intervening barriers such as roadways, structures, and vegetation. Addition of new facilities within the context of Ebbing ANG Base (and the FSRA) is not expected to substantively contribute to nighttime lighting or create unusual or brighter-than-normal light sources. The visibility of military aircraft, particularly low-flying aircraft, is extremely transitory. Often, the aircraft is unseen because of the fast onset of the aircraft. Nighttime training already occurs in the environment (some at low altitudes), and overflights are extremely brief. Aircraft lighting at night would cause no measurable change that would interfere with existing activities or contrast or detract from the visual character of the existing environment or dark sky resources. Flares deployed from the aircraft would not pose a visual intrusion either, as flares are small in size and burn only for a few seconds, and the high relative altitude of the flights would make them virtually undetectable to people on the ground. Visual impacts are not discussed further with regard to the Preferred Alternative.
Natural Resources and Energy Supply	Yes	No	Construction, operation, and maintenance activities associated with the Preferred Alternative would consume natural resources and use energy supplies. Building renovations and new construction would comply with the Energy Independence and Security Act by incorporating Leadership in Energy and Environmental Design and sustainable development elements to achieve optimum resource efficiency, sustainability, and

Table 3.2-1. Preferred Alternative Specific Issues/Resources Not Carried Forward for Detailed Analysis

Resource Area	Affected Environment Interaction		Summary of Rationale for No Detailed Analysis
	Installation	Airspace	
			energy conservation. The potential increase in fuel usage associated with corresponding increase in airspace use by the FMS PTC is consistent with ongoing DAF aircraft operations at other installations. The addition of up to 36 aircraft would not be expected to cause demand to exceed available or future supplies of these resources, and impacts to local and/or regional energy supplies would not be expected to be significant. Therefore, natural resources consumption and energy supply were not evaluated further under the Preferred Alternative.
Water Resources (including wetlands and floodplains)	Yes	No	Impacts to installation water resources are discussed in detail in Section 3.9.4. With respect to airspace, no ground-disturbing activities or change in the use of water resources (to include wetlands) would occur in the regions below the airspace proposed for use. Therefore, analysis of water resources under airspace has not been carried forward in for the Preferred Alternative.
Soils and Geology	Yes	No	Ground disturbance would occur, and activities involving more than an acre of land area would require a NPDES permit and associated implementation of sediment and erosion control measures. Based on information from previous analysis of development activities at Ebbing ANG Base (and FSRA) (NGB, 2016b; Garver, 2022), impacts would not be expected to negatively affect soil productivity on the base, and impacts would not be considered significant. Potential soil erosion impacts would be minimized through implementation of permit requirements designed to avoid, minimize, or mitigate soil erosion from construction-related activities (e.g., development of Soil Erosion and Sedimentation Plans, Stormwater Pollution Prevention Plans, use of sediment erosion control mechanisms, etc.). This resource area is not analyzed further under the Preferred Alternative.

Key: 188 WG = 188th Wing; ACM = asbestos-containing materials; AFFF = aqueous film-forming foam; AFGM = Air Force Guidance Memorandum; AFMAN = Air Force Manual; AFSEC = Air Force Safety Center; ANG = Air National Guard; ARANG = Arkansas Air National Guard; BASH = Bird Aircraft Strike Hazard; C&D = construction and demolition; DAF = Department of the Air Force; dB = decibels; DoD = Department of Defense; ERP = Environmental Restoration Program; FMS = Foreign Military Sales; FSRA = Fort Smith Regional Airport; HWMP = Hazardous Waste Management Plan; IFR = Instrument Flight Rules; ISWMP = Integrated Solid Waste Management Plan; LBP = lead-based paint; L_{dnmr} = onset rate-adjusted monthly day-night average sound level; MOA = Military Operations Area; NGB = National Guard Bureau; NPDES = National Pollutant Discharge Elimination System; PFAS = per- and polyfluoroalkyl substances; PFOA = perfluorooctanoic acid; PFOS = perfluorooctane sulfonate; PTC = Pilot Training Center; ROI = region of influence; SUA = Special Use Airspace; VFR = Visual Flight Rules; USAF = United States Air Force

3.3 NOISE

Although degradation of the acoustic environment (noise) can affect several resource areas, this section focuses on potential noise impacts on human annoyance and health. Noise impacts on biological resources (e.g., wildlife), cultural resources, land use and recreation, socioeconomics, and environmental justice/protection of children are discussed in sections dedicated to those resources. Volume II, **Appendix C**, *Noise Supporting Information*, defines terms used to describe the noise environment, as well as methods used to calculate noise levels and assess potential noise impacts. A summary of noise metrics used in this EIS is also provided below. In accordance with DoD and FAA policy, multiple noise measurement metrics are used in this EIS to describe the acoustic environment and predict noise impacts. These noise metrics are as follows.

- Decibels (dB) are a unit of measure used to describe sound intensity. Those dB levels that match the range of human hearing are denoted as "A-weighted decibels" or dBA. All noise

levels stated in this EIS can be assumed to be dBA unless denoted otherwise. Sounds that are felt as well as heard, such as sonic booms, are described with C-weighted decibels (dBC), which emphasize low-frequency sound energy.

- Day-Night Average Sound Level (DNL) combines the intensity and durations of noise events with the number of events over a 24-hour period to yield a single number descriptor. The DNL metric applies a 10 dB penalty to noises that occur between the hours of 10:00 p.m. and 7:00 a.m. This penalty reflects the fact that nighttime noise is more disruptive to activities like sleeping and less masked by the noise of typical daytime activities. DNL is very good for comparing one site to another by an overall daily exposure, but individual events are averaged together and cannot be distinguished using this metric. In this EIS, DNL is calculated for an average annual day (i.e., a day with 1/365 of total annual operations) and is equivalent to the Yearly DNL (YDNL) metric referenced in FAA guidelines.
- Onset Rate-Adjusted Monthly Day-Night Average Sound Level (L_{dnmr}) is a version of DNL modified to account for the effects of operational noise in training airspace. The metric L_{dnmr} adds up to 11 dB to the noise levels of overflights at low altitude and high airspeed to account for the potential "surprise factor" associated with sudden onset noise. For this analysis, SUA operations were distributed equally among all 12 months, such that the "busy month" operations tempo is the same as an "average month" operations tempo. The onset-rate penalty, which is incorporated into the L_{dnmr} metric but is not included in the DNL metric, is important for the accurate assessment of community reaction to low-altitude flying operations.
- C-Weighted Day-Night Average Sound Level (CDNL) is a DNL computed for impulsive noise such as sonic booms. The range is shifted to emphasize low-frequency sounds.
- Sound Exposure Level (SEL) expresses the maximum sound intensity and duration by compressing the total sound exposure for an individual event into a single second.
- Maximum Noise Level (L_{max}) is the highest sound level measured during a single event. As an aircraft approaches, the sound increases as the distance decreases, then the opposite occurs as the plane moves away. L_{max} would typically be the sound intensity when the aircraft is the closest.
- Equivalent Noise Level (L_{eq}) represents noise intensity (in decibels) averaged over a specified time. This is useful for considering noise effects during a specific time period such as an 8-hour school day (denoted L_{eq-8hr} and measured from 8:00 a.m. to 4:00 p.m.).
- Peak Sound Levels (denoted as L_{pk} or dBP) are used to describe individual noise events, such as munitions firing, where the noise arises very suddenly from background. Peak sound levels are typically not frequency weighted, because low-frequency noise energy components (i.e., noise energy that may be felt more than it is heard) are an important factor in determining the impacts of peak sound levels.

3.3.1 Resource-Specific Analysis Methodology

3.3.1.1 Base Vicinity

Military aircraft noise levels near the bases were modeled using NOISEMAP, version 7.3. At FSRA, which is collocated with Ebbing ANG Base, civilian aircraft operations noise levels were modeled using FAA's Aviation Environment Design Tool (AEDT), version 3d. Both models reference databases of field-measured sound levels generated by each aircraft type in various flight configurations. Noise level results generated by NOISEMAP and AEDT were summed to

yield overall noise levels. NOISEMAP runs used F-35 and F-16 engine power, airspeed, and altitude profiles based on input from pilots. Flight paths, pattern altitudes, and other operational parameters used in modeling were based on local flying procedures. Because there is not currently a flying mission at Ebbing ANG Base, local procedures prior to the loss of the A-10 flying mission were used. Areas exposed to elevated DNL are shown using contours at 5 dBA increments from 60 dBA to 85 dBA. Elevated DNL implies that overflight noise is particularly frequent and intense. In general, noise levels are highest on and near the airfield and decrease with distance from the airfield. Frequently used flight paths are often reflected by elevated time-averaged noise levels.

The number of off-base residents within each 5 dBA DNL increment from 65 dBA to 85 dBA was estimated using U.S. Census Bureau's 2019 American Community Survey data at the block group level. First, the fraction of each census block that occurs within each noise level increment was calculated. Next, the census block's population was apportioned to inside or outside of the noise level increment based on the fraction of the census block affected. The accuracy of the population estimates was improved by excluding areas not classified as being used for residential purposes. This method assumes an even distribution of population within the residential portions of census blocks. The U.S. Census counts permanent residents; non-permanent residents are not counted using this method.

In addition, the DAF is incorporating FAA's requirements outlined in FAA Order 1050.1F for determining significant noise impacts associated with the Proposed Action under the Preferred Alternative as well as to depict noise contours and compatible land use impacts. A significant impact would be an increase of 1.5 dB DNL within a noise-sensitive land use that is already exposed to noise at or above 65 dB DNL noise levels or exposure to noise at or above 65 dB DNL due to an increase of 1.5 dB DNL or greater when compared to the No Action Alternative. For example, a significant impact would be an increase from 65.5 dB DNL to 67 dB DNL or an increase from 63.5 dB DNL to 65 dB DNL.

3.3.1.1.1 Annoyance

Annoyance is the most common impact associated with aircraft noise. Social surveys have found that, in areas exposed to higher DNL, individuals are more likely to become highly annoyed by the noise (see Volume II, **Appendix C**, *Noise Supporting Information*, for additional details). A recent nationwide survey conducted by FAA suggests that people are currently more likely to represent themselves as being highly annoyed than was indicated in older social surveys when exposed to the same aircraft DNL (FAA, 2022b). Individuals have variable sensitivity to noise depending on a number of factors. Extreme examples of noise sensitivity can be found in people on the autism spectrum or those afflicted with post-traumatic stress disorder.

3.3.1.1.2 Speech Interference

Interference with conversation and other communication-related activities is one of the most common complaints received about noise. Communication could be interrupted when background noise levels (e.g., the noise generated by aircraft overflights) exceed 50 dB L_{max}. The number of speech interference events is quantified by the average number of daytime (7:00 a.m. to 10:00 p.m.) events per hour exceeding 50 dB L_{max}. Typical residential construction

accounts for 15 or 25 dB of noise attenuation (i.e., windows open or closed, respectively) (DoD Noise Working Group, 2013b).

3.3.1.1.3 Classroom Interference

Noise can interfere with learning by interfering with communication and by disrupting concentration. American National Standards Institute (ANSI) guidelines recommend limiting background transportation noise levels to 35 to 40 dB L_{eq} (depending on classroom size) and single events to less than 50 dB L_{max} (ANSI, 2009). Noise generated by sources other than aircraft (e.g., ground vehicle traffic, air conditioning systems, etc.) are outside of the scope of this analysis and are assumed to be minimal. This EIS provides the indoor $L_{eq\text{-}8hr}$ and average number of events per hour exceeding 50 dB L_{max} during the school day (8:00 a.m. to 4:00 p.m.) with windows closed and with windows open in accordance with DoD Noise Working Group guidance (DoD Noise Working Group, 2013b).

3.3.1.1.4 Sleep Disturbance

Lack of quality sleep has the potential to affect health and concentration. This EIS includes the probability of being awakened at least once per night by overflights occurring between 10:00 p.m. and 7:00 a.m. (when most people sleep). Following a procedure published by the ANSI, the probability of being awakened by each overflight type was first calculated based on the military aircraft overflight SEL (ANSI, 2008). Civilian aircraft overflight SEL values were not included in sleep disturbance calculations at FSRA because they rarely exceed levels at which sleep disturbance is common. Next, the probabilities of being awakened by each type of event were summed to determine overall probability of being awakened at least once per night. The method of sleep disturbance estimation was rescinded by ANSI in 2018, largely because it overpredicts impacts in certain situations (ANSI, 2018). However, the method has not been replaced and remains the best available method prediction of sleep disturbance due to aircraft overflight noise. Results are presented for people sleeping indoors with windows open and for people sleeping indoors with windows closed. The calculations account for 15 dB of structural noise-level reduction with windows open and 25 dB of structural noise-level reduction with windows closed.

3.3.1.1.5 Potential for Hearing Loss

Risk of noise-related hearing loss risk has been studied extensively, with most studies having been conducted in workplace environments. Populations exposed to noise greater than 80 dB DNL are at the most risk of potential hearing loss, and DoD policy calls for estimation of long-term noise-induced permanent threshold shift (NIPTS) risk in such areas using a process defined in U.S. Environmental Protection Agency (USEPA) *Guidelines for Noise Impact Analysis* (Undersecretary of Defense, 2009). A permanent threshold shift is a change in the lowest sound level audible that does not disappear over time. Some hearing loss is normal as people age, and the NIPTS is specifically defined as the difference in threshold shifts between people exposed to noise and those who are not exposed. Numerically, the NIPTS is the change in threshold averaged over several frequencies that can be expected from exposure lasting 8 hours per day, 5 days per week, starting at age 20 and continuing for 40 years. Because individuals' sensitivity to noise varies, NIPTS is estimated for a person with average sensitivity and for someone in the most sensitive 10 percent of the population. Many people spend at least part of their day indoors, where aircraft noise levels are lower. A 2-year USEPA-sponsored telephone survey of

more than 9,000 persons found that the average American spends approximately 87 percent of their time indoors (Klepeis et al., 2001). This percentage was found to be fairly constant across the contiguous United States. **Table 3.3-1** shows the "average NIPTS" and the "10th percentile" NIPTS as a function of 24-hour equivalent noise level (L_{eq24}) if the person is fully exposed to the noise level at his or her residence (i.e., outdoors 100 percent of the time) or if he or she is outdoors for the national average 13 percent of the day. It was assumed for the purposes of this analysis that residents would remain at their residences 24 hours per day, 365 days per year.

Table 3.3-1. Estimated Average NIPTS and 10th Percentile NIPTS as a Function of L_{eq24}

L_{eq24} (dB)	100 Percent of Time Outdoors		National Average Percentage of Time Outdoors	
	Average NIPTS (dB) [a], [b]	10th Percentile NIPTS (dB) [b]	Average NIPTS (dB) [b]	10th Percentile NIPTS (dB) [b]
79–80	2.5	6.0	N/A [c]	N/A [c]
80–81	3.0	7.0	N/A [c]	N/A [c]
81–82	3.5	8.0	N/A [c]	N/A [c]
82–83	4.0	9.0	1.0	3.5
83–84	4.5	10.0	1.0	4.0
84–85	5.5	11.0	1.5	4.5
85–86	6.0	12.0	2.0	5.5
86–87	7.0	13.5	2.5	6.5
87–88	7.5	15.0	3.0	7.0
88–89	8.5	16.5	3.5	8.0
89–90	9.5	18.0	4.0	9.0

Sources: (Klepeis et al., 2001; USEPA, 1982)

Key: dB = decibels; DoD = Department of Defense; L_{eq24} = 24-hour equivalent noise level; N/A = not applicable; NIPTS = noise-induced permanent threshold shift

Notes: a. Relationships between L_{eq24} and NIPTS as stated in DoD Noise Working Group guidance (DoD Noise Working Group, 2013a)

b. NIPTS values are rounded to the nearest 0.5 dB.

c. Equivalent exposure noise level is below the threshold at which NIPTS has been demonstrated to occur.

To put these numbers in perspective, changes in hearing level of less than 5 dB are generally not considered noticeable or significant. Furthermore, there is no known evidence that a NIPTS of 5 dB is perceptible or has any practical significance for the individual. Lastly, the variability in audiometric testing is generally assumed to be plus or minus 5 dB (USEPA, 1974). The preponderance of available information on risk of hearing loss for the adult working population is from the workplace, with continuous exposure throughout the day for many years. According to a report by Ludlow and Sixsmith (1999), there were no significant differences in audiometric test results between military personnel who as children had lived in or near stations where jet operations were based and a similar group who had no such exposure as children (Ludlow & Sixsmith, 1999). Thus, for the purposes of hearing loss analysis, it could be assumed that the limited data on hearing loss are applicable to the general population, including children, and provide a conservative estimate of hearing loss.

3.3.1.1.6 Workplace Noise

This analysis assesses potential impacts in consideration of applicable workplace noise regulations and the programs established to enforce them.

3.3.1.1.7 Nonauditory Health

The current state of scientific knowledge cannot yet support inference of a causal or consistent relationship between aircraft noise exposure and nonauditory health consequences for

exposed residents. The large-scale *Hypertension and Exposure to Noise Near Airports Study* (Jarup et al., 2008) and the recent studies by Hansell et al. (2013) and Correia et al. (2013) offer indications, but it is not yet possible to establish a quantitative cause and effect based on the currently available scientific evidence. These summary conclusions are supported by extensive reviews of recent literature conducted by several groups (Federal Interagency Committee on Aviation Noise, 2018; Basner et al., 2017). Therefore, nonauditory health effects are not discussed further in this analysis.

3.3.1.1.8 Structural Damage

In general, structural damage is possible only for non-impulsive sounds that last more than 1 second at an unweighted sound level greater than 130 dB (Committee on Hearing, Bioacoustics and Biomechanics, 1977). Noise at this intensity and duration does not typically occur anywhere except on the flightline immediately adjacent to aircraft. Sonic booms are impulsive sounds that are associated with an increased risk of structural damage at overpressures greater than 4 pounds per square foot. Supersonic operations over land at altitudes greater than 30,000 feet above MSL, such as would occur under the Preferred Alternative, do not generate sonic booms of sufficient intensity to pose a risk to structures. Because the risk to structures associated with proposed aircraft operations is uniformly minimal, the potential for structural damage due to noise is not discussed further in this analysis.

3.3.1.2 Airspace

3.3.1.2.1 Subsonic

The MR_NMAP computer model was used to calculate L_{dnmr} and DNL values for each modeled airspace unit and MTR. Results reflect summed noise contributions from multiple airspace units, where units overlap. For airspace environments where noise levels are calculated to be less than 45 dB L_{dnmr}, the noise levels are stated as "<45." Time-averaged outdoor sound levels less than 45 dB L_{dnmr} are substantially less than any currently accepted guidelines for aircraft noise land use compatibility. As discussed under land use, most of the guidelines for the acceptability of aircraft noise are on the order of 65 dB and greater.

3.3.1.2.2 Supersonic

Aircraft exceeding the speed of sound create a sonic boom, but the sonic boom does not always reach the ground. In a typical atmospheric profile, sonic booms travelling downwards propagate through increasingly dense layers of air and are bent upward. Sonic booms generated at high altitudes (e.g., 30,000 MSL) often do not reach the ground and, if they do reach the ground, have diminished in intensity such that they pose minimal risk of structural damage. Modeling of supersonic flight activity was conducted using the algorithms contained in the BOOMAP computer model, as adjusted to account for supersonic floor altitude. This EIS assesses the maximum CDNL levels in applicable airspace against land use compatibility thresholds applicable to supersonic noise.

3.3.1.2.3 Munitions

Munitions noise was assessed using the Air Gunnery Noise Model, and peak noise levels are reported for acoustically average atmospheric conditions. Peak levels exceeding 115 dBP are typically associated with a moderate likelihood of complaints, and levels exceeding 130 dBP are associated with a high likelihood of complaints (Army Regulation 200-1).

3.3.2 Preferred Alternative Affected Environment

3.3.2.1 Ebbing ANG Base and Surrounding Area

The acoustic environment on Ebbing ANG Base (and FSRA) and in the immediately surrounding area is dominated by aircraft operations. The area surrounding Ebbing ANG Base has experienced military aircraft noise in the past. In 1988 the Base hosted the F-16A, and then upgraded its F-16As to F-16Cs in 2000. In 2005, the Base converted to the A-10 Thunderbolt II "Warthogs" and, in 2007, to the A-10C. In 2013, the Base converted from the A-10C Thunderbolt II fighter mission to an MQ-9 Reaper remotely piloted aircraft, intelligence, surveillance and reconnaissance and targeting wing, which involved the loss of hosted flying assets. Although the 188 WG does not currently operate aircraft from Ebbing ANG Base, transient military aircraft and civilian aircraft operations occur frequently on the collocated FSRA runways. Under current conditions, FSRA supports 34,446 aircraft operations per year, of which 7,921 are military transient operations and the remainder are civilian operations (**Table 2.2-1**, Current and Proposed Aircraft Operations at Fort Smith Regional Airport, Arkansas).

Ebbing ANG Base and FSRA also support noise-generating operations of ground vehicles (e.g., delivery vehicles, air passenger ground transport) and equipment use (e.g., heating ventilation and air conditioning systems). These non-aircraft operations contribute to an overall acoustic environment typical of a busy airport. The area surrounding Ebbing ANG Base and FSRA includes urbanized areas as well as undeveloped areas. The National Park Service (NPS) conducted a large-scale study linking measured sound levels to characteristics of the environment (e.g., land cover, nighttime light level) and generated a nationwide ambient sound map (NPS, 2020). The study shows that nearby human activities are a primary factor in predicting ambient noise levels. Time-averaged daytime ambient noise levels in urbanized areas are predicted to be approximately 52 dB, while less developed areas in the vicinity of Ebbing ANG Base are predicted to be as low as 40 dB.

3.3.2.2 Fort Smith Regional Airport

The City of Fort Smith, Arkansas, owns FSRA. Ebbing ANG is a tenant on FSRA. As the owner/airport sponsor of FSRA, the City prepared a Noise Compatibility Plan (NCP) for the airport in 1989, updating it in 1997. The NCP was prepared in accordance with Title 14, CFR, Part 150 (Part 150), "*Airport Noise Compatibility Planning,*" the implementing regulations of the Aviation Safety and Noise Abatement Act of 1979, as amended. Part 150 provides a voluntary process an airport owner/sponsor may use to plan for compatible land use around civil airports and address identified noise impacts from airport users. It is important to note that an NCP prepared by an airport owner/sponsor pursuant to 14 CFR Part 150 is not intended to mitigate project-specific impacts. The NCP identifies and recommends measures for addressing noise impacts on noise-sensitive land uses from the typical day-to-day operations of a civil airport. If an airport owner/sponsor develops an NCP (NCPs require FAA approval) and the Noise Exposure Maps developed as part of that process identify noise-sensitive land uses impacted by the day-to-day operations of the airport, the airport owner/sponsor may apply to FAA for financial assistance under the Airport Improvement Program to support implementation of measures identified in the NCP. However, financial assistance under the Airport Improvement Program is dependent on eligibility requirements and funding availability.

3.3.2.3 Affected Airspace

Current subsonic aircraft noise levels beneath primary training airspace units and MTRs are below 65 dB L_{dnmr} (**Figure 3.3-1**). Noise levels when no military operations are under way (i.e.,

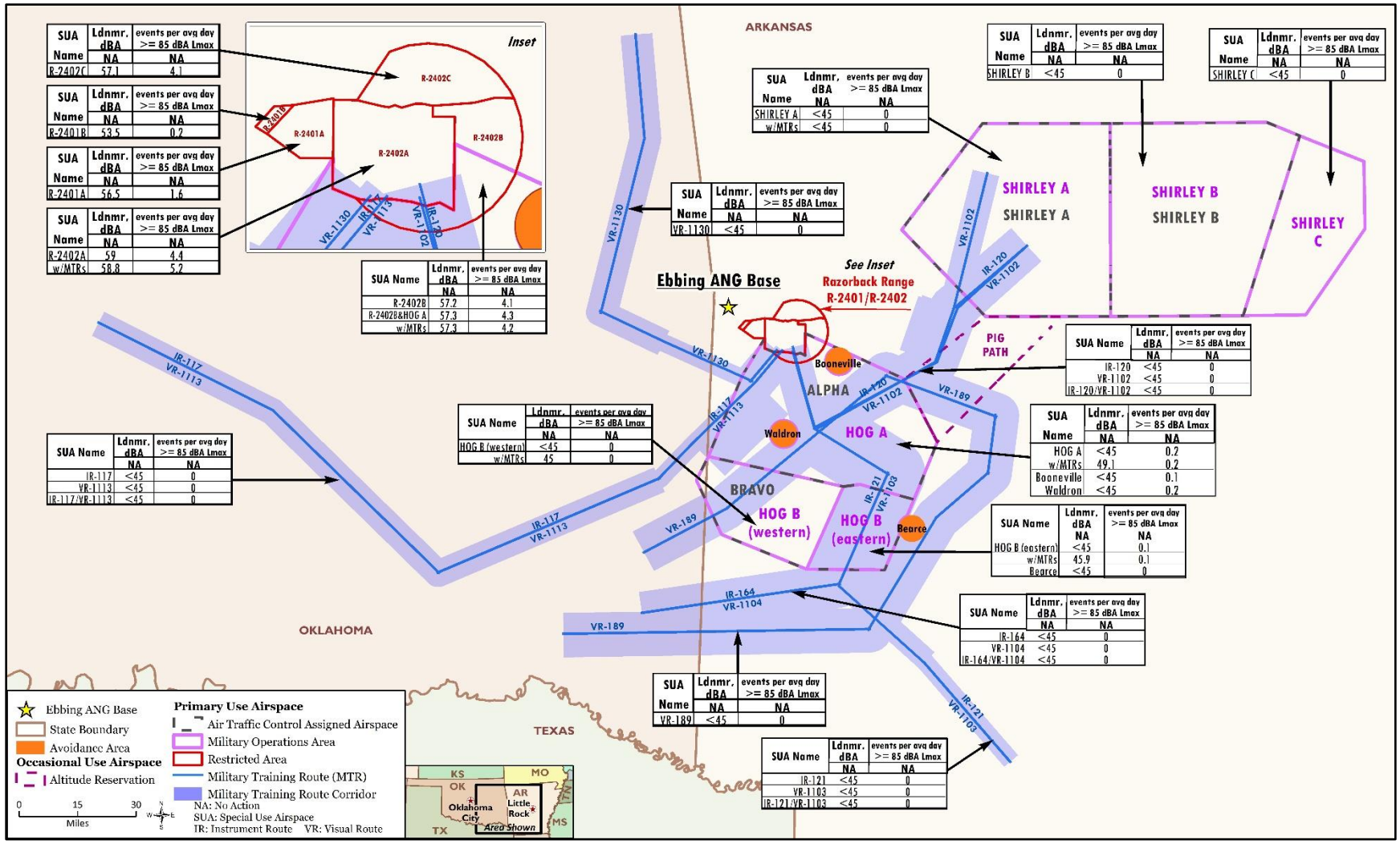


Figure 3.3-1. Ebbing ANG Base Airspace Noise Levels Under Current Conditions (denoted "NA")

Sources: (Ebbing ANG Base, 2021; FAA, 2021a; FAA, 2021b; ESRI Data & Maps, 2019c; BRRC, 2022a)

ambient noise levels) are low in training airspace. Based on results of a study conducted by the NPS, time-averaged sound levels in developed portions of these areas are 48 dB, while remote portions could be 33 dB (NPS, 2020). While ambient sound levels predicted by the NPS are stated using a median sound level (including both times of quiet and louder sounds), they are not directly comparable to the L_{dnmr} metric. However, the range of values does provide a useful description of ambient conditions in the area of interest. The number of events per average day exceeding 85 dB L_{max} is as high as 1.1. Users of the airspace include Tulsa-based F-16 aircraft, Blue Air flights from Ebbing ANG Base, and a wide variety of transient military aircraft.

Under current conditions, there are a total of 5,211 airspace operations in the training airspace. Supersonic operations at altitudes above 30,000 feet MSL in ATCAAs overlying the Hog and Shirley MOAs generate sonic booms that occasionally reach the ground. These occasional, low-intensity booms result in noise levels below 45 dB CDNL. Although sonic booms are sometimes heard, their effects are minimal. Air-to-ground munitions use at Razorback Ranges generates peak noise levels that are below 115 dBP at the closest noise-sensitive locations (residences located more than 2 miles north of the air-to-ground gunnery targets). Noise levels below 115 dBP are associated with a low risk of complaints.

3.3.3 No Action Alternative

Noise levels within the affected environment under the No Action Alternative reflect actions that are expected to have occurred by CY 2029. These are described in Section 3.12.2.1, *Cumulative Impacts, Noise*. Implementation of the No Action Alternative (i.e., no beddown of the FMS PTC at Ebbing ANG Base) would not result in any additional impacts outside those described under Cumulative Impacts.

3.3.4 Preferred Alternative Environmental Consequences

Military aircraft noise levels modeled in this section reflect the program of record number of F-35A, F-35B, and F-16 aircraft operating at Ebbing ANG Base. As noted in Section 2.2, *Aircraft Operations*, the number of aircraft of each type operating from Ebbing ANG Base would vary over time as a result of various flying units arriving to and departing from the base. The program of record is the maximum number of aircraft expected to be operating at the base at any given time and is expected to have been reached in CY 2029; the noise environment within the affected environment at that time would be expected to be as described in Section 3.12.2.1, *Cumulative Impacts, Noise*.

The Preferred Alternative involves aircraft operations, personnel changes, and facilities construction/renovation. Aircraft operations noise, which would affect both the installation and surrounding areas, is discussed in detail. Increases in manpower and construction/renovation activity on Ebbing ANG Base would result in noise level changes, but those changes would occur primarily within installation boundaries and are not discussed in detail. Increased personnel at Ebbing ANG Base would result in increased ground vehicle movements and noise-generating activities. Construction projects would result in localized increases in noise levels while the projects are under way. Heavy construction equipment, such as a dozer, generate maximum noise levels of approximately 85 dB at a distance of 50 feet (Federal Highway Administration, 2006). Construction noise may be disturbing in nearby portions of the installation but would be consistent with the soundscape of an active military installation. Because noise impacts associated with increased personnel and construction activities would be limited to on-installation areas, which are not noise sensitive, these activities are not analyzed further.

3.3.4.1 Ebbing ANG Base and Surrounding Area

The F-35A, F-35B, and F-16 aircraft that would begin regular operations at Ebbing ANG Base/FSRA under the Preferred Alternative are high-performance tactical aircraft and are very loud. The exact noise level experienced on the ground during an overflight depends not only on the aircraft type but on how the aircraft is flown. For example, aircraft departures that make use of the afterburner generate a different noise signature than departures that do not use the afterburner. Use of the afterburner allows the aircraft to accelerate faster, and reach takeoff airspeeds earlier, than standard military power departures. During afterburner takeoffs, the aircraft typically leaves the ground sooner and is at slightly higher altitudes throughout the climb out compared to standard military power takeoffs. For this EIS, the DAF evaluated three different scenarios for F-35A and F-35B afterburner use: (1) 5 percent of departures, (2) 50 percent of departures, and (3) 95 percent of departures (hereinafter referred to as the 5%, 50%, and 90% afterburner scenarios).

During afterburner takeoffs, F-35 pilots typically turn the afterburner off at approximately 10,000 feet from brake release to conserve fuel and avoid accelerating beyond airspeeds allowable near an installation. After turning the afterburner off, the aircraft continues its climb at standard military power (i.e., full power without afterburner). At locations perpendicular to the runway, the increased noise generated by the afterburner results in maximum noise levels being slightly louder, as measured in A-weighted sound levels, than standard military power takeoffs.However, locations further down the aircraft flight path are overflown at slightly higher altitudes and the same engine power setting during afterburner takeoffs than during standard military power takeoffs. As a result, afterburner takeoff overflight noise levels are often slightly less loud than standard military power takeoff noise levels at locations beyond the end of the runway due to the difference in the distance between the aircraft and the noise-sensitive location.

Table 3.3-2 lists individual calculated overflight noise levels for F-35A, F-35B, F-16C, and representative military transient aircraft at a representative location near the installation (Vineyard Community Church). At this location, the F-35A, F-35B, and F-16C afterburner departures would generate noise levels comparable to those generated by military power departures of the same aircraft type. Overflights of this location during arrivals and closed patterns would be flown at reduced engine power settings but are also typically at lower altitudes than departure overflights. As a result, arrival and closed-pattern overflights sometimes generate noise levels comparable to departure overflight events. Certain transient military aircraft types that operate at Ebbing ANG Base under current conditions (e.g., T-38 and F/A-18E/F) generate noise levels comparable to those generated by F-35A, F-35B, and F-16C aircraft. F-35B aircraft would not conduct STOVL operations, which have a distinctive noise signature, at Ebbing ANG Base.

Table 3.3-2. Individual Overflight Noise Levels at a Representative Location Near Ebbing ANG Base

Aircraft	Operation Type	Engine Power	Distance from Aircraft (feet) [(a)]	L_{max} (dBA)
F-35A (military power)	Departure	100% ETR	1,150	109
F-35A (afterburner power)		150% ETR	1,258	108
F-35B (military power)		100% ETR	1,486	105
F-35B (afterburner power)		150% ETR	1,600	104
F-16C (military power)		93% NC	893	107

Table 3.3-2. Individual Overflight Noise Levels at a Representative Location Near Ebbing ANG Base

Aircraft	Operation Type	Engine Power	Distance from Aircraft (feet) [(a)]	L_{max} (dBA)
F-16C (afterburner power)		93% NC	993	106
Transient T-38C (afterburner power)		99.42% RPM	662	105
Transient F/A-18E/F (afterburner power)		95% NC	3312	97
F-35A	Arrival	60% ETR	481	107
F-35B		55% ETR	455	107
F-16C		84% NC	490	94
Transient T-38C		89% RPM	452	88
Transient F/A-18E/F		84% NC	443	115
F-35A	Closed pattern	80% ETR	1,275	105
F-35B		55% ETR	514	106
F-16C		93% NC	1,259	103
Transient T-38C		95% RPM	487	93
Transient F/A-18E/F		82.2% NC	623	111

Source: (BRRC, 2022a)

Key: % = percent; ANG = Air National Guard; dBA = A-weighted decibels; ETR = engine thrust request; L_{max} = maximum noise level; NC = core engine; RPM = revolutions per minute

Note:

a. During typical afterburner departure, afterburner has been deselected (such that the aircraft is flying at military power) prior to the aircraft passing the location being described in this table.

Several categories of potential noise impacts associated with noise generated by proposed aircraft operations are discussed in Section 3.3.4.1.1, *Annoyance and Land Use Compatibility,* through Section 3.3.4.1.6, *Workplace Noise*.

3.3.4.1.1 Annoyance and Land Use Compatibility

Time-averaged noise levels, quantified using the DNL metric, would increase significantly under the Preferred Alternative as a result of frequent operations by loud aircraft. As shown in **Figure 3.3-2, Figure 3.3-3**, and **Figure 3.3-4**, noise levels exceeding 65 DNL would extend approximately 4 miles from each end of the FSRA main runway. Noise-sensitive areas exposed to noise levels between 60 and 65 dB DNL, which include residences, places of worship, recreational areas, and schools, would also experience substantial aircraft noise, but impacts would be less likely to be considered significant. The crosswind runway would not be used by FMS aircraft under normal conditions, and noise levels along flight paths to and from the crosswind runway would not increase to the same extent as flight paths to and from the main runway. Noise levels are slightly higher under the 95% afterburner scenario than scenarios in which F-35 afterburner use would be limited to 50% or to 5% percent of total departures.

Several social surveys have found that people are consistently more likely to become annoyed by aircraft noise at higher DNL and are less likely to become annoyed at lower DNL (Schultz, 1978; Finegold et al., 1994; Miedema & Vos, 1998). A recent nationwide survey conducted by FAA suggests that people are currently more likely to represent themselves as being highly annoyed than was indicated in older social surveys when exposed to the same aircraft DNL (FAA, 2022b). Noise levels greater than 65 dB DNL are considered incompatible with noise-sensitive land uses, such as residential, in accordance with DoD guidelines. Under the Preferred Alternative, the number of acres of off-base/airport land at greater than 65 dB DNL would increase to 7,112, 7,321, and 8,062 acres for the 5%, 50%, and 95% afterburner scenarios, respectively (**Table 3.3-3**).

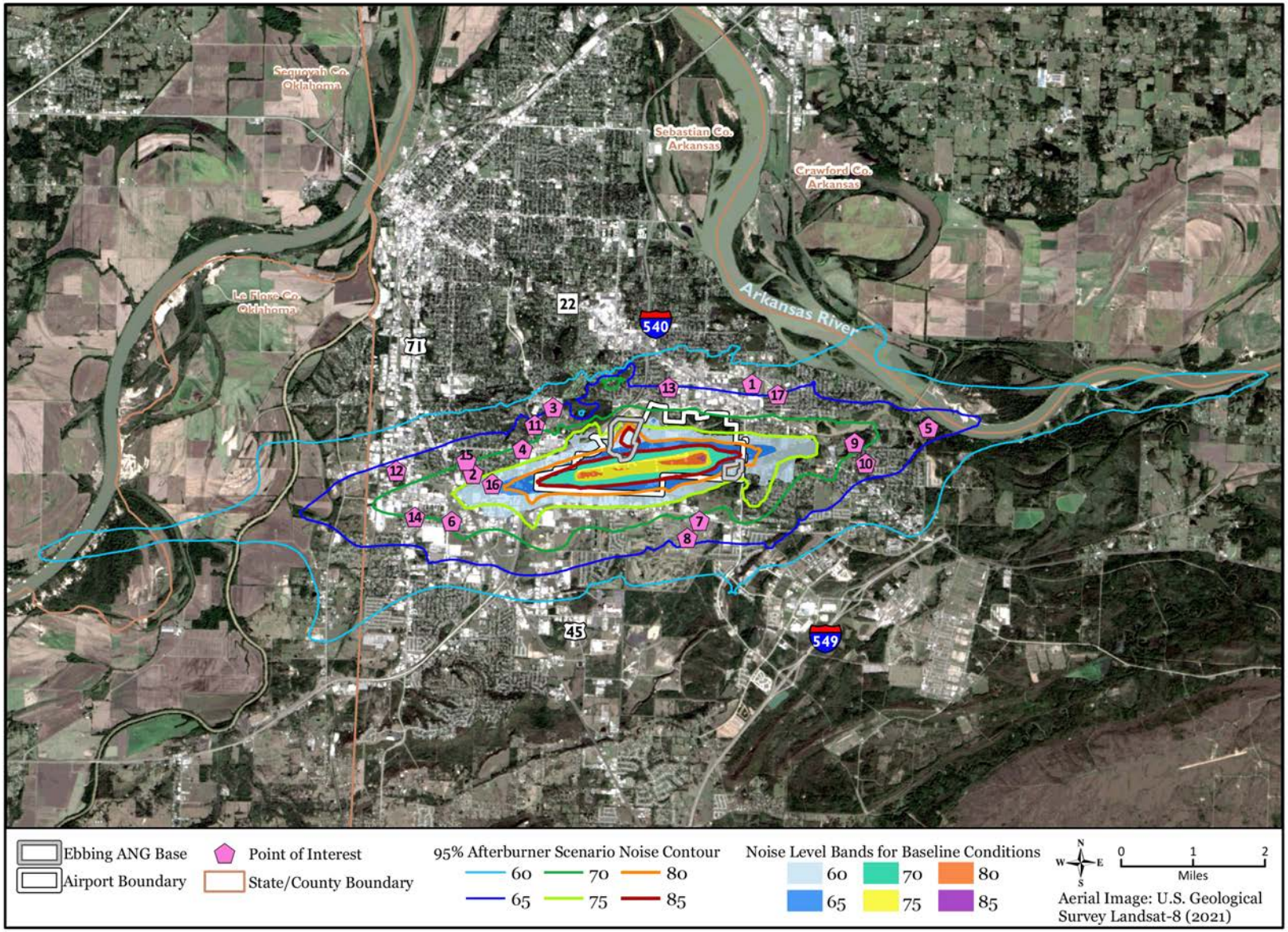


Figure 3.3-2. Noise Contours Under Preferred Alternative, 95% Afterburner Use Scenario Near Ebbing ANG Base

Sources: (Ebbing ANG Base, 2021; USDA-FSA-APFO, 2019b; BRRC, 2022a; ESRI Data & Maps, 2019a; ESRI Data & Maps, 2019b; USGS, 2021)

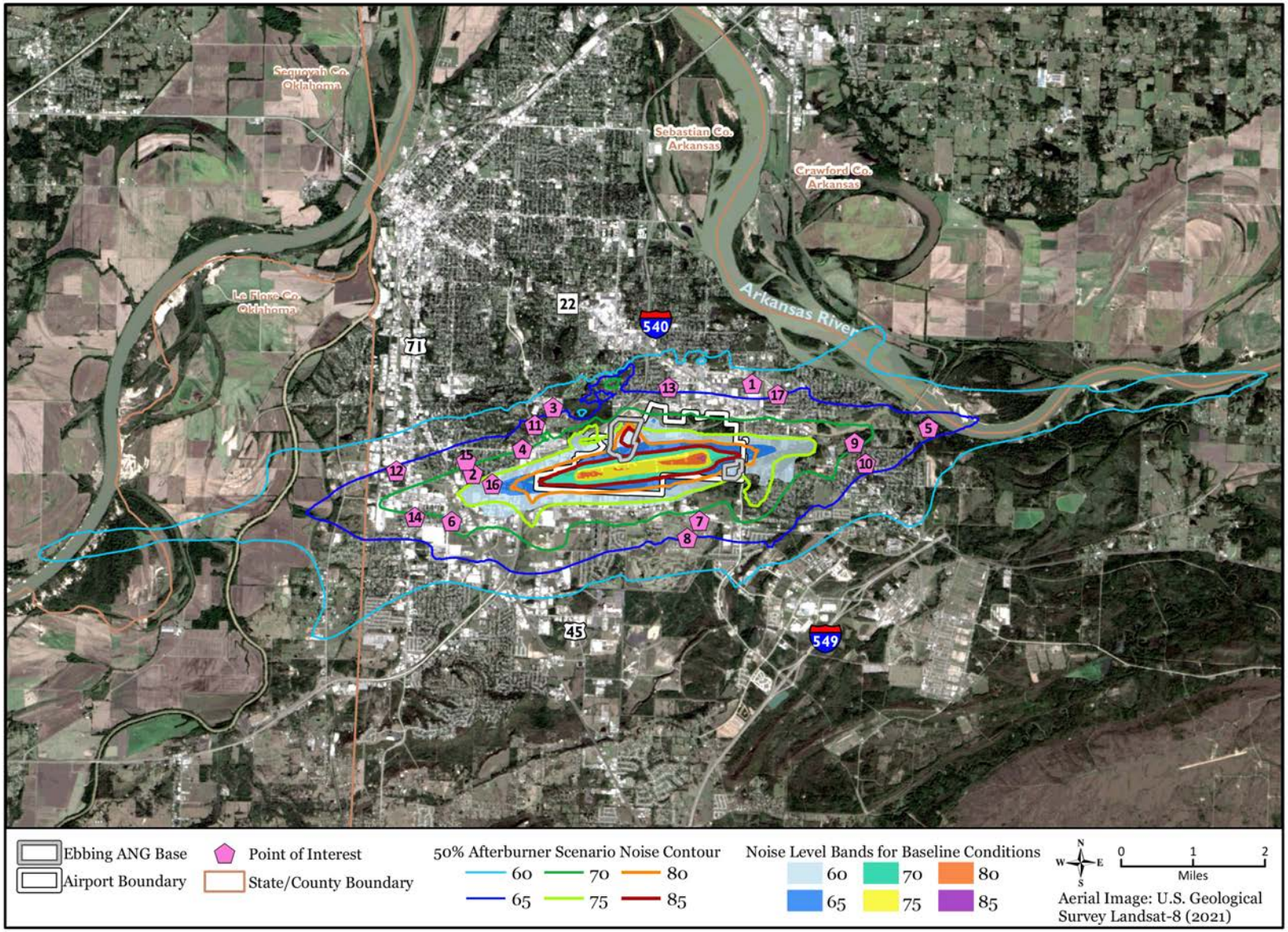


Figure 3.3-3. Noise Contours Under Preferred Alternative, 50% Afterburner Use Scenario Near Ebbing ANG Base

Sources: (Ebbing ANG Base, 2021; USDA-FSA-APFO, 2019b; BRRC, 2022a; ESRI Data & Maps, 2019a; ESRI Data & Maps, 2019b; USGS, 2021)

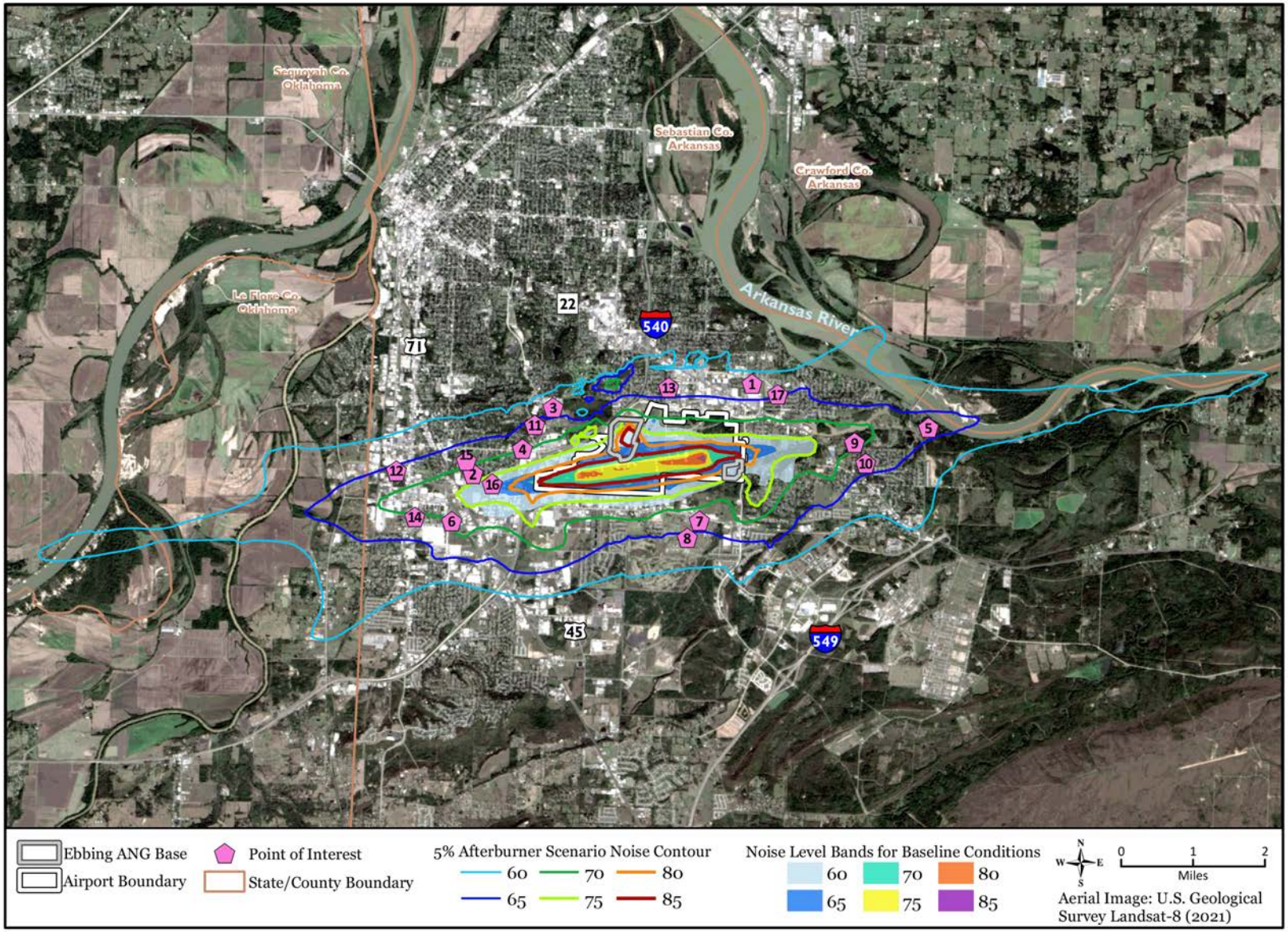


Figure 3.3-4. Noise Contours Under Preferred Alternative, 5% Afterburner Use Scenario Near Ebbing ANG Base

Sources: (Ebbing ANG Base, 2021; USDA-FSA-APFO, 2019b; BRRC, 2022a; ESRI Data & Maps, 2019a; ESRI Data & Maps, 2019b; USGS, 2021)

Table 3.3-3. Off-Base/Airport Acres of Land at 65 dB DNL or Greater Near Ebbing ANG Base Under Preferred Alternative Afterburner Usage Scenarios

DNL (dB)	No Action	Preferred Alternative					
		5% Afterburner Scenario		50% Afterburner Scenario		95% Afterburner Scenario	
	Acres	Acres	Change	Acres	Change	Acres	Change
65–69	202	3,966	3,764	4,055	3,853	4,396	4,194
70–74	5	2,146	2,141	2,178	2,173	2,362	2,357
75–79	0	868	868	942	942	1,093	1,093
80–84	0	132	132	145	145	207	207
≥85	0	0	0	1	1	4	4
Total	207	7,112	6,905	7,321	7,114	8,062	7,855

Source: Data derived from noise analysis and GIS data (see Figure 3.3-2, Figure 3.3-3, and Figure 3.3-4)
Key: ≥ = greater than or equal to; % = percent; ANG = Air National Guard; dB = decibels; DNL = day-night average sound level

The estimated number of people affected by noise levels greater than 65 dB DNL under the 5%, 50%, and 95% afterburner scenarios would be 10,635, 11,221, and 12,720, respectively (**Table 3.3-4**).

Table 3.3-4. Estimated Number of Residents Exposed to Noise Levels Greater Than 65 dB DNL Near Ebbing ANG Base Under the Preferred Alternative Afterburner Usage Scenarios

DNL (dB)	No Action	Preferred Alternative					
		5% Afterburner		50% Afterburner		95% Afterburner	
	Residents	Residents	Change	Residents	Change	Residents	Change
65–69	66	6,993	6,927	7,422	7,356	8,212	8,146
70–74	0	2,796	2,796	2,943	2,943	3,487	3,487
75–79	0	842	842	852	852	1,007	1,007
80–84	0	4	4	4	4	14	14
≥85	0	0	0	0	0	0	0
Total	**66**	**10,635**	**10,569**	**11,221**	**11,155**	**12,720**	**12,654**

Source: Data derived from noise analysis and GIS data (see Figure 3.3-2, Figure 3.3-3, Figure 3.3-4)
Key: ≥ = greater than or equal to; % = percent; ANG = Air National Guard; dB = decibels; DNL = day-night average sound level

Additional noise calculations were run at several representative noise-sensitive locations, which are depicted in **Figure 3.3-2**. Noise levels would exceed 65 dB DNL at 12 of the locations studied under the 5% afterburner scenario, at 13 locations under the 50% afterburner scenario, and at 16 locations under the 95% afterburner scenario (**Table 3.3-5**). Changes in noise level would be considered significant, based on FAA significance criteria, at the 12 locations where the noise level would exceed 65 dB DNL.

Table 3.3-5. Day-Night Average Sound Level at Representative Noise-Sensitive Locations Under the Preferred Alternative

Location Description	ID	No Action	Preferred Alternative					
			5% Afterburner		50% Afterburner		95% Afterburner	
			DNL	Change	DNL	Change	DNL	Change
Valley Behavioral Health Hospital	9	56	71	+15	71	+15	72	+16
Mercy Crest Assisted Living	10	50	67	+17	67	+17	68	+18
Mercy Clinic Primary Care	11	51	65	+14	65	+14	66	+15
Blossoms Rehab and Nursing Center	12	49	66	+17	66	+17	67	+18
Cliff Terrace Church	13	51	63	+12	64	+13	65	+14
Bridge Church	14	53	69	+16	69	+16	70	+17
Trinity Church of the Nazarene	15	55	69	+14	69	+14	70	+15
Vineyard Community Church	16	64	78	+14	78	+14	79	+15
New Life Church	17	50	64	+14	64	+14	65	+15

Table 3.3-5. Day-Night Average Sound Level at Representative Noise-Sensitive Locations Under the Preferred Alternative

Location Description	ID	No Action	Preferred Alternative					
			5% Afterburner		50% Afterburner		95% Afterburner	
			DNL	Change	DNL	Change	DNL	Change
Springhill Park Campground	5	52	67	+15	67	+15	67	+15
Evans Boys and Girls Club	6	56	71	+15	71	+15	71	+15
Parrott Island Waterpark	7	55	67	+12	68	+13	69	+14
Ben Geren Regional Park	8	56	64	+8	65	+9	66	+10
Chaffin Middle School	1	48	62	+14	62	+14	63	+15
Carnall Elementary	2	57	72	+15	72	+15	73	+16
Southside High School	3	49	63	+14	64	+15	65	+16
Raymond Orr Elementary School	4	55	70	+15	70	+15	71	+16

Source: (BRRC, 2022a)
Key: % = percent; + = plus; DNL = day-night average sound level; ID = identification number

3.3.4.1.2 Speech Interference

Overflight events that exceed 50 dB, even momentarily, have some potential to interfere with speech (DoD Noise Working Group, 2013b). The number of potential outdoor speech-interference events would increase by as much as four per average daytime hour under the three afterburner-use scenarios(**Table 3.3-6**). Speech-interference events are brief, lasting only for the duration of the overflight. Speech-interference event-counts assume that the people involved in conversation do not raise their voices to talk over the aircraft noise.

Table 3.3-6. Number of Outdoor Speech-Interference Events per Average Daytime Hour Near Ebbing ANG Base Under Preferred Alternative Afterburner Usage Scenarios

Location Description	ID	No Action	Preferred Alternative					
			5% Afterburner		50% Afterburner		95% Afterburner	
		Events	Events	Change	Events	Change	Events	Change
Valley Behavioral Health Hospital	9	2	6	+4	6	+4	6	+4
Mercy Crest Assisted Living	10	2	5	+3	5	+3	5	+3
Mercy Clinic Primary Care	11	3	7	+4	7	+4	7	+4
Blossoms Rehab and Nursing Center	12	2	5	+3	5	+3	5	+3
Cliff Terrace Church	13	3	7	+4	7	+4	7	+4
Bridge Church	14	2	5	+3	5	+3	6	+4
Trinity Church of the Nazarene	15	3	6	+3	6	+3	7	+4
Vineyard Community Church	16	4	7	+3	7	+3	7	+3
New Life Church	17	3	6	+3	6	+3	6	+3
Springhill Park Campground	5	2	5	+3	5	+3	5	+3
Evans Boys and Girls Club	6	3	6	+3	6	+3	6	+3
Parrott Island Waterpark	7	4	7	+3	7	+3	7	+3
Ben Geren Regional Park	8	3	7	+4	7	+4	7	+4
Chaffin Middle School	1	3	6	+3	6	+3	6	+3
Carnall Elementary	2	3	6	+3	6	+3	7	+4
Southside High School	3	3	7	+4	7	+4	7	+4
Raymond Orr Elementary School	4	4	7	+3	7	+3	8	+4

Source: (BRRC, 2022a)
Key: % = percent; + = plus; ANG = Air National Guard; DNL = day night average sound level; ID = identification number

3.3.4.1.3 Classroom Noise

Noise interference with learning in schools is of particular concern because noise can interrupt communication or interfere with concentration. The DoD Noise Working Group guidelines recommend that exterior noise levels during the school day not exceed 60 dB L_{eq-8hr}, as that would indicate that interior classroom noise levels likely exceed a recommended 40 dB maximum background noise level (DoD Noise Working Group, 2009). Indoor school-day noise levels would be expected to exceed criteria at all four schools studied under all afterburner scenarios (**Table 3.3-7**). As shown in **Table 3.3-8**, the number of noise events with potential to interfere with speech per average daytime hour would increase by as much as four with windows open and by as much as three with windows closed under the afterburner usage scenarios.

Table 3.3-7. School Day Outdoor Equivalent Noise Levels Under Preferred Alternative Afterburner Usage Scenarios

Location Description	ID	No Action	Preferred Alternative					
			5% Afterburner		50% Afterburner		95% Afterburner	
		L_{eq-8hr} (dB)	L_{eq-8hr} (dB)	Change	L_{eq-8hr} (dB)	Change	L_{eq-8hr} (dB)	Change
Chaffin Middle School	1	48	63	+15	63	+15	64	+16
Carnall Elementary	2	58	73	+15	73	+15	74	+16
Southside High School	3	50	64	+14	65	+15	66	+16
Raymond Orr Elementary School	4	56	71	+15	71	+15	72	+16

Source: (BRRC, 2022a)
Key: < = less than; % = percent; + = plus; dB = decibels; ID = identification number; L_{eq-8hr} = 8 hour equivalent noise level

Table 3.3-8. School Day Potential Speech Interference Events Under Preferred Alternative Afterburner Usage Scenarios

Location Description	ID	No Action (Windows Open)	Preferred Alternative (Windows Open)					
			5% Afterburner		50% Afterburner		95% Afterburner	
		Events	Events	Change	Events	Change	Events	Change
Chaffin Middle School	1	-	3	+3	3	+3	4	+4
Carnall Elementary	2	2	5	+3	5	+3	5	+3
Southside High School	3	-	3	+3	3	+3	4	+4
Raymond Orr Elementary School	4	1	4	+3	4	+3	5	+4
Location Description	**ID**	**No Action (Windows Closed)**	**Preferred Alternative (Windows Closed)**					
			5% Afterburner		50% Afterburner		95% Afterburner	
		Events	Events	Change	Events	Change	Events	Change
Chaffin Middle School	1	-	2	+2	2	+2	2	+2
Carnall Elementary	2	1	3	+2	3	+2	3	+2

Table 3.3-8. School Day Potential Speech Interference Events Under Preferred Alternative Afterburner Usage Scenarios

Location Description	ID	No Action (Windows Open)	Preferred Alternative (Windows Open)					
			5% Afterburner		50% Afterburner		95% Afterburner	
		Events	Events	Change	Events	Change	Events	Change
Southside High School	3	-	2	+2	2	+2	3	+3
Raymond Orr Elementary School	4	-	3	+3	3	+3	3	+3

Source: (BRRC, 2022a)
Key: % = percent; + = plus; dB = decibels; ID = identification number

3.3.4.1.4 Sleep Disturbance

Nighttime flying, which is required training for certain missions, has an increased likelihood of causing sleep disturbance. The lack of quality sleep has the potential to affect health and concentration. The percentage of total operations conducted during the late-night period between 10:00 p.m. and 7:00 a.m. would remain at 4 percent under all action alternative scenarios. However, the overall number of operations would increase by approximately 67 percent under the Preferred Alternative relative to the No Action Alternative, resulting in more late-night flying. The probability of being awakened at least once per night was calculated using a method described in Section 3.3.1.1.4, *Sleep Disturbance*. As shown in **Table 3.3-9**, the maximum likelihood of awakening at any of the locations would increase from 1 percent to 8 percent under the Preferred Alternative afterburner usage scenarios if windows are open. If windows are closed (**Table 3.3-10**), the maximum likelihood at the locations studied would increase from 1 percent to 5 percent. The analysis also accounts for standard building attenuation of 15 dB and 25 dB with windows open and closed, respectively. Sleep disturbance probabilities listed for parks and schools are not intended to imply that people regularly sleep in parks or schools, but instead are indicative of impacts in nearby residential areas.

Table 3.3-9. Percent of People Awakened by Aircraft Noise at Least Once per Night Near Ebbing ANG Base Under Preferred Alternative Afterburner Usage Scenarios With Windows Open

Location Description	ID	No Action (Windows Open)	Preferred Alternative (Windows Open)					
			5% Afterburner		50% Afterburner		95% Afterburner	
		% Awakened	% Awakened	Change	% Awakened	Change	% Awakened	Change
Valley Behavioral Health Hospital	9	1%	6%	+5%	6%	+5%	6%	+5%
Mercy Crest Assisted Living	10	1%	4%	+3%	4%	+3%	5%	+4%
Mercy Clinic Primary Care	11	1%	4%	+3%	4%	+3%	5%	+4%
Blossoms Rehab and Nursing Center	12	1%	5%	+4%	5%	+4%	5%	+4%
Cliff Terrace Church	13	1%	4%	+3%	4%	+3%	5%	+4%
Bridge Church	14	1%	5%	+4%	5%	+4%	6%	+5%
Trinity Church of the Nazarene	15	1%	5%	+4%	5%	+4%	5%	+4%
Vineyard Community	16	1%	8%	+7%	8%	+7%	8%	+7%

Table 3.3-9. Percent of People Awakened by Aircraft Noise at Least Once per Night Near Ebbing ANG Base Under Preferred Alternative Afterburner Usage Scenarios With Windows Open

Location Description	ID	No Action (Windows Open)	Preferred Alternative (Windows Open)					
			5% Afterburner		50% Afterburner		95% Afterburner	
		% Awakened	% Awakened	Change	% Awakened	Change	% Awakened	Change
Church								
New Life Church	17	1%	4%	+3%	4%	+3%	4%	+3%
Springhill Park Campground	5	1%	5%	+4%	5%	+4%	5%	+4%
Evans Boys and Girls Club	6	1%	5%	+4%	5%	+4%	6%	+5%
Parrott Island Waterpark	7	1%	5%	+4%	5%	+4%	5%	+4%
Ben Geren Regional Park	8	1%	5%	+4%	5%	+4%	5%	+4%
Chaffin Middle School	1	1%	4%	+3%	4%	+3%	4%	+3%
Carnall Elementary	2	1%	6%	+5%	6%	+5%	6%	+5%
Southside High School	3	1%	4%	+3%	4%	+3%	4%	+3%
Raymond Orr Elementary School	4	1%	5%	+4%	5%	+4%	6%	+5%

Source: (BRRC, 2022a)
Key: % = percent; + = plus; ANG = Air National Guard; ID = identification number

Table 3.3-10. Percent of People Awakened by Aircraft Noise at Least Once per Night Near Ebbing ANG Base Under Preferred Alternative Afterburner Usage Scenarios With Windows Closed

Location Description	ID	No Action (Windows Closed)	Preferred Alternative (Windows Closed)					
			5% Afterburner		50% Afterburner		95% Afterburner	
		% Awakened	% Awakened	Change	% Awakened	Change	% Awakened	Change
Valley Behavioral Health Hospital	9	0%	4%	+4%	4%	+4%	4%	+4%
Mercy Crest Assisted Living	10	0%	3%	+3%	3%	+3%	3%	+3%
Mercy Clinic Primary Care	11	0%	3%	+3%	3%	+3%	3%	+3%
Blossoms Rehab and Nursing Center	12	0%	3%	+3%	3%	+3%	3%	+3%
Cliff Terrace Church	13	0%	2%	+2%	2%	+2%	3%	+3%
Bridge Church	14	0%	3%	+3%	3%	+3%	4%	+4%
Trinity Church of the Nazarene	15	0%	3%	+3%	3%	+3%	3%	+3%
Vineyard Community Church	16	1%	5%	+4%	5%	+4%	5%	+4%
New Life Church	17	0%	3%	+3%	3%	+3%	3%	+3%
Springhill Park Campground	5	0%	3%	+3%	3%	+3%	3%	+3%
Evans Boys and Girls Club	6	1%	3%	+2%	3%	+2%	4%	+3%
Parrott Island Waterpark	7	1%	3%	+2%	3%	+2%	3%	+2%
Ben Geren Regional Park	8	1%	2%	+1%	3%	+2%	3%	+2%

Table 3.3-10. Percent of People Awakened by Aircraft Noise at Least Once per Night Near Ebbing ANG Base Under Preferred Alternative Afterburner Usage Scenarios With Windows Closed

Location Description	ID	No Action (Windows Closed)	Preferred Alternative (Windows Closed)					
			5% Afterburner		50% Afterburner		95% Afterburner	
		% Awakened	% Awakened	Change	% Awakened	Change	% Awakened	Change
Chaffin Middle School	1	0%	2%	+2%	2%	+2%	3%	+3%
Carnall Elementary	2	1%	4%	+3%	4%	+3%	4%	+3%
Southside High School	3	0%	2%	+2%	2%	+2%	3%	+3%
Raymond Orr Elementary School	4	1%	3%	+2%	3%	+2%	4%	+3%

Source: (BRRC, 2022a)
Key: % = percent; + = plus; ANG = Air National Guard; ID = identification number

3.3.4.1.5 Potential Hearing Loss

The risk of hearing loss was assessed using the methodology prescribed by DoD policy, which is described in Section 3.3.1.1.5, *Analysis Methodology, Potential for Hearing Loss*, and in Volume II, **Appendix C**, *Noise Supporting Information*, Section C.1.2.5, Noise-Induced Hearing Impairment). In accordance with this policy, the 80 dB DNL noise contours were used to identify populations at the greatest risk of hearing loss, and the L_{eq24} metric was used to assess risk of hearing loss.

As stated in Section 3.3.4.1.1, *Annoyance and Land Use Compatibility*, an estimated four people reside in areas affected by 80 dB DNL or greater under the Preferred Alternative 5% and 50% afterburner scenarios. Of the four people affected at 80 dB DNL or greater under both scenarios, an estimated two people reside in areas that would be affected at 79 to 80 dB L_{eq24}, and two people reside in areas affected at 80 to 81 dB L_{eq24}. An estimated 14 people reside in areas exposed to noise levels of 80 dB DNL or greater under the 95% afterburner scenario. Of the 14 people within the 80 dB DNL contour, an estimated 12 people reside in an area exposed to 79 to 80 dB L_{eq24}, and two people reside in an area exposed to 80 to 81 dB L_{eq24}. Affected residential parcels are located off the departure end of RWY 26. The census-based population estimates for these areas could be higher or lower than the actual population.

Zero residential parcels and zero residents are affected at greater than or equal to 84 dB L_{eq24} under any Preferred Alternative sub-alternative. Therefore, noise levels would be below those associated with noticeable hearing loss for people with average sensitivity, as stated in **Table 3.3-1**. A noticeable loss of hearing (i.e., exceeding 5 dB NIPTS) is highly unlikely for any individual.

3.3.4.1.6 Workplace Noise

Workplace noise would continue to be managed in accordance with applicable regulations to minimize hearing-loss risk for people working on Ebbing ANG Base and FSRA. The DAF and FAA hearing conservation programs are designed to protect workers from the harmful effects of hazardous noise by identifying all areas where workers are exposed to hazardous noise and requiring hearing protection and monitoring as necessary. Commercial and industrial areas outside of airport boundaries exposed to noise exceeding potentially hazardous levels would

utilize existing workplace hearing conservation programs to identify and mitigate hearing loss risk among employees. Customers at businesses exposed to noise levels exceeding 80 dB DNL would not be expected to be exposed to these noise levels for sufficient time to pose a risk of long-term hearing loss.

3.3.4.2 Affected Airspace

Noise results under the Preferred Alternative were calculated for areas beneath primary training airspace SUAs, MTRs, and avoidance areas, as well as for areas where multiple training airspaces overlap (**Figure 3.3-5**). Subsonic time-averaged aircraft noise levels (L_{dnmr}) in affected areas would increase by as much as 13 dB under the Preferred Alternative but would remain below 65 dB L_{dnmr} in all areas. The number of overflights per average day that exceed 85 dB L_{max} would increase by as much as 1.3. The highest calculated noise levels would occur in areas that are beneath R-2402B and also multiple MTRs. In these areas, L_{dnmr} would increase to 61.9 dB, and the number of events exceeding 85 dB L_{max} per average day would increase to 5.5.

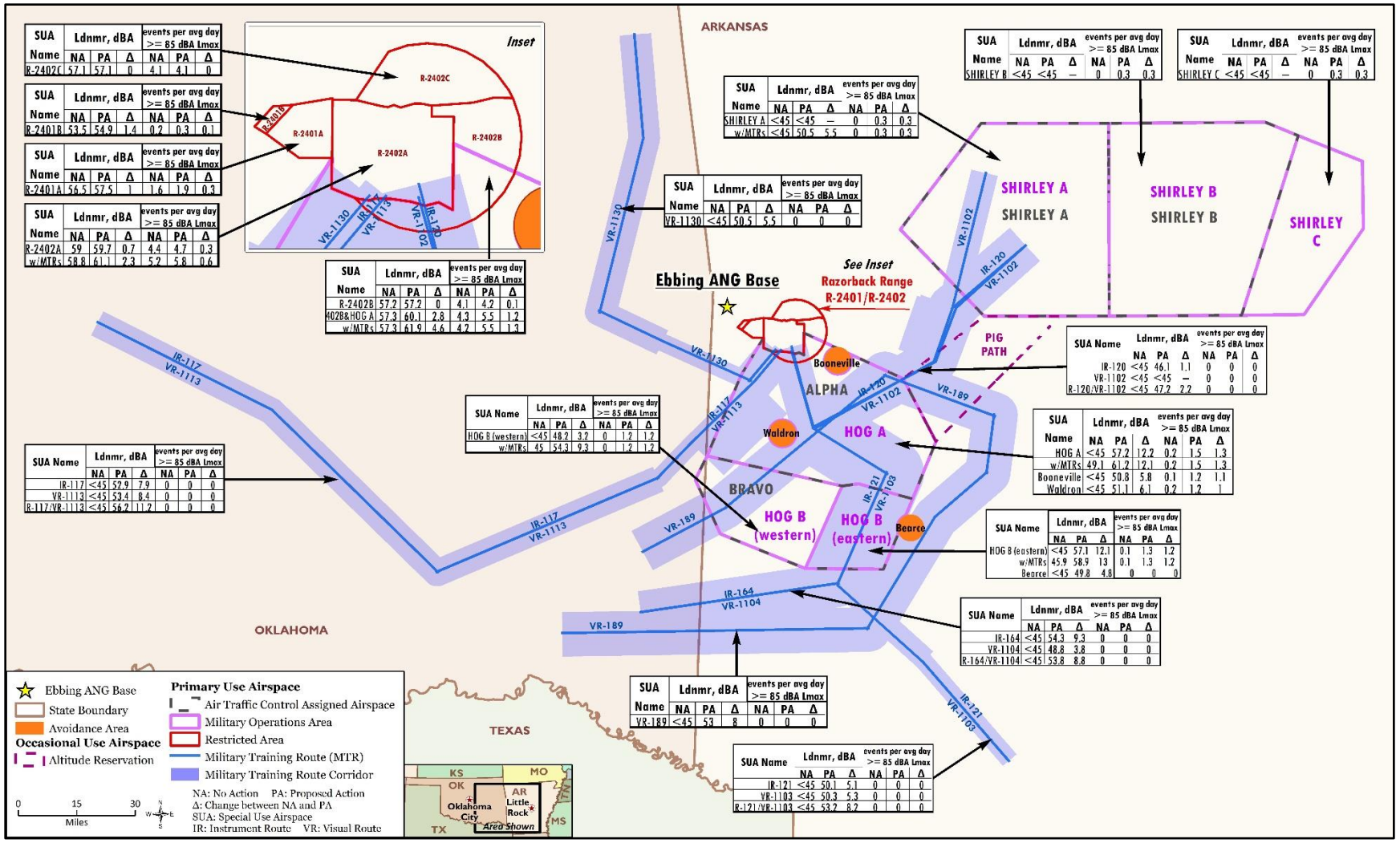
These noise level increases reflect more frequent operations by loud F-35A, F-35B, and F-16 aircraft. As described in Section 2.2, *Aircraft Operations*, the number of airspace operations conducted in Ebbing ANG Base training airspace would increase from 5,211 under the No Action Alternative to 18,489 under the Preferred Alternative. The change in operations tempo and noise levels would be expected to be noticeable to people living beneath the training airspace. Increased overflight noise would be expected to result in increased likelihood of annoyance and activity interference (e.g., speech interference, sleep interference) for people living, working, or recreating beneath the training airspace. Time-averaged noise levels would remain below 65 dB, and noise impacts beneath Ebbing ANG Base training airspace would not be classified as significant.

Under the Preferred Alternative, F-16 and F-35 aircraft would conduct supersonic operations in ATCAAs overlying the Hog and Shirley MOAs at altitudes above 30,000 feet MSL. Sonic booms generated by the proposed operations and ongoing supersonic operations at these altitudes would occasionally reach the ground. Time-averaged noise levels would remain below 45 dB CDNL, and impacts would continue to be minimal.

Air-to-ground munitions use at Razorback Ranges would continue to generate peak noise levels at the closest noise-sensitive locations that are associated with a low risk of complaints (i.e., noise levels below 115 dBP). The closest noise-sensitive locations are residences located more than 2 miles north of the air-to-ground gunnery targets. High-explosive munitions training is not permitted at Razorback Range. Under the Preferred Alternative, this training would be conducted at other ranges that are approved for and currently support high-explosive munitions use.

3.3.5 Mitigations

There are no specific legal limits that apply to military noise. In 1972, Congress passed the Noise Control Act, which imposed limitations on source noise levels of several types of equipment. However, because noise controls could, in some cases, reduce the combat effectiveness of military equipment, military equipment was exempted from these requirements. For the same reason, FAA limitations on civilian aircraft noise do not apply to military aircraft. The DAF participated in the Federal Interagency Committee on Urban Noise development of noise levels and land use compatibility associated with airfields. Noise impacts are defined based on published guidelines on the compatibility of various land uses with noise and published scientific documents on noise effects.



SUA Name	Ldnmr, dBA NA	PA	Δ	events per avg day >= 85 dBA Lmax NA	PA	Δ
R-2402C	57.1	57.1	0	4.1	4.1	0

SUA Name	Ldnmr, dBA NA	PA	Δ	events per avg day >= 85 dBA Lmax NA	PA	Δ
R-2401B	53.5	54.9	1.4	0.2	0.3	0.1

SUA Name	Ldnmr, dBA NA	PA	Δ	events per avg day >= 85 dBA Lmax NA	PA	Δ
R-2401A	56.5	57.5	1	1.6	1.9	0.3

SUA Name	Ldnmr, dBA NA	PA	Δ	events per avg day >= 85 dBA Lmax NA	PA	Δ
R-2402A	59	59.7	0.7	4.4	4.7	0.3
w/MTRs	58.8	61.1	2.3	5.2	5.8	0.6

SUA Name	Ldnmr, dBA NA	PA	Δ	events per avg day >= 85 dBA Lmax NA	PA	Δ
R-2402B	57.2	57.2	0	4.1	4.2	0.1
402B&HOG A	57.3	60.1	2.8	4.3	5.5	1.2
w/MTRs	57.3	61.9	4.6	4.2	5.5	1.3

SUA Name	Ldnmr, dBA NA	PA	Δ	events per avg day >= 85 dBA Lmax NA	PA	Δ
SHIRLEY A	<45	<45	–	0	0.3	0.3
w/MTRs	<45	50.5	5.5	0	0.3	0.3

SUA Name	Ldnmr, dBA NA	PA	Δ	events per avg day >= 85 dBA Lmax NA	PA	Δ
VR-1130	<45	50.5	5.5	0	0	0

SUA Name	Ldnmr, dBA NA	PA	Δ	events per avg day >= 85 dBA Lmax NA	PA	Δ
SHIRLEY B	<45	<45	–	0	0.3	0.3

SUA Name	Ldnmr, dBA NA	PA	Δ	events per avg day >= 85 dBA Lmax NA	PA	Δ
SHIRLEY C	<45	<45	–	0	0.3	0.3

SUA Name	Ldnmr, dBA NA	PA	Δ	events per avg day >= 85 dBA Lmax NA	PA	Δ
IR-120	<45	46.1	1.1	0	0	0
VR-1102	<45	<45	–	0	0	0
R-120/VR-1102	<45	47.2	2.2	0	0	0

SUA Name	Ldnmr, dBA NA	PA	Δ	events per avg day >= 85 dBA Lmax NA	PA	Δ
HOG A	<45	57.2	12.2	0.2	1.5	1.3
w/MTRs	49.1	61.2	12.1	0.2	1.5	1.3
Booneville	<45	50.8	5.8	0.1	1.2	1.1
Waldron	<45	51.1	6.1	0.2	1.2	1

SUA Name	Ldnmr, dBA NA	PA	Δ	events per avg day >= 85 dBA Lmax NA	PA	Δ
HOG B (western)	<45	48.2	3.2	0	1.2	1.2
w/MTRs	45	54.3	9.3	0	1.2	1.2

SUA Name	Ldnmr, dBA NA	PA	Δ	events per avg day >= 85 dBA Lmax NA	PA	Δ
HOG B (eastern)	<45	57.1	12.1	0.1	1.3	1.2
w/MTRs	45.9	58.9	13	0.1	1.3	1.2
Bearce	<45	49.8	4.8	0	0	0

SUA Name	Ldnmr, dBA NA	PA	Δ	events per avg day >= 85 dBA Lmax NA	PA	Δ
IR-117	<45	52.9	7.9	0	0	0
VR-1113	<45	53.4	8.4	0	0	0
R-117/VR-1113	<45	56.2	11.2	0	0	0

SUA Name	Ldnmr, dBA NA	PA	Δ	events per avg day >= 85 dBA Lmax NA	PA	Δ
IR-164	<45	54.3	9.3	0	0	0
VR-1104	<45	48.8	3.8	0	0	0
R-164/VR-1104	<45	53.8	8.8	0	0	0

SUA Name	Ldnmr, dBA NA	PA	Δ	events per avg day >= 85 dBA Lmax NA	PA	Δ
VR-189	<45	53	8	0	0	0

SUA Name	Ldnmr, dBA NA	PA	Δ	events per avg day >= 85 dBA Lmax NA	PA	Δ
IR-121	<45	50.1	5.1	0	0	0
VR-1103	<45	50.3	5.3	0	0	0
R-121/VR-1103	<45	53.2	8.2	0	0	0

Figure 3.3-5. Ebbing ANG Base Airspace Noise Levels Under Preferred Alternative (PA) and No Action (NA) Alternative Conditions

Sources: (Ebbing ANG Base, 2021; BRRC, 2022a; ESRI Data & Maps, 2019c; FAA, 2021a; FAA, 2021b)

The DAF currently proposes primarily near-term, source-based noise mitigations. Longer-term, receptor-based mitigations (i.e., Office of Local Defense Community Cooperation [OLDCC] grant programs) are subject to Congressional authorizations to allow for Agency funding obligations when they become available. There are noise mitigations available: (1) where sound is reduced at the source and (2) where sound is reduced at the receptor for airfield noise within the 65 dB and over noise-sensitive receptors and land uses.

The Office of the Secretary of Defense's OLDCC has been authorized to administer a grant program for attenuating off-base noise impacts from military aircraft. OLDCC is in the process of establishing the guidelines for this new authority. "Community Noise Mitigation" is an initiative being undertaken as a result of recently enacted legislation to understand noise mitigation needs of communities experiencing 65 dB DNL or louder noise, and to develop a mechanism to support noise mitigation actions by these affected communities. Approximately 205 active and reserve installations have been identified with potential "covered facilities" as defined by Section 8136 of the Consolidated Appropriations Act, 2021 (Public Law [P.L.] 116-260), which include hospitals, daycare facilities, schools, facilities serving senior citizens, and private residences within 1 mile of a military installation or another location at which military fixed-wing aircraft are stationed or exposed to 65 dB DNL or greater noise levels.

Congress has limited the amount of money available to make these grants to $18,750,000 for programs at or near reserve component installations, of which $5,000,000 shall be for grants to communities for which a nearby military installation has transitioned to a new type or model of aircraft after January 1, 2019. The Community Noise Mitigation program is not authorized to buy noise-exposed homes.

There are a number of mitigation options available to property owners depending on the noise exposure and the condition and construction of the building. Sealing air gaps is usually the first step. One approach to sound mitigation is to add rigidity and mass so that sound pressure waves do not penetrate the building shell. Replacing acoustically poor–performing windows and doors, adding layers of gypsum board to the walls, and adding sound insulation to the wall cavities are techniques to harden the exterior. Another approach to increase the fraction of noise energy absorbed by walls is to stagger the wall studs on an expanded sill plate or add resilient channels behind the drywall.

As described in Section 3.3.4, *Preferred Alternative Environmental Consequences*, aircraft noise levels would increase relative to the No Action Alternative under all Preferred Alternative scenarios. As mentioned in Section 3.3.1, *Resource-Specific Analysis Methodology*, modeled noise levels of FMS aircraft at Ebbing ANG Base reflect the aircraft operating in accordance with the installation-specific military aircraft flying guidance developed to support the A-10 mission. These procedures evolved over several years to balance operational efficiency and flexibility against potential reductions in noise impacts associated with certain operational restrictions. The primary purpose of installation-specific military aircraft flying guidance is to ensure safety of flight while also maximizing training goals met per flying hour. There is typically some cost, in terms of operational efficiency, associated with adding restrictions to change current flight procedures. Example of such measures include the following.

- **Reduce the number of flying operations.** The proposed numbers of sorties and practice approaches to be conducted by F-35 and F-16 aircraft were calculated to meet minimum training requirements, with allowances for noneffective sorties (e.g., maintenance or weather mission cancellations). Flying a lesser number of sorties or practice approaches would not allow the unit to meet minimum training requirements. Conducting sorties or

practice approaches at other locations is a possibility; these operations would occur during certain events such as off-station Large Force Exercises or combat deployments. Ebbing ANG Base does not have a designated auxiliary airfield to support practice approaches, and other locations, such as nearby civilian airfields, cannot be assumed available for use. To ensure that impacts are not underestimated, aircraft noise levels at Ebbing ANG Base were modeled under the assumption that all sorties and practice approaches would be conducted at home station.

The DNL noise metric is relatively insensitive to changes in operations counts, making operations reductions a less effective method for achieving DNL reductions than other operational changes. For example, a 50 percent reduction in the frequency of all operations would result in a DNL reduction at all locations of only 3 dB. Less extreme adjustments in operations tempo would yield only minimal effect on DNL.

- **Adjust runway usage patterns so that loud overflights occur less frequently over areas of greater noise sensitivity.** Currently, runway selection for approaches and departures is made based on considerations including winds, noise sensitivities, and air-traffic flows at nearby airfields. Flight safety is improved by flying into the wind during landing and takeoff. As stated in Section 3.3.4.1.1, *Preferred Alternative, Environmental Consequences, Ebbing ANG Base and Surrounding Areas, Annoyance and Land Use Compatibility*, FMS aircraft would not use the crosswind runway (RWY 1 and 19) under normal conditions. There are noise sensitive areas located beyond both ends of the main runway (RWY 8 and 26). Therefore, adjusting runway usage patterns to emphasize use of either RWY 8 (eastward traffic flow) or 26 (westward traffic flow) would simply shift noise from one sensitive area to another. No changes to the existing runway selection procedure are proposed at this time.
- **Increase the distance between aircraft and noise-sensitive locations by adjusting routing.** As mentioned previously, F-35 and F-16 flight operations were modeled as flying the same procedures flown by A-10 aircraft prior to departure of the A-10 flying mission. Changes in aircraft routing to minimize overflight of sensitive locations at low altitudes could result in noise level reductions in some areas.

  Delaying turns from runway heading after departure until after the aircraft has passed beyond city limits would reduce time spent over densely developed areas somewhat. The potential mitigation scenario being considered includes F-35 aircraft (i.e., the loudest proposed aircraft operations) departures from RWY 8 to the Hog MOA airspace complex turning from runway heading after crossing the river rather than before and routing directly into the MOA complex from the north rather to the southwest over inhabited areas. Also, departures of F-35 aircraft from RWY 26 to the Hog MOA complex would delay the turn from runway heading until after crossing into Oklahoma, reducing time spent directly over densely populated areas.

  When maneuvering to make practice approaches to the airfield, turning from runway heading as early as possible reduces the number of noise sensitive locations overflown. The potential mitigation scenario being considered includes F-35 aircraft turning at the end of the runway rather than several thousand feet past the end of the runway when maneuvering for non-radar-assisted practice approaches.
- **Place restrictions on late-night flying.** Late-night flying (i.e., between 10:00 p.m. and 7:00 a.m.) makes up a small fraction (4 percent or less) of total operations expected to be flown by F-35 and F-16 aircraft at Ebbing ANG Base. Further reductions in the number of late-night flights would limit operational flexibility, preventing aircrews from accomplishing night training during portions of the year when the sun sets late in the day. Limiting runway

usage, altitudes, or routing specifically during these times could decrease safety and/or reduce operational effectiveness as described above. No restrictions on late-night flying are proposed at this time.

- **Limit afterburner usage.** Several F-35 afterburner usage scenarios were analyzed as part of the EIS, covering the range of expected afterburner use. Scenarios with 5% and 50% F-35 afterburner usage would result in less-extensive noise impacts than the 95% afterburner scenario, as detailed in Section 3.3.4, *Preferred Alternative Environmental Consequences*.
- **Reduced-power departures.** Full power (either military power or afterburner) is required during departures to get the aircraft to speeds and altitudes that provide the best margins of safety. However, once the aircraft has accelerated to an ideal climb airspeed (300 knots), the engine power setting can be reduced without a reduction in safety of flight. Whereas non-reduced-power departures continue to accelerate from 300 to 350 knots while also continuing to climb, reduced-power departures would use only enough engine power to maintain 300 knots during the continued climb. Reduced engine power settings result in lower noise levels, but the reduced airspeed results in departure noise events lasting slightly longer. The potential mitigation scenario being considered includes F-35 aircraft conducting reduced-power departures.

Impacts associated with potential mitigations under consideration are described briefly below. As more information is gained via public and agency input throughout the NEPA process, mitigation measures will be further refined. Operational mitigation measures deemed to be operationally feasible and that provide considerable noise impacts reductions will be described in the Final EIS. Mitigated noise impacts associated with these altered operational parameters will also be described in the Final EIS.

As shown in **Figure 3.3-6**, the potential mitigation scenarios being considered would reduce DNL relative to the unmitigated (original) operational scenario in some areas while other areas would see a minor increase. The total off-base/airport land area exposed to noise levels exceeding 65 dB DNL would be reduced by 10 percent, 12 percent, and 15 percent relative to the original (unmitigated) 5%, 50%, and 95% afterburner scenarios, respectively (**Table 3.3-11**). The estimated number of residents exposed to noise levels greater than 65 dB DNL would be reduced by 11%, 15%, and 20% relative to the original (unmitigated) 5%, 50%, and 95% afterburner scenarios, respectively (**Table 3.3-12**).

Table 3.3-11. Off-Base/Airport Acres of Land at 65 dB DNL or Greater Near Ebbing ANG Base Under Original (Unmitigated) and Potential Mitigations Being Considered for Each Afterburner Usage Scenario

DNL (dB)	No Action	Preferred Alternative – Mitigated and Unmitigated								
		5% Afterburner Scenario			50% Afterburner Scenario			95% Afterburner Scenario		
	Acres	Unmitigated	Mitigated	Change (a)	Unmitigated	Mitigated	Change (a)	Unmitigated	Mitigated	Change (a)
65–69	202	3,966	3,573	-10%	4,055	3,627	-11%	4,396	3,799	-14%
70–74	5	2,146	1,985	-8%	2,178	1,981	-9%	2,362	2,030	-14%
75–79	0	868	804	-7%	942	792	-16%	1,093	886	-19%
80–84	0	132	74	-44%	145	69	-52%	207	96	-54%
≥85	0	0	0	n/a	1	1	0%	4	3	-25%
Total	**207**	**7,112**	**6,436**	**-10%**	**7,321**	**6,470**	**-12%**	**8,062**	**6,814**	**-15%**

Source: Data derived from noise analysis and GIS data (see Figure 3.3-6)
Note:
a. Change is relative to unmitigated scenario results

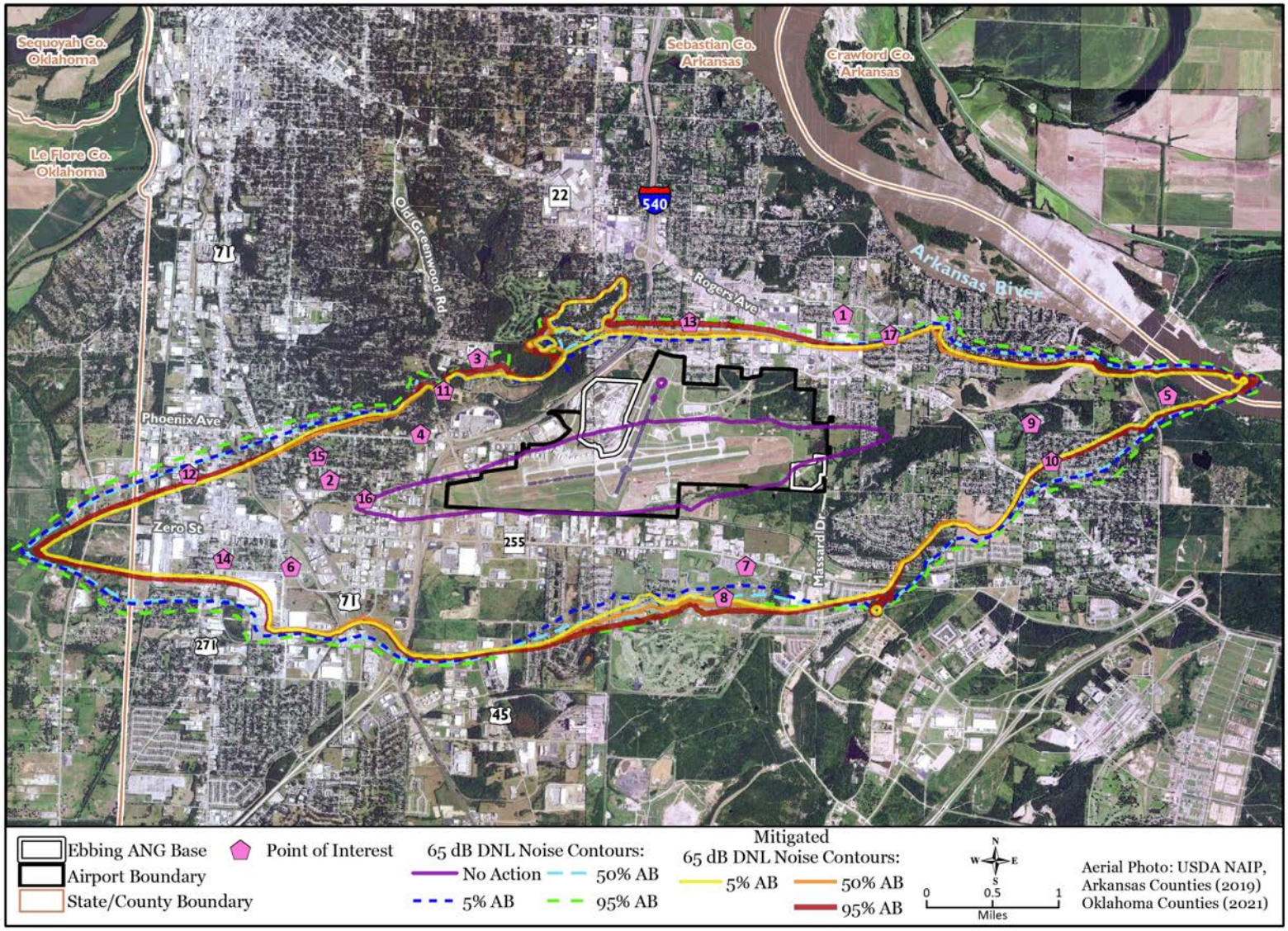


Figure 3.3-6. Comparison of 65 dB DNL Noise Contours for Mitigated and Original Operations Under Preferred Alternative F-35 Afterburner Use Scenario Near Ebbing ANG Base

Sources: (Ebbing ANG Base, 2021; USDA-FSA-APFO, 2019b; BRRC, 2022a; ESRI Data & Maps, 2019a; ESRI Data & Maps, 2019b; BRRC, 2022b; USDA-FSA-APFO, 2021a; USDA-FSA-APFO, 2021b)

Table 3.3-12. Estimated Number of Residents Exposed to Noise Levels Greater Than 65 dB DNL Near Ebbing ANG Base Under Original (Unmitigated) and Potential Mitigations Being Considered for Each Afterburner Usage Scenario

DNL (dB)	No Action	Preferred Alternative – Mitigated and Original								
		5% Afterburner			50% Afterburner			95% Afterburner		
	Residents	Unmitigated	Mitigated	Change (a)	Unmitigated	Mitigated	Change (a)	Unmitigated	Mitigated	Change (a)
65–69	66	6,993	6,521	-7%	7,422	6,788	-9%	8,212	7,134	-13%
70–74	0	2,796	2,389	-15%	2,943	2,347	-20%	3,487	2,603	-25%
75–79	0	842	517	-39%	852	433	-49%	1,007	486	-52%
80–84	0	4	0	-100%	4	0	-100%	14	0	-100%
≥85	0	0	0	n/a	0	0	n/a	0	0	n/a
Total	**66**	**10,635**	**9,427**	**-11%**	**11,221**	**9,568**	**-15%**	**12,720**	**10,223**	**-20%**

Source: Data derived from noise analysis and GIS data (see Figure 3.3-6)
Note:
a. Change is relative to unmitigated scenario results

The DNL at locations studied would differ from the unmitigated scenario by values ranging from reductions of up to 3 dB to increases of up to 1 dB. Notable differences include the Blossoms Rehab and Nursing Center not exceeding 65 dB DNL under any afterburner usage scenario and DNL at Southside High School not exceeding 65 dB under the 95% afterburner scenario. DNL at the Ben Geren Regional Park would increase to 65 dB under the 5% afterburner scenario with potential mitigations being considered while it would remain below 65 DNL under the unmitigated 5% afterburner scenario.

The number of noise events per average daytime hour with the potential to interfere with speech would decrease by 1 at one location if windows are closed and at one location if windows are open under the 5% and 50% afterburner scenarios with potential mitigations being considered. Under the 95% afterburner scenario, the number of events would increase by one at two locations if windows are closed.

All schools that would exceed criteria $L_{eq(8hr)}$ under the original (unmitigated) scenario would also exceed the criteria $L_{eq(8hr)}$ under the potential mitigation scenario being considered. The $L_{eq(hr)}$ would remain the same or be reduced relative to the unmitigated scenario by as much as 2 dB under any of the afterburner usage scenarios. The number of potential speech interference events would remain the same at all locations under all afterburner usage scenarios except at Chaffin Middle School with windows closed under the 95% afterburner scenario, where it would increase by 1.

The probability of being awakened at least once per night would differ by 1 percent or less under the potential mitigation scenario being considered.

Under the potential mitigation scenario being considered, zero residents would be exposed to noise levels at or exceeding 80 dB DNL under any afterburner usage scenario, whereas the original unmitigated scenarios had included an estimated 4, 4, and 14 residents under the 5%, 50%, and 95% afterburner scenarios, respectively. Therefore, the potential hearing loss risk would be minimal under the potential mitigation scenario being considered in accordance with DoD policy.

3.4 LAND USE

Land use describes the way the natural landscape has been modified or managed to provide for human needs. Land management plans, comprehensive plans, and zoning regulations

determine the type and extent of land use in specific areas to limit conflicting uses and protect certain designated or environmentally sensitive areas. In urban areas, land uses generally include residential, commercial, industrial, agricultural, mixed-use areas, and other public uses (such as parks, services for healthcare, transportation, and schools). Land uses arrange themselves over time to take advantage of infrastructures and other attributes, such as terrain and natural features, transport routes, utilities and communications, public services, access routes, and adjacent compatibilities. For the installation and environs, local plans and zoning ordinances control the type and density of allowable land use to limit conflict and promote compatibility. On military installations, land use is organized according to various operational and support functions, compliant with applicable safety and security directives.

Land under the training airspace is generally in less populated and remote areas, where natural attributes of the land predominate. These areas are valued and used for resource productive uses (such as forestry, mining, and energy production), agriculture, conservation, and outdoor recreation. Small rural communities and transport and utility networks are interspersed throughout these regions. Controls on land use are under the managing entity—counties in the case of private ownership, tribal leadership for tribal lands, and by designated state and federal agencies for publicly owned land (local, state, or federal). These agencies develop plans and priorities for resources and land under their management according to applicable laws. Many agencies have specific mandates for optimizing resource values and production, including conservation and access for multiple uses, particularly recreation. Specially designated areas such as parks, monuments, refuges/preserves, wilderness, and Wild and Scenic Rivers, have the highest degree of protection due to their special attributes and purposes.

Most military ranges use lands withdrawn for military purposes, with public use either prohibited or restricted. These lands are managed by their requisite military department and/or federal managing agency.

3.4.1 Resource-Specific Analysis Methodology

3.4.1.1 Ebbing ANG Base and Surrounding Area

The land use analysis does not examine the compatibility of siting and layout of proposed new facilities and renovations within the host installation. These have been evaluated and determined by the DAF and the ANG to best fit the purpose and need of the action based on multiple factors, including applicable safety and security requirements. The use of facilities would have little impact on surrounding airport tenants since the airport functions as an air operations industrial use area.

Impacts on land use from construction operations can affect ongoing uses in nearby areas, both on and off the airport. These include elevated traffic, including heavier-than-usual truck traffic; dust from ground disturbance and site preparation; and noise from construction equipment. While these effects can cause inconvenience and some annoyance for local users, upon completion of construction, these effects would cease. It is assumed that all construction contracts would require preparation of safety and traffic plans to address access concerns, particularly for specific locations such as local businesses and nearby schools. These plans would follow BMPs for the various trades during all phases of work. For these reasons, this EIS does not provide a detailed analysis of construction-phase impacts on land use.

Impacts to land use are evaluated by determining whether an action is incompatible with an existing land use or reasonably foreseeable land use due to noise, safety, or other issues. The

significance of potential land use impacts is based on the land use compatibility guidelines for land use and noise exposure based on the context and intensity of the impact. Using a geographic information system, the process for determining land use compatibility consists of: (1) quantifying the exposure of surrounding land uses by noise exposure in 5 dB intervals from 65 dB DNL to greater than 80 dB DNL under current and proposed conditions, (2) calculating any increase in noise exposure by land use, (3) identifying compatibility of noise exposure of affected land use using FAA land use compatibility guidelines, and (4) identifying noise-sensitive areas with potentially significant increases based on FAA Order 1050.1F criteria. Recommended land use compatibilities and restrictions are provided in Volume II, **Appendix B**, *Land Use Supporting Information*, Table 3.

The analysis also examines existing land uses within the runway protection zones (RPZs) to determine compatibility based on guidelines for safety hazards at the airfield. Changes in operations that increase safety risks are considered.

Potential impacts to affected persons are addressed in the sections related to noise (Section 3.3), socioeconomics (Section 3.5), and environmental justice (Section 3.6). The potential for structural damage to homes from non-impulsive and impulsive noise sources is addressed in Section 3.3.1.1.8, *Structural Damage*. Because the risk to structures is minimal, the potential for incompatible conditions for land use, particularly residential use, is minimal and not further addressed in the land use compatibility analysis for this EIS.

3.4.1.2 Affected Airspace

The analysis considers the effects of noise on underlying land uses by identifying uses and activities and change in noise exposure and overflight, in consideration of the sensitivity to noise of activities, uses, and specially managed areas.

Land use compatibility guidelines do not fully address the effects of noise on noise-sensitive areas such as national parks or designated Wilderness Areas, where a quiet setting is a generally recognized purpose and attribute. In Wilderness Areas, there is a strong expectation that anthropogenic noise intrusions will be infrequent. For these areas, the calculated increase in noise compared to the baseline noise exposure is one method for evaluating noise impacts on noise-sensitive areas. This EIS also uses supplemental noise metrics to evaluate the significance of noise impacts within national parks, Wilderness Areas, national wildlife refuges (see Section 3.8.4, *Biological Resources, Preferred Alternative Environmental Consequences*), and historic sites including traditional cultural properties (Section 3.7.4, *Cultural Resources, Preferred Alternative Environmental Consequences*) where a quiet setting is a recognized attribute and part of the purpose of the area (i.e., context). The analysis uses a qualitative assessment and supplements the description of noise effects using degree of change in noise and operations (i.e., intensity) such as L_{dnmr}/dB DNL, frequency and altitude of overflight, time in airspace, and time overhead (as presented in Section 3.3.4, *Noise, Preferred Alternative Environmental Consequences*).

For the ordnance ranges, most lands have been withdrawn for military purposes, with public use either prohibited or restricted. The analysis uses degree of change in noise from aircraft overflights and expenditures of munitions to assess noise compatibility with surrounding land peak-level noise levels as presented in Section 3.3.2, *Noise, Preferred Alternative Affected Environment*, and Section 3.3.4, *Noise, Preferred Alternative Environmental Consequences*.

For areas where low overflight is possible, the analysis evaluates the effect of loud, startling noise on land use and users that can disrupt regular or typical activities or cause safety hazards. Low ambient noise levels combined with short, loud noise events (e.g., from low-level military overflights) can heighten the reaction of individuals to noise, causing startle effects. The analysis identifies outdoor recreational and occupational activities that are sensitive to startle effects. The analysis uses single-event noise levels (L_{max}) and how often they occur (based on aircraft time in the airspace or time overhead) to assess these impacts.

The analysis of loud impulsive noise of sonic booms considers changes in the frequency of operations, changes in the location of the noise exposure, and the averaged sound levels (reported as CDNL) resulting from proposed operations. For sonic booms, the analysis uses 62 dB CDNL as a guideline for noise levels that are compatible with residential areas and 57 dB CDNL as a level below which most land uses are compatible. Compatibility of land use around training ranges evaluates changes in noise exposure using equivalent noise exposure metrics.

Impacts to Wilderness Areas, Wilderness Study Areas, and lands with wilderness characteristics are assessed based on how the action would affect wilderness qualities, specifically untrammeled, natural, undeveloped, solitude or primitive and unconfined recreation, and other features of value (Public Law 88-577). The analysis weighs all wilderness qualities that contribute to an area's overall wilderness character. Similarly, the evaluation of impacts on Wild and Scenic Rivers addresses the potential impact of noise and startle effects on qualities that contribute to the river's outstanding attributes for wild or recreational value. Scenic values are not altered by the action.

Determinations of impacts on land use are stated as low, moderate, or substantial, based on the degree of change (intensity) and the degree of sensitivity of the affected area, use, or associated activities (context).

3.4.2 Preferred Alternative Affected Environment

3.4.2.1 Ebbing ANG Base and Surrounding Area

The main Ebbing ANG cantonment has 26 occupied buildings and 27 facilities used for storage, supplies, and equipment (ARANG, 2022). A separate 20-acre parcel on the southeast side of the airfield is used as a fire training area. Within the airport area, Airport Drive, Phoenix Avenue, and Leigh Avenue provide access to Ebbing ANG Base. The siting of facilities on Ebbing ANG Base is functionally arranged to support the mission and described in detail in the Installation Development Plan (ARANG, 2022). Aircraft parking and maintenance areas are situated along the flightline, directly connected to the taxiways and airfield. A new Veterans Clinic is located on the north side of the cantonment along Phoenix Avenue. The surrounding support facilities are between the flightline areas and Phoenix Avenue and Leigh Avenue on the west.

The airport is surrounded by a variety of land uses, including residential, agricultural/open, commercial, parks/recreational, industrial, and institutional. Land uses surrounding the airport are illustrated in **Figure 3.4-1.** On the north end of RWY 2/20, land use is residential immediately adjacent to airport property. Large areas of residential and commercial-use land occupy the land between the airport and Rogers Avenue (a main arterial to the north). Industrial uses and vacant land are located south of the airport along Zero Road. South of Zero Road are residential, commercial, and parks/recreational uses. To the west of the airport are commercial, industrial, and agricultural/open land uses. Further west, land transitions to predominantly residential use. Land uses to the east consist of residential and agricultural/open

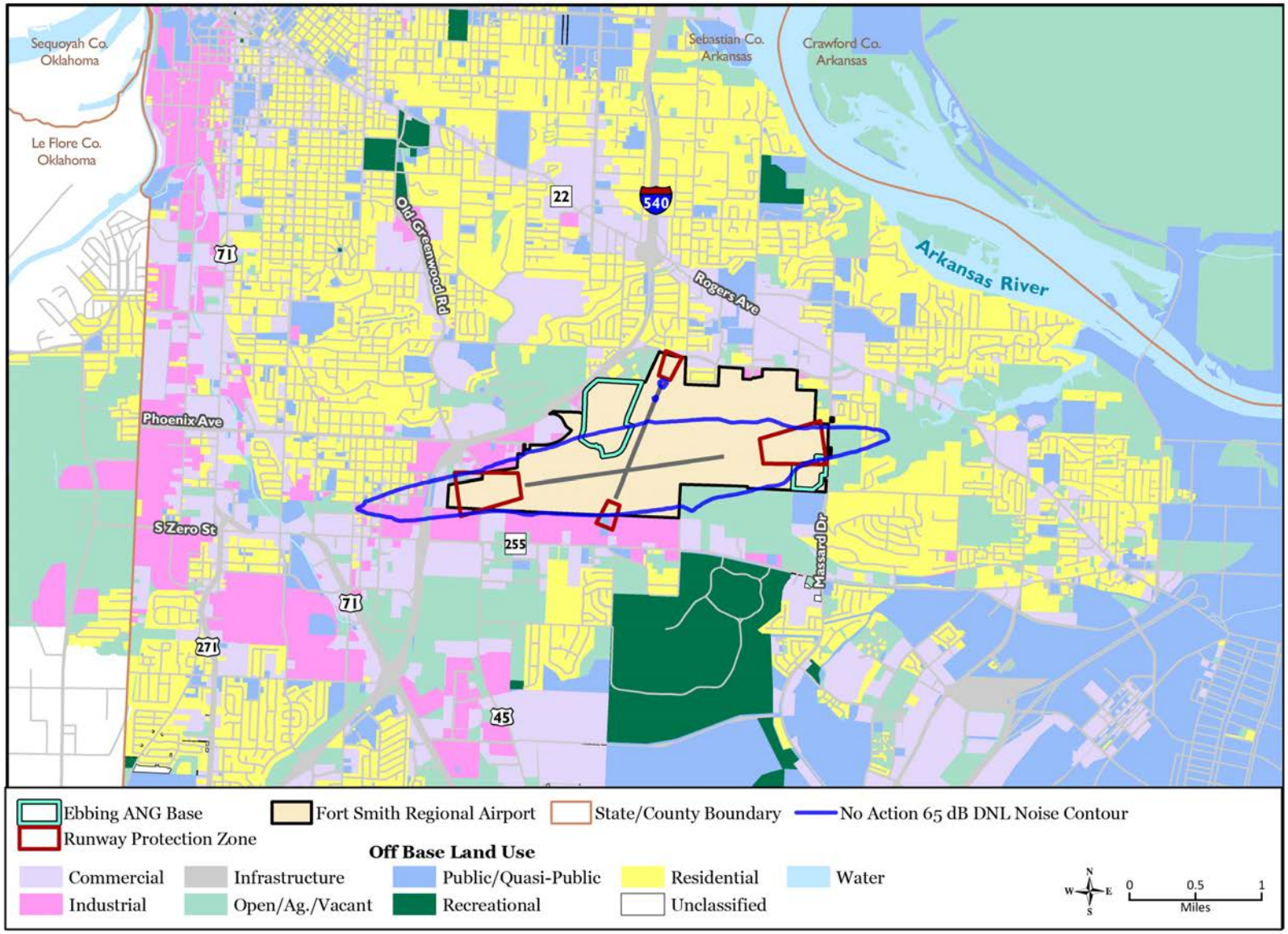


Figure 3.4-1. Ebbing ANG Base and Surrounding Land Use

Sources: (Arkansas GIS Office, 2021; BRRC, 2022a; Ebbing ANG Base, 2021; ESRI Data & Maps, 2019a; ESRI Data & Maps, 2019b; ESRI Data & Maps, 2019c; Oklahoma Office of Geographic Information, 2022)

land uses. Southeast of the airport is the Fort Chaffee Military Reservation and Chaffee Crossing Historic District redevelopment area, including the 1,300-acre Ben Geren Regional Park with a variety of outdoor recreation amenities Future plans for this area include residential and educational uses on the north side of the redevelopment area (Tull, 2021).

The City of Fort Smith administers land use and zoning in the vicinity of the airport through the Fort Smith Municipal Code, Chapter 27, Unified Development Ordinance (City of Fort Smith, 2019). Chapter 5, Aviation, addresses the specific overlay area for the airport, with limitations on siting and structures near the airfield to minimize conflicts with airport functions and navigation. Most of the vacant land around the airfield is zoned for airport-related, commercial, or industrial uses. An area to the southwest of the airfield, east of I-540, south of Zero Road around Old Greenwood Road, is outside the city boundary. This parcel is vacant and unzoned.

Under current conditions, a small area of residential land in the Wellington Park subdivision to the west of the airfield is not compatible with noise exposure over 65 dB DNL, according to FAA guideline (see Appendix D in the *Final Environmental Assessment Fort Smith Regional Airport Runway 8-26 Extension and Finding of No Significant* Impact, hereinafter referred to as the "Runway Extension EA") (Garver, 2022). All other surrounding areas are compatible with current noise exposure. Specific noise-sensitive sites and receptors are listed in **Table 3.12-3** (Day-Night Average Sound Level at Representative Noise-Sensitive Locations Near Ebbing ANG Base (and FSRA) Associated With Reasonably Foreseeable Future Actions).

The airfield at FSRA has four RPZs defined for the ends of both runways. **Figure 3.4-1** shows the location of the RPZs in relation to surrounding land use. These are trapezoidal areas at the end of the runways that serve to protect people and property on the ground in the event an aircraft lands or crashes beyond the runway end. Compatible land use within the RPZ is generally restricted to agricultural and similar uses that do not involve congregating of people, construction of buildings, uses that attract birds and wildlife, or other improvements that may be obstructions. Allowable activities and structures must meet the airport design clearance standards of FAA's Advisory Circular 150/5300-13A, *Airport Design*, and FAA's *Airport Improvement Program Sponsor Guide*, Section 500, Airport Planning, and Section 550, Runway Protection Zones (FAA, 2020). The Airport Commission has control over land within the airport boundary, including the RPZs. **Table 3.4-1** tabulates the land use of about 21 acres of land within the RPZs outside the airport boundary. Of this, 20 acres are incompatible based on FAA planning criteria (FAA, 2020). The airport intends to acquire these areas in fee simple (and relocate existing businesses) or through easement acquisitions, to gain control over the use of these areas (Delta Consultants Inc, 2006; Garver, 2022).

Table 3.4-1. Off-Base Land Use in Runway Protection Zones at Fort Smith Regional Airport

Off-Base Land Use	RPZ (Acres)	Compatible (Y/N)
Agricultural/open space/vacant	1.0	Y [(a)]
Commercial	9.1	N
Industrial	2.0	N
Public/quasi public	4.3	N
Residential	0.5	N
Roadway	3.6	N [(b)]

Source: (Arkansas GIS Office, 2021)
Key: N = no; RPZ = runway protection zone; Y = yes
Notes:
a. Undeveloped vacant land is compatible, but potential use and development may be incompatible, depending on how the land is zoned.
b. Type of land use may be allowable depending on location within the RPZ and height of associated infrastructure.

3.4.2.2 Affected Airspace

The training airspace under the Preferred Alternative overlies portions of north and western Arkansas and east Oklahoma. The region of influence (ROI) encompasses 8,624,850 acres (13,476 square miles), of which almost 27 percent is under federal management, 3.6 percent under state management, and a fraction under local ownership (see **Table 3.4-2**). **Figure 3.4-2** shows the areas of federal and state specially managed lands under the training airspace for the Preferred Alternative. Federal and state lands generally have defined purposes and management frameworks that support the public interest, ranging from extractive and productive uses (e.g., mining, forestry) to active and passive use (such as recreation, hunting, and fishing) and conservation (wildlife and wildland protection). A small amount of tribal land, under the authority of six different Tribes, is within the ROI. Almost 70 percent of the underlying land is privately owned. County ordinances manage permitting of development and uses in county boundaries. The ROI overlies portions of 52 counties in Arkansas and Oklahoma and 10 towns with over 5,000 persons, including Batesville, De Queen, Fort Smith, Greenwood, Heber Springs, Mena, and Russellville in Arkansas and Norman, Poteau, and Sallisaw in Oklahoma.

Table 3.4-2. Surface Management in the ROI – Preferred Alternative

Surface Management	Area (Acres)	Portion of ROI (%)
Federal [a]	2,292,760	26.6%
Local [b]	610	0.0%
Non-governmental organization [c]	11,130	0.1%
Tribal Statistical Area (TSA) [d]	ND	ND
State [e]	308,890	3.6%
Total Managed Area	**2,613,390**	**30.3%**
Not a managed area [f]	6,011,460	69.7%
Water	259,620	3.0%
Preferred Alternative footprint (ROI) [g]	8,624,850	

Source: (Arkansas GIS Office, 2021)
Key: % = percent; ND = No Data; ROI = region of influence; TSA = Tribal Statistical Area
Notes:
a. Federal land under management of various federal departments
b. Owned/managed by a local authority (public land)
c. Usually owned by a private entity (such as Nature Conservancy) used for conservation purposes
d. Six TSAs present in the ROI
e. Owned/managed by the state of Michigan (public land)
f. Private land, governed under county ordinances and applicable laws
g. Total area underlying the combined footprint of the training airspace for the Preferred Alternative, covers portions of Arkansas and Oklahoma

The Hog and Shirley MOAs and a network of MTRs overlie rugged, scenic, mountainous terrain, mostly forested, bisected by rivers with broad valleys with cultivated agriculture and pastureland. The ROI includes many smaller rural communities supporting diverse livelihoods and industries based on the natural resources of the region, including forestry, mining, lumber mills, furniture making, agriculture and food processing, tourism, hunting, and fishing. The ROI is crisscrossed by networks of roads, communications, and utility/energy infrastructures that are generally compatible with military overflights. Towers above 200 feet are approved by FAA and charted on navigation maps. Lower structures that are uncharted can conflict with low-flying military operations especially in low MOAs and MTRs.

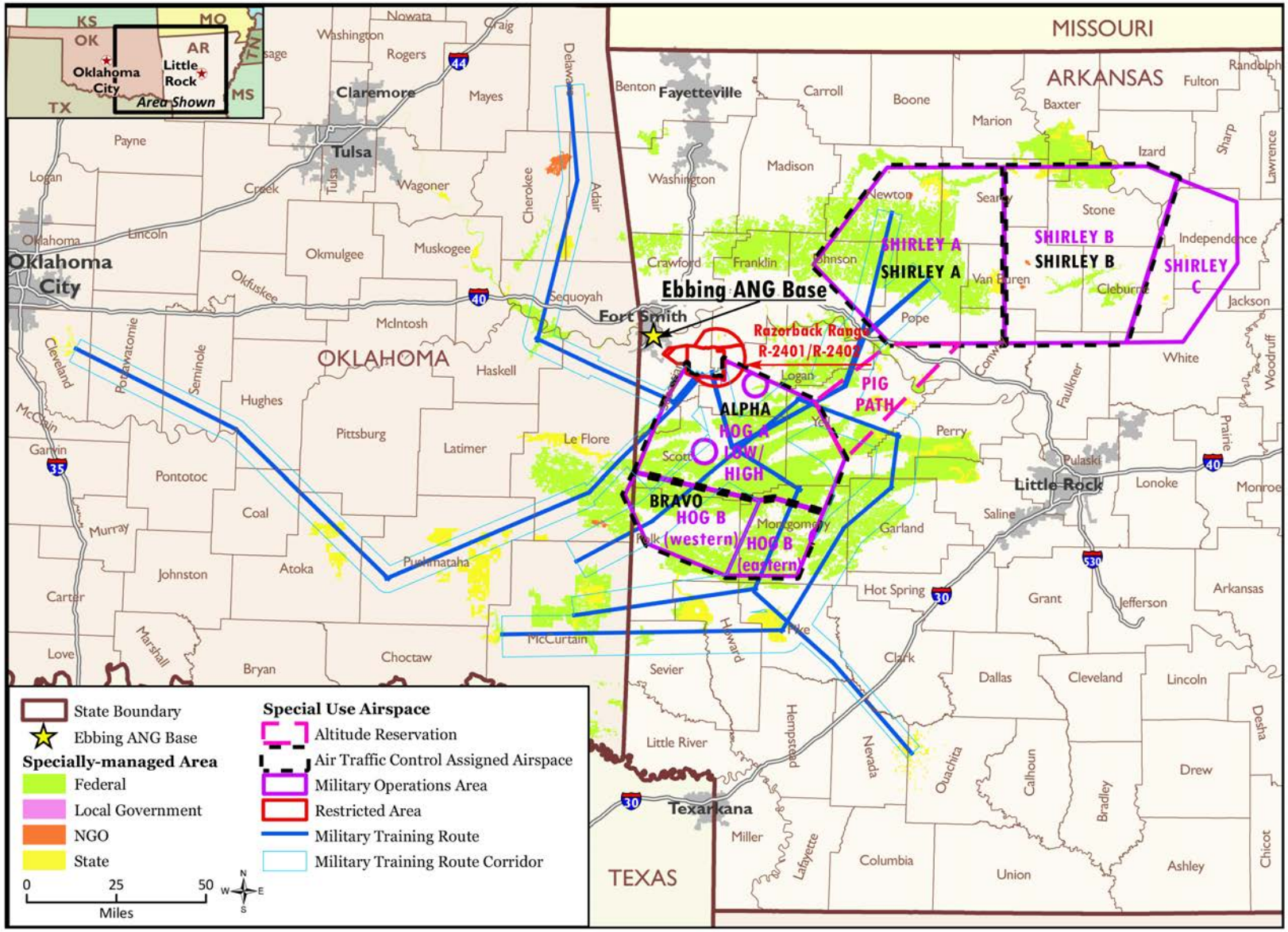


Figure 3.4-2. Surface Management in the Region of Influence – Preferred Alternative

Sources: (BRRC, 2022a; Ebbing ANG Base, 2021; FAA, 2021a; FAA, 2021b; USGS, 2020; ESRI Data & Maps, 2019a; ESRI Data & Maps, 2019b; ESRI Data & Maps, 2019c)

Razorback Range of the 188 WG Detachment 1 covers about 1,000 acres in west central Arkansas. Located south of Highway 22 and west of Highway 217, the range has a variety of targets to support training for air combat gunnery and munitions. The surrounding area is rural, with little encroachment on its periphery. The community of Charleston is located to the north of the range. Volume II, **Appendix B**, *Land Use Supporting Information*, Table 4 (Federal Managed Lands in the ROI – Preferred Alternative) and Table 5 (State Managed Lands in the ROI – Preferred Alternative), provide an inventory of the managed lands under the airspace. The region includes portions of three national forests: (1) Ouachita, (2) Ozark, and (3) Ozark-St. Francis. These forests encompass specially defined management areas including natural areas, roadless areas, botanic areas, research natural areas, and wildlife/game refuges. The U.S. Army Corps of Engineers (USACE) manages and operates several dams and reservoirs in the ROI, including all or portions of 13 lakes and reservoirs that serve purposes ranging from flood control and energy production to outdoor recreation. Similarly, the states of Arkansas and Oklahoma manage lands for various resource values, including forestry, game management, and recreational hunting and fishing. The ROI overlies 11 state parks and 39 wildlife and game management areas.

The ROI overlies all or portions of 10 Wilderness Areas (see Volume II, **Appendix B**, *Land Use Supporting Information*, Table 6: Wilderness Areas in the ROI – Preferred Alternative). These areas have special protection to conserve their natural and pristine qualities and opportunities for solitude and unconfined recreation. All of the Wilderness Areas were created by P.L. 98-508 (Arkansas Wilderness Act of 1984) (98 Statutes [Stat.] 2349), with the exception of Black Fork Mountain Wilderness, Oklahoma (P.L. 100-499, Winding Stair Mountain National Recreation and Wilderness Area Act; 102 Stat. 2491), Caney Creek Wilderness, Arkansas (P.L. 93-622; 88 Stat. 2096), and Upper Buffalo Wilderness (originally created by P.L. 93-622; 88 Stat. 2096, with an addition created by P.L. 98-508; 98 Stat. 2349 in 1984). Portions of seven Wild and Scenic Rivers underlie the airspace. These are listed in **Appendix B**, Table 7: Wild and Scenic Rivers in the ROI – Preferred Alternative). These rivers are protected to conserve their wild, scenic, or special recreational qualities. The Buffalo National River is managed by the NPS and the U.S. Forest Service and embraces several sites that are popular for recreational activities and tourists. FAA Advisory Circular 91-36D, *Visual Flight Rules (VFR) Flight Near Noise-Sensitive Areas*, recommends voluntary avoidance of noise-sensitive areas by 2,000 feet AGL where safe and practical, to minimize noise. Noise-sensitive areas include parks, recreational areas (including areas with wilderness characteristics), wildlife refuges, and cultural and historical sites where a quiet setting is a generally recognized feature or attribute.

Outdoor recreation is vitally important in the ROI, with highly scenic landscapes attracting tourists and outdoor sports enthusiasts. This supports the livelihoods of many residents of the underlying communities and towns. Hunting is managed by the Arkansas Game and Fish Commission (AGFC). The Commission is responsible for issuing licenses for fishers and hunters. Hunting occurs on state Wildlife Management Areas (see Volume II, **Appendix B,** *Land Use Supporting Information*, Table 5: State Managed Lands in the ROI – Preferred Alternative) and a network of leased private lands used for hunting. A spectrum of big and small game species, migratory birds, turkeys, fur-bearing animals, and hogs have specific seasons, with bag limits and restrictions set by AGFC. Fishing occurs at hundreds of sites on lakes and in flowing streams and rivers. AGFC provides substantial information about all locations and catch type on the AGFC website. Also, the Wilderness Areas and Wild and Scenic Rivers in the ROI provide opportunities for solitude and primitive and unconfined recreation.

Within the federal- and state-managed areas in the ROI, miles of roads and trails provide access and recreational opportunities for hiking; biking; horseback riding; and use off-road vehicles, all-terrain vehicles, and snow mobiles. Some trails are for single use (e.g., just hiking or all-terrain vehicle use), and others allow multiple modes. The U.S. Forest Service has developed amenities such as picnic areas and campgrounds throughout to support recreational use. Portions of the Ouachita National Recreation Trail and the Trail of Tears National Heritage Trail traverse the ROI.

3.4.3 No Action Alternative

The affected environment under No Action Alternative would reflect actions that are expected to have occurred by CY 2029. These are described in Section 3.12.2.2, *Cumulative Impacts, Land Use*. Implementation of the No Action Alternative (i.e., no beddown of the FMS PTC at Ebbing ANG Base) would not result in any additional impacts outside those described under Cumulative Impacts.

3.4.4 Preferred Alternative Environmental Consequences

The analysis of land use impacts for the Preferred Alternative evaluates land use compatibility in relation to changes in noise exposure from the No Action Alternative (CY 2029); the affected environment at that time would be expected to be as described in Section 3.12.2.1, *Cumulative Impacts, Noise*, and Section 3.12.2.2, *Cumulative Impacts, Land Use*.

3.4.4.1 Ebbing ANG Base and Surrounding Area

The analysis of land use impacts for the Ebbing ANG Base Preferred Alternative evaluates land use compatibility in relation to changes in noise exposure from the No Action Alternative. The accident potential hazard associated with the Preferred Alternative is considered negligible (see Section 3.2). Therefore, the Preferred Alternative would not impact land use compatibility from aircraft accident risks.

Figure 3.4-3 shows the projected change in noise exposure for the 95% afterburner scenario compared to the No Action Alternative (CY 2029) condition. The 95% scenario has a slightly larger total footprint than the 5% and 50% scenarios and, therefore, is used as the basis for the assessment.

Table 3.4-3 quantifies the area affected by land use category and noise exposure in 5 dB increments. The table also indicates compatibility of these land uses according to FAA guidelines in Volume II, **Appendix B**, *Land Use Supporting Information*, Table 3 (FAA Land Use Compatibility Recommendations). This analysis is complemented by the analysis of compatibility of projected sound levels for representative noise-sensitive locations in the surrounding area, including schools, hospitals, parks, and places of worship (see Section 3.3.2.1, *Noise, Ebbing ANG Base and Surrounding Area*, and **Table 3.3-5**, Day-Night Average Sound Level at Representative Noise-Sensitive Locations Under the Preferred Alternative).

Under the Preferred Alternative, the area outside the airport boundary exposed to noise levels of 65 dB DNL and greater would greatly expand from 202 acres to 8,062 acres. Notably, the area of residential land exposed to noise of 65 dB DNL and greater would increase from 11 acres to 1,821 acres. The estimated number of residents affected by this expansion is provided in **Table 3.3-4** (Estimated Number of Residents Exposed to Noise Levels Greater Than 65 dB DNL Near Ebbing ANG Base Under the Preferred Alternative Afterburner Usage Scenarios).

Table 3.4-3. Land Use Compatibility and Noise Exposure Surrounding Ebbing ANG Base (95% Afterburner Condition) – Preferred Alternative (in Acres)

Land Use Category	65 dB DNL			70 dB DNL			75 dB DNL			80 dB DNL and Greater [f]			Total (acres)		
	NA	PA	Change	NA	PA	Change	NA	PA	Change	NA	PA	Change	NA	PA	Change
Agricultural/open space/vacant [1]	73	1,054	981	1	563	562	0	307	307	0	73	73	74	1,997	1,923
Commercial [2]	21	525	504	4	573 [b]	569	0	170 [b]	170	0	29 [d]	29	25	1,297	1,272
Industrial [3]	59	411	352	0	155 [b]	155	0	273 [b]	273	0	76 [f]	76	59	915	856
Public/quasi-public [4]	9	297 [a][b]	288	0	187 [a][b]	187	0	18 [b][k]	18	0	8	8	9	510	501
Recreation [5]	0	247 [h]	247	0	9 [g][h][i]	9	0	0 [b][g][i]	0	0	0 [j]	0	0	256	256
Residential [6][a]	11	1,162 [c]	1,151	0	485 [c]	485	0	172 [c]	172	0	2	2	11	1,821	1,810
Roadway/infrastructure[7]	29	586	557	0	337	337	0	147	147	0	23 [f]	23	29	1,093	1,064
Unclassified	0	2	2	0	0	0	0	0	0	0	0	0	0	2	2
Water	0	112	112	0	53	53	0	6	6	0	0	0	0	171	171
Total	**202**	**4,396**	4,194	**5**	**2,362**	2,357	**0**	**1,093**	1,093	**0**	**211**	211	**207**	**8,062**	7,855

Source: (Arkansas GIS Office, 2021)

Key: > = greater than; ≥ = greater than or equal to; ANG = Air National Guard; dB = decibels; DNL = day-night average sound level; FAA = Federal Aviation Administration; GIS = geographic information system; NA = No Action; NLR = noise level reduction; PA = Preferred Alternative

Notes:

Green = Compatible; Orange = Some uses allowed, with conditions as noted; Red = Incompatible

GIS data was aggregated into selected categories to allow correlation to FAA guidelines to the extent possible. The following summaries

Use table in conjunction with Volume II, Appendix B, *Land Use Supporting Information*, Table 3.

1. Agricultural use exceptions include livestock farming incompatible at levels >75 dB DNL. Associated residential buildings are allowed up to 75 dB DNL, with NLR of at least 25 dB and 30 dB.
2. Commercial includes offices, business, professional, wholesale and large-item retail, hardware, and general retail.
3. Industrial includes general manufacturing, photographic and optical, and productive uses (mining, fishing, resource extraction and production).
4. Public/quasi-public includes schools, hospitals, nursing homes, churches, concert halls, and government buildings.
5. Recreation includes outdoor arenas and performance spaces, parks, zoos, golf courses, stables, water parks, amusement parks, resorts, and camps. Associated structures where public gather generally require NLR construction.
6. Residential includes residential single and multi-unit dwellings and transient lodging. Mobile home parks are not allowed at levels ≥65 dB DNL.
7. Transportation/infrastructure includes roads, rail, utility infrastructure, and parking. Associated inhabited structures require appropriate NLR construction.

a. Residential (including transient lodging) is generally prohibited except where the community determines that residential or school uses must be allowed; measures to achieve outdoor-to-indoor NLR of at least 25 dB in DNL 65–70 and 30 dB in DNL 70–75 should be incorporated into building codes. Normal residential construction can be expected to provide a NLR of 20 dB; thus, the reduction requirements are often stated as 5, 10, or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year-round. However, the use of NLR criteria will not eliminate outdoor noise problems.

b. Allowed if occupied structures where public is received have suitable NLR construction to achieve 25 and 30 dB indoor-to-outdoor reduction (see Volume II, Appendix B, Table 3)

c. Transient lodging is allowed with appropriate NLR construction as per FAA guidelines.

d. Only wholesale and large-item retail hardware is allowed with NLR construction of 35 dB for offices and public indoor areas as per FAA guidelines and local authority.

e. Only transportation is allowed at levels >85 dB DNL, with NLR for supporting structures.

f. No photographic and optical uses allowed at ≥80 dB DNL. Fishing, mining, resource production, and extraction are allowed at levels ≥80 dB, but without associated residential use.

g. Compatibility varies by activity. Unsuitable uses are as follows: ≥65 dB for outdoor music/performance spaces, ≥70 dB for zoos and nature exhibits, and ≥75 dB for outdoor spectator arenas.

h. Outdoor arenas require sound reinforcement systems.

i. Structures associated with golf, stables, and water recreation require 25 and 30 dB NLR, as appropriate.

j. Outdoor amusements, parks, resorts, and camps are allowed.

k. Schools, hospitals, nursing homes, churches, auditoriums, and concert halls are incompatible. Government offices are allowed with 30 dB NLR construction.

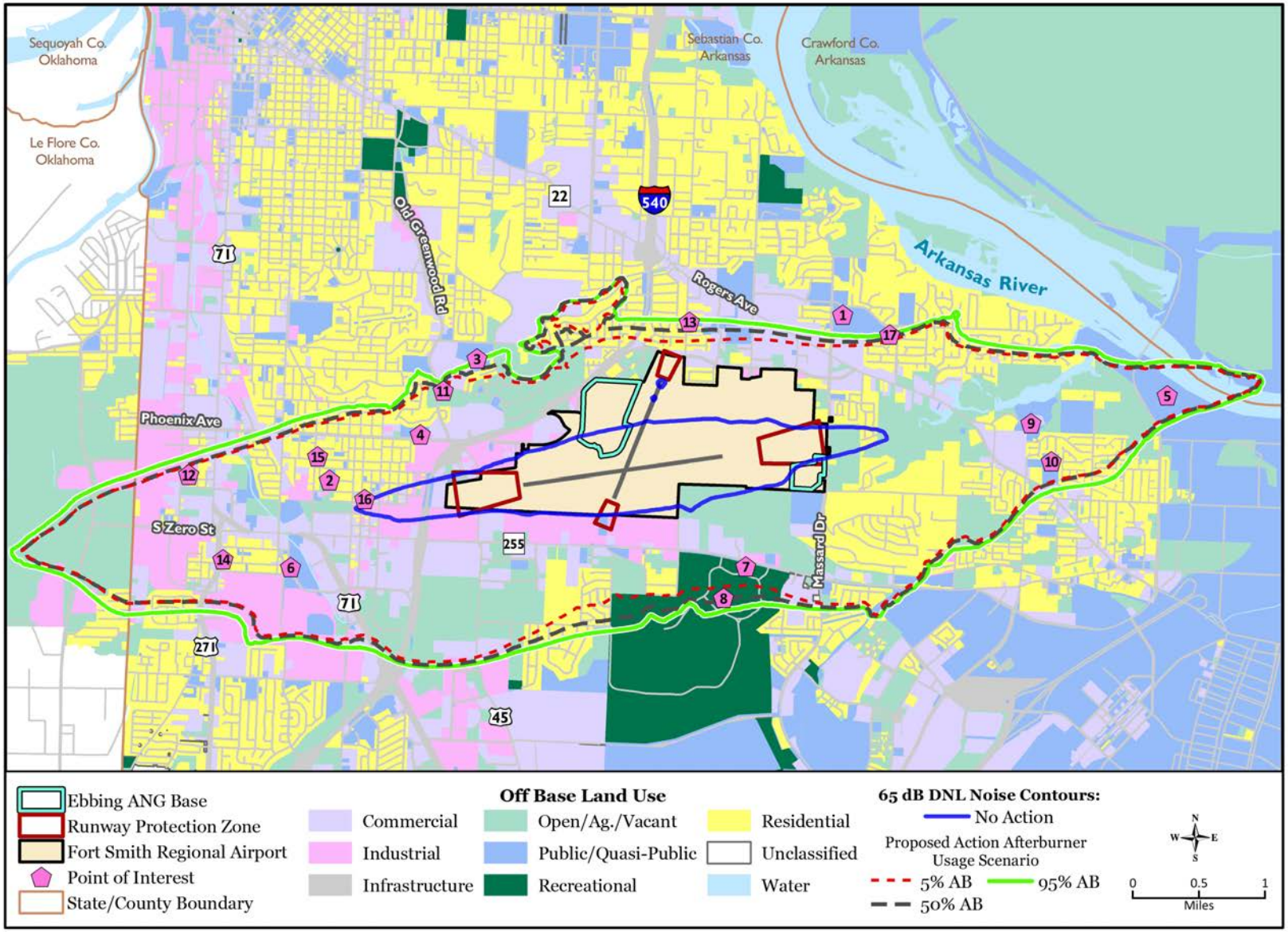


Figure 3.4-3. Noise Exposure and Land Use Surrounding Ebbing ANG Base (and FSRA)

Sources: (Ebbing ANG Base, 2021; ESRI Data & Maps, 2019a; USDA-FSA-APFO, 2019a; BRRC, 2022a; Arkansas GIS Office, 2021; Oklahoma Office of Geographic Information, 2022)

An estimated 1,162 acres of residential land would experience new noise levels of 65 dB DNL, but less than 70 dB DNL, and noise levels of 70 dB up to 75 dB DNL would affect 485 acres. As **Table 3.4-3** indicates, for noise exposure of 65 dB to 75 dB DNL, where the local community determines that schools and residential use must be allowed, inclusion of noise-level reduction (NLR) construction is recommended to minimize indoor-to-outdoor noise levels to acceptable levels. Normal permanent construction can be expected to provide a NLR of 20 dB, which somewhat offsets the impact of projected noise increases. Noise levels of 75 dB DNL and greater would affect 174 acres of residential land and is not considered compatible, even with NLR measures. The impact on residential land use is adverse and significant but can be reduced through various mitigating measures (see Section 3.3.5, *Noise Mitigations*).

A mixture of commercial use land (1,297 acres) is also newly exposed to marginally compatible and incompatible noise levels. As indicated in **Table 3.4-3**, most commercial uses exposed to 70 dB to 80 dB DNL are compatible, if associated structures have the requisite NLR construction. Those businesses and use without it could experience incompatible noise levels. About 29 acres of this land lies within the 80 dB DNL contour, where only large-scale warehouse-type commercial use is possible, with appropriate NLR construction for occupied structures.

About 510 acres of public/quasi-public land is exposed to noise levels of 65 dB DNL and greater. Some of this land is public parkland and vacant land. The data for this land use category includes public facilities such as schools, hospitals, nursing homes, churches, concert halls, and government buildings, although some of these uses can also be found intermixed within other land uses (as shown in **Figure 3.4-3**). Compatibility of most of the land in this category would depend on specific uses and the use of NLR construction. Representative noise-sensitive locations in **Table 3.3-5** (Day-Night Average Sound Level at Representative Noise-Sensitive Locations Under the Preferred Alternative), many falling into the public/quasi-public land use category, would experience noticeable increases in noise. Those without adequate NLR construction would experience adverse impacts and incompatible conditions.

An estimated 856 acres of industrial use land is newly exposed to levels of 65 dB DNL or higher. Most industrial uses are compatible with higher noise exposure, provided occupied buildings where the public are received have NLR modifications or construction. Within the 80 dB DNL exposure area, some industrial uses may be incompatible (see **Table 3.4-3**). About 3,090 acres of agricultural land (excluding livestock farming), open space, vacant land, and land used for roads and infrastructure are compatible with higher noise exposure of 75 dB DNL and greater than 80 dB DNL. Potential development of vacant land or open space would likely follow the current zoning of the parcels. Where zoning does not incorporate new noise conditions at the airport, incompatible land development could occur on vacant parcels in the future.

About 256 acres of recreational use land would be newly exposed to noise levels of 65 dB DNL and higher, mostly within the north part of Ben Geren Regional Park. A portion of this area is planned for single-family residential development in the *Chaffee Crossing Redevelopment Plan Future Land Use Map* (Tull, 2021). These noise levels are compatible with underlying outdoor recreational uses, but NLR measures are recommended for future residential uses exposed to noise levels of greater than or equal to 65 dB DNL and for current and future indoor facilities for public use in areas exposed to 70 dB DNL and greater.

Based on the context of the impacts (residential land areas) and the increase in noise exposure (intensity), implementation of the Preferred Alternative would have significant impacts on residential land uses surrounding the airport. Commercial and public/quasi-public uses in the surrounding area could experience moderate adverse impacts.

3.4.4.2 Affected Airspace

The primary driver of impacts for areas within the Ebbing ANG affected airspace ROI (also called SUA in this EIS) is noise from training aircraft. The change in noise is quantified in Section 3.3.4, *Noise, Preferred Alternative Environmental Consequences*. For this assessment, noise-sensitive land uses include residential, including lodging and care facilities, and areas protected for their quiet and special qualities of naturalness. Areas used for a spectrum of outdoor recreational uses and occupational activities, and small-scale commercial and service uses, are moderately sensitive to noise. Areas used for transportation, utility infrastructure, manufacturing and industry, agriculture, most commercial outdoor recreation (excluding performance areas), large-scale retail and wholesale commerce, and resource extractive and energy productive uses have low sensitivity to noise.

Table 5-4 "Ebbing ANGB SUA L_{dnmr} and DNL Results" in the FMS F-35 and RSAF F-16 EIS at Ebbing ANG Base/FSRA: Noise Modeling (BRRC, 2022a) presents the changes in noise levels in the SUA under the Preferred Alternative. Throughout the affected region, underlying small and mid-size towns and villages with a mixture of land uses and activities would experience noise increases ranging from 0 to 12 dBA L_{dnmr} (0 to 11 dBA DNL). Persons residing in the area would notice changes in noise in areas underlying the Hog A and B Low MOAs and the Shirley MOAs plus underlying MTRs, with noise increases ranging from 3.2 dBA L_{dnmr}/DNL up to 12.2 dB L_{dnmr}/10.9 dB DNL. Projected noise levels ranging from less than 45 up to low 60s L_{dnmr}/DNL would remain below 65 dBA L_{dnmr} (65 dBA DNL) and, therefore, be compatible with all land use categories in developed areas under DoD and FAA guidelines.

In undeveloped areas, the projected increase in noise would have low-to-moderate adverse effects on low-to-moderately noise-sensitive land uses and areas, respectively, including national and state forest lands that support productive uses (forestry) and outdoor uses such as hunting, hiking, climbing, sightseeing, and fishing. Additional information on impacts from aircraft noise on land use and recreation is provided in Volume II, **Appendix B**, *Land Use Supporting Information*, Section B.1.2, Noise Effects on Land Use and Recreation.

Noise from supersonic operations (occurring above 30,000 feet MSL) would increase from 36.5 to 44.6 CDNL, well under the level of concern for compatible land use under the SUA. Projected peak noise levels on Razorback Range from air-gunnery strafing operations by F-35 and F-16 aircraft would remain well below the current peak sound level of A-10 aircraft. The proposed aircraft peak levels would remain within the boundary of the range. No residential or highly noise-sensitive uses occur in the surrounding areas. Surrounding land use would experience minimal impact from peak noise on Razorback Range.

Noise from low-level single-event overflights can occur under the Hog A and B MOAs and MTRs with minimum floor altitudes that allow low-level operations. Because of their high speed and loudness, both F-35A and F-16 aircraft can cause startling noise for receptors on the ground. These events can be startling for persons on the ground, particularly in locations with quiet

settings. People respond differently to the sound of loud overflights by military aircraft depending on their experiences and associations. Loud and sudden overflights can cause annoyance, particularly where noise is not anticipated. Rare events could disrupt persons engaged in outdoor occupational or recreational activities requiring concentration and result in unsafe situations (e.g., utility infrastructure maintenance, rock climbing) (see Volume II, **Appendix B**, *Land Use Supporting Information*, Sections B.1.3 and B.1.4). The Preferred Alternative would increase the number of loud events per day across the SUA. The likelihood of a person experiencing a direct low-level overflight at low altitude is very small given the size of the SUA and the frequency and time spent by aircraft at low altitudes. Some people may choose to use different locations for their outdoor activities if they experience undesirable noise, but generally, it is unlikely that parks, forests, campgrounds, and trails would experience declines in visitation due to projected noise conditions. Overall, low-level overflights may have a minor-to-moderate adverse impact on persons engaged in outdoor recreational activities but would not change land uses.

Wilderness Areas (listed in Volume II, **Appendix B**, *Land Use Supporting Information*, Table 6 [Wilderness Areas in the ROI – Preferred Alternative]) have the highest degree of protection under the Wilderness Act, due to their intrinsic qualities of naturalness. Volume II, **Appendix B**, Section B1.1.3, describes that, of five wilderness characteristics, the one most likely to experience detrimental effects under the Preferred Alternative is "solitude or primitive and unconfined recreation."

Volume II, **Appendix B**, *Land Use Supporting Information*, Table 6 (Wilderness Areas in the ROI – Preferred Alternative), indicates which SUAs overlie 10 Wilderness Areas within the airspace ROI. This table also provides the range of current noise exposure and projected noise levels affecting Wilderness Areas for this alternative. Six SUAs would experience little change, with noise levels remaining at or under 45 dBA L_{dnmr}/DNL with an occasional loud overflight (about one or two per week). Black Fork Mountain, Dry Creek, and Poteau Mountain Wilderness Areas would have increases in noise, increasing by up to 12 dBA L_{dnmr}/10 dB DNL in underlying areas up to 61 dBA L_{dnmr}/59 dB DNL in affected portions of these Wilderness Areas mostly underlying a combination of MOA and MTRs. About seven to eight loud overflights (greater than 85 dBA L_{max}) would occur per week compared to none under the current condition. Caney Creek Wilderness Area would see a slight increase to about 48 dBA L_{dnmr}/DNL, with loud overflights increasing to seven or eight per week. The projected noise increases and potential for loud, single-event overflights may cause annoyance to some persons who expect to find solitude and an absence of anthropogenic noise in pristine areas, but they would not alter the scenic and natural qualities in Wilderness Areas; this may cause a moderate-to-high adverse impact on some wilderness users and their experience of primitive recreation. The Preferred Alternative would not limit wilderness users' unconfined use of these areas, nor would it diminish the opportunity for self-reliant challenges in the wild. Effects on wildlife and ecological systems are addressed in more detail in Section 3.8.2.2, *Biological Resources, Affected Airspace*. Overall, the impact on Wilderness Areas would range from low to high (for those with the greatest increase in noise), depending on the location under the airspace. Wilderness Areas underlying the Hog A and B Low MOAs and MTRs (Dry Creek and Poteau Mountain Wilderness Areas) would have the highest potential for impact due to the low minimum floor altitude.

Wild and Scenic Rivers are also noise-sensitive and valued for remarkable scenic, recreational, ecologic, geologic, fish and wildlife, historic, or cultural attributes. Volume II, **Appendix B**, *Land Use Supporting Information*, Table 7 (Wild and Scenic Rivers in the ROI – Preferred Alternative) lists seven Wild and Scenic Rivers in the airspace ROI. These rivers would continue to be affected by the visual intrusions of aircraft overflights. These overflights are short and may have an immediate negative impact on some users, but they would not alter the scenic setting of any river. Noise conditions would remain similar to current conditions for six of the listed Wild and Scenic Rivers, remaining less than 45 dBA L_{dnmr}, with potentially one loud overflight (greater than 85 dBA L_{max}) per week. Only the Cossatot River Wild and Scenic River would experience a moderate increase in noise between 49 to 54 dBA L_{dnmr} (46 to 52 dB DNL) and an increase of 9 dBA L_{dnmr}/7 dB DNL where both MOA and MTR overlie the river. Recreators may experience the noise from low-level overflights differently depending on their perceptions and associations with aircraft noise. Some find them intrusive, and others do not. The likelihood of a person being under a low overflight during their outdoor activities is low (infrequent.) Noise events are generally short in duration and would not cause any permanent change in outstanding wild or recreational values. Noise effects on fish and wildlife are expected to be minimal (see Section 3.8.2.2). Overall, noise effects would result in low (minor) adverse effects on Wild and Scenic Rivers.

For recreational uses, the projected changes in noise would vary in underlying areas and are generally minimal. Some locations would experience noticeable increases, especially under the Hog MOAs. A small portion of the Ouachita Recreational Trail under the Hog North Low MOA and VR-1103 would experience noticeable increases in noise of 12 dBA L_{dnmr}/10 dBA DNL (up to 61 dBA L_{dnmr}/59 dBA DNL), but most of the trail would experience little change in noise. The airspace ROI provides extensive opportunities for quiet and active outdoor recreation, and projected noise levels would likely have little impact on most recreational activities, including hiking, hunting, and fishing. Training on weekends would conflict with outdoor recreation the most, since this is the time of highest participation and visitation. Potential for startle effects from loud single overflights is low but can have adverse effects on individuals partaking in high-risk recreational activities requiring concentration. Local clubs or individuals should coordinate the locations and times of these activities with airspace managers to minimize impacts. Moderate impacts on solitude or primitive recreational experiences in five Wilderness Areas is noted as an impact but is minor in consideration of the potential to find these experiences in the ROI. Overall, impacts on most recreational uses from projected noise exposure and loud overflights would remain low and not noticeably different compared to current conditions in most underlying locations.

Noise from military overflights under the SUA is not new, and the Preferred Alternative would not change the size or operating altitudes of any airspace. As such, the changes under this action would have minimal impact on the continued management of lands by various state and federal agencies. Established protocols and coordination of management actions can minimize potential conflicts between multiple uses, fire management activities, and military aircraft operations. Specific impacts on management of biological or cultural resources are addressed in Sections 3.8.2.2 and 3.7.4.2, *Biological Resources* and *Cultural Resources, Affected Airspace*, respectively. It is possible that future infrastructure and energy production projects may involve installation of new equipment. Towers and taller structures may be incompatible with safe

navigation. Coordination between permitting authorities, FAA, and the DAF minimizes the potential for development of incompatible large-scale projects in the future.

3.4.5 Mitigations

3.4.5.1 Ebbing ANG Base and Surrounding Areas

Section 3.3.5, *Noise, Mitigations*, describes several potential adjustments in flight procedures the DAF is considering that can reduce noise levels to some degree. **Figure 3.4-4** depicts the 65 dB DNL noise contours based on the 5%, 50%, and 95% mitigated afterburner usage scenarios as shown in **Table 3.4-4**, **Table 3.4-5**, and **Table 3.4-6**.

As shown in **Figure 3.4-4** and **Table 3.4-4**, **Table 3.4-5**, and **Table 3.4-6** the potential mitigation scenarios being considered would reduce DNL relative to the unmitigated operational scenarios in some areas while other areas would see a minor increase. Of particular note, the total off-base/airport residential land area (acres) exposed to noise levels exceeding 65 dB DNL under the mitigated 5% afterburner scenario would be reduced by 6% relative to the unmitigated scenario; residential acres exposed to noise levels exceeding 70 dB DNL would be reduced by 11% relative to the unmitigated scenario; residential acres exposed to noise levels exceeding 75 dB DNL would be reduced by 50% relative to the unmitigated scenario; no residential land area would be exposed to more than 80 dB DNL with the mitigated scenario, whereas 1 acre would be exposed under the unmitigated scenario.

The total off-base/airport residential land area exposed to noise levels exceeding 65 dB DNL under the mitigated 50% afterburner scenario would be reduced by 9% relative to the unmitigated scenario; residential land areas exposed to noise levels exceeding 70 dB DNL would be reduced by 15% relative to the unmitigated scenario; residential land areas exposed to noise levels exceeding 75 dB DNL would be reduced by 57% relative to the unmitigated scenario; no residential land areas would be exposed to more than 80 dB DNL with the mitigated scenario, whereas 1 acre would be exposed under the unmitigated scenario.

The total off-base/airport residential land area exposed to noise levels exceeding 65 dB DNL under the mitigated 95% afterburner scenario would be reduced by 14% relative to the unmitigated scenario; residential land areas exposed to noise levels exceeding 70 dB DNL would be reduced by 19% relative to the unmitigated scenario; residential land areas exposed to noise levels exceeding 75 dB DNL would be reduced by 58% relative to the unmitigated scenario; no residential land areas would be exposed to more than 80 dB DNL with the mitigated scenario, whereas 1 acre would be exposed under the unmitigated scenario.

In addition to operational noise mitigations, the DAF would focus on continuing an active AICUZ program and providing updated operations and noise information to surrounding jurisdictions. Additionally, the adoption of zoning ordinances, which align with compatible land use and projected noise levels is a possible measure that might be taken locally to prevent future noise impacts. As discussed in Section 3.3.5, *Noise, Mitigations*, as more information is gained via public and agency input throughout the NEPA process, mitigation measures will be further refined. Operational mitigation measures deemed to be operationally feasible and that provide considerable noise impacts reductions will be described in the Final EIS. Mitigated noise impacts associated with these altered operational parameters will also be described in the Final EIS.

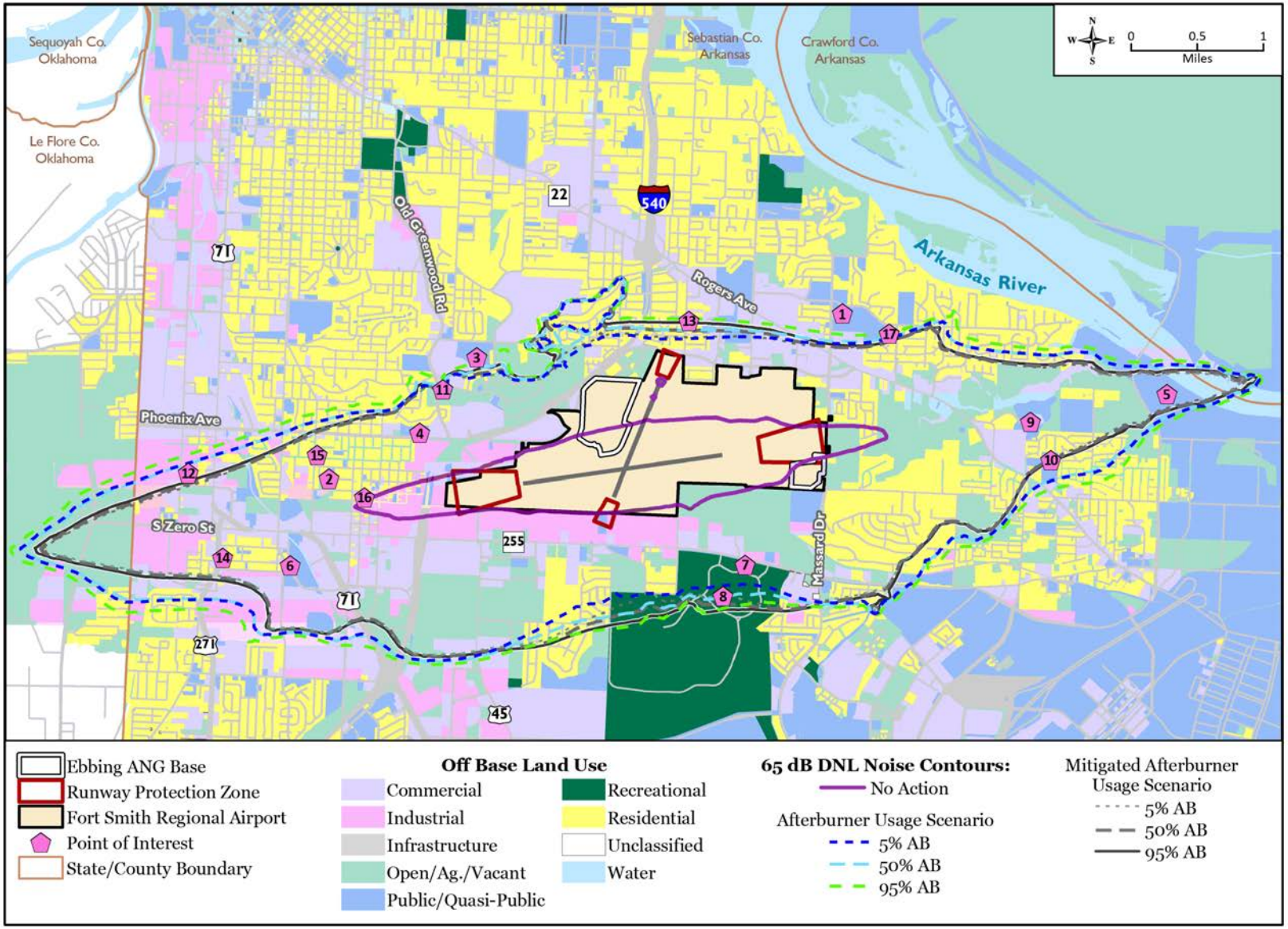


Figure 3.4-4. Noise Exposure and Land Use Surrounding Ebbing ANG Base – Preferred Alternative – Mitigated

Sources: (Ebbing ANG Base, 2021; ESRI Data & Maps, 2019a; USDA-FSA-APFO, 2019a; BRRC, 2022a; BRRC, 2022b; Arkansas GIS Office, 2021; Oklahoma Office of Geographic Information, 2022)

Table 3.4-4. Land Use Compatibility and Noise Exposure Surrounding Ebbing ANG Base Unmitigated (U) versus Mitigated (M) 5% Afterburner Condition

Land Use Category	65 dB DNL (acres)			% Change	70 dB DNL (acres)			% Change	75 dB DNL (acres)			% Change	> 80 dB DNL (acres)			% Change	Total (acres)				% Change
	NA	U	M		NA	U	M		NA	U	M		NA	U	M		NA	U	M	Change	
Agricultural/Open Space/Vacant	73	1,072	838	-22%	1	511	568	11%	0	252	242	-4%	0	42	22	-48%	74	1,877	1,670	-207	-11%
Commercial	21	527	536	2%	4	500	452	-10%	0	130	111	-15%	0	21	19	-10%	25	1,178	1,118	-60	-5%
Industrial	59	353	261	-26%	0	220	184	-16%	0	213	241	13%	0	43	17	-60%	59	829	703	-126	-15%
Public/Quasi-Public	9	262	219	-16%	0	162	120	-26%	0	11	33	200%	0	8	6	-25%	9	443	378	-65	-15%
Recreational	0	119	181	52%	0	0	1	100%	0	0	0	0%	0	0	0	0%	0	119	182	63	53%
Residential	11	986	929	-6%	0	408	364	-11%	0	143	72	-50%	0	1	0	-100%	11	1,538	1,365	-173	-11%
Roadway	29	544	521	-4%	0	297	262	-12%	0	114	102	-11%	0	17	10	-41%	29	972	895	-77	-8%
Unclassified	0	2	2	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%	0	2	2	0	0%
Water	0	101	86	-15%	0	48	34	-29%	0	5	3	-40%	0	0	0	0%	0	154	123	-31	-20%
Total	**202**	**3,966**	**3,573**	**-10%**	**5**	**2,146**	**1,985**	**-8%**	**0**	**868**	**804**	**-7%**	**0**	**132**	**74**	**-44%**	**207**	**7,112**	**6,436**	**-676**	**-10%**

Source: Data derived from noise analysis and GIS data (see Figure 3.3-6, Figure 3.4-4, and Table 3.3-11)
Key: % = percent; >= greater than; - = minus; ANG = Air National Guard Base; dB = decibels; DNL = day-night average sound level; M = mitigated; NA = No Action Alternative; U = unmitigated

Table 3.4-5. Land Use Compatibility and Noise Exposure Surrounding Ebbing ANG Base Unmitigated (U) versus Mitigated (M) 50% Afterburner Condition

Land Use Category	65 dB DNL (acres)			% Change	70 dB DNL (acres)			% Change	75 dB DNL (acres)			% Change	> 80 dB DNL (acres)			% Change	Total (acres)				% Change
	NA	U	M		NA	U	M		NA	U	M		NA	U	M		NA	U	M	Change	
Agricultural/Open Space/Vacant	73	1,040	827	-20%	1	528	582	10%	0	267	234	-12%	0	50	26	-48%	74	1,885	1,669	-216	-11%
Commercial	21	516	548	6%	4	526	444	-16%	0	142	110	-23%	0	21	17	-19%	25	1,205	1,119	-86	-7%
Industrial	59	350	258	-26%	0	182	175	-4%	0	246	250	2%	0	49	15	-69%	59	827	698	-129	-16%
Public/Quasi-Public	9	266	221	-17%	0	161	117	-27%	0	13	36	177%	0	8	4	-50%	9	448	378	-70	-16%
Recreational	0	189	212	12%	0	0	3	300%	0	0	0	0%	0	0	0	0%	0	189	215	26	14%
Residential	11	1,039	949	-9%	0	424	360	-15%	0	147	63	-57%	0	1	0	-100%	11	1,611	1,372	-239	-15%
Roadway	29	556	523	-6%	0	309	268	-13%	0	123	97	-21%	0	17	8	-53%	29	1,005	896	-109	-11%
Unclassified	0	2	2	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%	0	2	2	0	0%
Water	0	97	87	-10%	0	48	32	-33%	0	4	2	-50%	0	0	0	0%	0	149	121	-28	-19%
Total	**202**	**4,055**	**3,627**	**-11%**	**5**	**2,178**	**1,981**	**-9%**	**0**	**942**	**792**	**-16%**	**0**	**146**	**70**	**-52%**	**207**	**7,321**	**6,470**	**-851**	**-12%**

Source: Data derived from noise analysis and GIS data (see Figure 3.3-6, Figure 3.4-4, and Table 3.3-11)
Key: % = percent; >= greater than; - = minus; ANG = Air National Guard Base; dB = decibels; DNL = day-night average sound level; M = mitigated; NA = No Action Alternative; U = unmitigated

Table 3.4-6. Land Use Compatibility and Noise Exposure Surrounding Ebbing ANG Base Unmitigated (U) versus Mitigated (M) 95% Afterburner Condition

Land Use Category	65 dB DNL (acres)			% Change	70 dB DNL (acres)			% Change	75 dB DNL (acres)			% Change	> 80 dB DNL (acres)			% Change	Total (acres)				% Change
	NA	U	M		NA	U	M		NA	U	M		NA	U	M		NA	U	M	Change	
Agricultural/Open Space/Vacant	73	1,054	861	-18%	1	563	581	3%	0	307	256	-17%	0	73	40	-45%	74	1,997	1,738	-259	-13%
Commercial	21	525	547	4%	4	573	464	-19%	0	170	127	-25%	0	29	20	-31%	25	1,297	1,158	-139	-11%
Industrial	59	411	267	-35%	0	155	149	-4%	0	273	279	2%	0	76	25	-67%	59	915	720	-195	-21%
Public/Quasi-Public	9	297	245	-18%	0	187	121	-35%	0	18	39	117%	0	8	5	-38%	9	510	410	-100	-20%
Recreational	0	247	245	-1%	0	9	13	44%	0	0	0	0%	0	0	0	0%	0	256	258	2	1%
Residential	11	1,162	994	-14%	0	485	391	-19%	0	172	72	-58%	0	2	0	-100%	11	1,821	1,457	-364	-20%
Roadway	29	586	542	-8%	0	337	276	-18%	0	147	111	-24%	0	23	9	-61%	29	1,093	938	-155	-14%
Unclassified	0	2	2	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%	0	2	2	0	0%
Water	0	112	96	-14%	0	53	35	-34%	0	6	2	-67%	0	0	0	0%	0	171	133	-38	-22%
Total	**202**	**4,396**	**3,799**	**-14%**	**5**	**2,362**	**2,030**	**-14%**	**0**	**1,093**	**886**	**-19%**	**0**	**211**	**99**	**-53%**	**207**	**8,062**	**6,814**	**-1,248**	**-15%**

Source: Data derived from noise analysis and GIS data (see Figure 3.3-6, Figure 3.4-4, and Table 3.3-11)

Key: % = percent; >= greater than; - = minus; ANG = Air National Guard Base; dB = decibels; DNL = day-night average sound level; M = mitigated; NA = No Action Alternative; U = unmitigated

3.4.5.2 Affected Airspace

Five Wilderness Areas would experience moderate-to-high adverse impacts on qualities of solitude and primitive recreation. Raising floor altitudes of overlying SUA or defining selected overflight avoidance areas can minimize noise over these protected areas. Outreach to industries and local recreational groups can assist in identifying mutually incompatible activities. By coordinating locations and times/dates, special training protocols/avoidance procedures can help avoid sensitive activities and minimize conflicts in multi-use environments.

3.5 SOCIOECONOMICS

Socioeconomics comprise the basic attributes and resources associated with the human environment, particularly population and economic activity (i.e., employment, personal income, and economic growth). A socioeconomic analysis evaluates how the proposed action and alternatives might affect elements of the human environment such as population, housing, employment, economic growth, and public services. Impacts to these fundamental socioeconomic components also influence other issues such as housing availability and the provision of public services.

3.5.1 Resource-Specific Analysis Methodology

Socioeconomic impacts are assessed in terms of direct effects to the local economy and population and related indirect effects on other socioeconomic resources within the ROI. Although economic or social effects are not intended by themselves to require preparation of an EIS (40 CFR § 1508.14), socioeconomic impacts would be considered significant if the intensity of the Preferred Alternative resulted in a substantial shift in population trends or notably affected regional employment, earnings, or community resources such as schools based on the context of the affected environment.

The ROI for socioeconomics associated with the Preferred Alternative includes the county, township, and/or cities associated with Ebbing ANG Base (and FSRA), as well as those that are and would potentially be affected by noise generated at the airfield.

The socioeconomic analysis methodology draws upon previous DAF NEPA analysis, including the 2020 *Final United States Air Force F-35A Operational Beddown Air National Guard Environmental Impact Statement* (hereinafter referred to as "F-35A Operational Beddown EIS") (USAF, 2020b). That EIS evaluated socioeconomic impacts associated with a proposal to beddown F-35A aircraft at two of five alternative locations (USAF, 2020b). The socioeconomic aspect of potential impacts to lands underlying the SUA was not evaluated in that EIS, because airspace use would be consistent with ongoing actions, and there would be no development or other socioeconomic-related activities occurring under the airspace as a result of the Preferred Alternative. For similar reasons associated with the Preferred Alternative evaluated in this EIS, potential socioeconomic impacts to lands underlying the SUA were not evaluated.

3.5.2 Preferred Alternative Affected Environment

3.5.2.1 Ebbing ANG Base and Surrounding Area

The 188 WG of the ARANG is a tenant at FSRA in Fort Smith, Arkansas, located in Sebastian County, which comprises the ROI for this alternative. The affected environment represents the current status of the resource using the best available, most current data.

Population

Population information for the state of Arkansas, Sebastian County, and the city of Fort Smith is presented in **Table 3.5-1**. Overall, the population of Fort Smith increased by 7,475 people between 2000 and 2019. This represents a 0.47-percent average annual growth rate between the years 2000 and 2019. Sebastian County and the state experienced a higher average annual growth rate than the city during the same time period, with average annual growth rates of 0.55 percent and 0.61 percent, respectively. According to the 2020 Census, the population in the city of Fort Smith increased by 1,399 people (1.59 percent) from 2019 estimates.

Current personnel numbers at Ebbing ANG Base are shown in **Table 2.2-6** (Anticipated Preferred Alternative Increase in Number of Personnel at Ebbing ANG Base). There are currently an estimated 1,281 personnel at Ebbing ANG Base.

Table 3.5-1. Current Population, Ebbing ANG Base ROI

Area	Census 2000	Census 2010	Estimate 2019	Average Annual Growth Rate (2000–2019)	Census 2020	Y-O-Y Growth (2019–2020)
Arkansas	2,673,400	2,915,918	2,999,370	0.61%	3,011,524	0.41%
Sebastian County	115,071	125,744	127,591	0.55%	127,799	0.16%
Fort Smith City	80,268	86,209	87,743	0.47%	89,142	1.59%

Sources: (AEDI, 2002a; AEDI, 2002b; AEDI, 2002c; USCB, 2019a; USCB, 2021a)
Key: % = percent; ANG = Air National Guard; ROI = region of influence; Y-O-Y = year-over-year

Employment and Income

Table 3.5-2 provides employment and income data for the state of Arkansas, Sebastian County, and the city of Fort Smith. Median household income and per capita income in the city of Fort Smith were lower than in the county and the state (USCB, 2019b). The unemployment rate in 2019 was 3.5 percent in the state of Arkansas and 3.3 percent in Sebastian County (BLS, 2021a). As of 2020, the unemployment rate in the state and county were approximately 6.1 percent and 6.0 percent, respectively (BLS, 2021c). Annual average unemployment rates rose in 2020 throughout all regions and states. The Bureau of Labor Statistics reported that "the deterioration in the labor market in 2020 reflected the impact of the coronavirus (COVID-19) pandemic and efforts to contain it" (BLS, 2021c).

Table 3.5-2. Current Employment and Income Statistics, Ebbing ANG Base ROI

Area	Median Household Income (2019)	Per Capita Income (2019)	Labor Force (2019)	Employed (2019)	Unemployed (2019)	Unemployment Rate (2019)
Arkansas	$47,597	$26,577	1,365,272	1,317,163	48,109	3.5%
Sebastian County	$46,228	$25,961	56,811	54,957	1,854	3.3%
Fort Smith City	$41,724	$25,487	NA [a]	NA [a]	NA [a]	NA [a]

Sources: (USCB, 2019b; BLS, 2021a)
Key: % = percent; ANG = Air National Guard; ROI = region of influence
Note:
a. NA = not available from the Bureau of Labor Statistics Local Area Unemployment Statistics.

Table 3.5-3 shows the total number of jobs by industry in Sebastian County. Overall, the total number of full-time and part-time jobs has decreased by an average annual rate of 0.22 percent between 2010 and 2019. Between 2019 and 2020, the total number of jobs decreased by 4.71 percent. Most industries experienced a reduction in the number of jobs between 2019

and 2020. The largest industry in terms of the number of employees during the years 2010, 2019, and 2020 was the manufacturing industry, followed by the health care and social assistance industry and the retail industry (BEA, 2021a).

The number of jobs in the construction industry grew at an average annual rate of 0.28 percent from 3,898 jobs in 2010 to 3,999 jobs in 2019 (BEA, 2021a). The construction industry comprised around 4.5 percent to 5.0 percent of total employment during the years shown in **Table 3.5-3**.

Table 3.5-3. Current Number of Jobs by Industry, Sebastian County

Industry	2010		2019		Average Annual Growth Rate (2010–2019)	2020		Y-O-Y Change (2019–2020)
	Number of Jobs	Percent of Total	Number of Jobs	Percent of Total		Number of Jobs	Percent of Total	
Farm Employment	837	0.98%	751	0.89%	-1.20%	750	0.94%	-0.13%
Forestry, fishing, and related activities	107	0.12%	109	0.13%	0.21%	105	0.13%	-3.67%
Mining, quarrying, and oil and gas extraction	2,976	3.47%	1,067	1.27%	-10.77%	970	1.21%	-9.09%
Utilities	363	0.42%	354	0.42%	-0.28%	356	0.44%	0.56%
Construction	3,898	4.54%	3,999	4.76%	0.28%	3,972	4.96%	-0.68%
Manufacturing	14,683	17.12%	11,528	13.71%	-2.65%	10,920	13.63%	-5.27%
Wholesale trade	2,978	3.47%	3,220	3.83%	0.87%	3,131	3.91%	-2.76%
Retail trade	9,048	10.55%	8,770	10.43%	-0.35%	8,488	10.60%	-3.22%
Transportation and warehousing	2,506	2.92%	2,959	3.52%	1.86%	2,861	3.57%	-3.31%
Information	986	1.15%	1,066	1.27%	0.87%	991	1.24%	-7.04%
Finance and insurance	2,605	3.04%	2,574	3.06%	-0.13%	2,517	3.14%	-2.21%
Real estate and rental and leasing	3,393	3.96%	3,584	4.26%	0.61%	3,315	4.14%	-7.51%
Professional, scientific and technical services	2,363	2.75%	2,508	2.98%	0.66%	2,484	3.10%	-0.96%
Management of companies and enterprises	1,893	2.21%	1,909	2.27%	0.09%	1,571	1.96%	-17.71%
Administrative and support and waste management	6,462	7.53%	6,804	8.09%	0.57%	6,498	8.11%	-4.50%
Educational services	602	0.70%	1,017	1.21%	6.00%	988	1.23%	-2.85%
Health care and social assistance	11,402	13.29%	12,409	14.76%	0.94%	12,034	15.02%	-3.02%
Arts, entertainment, and recreation	711	0.83%	792	0.94%	1.21%	685	0.86%	-13.51%
Accommodation and food services	5,395	6.29%	6,181	7.35%	1.52%	5,487	6.85%	-11.23%
Other services (except	3,958	4.61%	4,223	5.02%	0.72%	3,931	4.91%	-6.91%

Table 3.5-3. Current Number of Jobs by Industry, Sebastian County

Industry	2010		2019		Average Annual Growth Rate (2010–2019)	2020		Y-O-Y Change (2019–2020)
	Number of Jobs	Percent of Total	Number of Jobs	Percent of Total		Number of Jobs	Percent of Total	
government and government enterprises)								
Government and government enterprises	8,615	10.04%	8,242	9.80%	-0.49%	8,051	10.05%	-2.32%
Total Employment	**85,781**	**100.00%**	**84,066**	**100.00%**	**-0.22%**	**80,105**	**100.00%**	**-4.71%**

Source: (BEA, 2021a)
Key: % = percent; Y-O-Y = year-over-year

The 188 WG of the ARANG is an important contributor to the local and regional economy of Fort Smith. The 188 WG is ranked as the 12th largest employer in the Fort Smith Metropolitan Statistical Area (MSA) (Fort Smith Regional Chamber of Commerce, 2022). Sebastian County ranks within the top 10 counties for defense expenditures according to a report by the Arkansas Economic Development Commission on the impact of military installations in Arkansas (Arkansas Economic Development Commission, 2016). **Table 3.5-4** provides the type and amount of defense expenditures in Sebastian County.

Table 3.5-4. Defense Expenditures in Sebastian County, 2015

Type of Expenditure	County Rank	Dollar Amount (millions)
Personnel compensation	4	$29
Procurement contracts	6	$25
Transfer payments	7	$100
Total defense expenditures	**7**	**$154**

Source: (Arkansas Economic Development Commission, 2016)

Housing

As shown in **Table 3.5-5**, in 2019 there were an estimated 4,075 vacant housing units in the city of Fort Smith and an estimated 5,613 vacant housing units in Sebastian County (USCB, 2019c). The median housing value in the city of Fort Smith was lower than the county and the state. The overall vacancy rate for housing was 10.2 percent in Fort Smith and 9.9 percent in Sebastian County. Both rates were lower than the vacancy rate for Arkansas, which was 15.5 percent (USCB, 2019c).

Table 3.5-5. Current Housing Characteristics, Ebbing ANG Base ROI

Area	Housing Units (2019)	Median Housing Value (2019)	Vacant Housing Units (2019)	
			Number	Percent [a]
Arkansas	1,370,281	$127,800	212,210	15.5%
Sebastian County	56,841	$123,100	5,613	9.9%
Fort Smith City	39,983	$121,800	4,075	10.2%

Source: (USCB, 2019c)
Key: % = percent; ANG = Air National Guard; ROI = region of influence
Note:
a. Percentages are rounded to the nearest tenth.

Education

The number of students enrolled, certified teachers, and average student/teacher ratio during the 2021–2022 school year for Sebastian County are presented in **Table 3.5-6**.

Table 3.5-6. Current[(a)] School Enrollment, Ebbing ANG Base ROI

Area	Students (number)	Certified Teachers (number)	Student/Teacher Ratio
Arkansas	473,861	34,027	13.9:1
Sebastian County	20,249	1,486	13.6:1

Sources: (ADE, 2021a; ADE, 2021b; ADE, 2021c; ADE, 2021d)
Key: ANG = Air National Guard; ROI = region of influence
Note:
a. Information presented is for the school year 2021–2022.

3.5.3 No Action Alternative

The affected environment under the No Action Alternative reflects actions that are expected to have occurred by CY 2029. These are described in Section 3.12.2.3, *Cumulative Impacts, Socioeconomics*. Potential direct, indirect, and induced benefits to the local economy resulting from construction activities and additional wages and income from the personnel associated with the foreign training units would not be realized under this alternative. Increased demands on housing and educational services associated with incoming personnel and dependents would also not be realized under this alternative.

3.5.4 Preferred Alternative Environmental Consequences

The analysis of socioeconomic impacts for the Preferred Alternative evaluates socioeconomic impacts in relation to the No Action Alternative (CY 2029); the affected environment at that time would be expected to be as described in Section 3.12.2.3, *Cumulative Impacts, Socioeconomics*.

3.5.4.1 Ebbing ANG Base and Surrounding Area

Population

Approximately 1,185 personnel and dependents would be associated with the Preferred Alternative. Under a maximum impact scenario, if all of the personnel and dependents relocated from outside the area, the total population would increase by 1,185 people by CY 2029, which would be an increase of approximately 0.88 percent of the projected population in Sebastian County and 0.04 percent of the projected population in the state of Arkansas compared to the No Action Alternative. Although unlikely and not anticipated, if all incoming personnel would migrate within the city of Fort Smith, the additional 1,185 people would result in a population change of 1.27 percent compared to the No Action Alternative. It should be noted that population projections estimated for CY 2029, shown in **Table 3.5-7**, are less than the point forecasts for the state and the county for CY 2029 reported by the Arkansas State Data Center, which were based on 2013 population estimates. The Arkansas State Data Center forecast for the population in CY 2029 is 3,249,267 people in the state of Arkansas and 138,551.9 people in Sebastian County (AEDI, 2018). Based on estimates from the Arkansas State Data Center, an additional 1,185 people by CY 2029 would represent a slightly lower percent change in the total population than shown in **Table 3.5-7**.

Table 3.5-7. Population, Ebbing ANG Base ROI, Preferred Alternative

Area	Census 2020	CY 2029 (No Action)	Preferred Alternative	Change from No Action to Preferred Alternative	Percent Change from No Action to Preferred Alternative
Arkansas	3,011,524	3,180,202	3,181,387	1,185	0.04%
Sebastian County	127,799	134,207	135,392	1,185	0.88%
Fort Smith City	89,142	92,982	94,167	1,185	1.27%

Sources: (AEDI, 2002a; AEDI, 2002b; AEDI, 2002c; USCB, 2019a; USCB, 2021a)
Key: % = percent; ANG = Air National Guard; ROI = region of influence; CY = calendar year

As detailed in **Table 2.2-6** (Anticipated Proposed Increase in Number of Personnel at Ebbing ANG Base), the Preferred Alternative would be anticipated to result in an increase in base personnel over the No Action Alternative estimates of approximately 384 personnel, representing a 30-percent increase in base personnel.

Incoming personnel would be anticipated to begin arriving late 2023 and would occur in stages, which would result in less impacts than if the change in population occurred all at once. Since the overall change in population would be less than 1 percent in the county, and the incoming population would arrive over several years, the population change associated with the Preferred Alternative at Ebbing ANG Base would not be significant.

Employment and Income

New construction, demolition, and modifications to facilities and infrastructure would result in direct, indirect, and induced economic impacts in terms of employment and income in the ROI. Cost details regarding the facilities and infrastructure are not available at the time of this EIS. However, it would be anticipated that construction, demolition, and renovations for base facilities and infrastructure would result in near-term economic benefits to the ROI, driven by an increase in construction spending. Construction-related impacts would last for the duration of the activities. Under the assumption that construction employment would continue to follow trends described in Section 3.3.2.1, *Ebbing ANG Base and Surrounding Area*, there would be no additional permanent population increase beyond projected, as the local construction workforce would be expected to meet the labor demand.

The increase and departure of personnel related to the FMS PTC beddown would be dependent on the total aircraft on base at any one time (see Section 2.2.2, *Personnel/Manpower*). However, during the timeline between CY 2023 and CY 2029, the incoming personnel would result in beneficial impacts to the local economy from additional wages and income. The direct employment (number of jobs) of personnel associated with the foreign training units in the interim and the overall additional 384 personnel associated with operations at the end state would result in indirect and induced employment and income in the ROI. The additional government jobs, payroll, and expenditures would maintain the status of the 188 WG as a top employer in the Fort Smith MSA. The additional defense spending would result in a greater economic impact of the defense industry to the ROI compared to the No Action Alternative. The increase in employment and income would be beneficial but not significant.

Housing

Under a maximum case scenario in which all personnel migrated from outside the area and all 384 personnel required one housing unit each, an additional 384 housing units would be demanded. Based on population and housing trends between 2000 and 2019, an average of 334 housing units are added to the total number of housing units in Sebastian County, which has

supported an average annual population growth of 0.53 percent (USCB, 2010b; USCB, 2019c). Therefore, additional housing units may be required to support the end-state personnel numbers. The increased cost of housing and the availability of jobs would be expected to increase corresponding to the average number of people per household. Housing costs could continue to rise as supply tries to catch up with demand before leveling off as new housing is constructed. Any lack of affordable homes in the interim may require homebuyers to expand their search to include areas outside their desired location and price range. The construction of 16 new housing areas with 1,040 housing units would absorb some of the additional and immediate increase in demand (see Section 3.12.1, *Foreseeable Actions and Trends*). Additionally, since personnel associated with the foreign training units would arrive and depart in stages, housing may become more readily available, depending on the timing of arrival and departure of personnel. It would be anticipated that personnel would choose housing in the ROI based on several factors such as the length of their stay, market conditions (i.e., house and rent prices and availability) and personal preferences (e.g., proximity to amenities, school districts).

A concern expressed during the public scoping comment period was the potential noise impacts on the health of residents and property. In particular, a common concern of noise as it relates to housing is the potential impact it would have on property values. The issue of the negative effect of airport noise on property values has been widely researched. A discussion of the impacts of noise levels on property values and resultant real estate taxes is contained in the F-35A Operational Beddown EIS's Appendix B (Noise Modeling, Methodology, and Effects) (USAF, 2020b). The property value-to-noise effects relationship is presented in the form of the Noise Depreciation Index, which reflects the estimated percent loss of property value per dB DNL. As concluded in the F-35A Operational Beddown EIS (USAF, 2020b), noise may affect property values and related taxes in a Noise Depreciation Index range of 0.2 to 2.0 percent per dB of noise increase, which correlates to an average loss of 0.5 percent of the property value per dB. The value of the property is determined based on many individual variables that, when taken together, form the total prices and requires detailed information on local housing markets and actual sales prices. Furthermore, property value price studies model relationships between city-level income and population data and the overall willingness to pay for noise abatement, which enables an estimate of noise impacts in locations where detailed housing data is not available (USAF, 2020b). The cost of noise mitigation is less of a factor in regions that experience extreme temperatures. Many structural elements designed to improve energy conservation also improve the acoustic performance of homes. The way properties are used in hot or cold environs (such as not opening windows for ventilation) can add as much as 15 dB of noise mitigation. The anticipation of noise level increase may also influence property values before the noise increases actually occur (USAF, 2020b).

The range of impacts of 0.2 to 2.0 percent per dB of noise increase serves as a rough estimate of potential impacts to property values. Based on the current median value of an owner-occupied home in Sebastian County of $123,000, noise impacts could potentially discount property values between $246 to $2,460 per dB DNL of noise increase. Noise impacts to property values will vary from location to location depending on the many other factors that influence property values, including local market conditions. If an area does in fact suffer from lower property values associated with increased noise levels, this will result in lower property taxes collected. Over time, lower sales prices in these areas will result in lower appraised values.

Table 3.5-8 shows the estimated number of people and housing units within the 65 dB DNL or greater noise contours for each afterburner scenario under the Preferred Alternative. Noise

mitigations under consideration by the DAF to minimize adverse noise impacts are provided in Section 3.3.5, *Noise, Mitigations*. The number of affected population and affected housing units under the Preferred Alternative with implementation of noise mitigations are shown in Section 3.5.5, *Socioeconomics, Mitigations*.

Table 3.5-8. Population and Housing Within the 65 dB DNL or Greater Noise Contours Under the Preferred Alternative

Affected Units	No Action Alternative	Preferred Alternative		
		5% Afterburner Scenario	50% Afterburner Scenario	95% Afterburner Scenario
Total affected population	66	10,635	11,221	12,720
Total affected housing units	18	2,579	2,680	3,014

Sources: (USCB, 2019d; USCB, 2019e)
Key: % = percent; dB = decibels; DNL = day-night average sound level

Education

Based on the 2020 Demographics Profile of the Military Community (DoD, 2020), 64.7 percent of ANG members are children, and 35.2 percent are spouses. Since the breakdown of family members for civilians are not provided in the report, the same distribution of spouses and children are assumed for incoming civilian personnel as well. Therefore, under these assumptions, 64.7 percent of the 801 dependents associated with the incoming personnel, or approximately 518 dependents, would be children. Under a maximum case scenario, all 518 dependents would be of school age and would be enrolled in the ROI. Children of school age would be of varying ages and would attend the many schools throughout the ROI. Additional students may result in larger class sizes and additional pressures on resources and expenditures. However, additional students would also contribute to revenue generated.

Based on the 2018 report by the Arkansas Division of Public School Academic Facilities and Transportation on progress, ongoing needs, and recommendations for Arkansas K-12 academic facilities (Arkansas Division of Public School Academic Facilities and Transportation, 2018), projected enrollment would decrease for school districts in Sebastian County during the 2026–2027 school year from 2017–2018 enrollment numbers. The average class size throughout the county is below the state requirements, and it would be anticipated to have teachers to support the incoming students. In addition, students would be expected to arrive in stages, as early as late 2023, in anticipation of the arrival of the aircraft, which would help offset some of the additional demands for school resources associated with the increase in the number of students. Potential impacts to educational services would not be significant.

3.5.5 Mitigations

Section 3.3.5, *Noise, Mitigations*, describes several potential adjustments in flight procedures the DAF is considering that can reduce noise levels to some degree. These mitigations would reduce adverse noise impacts to residential areas and reduce the number of residents and housing units newly exposed to noise levels of 65 dB DNL or greater. Residential areas potentially affected by the mitigated noise profiles are shown in Section 3.4.5, *Land Use, Mitigations*, in **Figure 3.4-4**.

Implementation of the Preferred Alternative with noise mitigations would result in fewer estimated residents and housing units within the 65 dB DNL or greater noise contours than the Preferred Alternative without noise mitigations (see **Table 3.5-9**).

Table 3.5-9. Population and Housing Within the 65 dB DNL or Greater Noise Contours Under the Preferred Alternative with Mitigations

Affected Units	5% Afterburner Scenario	50% Afterburner Scenario	95% Afterburner Scenario
Preferred Alternative (Unmitigated)			
Total affected population	10,635	11,221	12,720
Total affected housing units	2,579	2,680	3,014
Preferred Alternative (Mitigated)			
Total affected population	9,427	9,568	10,223
Total affected housing units	2,269	2,267	2,400
Difference (%) Between Unmitigated and Mitigated			
Total affected population	-11%	-15%	-20%
Total affected housing units	-12%	-15%	-20%

Source: Data derived from noise profile analysis and GIS data (see Figure 3.4-4)

3.6 ENVIRONMENTAL JUSTICE AND CHILDREN

USEPA defines "environmental justice" as "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation and enforcement of environmental laws, regulations and policies" (USEPA, 2021a). USEPA also defines minority and low-income populations as follows:

- **Minority** – This includes populations of people who are not single-race white and are not Hispanic but who are members of the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic.
- **Low-income** – These populations are characterized by limited economic resources (USEPA, 2021a).

The DAF also evaluates impacts to other sensitive populations including the children and elderly and defines children, ROI, and Community of Comparison (COC) (DAF, 2020).

- **Children** – In this analysis, this population refers to any person under the age of 17 years old, and elderly are considered 65 years of age or older.
- **ROI** – The ROI is the administrative area containing the best available and most appropriate units that underlie the affected area. Data collected for any given ROI is used to quantitatively characterize the demographic composition of the affected area and is used to determine whether environmental justice populations are present in the area affected by the Preferred Alternative and, if so, whether there may be disproportionate effects to these communities. In this case, the ROI includes the U.S. Census Bureau Block Groups.
- **COC** – The COC is the smallest set of U.S. Census Bureau data encompassing the ROI and is used to establish thresholds of comparison. In other words, the COC is data representing comparison data to which the demographic data in the ROI will be compared, to identify if there are "meaningfully greater" percentages. It is through the establishment of COC threshold data that it is determined whether environmental impacts would disproportionately affect environmental justice communities and populations. In this case, the COC is Sebastian County in Arkansas and Le Flore County in Oklahoma.

3.6.1 Resource-Specific Analysis Methodology

For minority and low-income populations, an analysis was conducted to identify the extent to which minority and low-income populations reside within the ROI. If the percentage of minority and low-income populations in the ROI (U.S. Census Block Groups) was higher compared to the COC (Sebastian County), it was considered to have a disproportionately higher minority or low-income population. For children and elderly, the same methodology was used to determine if effects were considered disproportionate.

3.6.2 Preferred Alternative Affected Environment

3.6.2.1 Ebbing ANG Base and Surrounding Area

The affected environment represents the status of the resource using the best available, most current data. The resource areas considered for potential disproportionate environmental and human health effects in minority and low-income communities and disproportionate health and safety risks to children include the following: noise, land use, and air quality.

Noise

The ROI for this analysis regarding environmental justice communities and noise is the area within the greater than 65 dBA DNL noise zones generated by airborne noise associated with FSRA. FAA considers all land uses to be compatible at noise levels less than 65 dBA DNL. Therefore, 65 dBA DNL or greater is considered the threshold for adverse impacts on populations, including environmental justice communities, children, and the elderly. Civilian and transient military aircraft operations occur frequently at the regional airport. Ebbing ANG Base is co-located with the regional airport but does not have a flying mission under existing conditions; however, the base is used occasionally by other transient military aircraft.

As shown in **Table 3.6-1**, the minority population within Arkansas is 27.6 percent, slightly higher in Sebastian County with 30.4 percent, while the city of Fort Smith is higher with 40.6 percent. The low-income population is approximately 17.1 percent of the total population in Arkansas and 18.5 percent in Sebastian County. The percentage for the city of Fort Smith is similar, with 21.0 percent. The percentages of children are similar among the state, county, and city, accounting for approximately 24 percent of the population. Those over 65 years of age range from 16.6 percent in the state, 15.6 percent in the county, and 14.7 percent in Fort Smith.

Table 3.6-1. Demographic Data for Arkansas, Sebastian County, the City of Fort Smith, Oklahoma, and Le Flore County

Area	Total Population	Minority		Low-Income			Children		Elderly	
		Number	Percent	Population for Whom Poverty is Calculated	Number	Percent	Number	Percent	Number	Percent
Arkansas	2,999,370	826,917	27.6%	2,910,954	496,260	17.1%	704,268	23.5%	498,778	16.6%
Sebastian County	127,591	38,837	30.4%	125,802	23,271	18.5%	30,809	24.2%	19,894	15.6%
City of Fort Smith	87,743	35,635	40.6%	86,282	18,156	21.0%	21,227	24.2%	12,858	14.7%
Oklahoma	3,932,870	1,351,639	34.4%	3,817,368	598,373	15.7%	956,964	24.3%	603,394	15.3%
Le Flore County	50,026	14,335	28.7%	48,642	10,082	20.7%	12,176	24.3%	8,772	17.5%

Sources: (USCB, 2019a; USCB, 2019f; USCB, 2019g)
Key: % = percent

According to the 2019 American Community Survey 5-year estimates obtained from the U.S. Census Bureau, the off-airport indirect study area does not contain low-income or minority populations.

Land Use

The affected environment for land use within the context of environmental justice includes associated environmental justice and aged populations within RPZs, which are incompatible with residential land uses. Based on analysis conducted as part of the Runway Extension EA, there are no low-income or minority populations within current RPZs (Garver, 2022).

Air Quality

The ROI for Air Quality under the Preferred Alternative is Sebastian County (see Section 3.10, *Air Quality*). Sebastian County is in attainment for all six criteria pollutants.

3.6.3 No Action Alternative

The affected environment under the No Action Alternative reflects actions that are expected to have occurred by CY 2029. These are described in Section 3.12.2.4, *Cumulative Impacts, Environmental Justice*. Implementation of the No Action Alternative (i.e., no beddown of the FMS PTC at Ebbing ANG Base) would not result in any additional impacts outside those described under Cumulative Impacts.

3.6.4 Preferred Alternative Environmental Consequences

The analysis of environmental justice impacts for the Preferred Alternative evaluates impacts in relation to the No Action Alternative (CY 2029); the affected environment for both Ebbing ANG Base (and FSRA) at that time would be expected to be as described in Section 3.12.2.4, *Cumulative Impacts, Environmental Justice*.

3.6.4.1 Ebbing ANG Base and Surrounding Area

Noise

This environmental justice, children, and elderly analysis for noise impacts consists of the area within the 65 dBA DNL or greater noise contours generated by airborne noise as a result of the beddown of the FMS aircraft. FAA considers all land uses to be compatible at noise levels below 65 dBA DNL. Therefore, 65 dBA DNL or greater is considered the threshold for adverse impacts on populations, including environmental justice communities, children, and the elderly. **Table 3.6-2** presents population data for the environmental justice and aged communities in the state of Arkansas, Sebastian County, and the city of Fort Smith. Based on these data:

- Six block groups would have minority populations greater than the COC of Sebastian County at 30.4 percent.
- Eight block groups would have low-income populations greater than Sebastian County at 18.5 percent.
- Eight block groups would have a higher percentage of children compared to the county with 24.2 percent.
- Thirteen block groups would have a higher percentage of elderly compared to the county at 15.6 percent.
- For the one block group in Oklahoma, both low-income and elderly populations would be greater than Le Flore County, with 20.7 low-income and 17.5 elderly.

Table 3.6-2. Ebbing ANG Base (and FSRA) Communities within the Greater than 65 dBA DNL Noise Zones at Ebbing ANG Base – Preferred Alternative

Area	Total Population	Minority		Low-Income			Children		Elderly	
		Number	Percent (a)(b)	Population for Whom Poverty is Calculated (c)	Number	Percent (a)(b)	Number	Percent (a)(b)	Number	Percent (a)(b)
Arkansas	**2,999,370**	**826,917**	**27.6%**	**2,910,954**	**496,260**	**17.1%**	**704,268**	**23.5%**	**498,778**	**16.6%**
Sebastian County	**127,591**	**38,837**	**30.4%**	**125,802**	**23,271**	**18.5%**	**30,809**	**24.2%**	**19,894**	**15.6%**
City of Fort Smith	**87,743**	**35,635**	**40.6%**	**86,282**	**18,156**	**21.0%**	**21,227**	**24.2%**	**12,858**	**14.7%**
Census Tract 11.01	3,792	1,263	33.3%	3,718	511	13.7%	750	19.8%	835	22.0%
Block Group 4	625	164	26.2%	625	12	1.9%	171	27.4%	96	15.4%
Census Tract 11.02	2,931	1,099	37.5%	2,912	556	19.1%	366	12.5%	517	17.6%
Block Group 1	1,220	450	36.9%	1,220	269	22.1%	331	27.1%	209	17.1%
Block Group 2	1,103	385	34.9%	1,084	140	12.9%	150	13.6%	291	26.4%
Block Group 3	608	264	43.4%	608	147	24.2%	136	22.4%	17	2.8%
Census Tract 12.01	3,489	735	21.1%	3,364	511	15.2%	824	23.6%	591	16.9%
Block Group 1	772	234	30.3%	772	64	8.3%	108	14.0%	161	20.9%
Block Group 3	1,662	289	17.4%	1,537	287	18.7%	511	30.8%	230	13.8%
Census Tract 12.02	2,558	916	35.8%	2,446	652	26.7%	518	20.3%	508	19.9%
Block Group 1	1,098	314	28.6%	1,005	273	27.2%	123	11.2%	288	26.2%
Block Group 2	708	427	60.3%	699	126	18.0%	232	32.8%	127	17.9%
Block Group 3	752	175	23.3%	742	253	34.1%	163	21.7%	93	12.4%
Census Tract 13.01	2,651	601	22.7%	2,520	149	5.9%	600	22.6%	717	27.1%
Block Group 2	1,011	307	30.4%	990	45	4.6%	240	23.7%	179	17.7%
Block Group 3	874	163	18.7%	874	32	3.7%	239	27.4%	180	20.6%
Census Tract 13.02	10,117	1,880	18.6%	9,989	1,387	13.9%	2,275	22.5%	1,239	12.3%
Block Group 1	1,385	76	5.5%	1,385	470	33.9%	358	25.9%	343	24.8%
Block Group 2	2,414	343	14.2%	2,389	318	13.3%	524	21.7%	224	9.3%
Block Group 3	6,318	1,461	23.1%	6,215	599	9.6%	1,393	22.1%	672	10.6%
Census Tract 13.03	6,815	2,088	30.6%	6,754	853	12.6%	1,634	24.0%	754	11.1%
Block Group 1	3,234	1,104	34.1%	3,221	575	17.9%	812	25.1%	272	8.4%
Block Group 2	2,096	820	39.1%	2,096	230	11.0%	467	22.3%	169	8.1%

Table 3.6-2. Ebbing ANG Base (and FSRA) Communities within the Greater than 65 dBA DNL Noise Zones at Ebbing ANG Base – Preferred Alternative

Area	Total Population	Minority		Low-Income			Children		Elderly	
		Number	Percent (a)(b)	Population for Whom Poverty is Calculated (c)	Number	Percent (a)(b)	Number	Percent (a)(b)	Number	Percent (a)(b)
Census Tract 13.05	4,521	757	16.7%	4,521	455	10.1%	1,030	22.8%	4,521	23.4%
Block Group 1	597	98	16.4%	597	0	0.0%	95	15.9%	165	27.6%
Block Group 2	1,327	200	15.1%	1,327	424	32.0%	445	33.5%	215	16.2%
Block Group 3	575	34	5.9%	575	0	0.0%	15	2.6%	191	33.2%
Block Group 4	2,022	425	21.0%	2,022	31	1.5%	475	23.5%	487	24.1%
Census Tract 6	4,916	939	19.1%	4,887	1,188	24.3%	952	19.4%	1,310	26.7%
Block Group 4	801	143	17.9%	801	271	33.8%	82	10.2%	204	25.5%
Oklahoma	**3,932,870**	**1,351,639**	**34.4%**	**3,817,368**	**598,373**	**15.7%**	**956,964**	**24.3%**	**603,394**	**15.3%**
Le Flore County	**50,026**	**14,335**	**28.7%**	**48,642**	**10,082**	**20.7%**	**12,176**	**24.3%**	**8,772**	**17.5%**
Census Tract 401.98	1,905	481	25.3%	1,860	629	33.8%	466	24.5%	375	19.7%
Block Group 2	801	143	17.9%	801	271	33.8%	82	10.2%	204	25.5%

Sources: (USCB, 2019a; USCB, 2019f; USCB, 2019g)
Key: % = percent; ANG = Air National Guard; dBA = A-weighted decibels; DNL = day-night average sound level
Notes:
a. Areas shaded gray indicate where block group percentages are greater than the county percentages.
b. Percentages are rounded to the nearest tenth.
c. Population for whom poverty is calculated is based on persons for whom the Census Bureau can determine poverty status and, therefore, may differ from the total population (USCB, 2021d).

Figure 3.6-1 and **Figure 3.6-2** show the locations of minority and low-income populations that would occur within the noise zones (e.g., greater than 65 dBA DNL noise zones).

Based on the percentages of populations located within the greater than 65 dBA DNL noise zones (**Table 3.6-2**), the Preferred Alternative would result in disproportionately high and adverse human health or environmental effects on the following:

- Minority populations (Census Tract 11.02, Block Groups 1, 2, and 3; Census Tract 12.02, Block Group 2; and Census Tract 13.03, Block Groups 1 and 2)
- Low-income populations (Census Tract 11.02, Block Groups 1 and 3; Census Tract 12.01, Block Group 3; Census Tract 12.02, Block Groups 1 and 3; Census Tract 13.02, Block Group 1; Census Tract 13.05, Block Group 2; Census Tract 6, Block Group 4; and Census Tract 401.98, Block Group 2 [Le Flore County])

The Preferred Alternative would also result in noise impacts that may disproportionately affect children. In addition, the elderly could be significantly impacted. Section 3.3, *Noise*, shows noise levels at points of interest that include schools and other sensitive locations and evaluates the potential for speech and learning interference.

The Preferred Alternative would result in an increase of the total population estimated to reside within the 65 dBA DNL or greater noise zones. To compare the total population versus those considered to be minority and low-income, estimates of population numbers were determined using the weighted average of the population residing within the residential portion of the block group and based on the U.S. Census Bureau American Community Survey 5-year estimates for 2015–2019. **Table 3.6-3** shows the comparison of the number of people within the greater than 65 dBA DNL noise zones for the No Action Alternative and Preferred Alternative under three potential afterburner scenarios. The beddown of the FMS aircraft would result in an increase in people located within the greater than 65 dBA DNL noise zones with an increase of 26 percent minority and 15 percent low-income populations. As shown, the majority of total affected population would not be identified as minority or low-income.

Table 3.6-3. Ebbing ANG Base (and FSRA) Comparison of Total, Minority, and Low-Income Populations Within the Greater than 65 dBA DNL Noise Zones

Community	No Action Alternative	5% Afterburner Scenario	50% Afterburner Scenario	95% Afterburner Scenario
Total affected population	66	10,635	11,221	12,720
Estimated minority population	14	2,770 (26%)	2,971	3,329
Estimated low-income population	12	1,603 (15%)	1,699	1,945

Source: (USCB, 2018b)
Key: % = percent; dB = decibels; DNL = day-night average sound level

A similar analysis was conducted for children and elderly populations and is shown in **Table 3.6-4**. The total affected population within the noise zones would increase along with the percentage of children (22 percent) and elderly (17 percent).

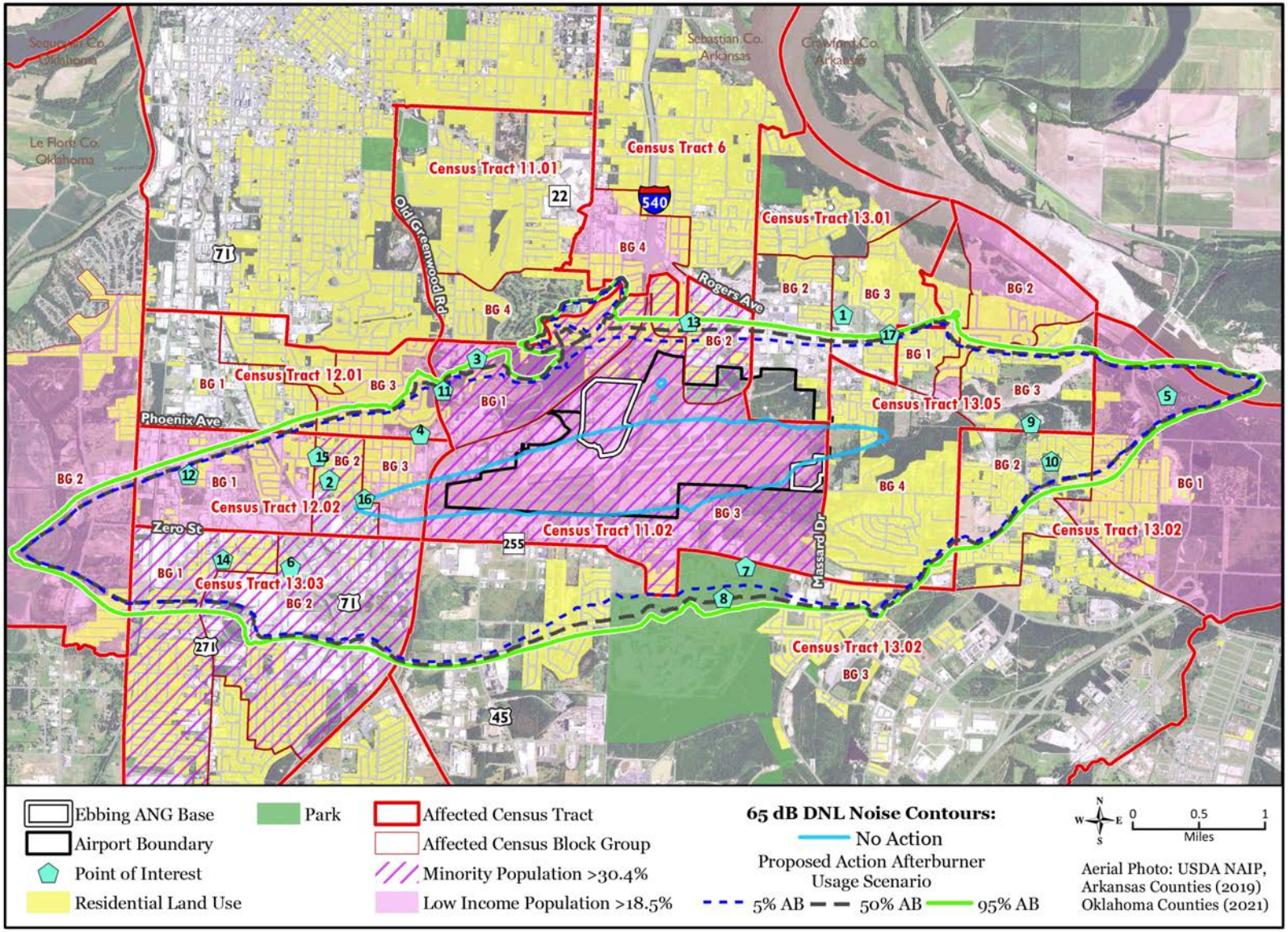


Figure 3.6-1. Ebbing ANG Base (and FSRA) Environmental Justice and Noise – Preferred Alternative

Sources: (Ebbing ANG Base, 2021; ESRI Data & Maps, 2019a; USDA-FSA-APFO, 2019a; USDA-FSA-APFO, 2019b; BRRC, 2022a; USDA-FSA-APFO, 2021a; USDA-FSA-APFO, 2021b; Arkansas GIS Office, 2021); (USCB, 2022; USCB, 2020)

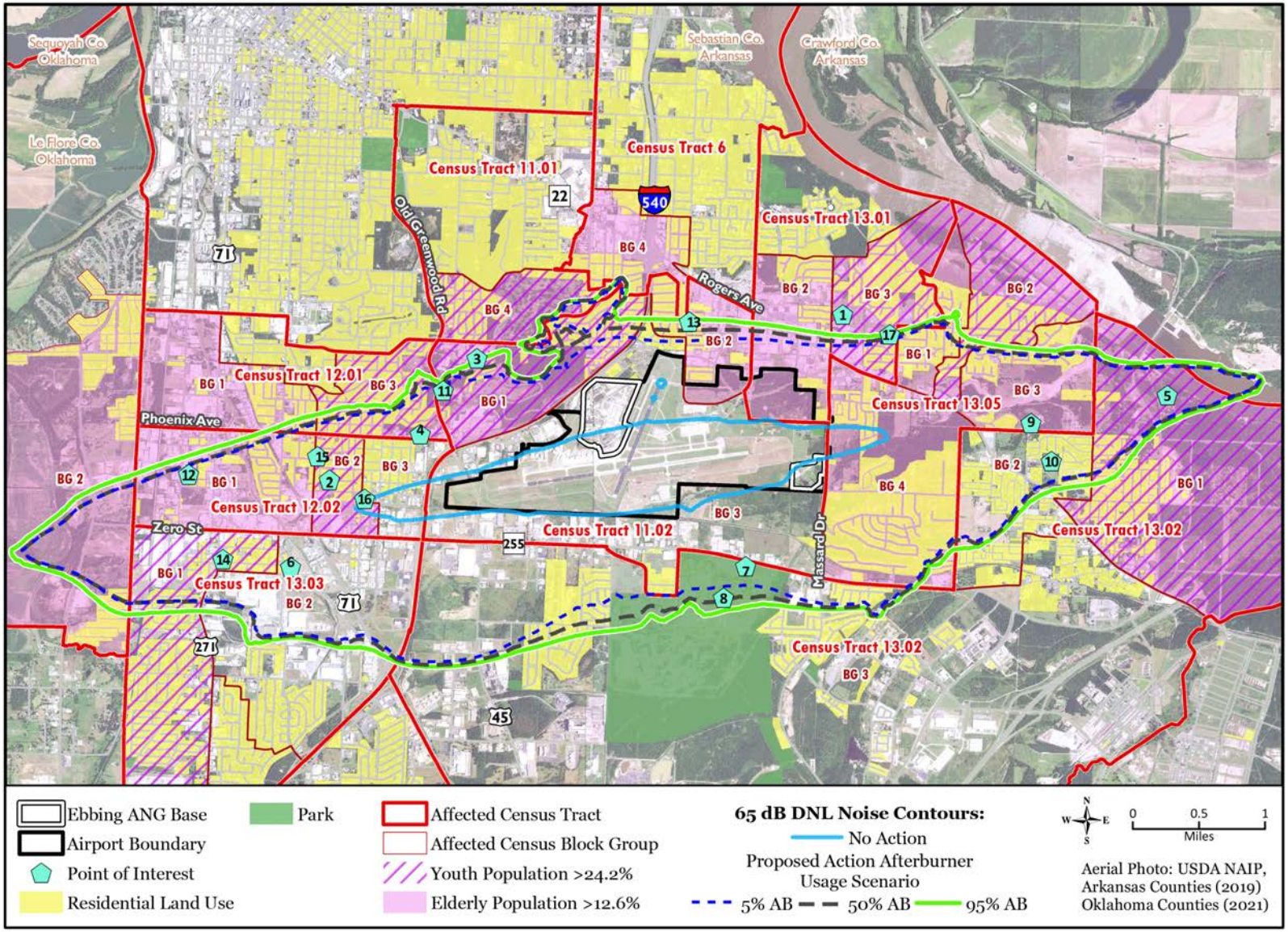


Figure 3.6-2. Ebbing ANG Base (and FSRA) Children/Elderly Noise – Preferred Alternative

Sources: (Ebbing ANG Base, 2021; ESRI Data & Maps, 2019a; USDA-FSA-APFO, 2019a; USDA-FSA-APFO, 2019b; BRRC, 2022a; USDA-FSA-APFO, 2021a; USDA-FSA-APFO, 2021b; Arkansas GIS Office, 2021); (USCB, 2020; USCB, 2022)

Table 3.6-4. Ebbing ANG Base (and FSRA) Comparison of Total, Children, and Elderly Populations Within the Greater than 65 dBA DNL Noise Zones

Community	No Action Alternative	5% Afterburner Scenario	50% Afterburner Scenario	95% Afterburner Scenario
Total affected population	66	10,635	11,221	12,720
Estimated children	15	2,341 (22%)	2,477	2,813
Estimated elderly	12	1,859 (17%)	1,951	2,219

Source: (USCB, 2019f)
Key: % = percent; dB = decibels; DNL = day-night average sound level

Land Use

As discussed in Section 3.4, *Land Use*, the Preferred Alternative would increase the amount of residential land within the greater than 65 dBA DNL noise zones. Residential uses within these noise zones would not be compatible. This would include residents within block groups with a higher percentage of minority and low-income populations within the greater than 65 dBA DNL noise zones and would be considered a disproportionately high and adverse human health or environmental effect. In addition, the block groups with a higher percent of children would be considered a disproportionate environmental health or safety risk. Impacts to the elderly would be significant.

Air Quality

As discussed in Section 3.10, *Air Quality*, the Preferred Alternative would result in an increase in air emissions but would not cause exceedances of the National Ambient Air Quality Standards (NAAQS) and would be below all emission significance thresholds. Sebastian County would remain in attainment for all six criteria pollutants under this alternative. With no significant impacts to air quality, no disproportionately high and adverse human health or environmental effects to minority and low-income populations and no environmental health or safety risks that may disproportionately affect children or elderly have been identified.

3.6.5 Mitigations

Section 3.3.5, *Noise, Mitigations*, describes several potential adjustments in flight procedures the DAF is considering that can reduce noise levels to some degree, which would in turn reduce adverse noise impacts to environmental justice communities, children, and the elderly exposed to noise levels of 65 dB DNL or greater. Implementation of the Preferred Alternative with noise mitigations would result in fewer environmental justice and aged communities within the 65 dB DNL or greater noise zones compared to the Preferred Alternative without noise mitigations. **Figure 3.6-3** shows the locations of minority and low-income populations that would occur within the noise zones (e.g., greater than 65 dBA DNL noise zones) with and without operational mitigations **Figure 3.6-4** presents children and elderly populations within the noise zones with and without mitigations.

Table 3.6-5 provides a comparison of minority and low-income populations under the Preferred Alternative with and without mitigation. **Table 3.6-6** shows a comparison for children and elderly with and without mitigation. The estimates of population numbers use the weighted average of the population residing within the residential portion of the block group and based on the U.S. Census Bureau American Community Survey 5-year estimates for 2015–2019.

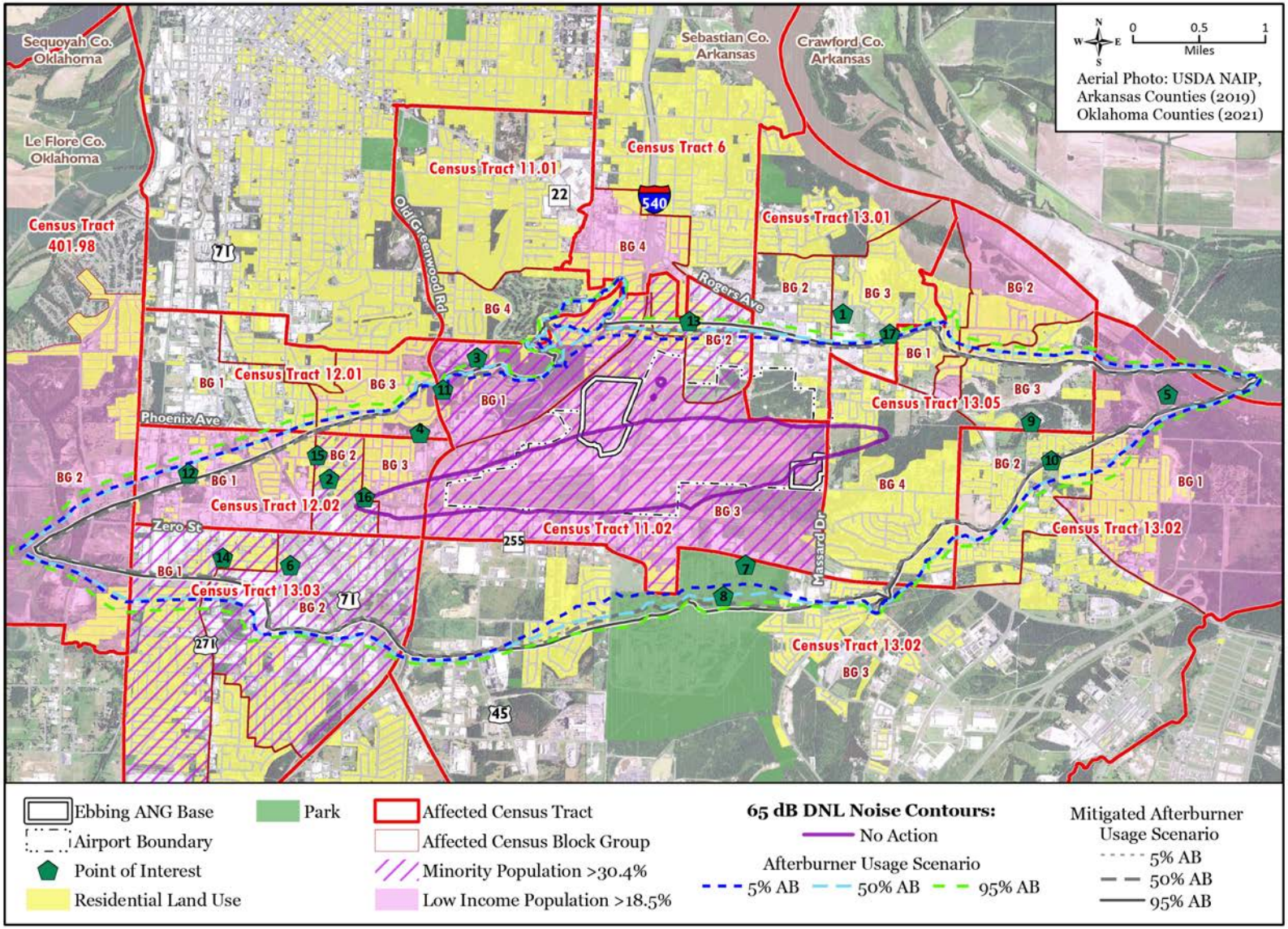


Figure 3.6-3. Ebbing ANG Base (and FSRA) Environmental Justice and Noise With and Without Mitigations – Preferred Alternative

Sources: (Ebbing ANG Base, 2021; ESRI Data & Maps, 2019a; USDA-FSA-APFO, 2019a; USDA-FSA-APFO, 2019b; BRRC, 2022a; USDA-FSA-APFO, 2021a; USDA-FSA-APFO, 2021b; Arkansas GIS Office, 2021); (USCB, 2020; BRRC, 2022b; Oklahoma Office of Geographic Information, 2022; USCB, 2022)

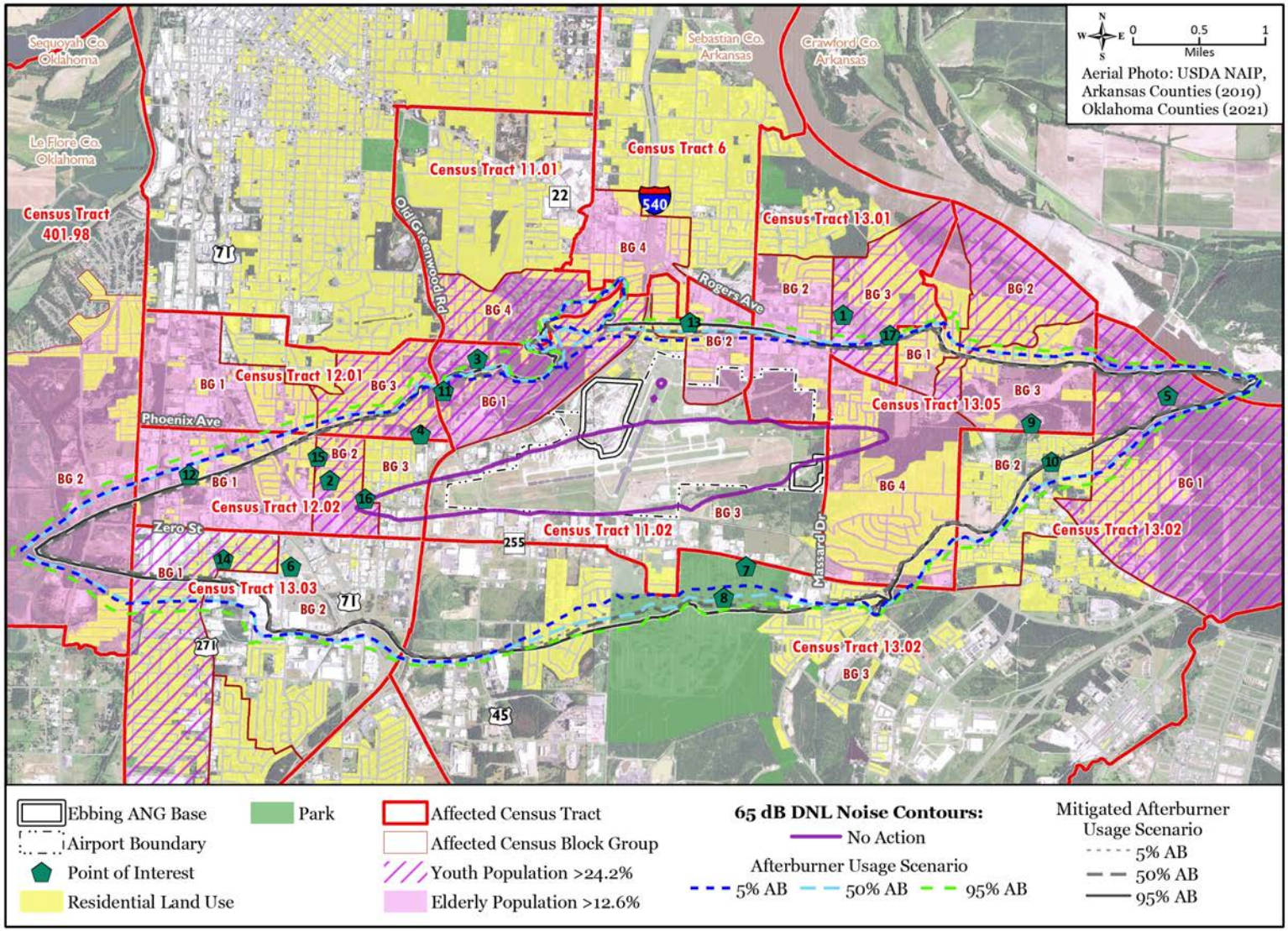


Figure 3.6-4. Ebbing ANG Base (and FSRA) Children/Elderly and Noise With and Without Mitigations – Preferred Alternative

Sources: (Ebbing ANG Base, 2021; ESRI Data & Maps, 2019a; USDA-FSA-APFO, 2019a; USDA-FSA-APFO, 2019b; BRRC, 2022a; USDA-FSA-APFO, 2021a; USDA-FSA-APFO, 2021b; Arkansas GIS Office, 2021); (USCB, 2020; BRRC, 2022b; Oklahoma Office of Geographic Information, 2022; USCB, 2022)

Table 3.6-5. Ebbing ANG Base (and FSRA) Comparison of Total, Minority, and Low-Income Populations Within the 65 dB DNL or Greater Noise Zones With and Without Mitigations

Community	5% Afterburner Scenario			50% Afterburner Scenario			95% Afterburner Scenario		
	Unmitigated	Mitigated	Change	Unmitigated	Mitigated	Change	Unmitigated	Mitigated	Change
Total affected population	10,635	9,427	-11%	11,221	9,568	-15%	12,720	10,223	-20%
Estimated minority	2,770	2,565	-7%	2,971	2,650	-11%	3,329	2,828	-15%
Estimated low income	1,603	1,402	-13%	1,699	1,438	-15%	1,945	1,541	-21%

Source: (USCB, 2019a; USCB, 2019g)
Key: % = percent; ANG = Air National Guard; dB = decibels; DNL = day-night average sound level

Table 3.6-6. Ebbing ANG Base (and FSRA) Comparison of Total, Children, and Elderly Populations Within the Greater than 65 dBA DNL Noise Zones With and Without Mitigations

Community	5% Afterburner Scenario			50% Afterburner Scenario			95% Afterburner Scenario		
	Unmitigated	Mitigated	Change	Unmitigated	Mitigated	Change	Unmitigated	Mitigated	Change
Total affected population	10,635	9,427	-11%	11,221	9,568	-15%	12,720	10,223	-20%
Estimated children	2,341	2,121	-9%	2,477	2,153	-13%	2,813	2,290	-19%
Estimated elderly	1,859	1,608	-14%	1,951	1,628	-17%	2,219	1,747	-21%

Source: Data derived from noise analysis and GIS data (see Figure 3.6-4)
Key: % = percent; ANG = Air National Guard; dBA = A-weighted decibels; DNL = day-night average sound level

In addition to exploring operational mitigations, the DAF made a good-faith effort to communicate with environmental justice and aged communities to inform them about the project and methods to participate in the EIS process, including the following:

- Conducted a digital campaign and posted notices specifically targeted toward potentially affected environmental justice communities to provide notification of the availability of the Draft EIS and dates and times for participation in the virtual public meetings.
- Distributed copies of the Draft EIS to local libraries located within the environmental justice communities.
- Ensured that virtual public meetings had a call-in number, to facilitate participation if Internet access was not available.
- Held virtual public meetings on different days and times to increase accessibility.
- Posted records of the virtual public meetings on the project website for additional access to project information.

3.7 CULTURAL RESOURCES

Cultural resources are any prehistoric or historic district, site, building, structure, or object considered important to a culture, subculture, or community for scientific, traditional, religious, or other purposes. They include archaeological resources, historic architectural resources, and traditional cultural resources. Archaeological resources are locations where prehistoric or historic activity measurably altered the earth or produced deposits of physical remains (e.g., arrowheads, bottles). Historic architectural resources include standing buildings and other structures of historic or aesthetic significance. Architectural resources generally must be more

than 50 years old to be considered for inclusion on the National Register of Historic Places (NRHP); however, more recent structures, such as Cold War–era resources, may warrant protection if they have the potential to gain significance in the future and are considered extraordinary in nature. Traditional cultural properties are associated with cultural practices and beliefs of a living community that are rooted in its history and are important in maintaining the continuing cultural identity of the community. Historic properties (as defined in 36 CFR § 60.4 and 36 CFR § 800.15(l)(1)) are significant archaeological, architectural, or traditional resources that are defined as eligible for listing on the NRHP.

3.7.1 Resource-Specific Analysis Methodology

Analysis of potential effects to historic properties considers both direct and indirect effects, in accordance with 36 CFR § 800.5. Direct effects may be the result of physically altering, damaging, or destroying all or part of a historic property; altering characteristics of the surrounding environment that contribute to the importance of the historic property; introducing visual, atmospheric, or audible elements that are out of character for the period the historic property represents (thereby altering the setting); or neglecting the historic property to the extent that it deteriorates or is destroyed. Indirect effects include reasonably foreseeable future effects caused by the undertaking that may occur later in time, be farther removed in distance, or be cumulative (36 CFR § 800.5(a)(1)).

For the purposes of cultural resources analysis, the ROI is considered equivalent to the Area of Potential Effects (APE), as defined by 36 CFR § 800.16(d). The APE for cultural resources is the geographic area or areas within which an undertaking (project, activity, program, or practice) may cause changes in the character or use of any historic properties present. The APE is influenced by the scale and nature of the undertaking and may be different for various kinds of effects caused by the undertaking. The APE for this undertaking includes the footprints of the proposed construction and renovation projects described in **Table 2.2-7** (Proposed Construction and Renovation Projects at Ebbing ANG Base [Preferred Alternative]), Ebbing ANG Base, the off-base land exposed to greater than 65 dB DNL for the Preferred Alternative (the 65 dB DNL contour APE, accounting for the greatest potential impact depending on 5%, 50%, or 95% afterburner usage), and the area under the airspace and MTRs to be utilized for the Preferred Alternative. The APE accounts for foreseeable effects to historic properties by the Preferred Alternative, including physical, visual, and audible effects associated with implementation of the action at Ebbing ANG Base, as well as an increase in noise associated with the aircraft training use of the associated airspace. Sixty-five dB DNL is the upper threshold for ambient sound on residential properties before there would be effects.

3.7.2 Preferred Alternative Affected Environment

3.7.2.1 Ebbing ANG Base and Surrounding Area

Archaeological Resources

For purposes of this EIS, the discussion of archaeological resources covers Ebbing ANG Base and FSRA. There are no known archaeological historic properties at Ebbing ANG Base or within FSRA property. The November 2007 *Cultural Resource Survey of the 188th Fighter Wing* addressed the main installation as well as the 188 WG Fire Training Area. As described in the survey report, “Research indicates that virtually all of the 188 Fighter Wing [sic] has undergone massive contour alteration associated with activities such as site preparation, construction and demolition, landscaping and intensive land use and training missions” (NGB, 2007). As such, the

survey included a limited testing regime developed following consultation with Arkansas State Historic Preservation Officer (SHPO) and focused on areas with some potential for intact subsurface soil contexts. No cultural resources were identified. No additional archaeological survey was recommended for either the main installation or the Fire Training Area. SHPO accepted the findings of the final cultural resource survey report on April 18, 2008 (McSwain, 2008). Following the findings of the Cultural Resource Survey, it is unlikely that any significant archaeological resources are present within the APE on FSRA. These particular areas have not undergone cultural resource surveys. However, two previous archaeological surveys that have been performed on airport property identified a few isolated artifacts in disturbed contexts. Neither of the two archaeological crews who conducted surveys within the APE identified intact archaeological sites (Buchner, 2017; Branam & Fuentes, 2021). FSRA was subjected to the same massive contour alteration as described in the 2007 survey of Ebbing ANG Base and is likely heavily disturbed, as is supported by the findings of previous archaeological surveys.

Architectural Resources

There are no NRHP-listed or eligible architectural resources at Ebbing ANG Base. NGB conducted a cultural resource survey of Ebbing ANG Base in 2007. As part of that survey, NGB evaluated 33 buildings and structures constructed through the end of the Cold War (1989) to determine if they were eligible for listing in the NRHP. The majority of the buildings were not 50 years of age at the time of the survey, thus the evaluation addressed the standard NRHP criteria as well Criteria Consideration G that requires properties less than 50 years old be of exceptional importance to be considered eligible for listing in the NRHP. NGB determined that none of the buildings at Ebbing ANG Base were eligible for listing in the NRHP either individually or as part of a potential district, due to "the absence of direct association with the national Cold War military alert defense mission and a lack of architectural integrity" (NGB, 2007). SHPO accepted the findings of the final cultural resource survey report on April 18, 2008 (McSwain, 2008). Only five buildings at Ebbing ANG Base are currently 50 years of age (Buildings 104, 200, 207, 102, and 113). Two of these buildings (Buildings 113 and 200) would be directly affected by the undertaking. Building 200 was already 50 years old when surveyed in 2007 and determined ineligible for listing in the NRHP. Building 113 was not 50 years old in 2007, but NGB continues to find this simple shop building ineligible for listing in the NRHP. All but three of the buildings that will be renovated or utilized for the undertaking were included in the 2007 survey and are identified in the Arkansas Historic Preservation ArcGIS Program as ineligible for listing in the NRHP. Of the three buildings not previously evaluated, two (Buildings 182 and 202) are of 21st century construction, and the hush house (Building 219) is not 50 years old. As such, none of these resources are eligible for listing in the NRHP.

Outside Ebbing ANG Base, the APE area exposed to greater than 65 dB DNL (the 65 dB DNL contour APE) includes FSRA. There are no previously recorded architectural resources and no historic properties at FSRA (Arkansas Historic Preservation Program, 2022). The airport property reflects continual improvements since its founding in the 1930s through the twenty-first century. Beyond airport property, the 65 dB DNL contour APE contains a mixture of residential, commercial, and light industrial development. There are 16 previously surveyed historic architectural resources within this area, of which 4 are not eligible for the NRHP, 2 are listed in the NRHP, and 8 are unevaluated (**Figure 3.7-1**). The two resources listed in the NRHP are the Barling Segment of Old Highway 22, listed in the NRHP in 2007 as part of the Arkansas Highway History and Architectural Multiple Property Listing, and the Elmwood Cemetery, also known as

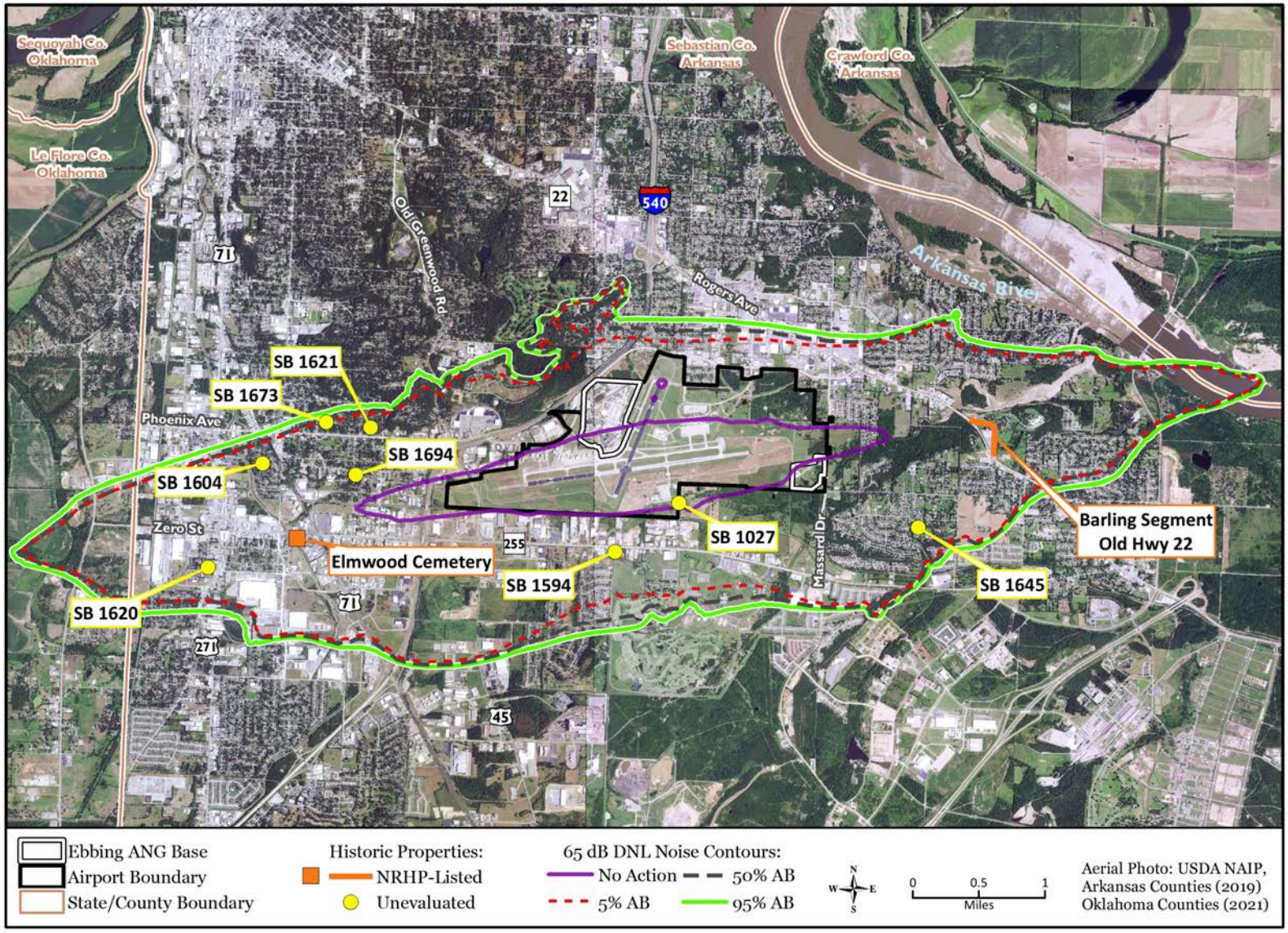


Figure 3.7-1. Map Depicting Historic Properties and Unevaluated Previously Recorded Resources Within the 65 dB DNL Contour APE Surrounding Ebbing ANG Base

Sources: (Ebbing ANG Base, 2021; USDA-FSA-APFO, 2019a; USDA-FSA-APFO, 2019b; BRRC, 2022a; ESRI Data & Maps, 2019a; ESRI Data & Maps, 2019b; Arkansas Historic Preservation Program, 2022; USDA-FSA-APFO, 2021a; USDA-FSA-APFO, 2021b)

the Poor Farm Cemetery, listed in the NRHP in 2018 (Arkansas Historic Preservation Program, 2022). The eight unevaluated previously recorded resources are listed in **Table 3.7-1**.

Table 3.7-1. Unevaluated Previously Recorded Historic Resources in the 65 dB DNL Contour APE

Resource No.	Resource Name	NRHP Status
SB 1027	Bridge 19464	No data
SB 1594	Carnall 4-H Building	Unknown
SB 1604	House at 1715 Tulsa Street	Unknown
SB 1620	House at 6216 S. 11th Street	Unknown
SB 1621	House at 2922 Osage Street	Unknown
SB 1645	House at 9308 Urban View Drive	Unknown
SB 1673	House at 4522 S. 25th Street	Unknown
SB 1694	House at 5011 S. 28th Street	Unknown

Source: (Arkansas Historic Preservation Program, 2022)
Key: APE = Area of Potential Effects; dB = decibels; DNL = day-night average sound level; No. = number; NRHP = National Register of Historic Places

Traditional Resources

Ebbing ANG Base and FSRA contain no known traditional resources. The DAF is seeking input from the federally recognized Tribes identified in Volume II, **Appendix A** regarding any traditional resources that may be affected by the Preferred Alternative. To date, the DAF has received comments from 13 Tribes, none of which have identified resources that may be affected by the Preferred Alternative (see Volume II, **Appendix A**, Section A.3, for summaries of Tribal correspondence).

3.7.2.2 Affected Airspace

There are 397 NRHP-listed properties located under the airspace and MTRs associated with the Ebbing ANG Base alternative, including 297 buildings, 57 structures, 26 districts, 12 sites, and 5 objects (NPS, 2014). No American Indian reservations or known traditional cultural properties underlie the airspace. Tribal consultation efforts to identify other traditional resources within the APE are described in Section 3.3.2.1, *Noise, Ebbing ANG Base and Surrounding Area*.

Foreseeable Actions and Trends

As described in Section 3.3.1, *Noise, Resource-Specific Analysis Methodology*, the *2036 Arkansas Airport Statewide Plan Update* identifies proposed improvements to three airports located under the affected airspace in order to address projected use and expected growth. Physical improvements to the airport properties may involve new ground disturbance and, thus, have the potential to directly affect historic properties; such effects would be accounted for in the National Historic Preservation Act (NHPA) Section 106 process for those projects, assuming there is some federal involvement in the undertakings. Increased air traffic resulting from the foreseeable future actions has the potential for noise effects within the airspace, but this is unlikely to result in direct effects or adverse effects to cultural resources.

3.7.3 No Action Alternative

The affected environment under the No Action Alternative would reflect actions that are expected to have occurred by CY 2029. These are described in Section 3.12.2.5, *Cumulative Impacts, Cultural Resources*. Implementation of the No Action Alternative (i.e., no beddown of the FMS PTC at Ebbing ANG Base) would not result in any additional impacts outside those described under Cumulative Impacts.

3.7.4 Preferred Alternative Environmental Consequences

The analysis of impacts to cultural resources for the Preferred Alternative evaluates impacts in relation to the No Action Alternative (CY 2029); the affected environment at that time would be expected to be as described in Section 3.12.2.5, *Cumulative Impacts, Cultural Resources*. Effects to historic properties resulting from the Preferred Alternative may include physical and visual effects associated with construction and renovation projects on Ebbing ANG Base and FSRA, noise effects to areas surrounding the base and airport, and noise effects to resources below the airspace to be utilized by the Preferred Alternative. The DAF is consulting with the Arkansas SHPO, Oklahoma SHPO, and interested Tribes regarding the effects of the Preferred Alternative to historic properties, in accordance with Section 106 of the NHPA. On January 11, 2022, the DAF sent letters initiating Section 106 consultation with the Arkansas and Oklahoma SHPOs and initiating government-to-government consultation with potentially interested Tribes. In a letter dated January 21, 2022, the Oklahoma SHPO found that the Preferred Alternative would result in no historic properties affected below the airspace in Oklahoma, and in a letter dated February 15, 2022, the Arkansas SHPO concurred with a finding of no historic properties affected (see Volume II, **Appendix A**, Section A.3.1). To date, the DAF has received comments from 13 Tribes, 12 of which have identified no resources that may be affected by the Preferred Alternative (see Volume II, **Appendix A**, Section A.3, for summaries of Tribal correspondence). On May 5, 2022, the DAF sent a second consultation letter and supporting documentation to the Arkansas SHPO, all Tribes requesting consultation, and all unresponsive Tribes, seeking comment on the DAF's finding of *no adverse effects to historic properties*. The Arkansas SHPO has not responded to updated project information presented in the submittal of May 5, 2022. The DAF is in ongoing consultation with the Cherokee Nation, which has expressed concern about the project's proximity to the Trail of Tears.

3.7.4.1 Ebbing ANG Base and Surrounding Area

Archaeological Resources

No effects to archaeological historic properties are anticipated from the Preferred Alternative. There are no previously documented historic properties in the APE, and prior surveys at Ebbing ANG Base and FSRA outside the APE have indicated extensive stratigraphic disturbance. It is, therefore, not expected that undiscovered cultural resources would be found during implementation of the Preferred Alternative at Ebbing ANG Base or FSRA; however, in the event of an inadvertent discovery during ground-disturbing operations, the following specific actions would occur:

- The project manager would cease work immediately and the discovery would be reported to the 188 WG environmental manager, who would secure the location with an adequate buffer and notify the Commander and the NGB cultural resources manager.
- The environmental manager would then continue to follow ANG standard operating procedures for cultural resource inadvertent discovery.

Therefore, there would be no adverse effects to archaeological historic properties with implementation of the Preferred Alternative.

Architectural Resources

Based on previous studies and a review of the Arkansas Historic Preservation Program survey records, there are no NRHP-listed or -eligible historic architectural resources located on Ebbing

ANG Base or FSRA; thus, no aboveground historic properties would be affected by the construction and renovation projects associated with the Preferred Alternative (NGB, 2007; Arkansas Historic Preservation Program, 2022).

There are two NRHP-listed resources located in the portion of the APE defined by the 65 dB DNL contour extending beyond Ebbing ANG Base and FSRA—the Barling Segment of Old Highway 22, listed in the NRHP in 2007 as part of the Arkansas Highway History and Architectural Multiple Property Listing, and the Elmwood Cemetery, also known as the Poor Farm Cemetery, listed in the NRHP in 2018 (Arkansas Historic Preservation Program, 2022). These two historic properties are considered "noise sensitive areas," as defined in paragraph 11-5b(10) of FAA Order 1050.1F. As stated in the FAA Order, "noise sensitive areas include residential, educational, health, and religious structures and sites, and parks, recreational areas, areas with wilderness characteristics, wildlife and waterfowl refuges, and cultural and historical sites." Both NRHP-listed properties would be located between the 55- and 60-dB DNL contours under baseline conditions (No Action Alternative) and between the 70 dB DNL and 75 dB DNL contours for the Preferred Alternative. The magnitude of increase in noise would represent a change in the setting of each historic property and, under FAA Order 1050.1F, could potentially be a significant effect. However, both properties exist in highly altered settings, which in turn has diminished the integrity of feeling of them. The Barling Segment of Old Highway 22 has been bypassed by modern Highway 22 and borders the edge of a modern self-storage facility. The Elmwood Cemetery is located adjacent to a five-lane highway and a channelized creek with extensive modern commercial development in its immediate viewshed. As a result, setting cannot be considered an important character-defining feature of either property, and the increased noise levels would not affect any of the characteristics of the historic roadway or cemetery that qualify them for listing in the NRHP.

Scientific studies of the effects of noise and vibration on historic properties have considered potential effects on historic buildings, prehistoric structures, water tanks, archaeological cave/shelter sites, and rock art. These studies have concluded that overpressures generated by subsonic overflight were well below established damage thresholds (see Volume II, **Appendix C**, Section C.1.2.13). Given the nature of the off-base historic properties (a concrete road and a cemetery with few aboveground monuments), they are particularly unlikely to be damaged by noise or vibration, and noise levels at these locations would not be high enough to cause any damage (see Section 3.3.1.1.8, *Noise, Analysis Methodology, Structural Damage*). As such, the Preferred Alternative would result in no adverse effects to historic properties in the APE surrounding Ebbing ANG Base.

The analysis also considered potential effects to the eight unevaluated previously recorded architectural resources identified by the records review. As discussed above, direct effects resulting from vibration are very unlikely, but audible changes to the properties' settings need to be considered. A review of aerial photographs indicates that the bridge (SB 1027) has been modified or replaced. Additionally, given the nature of this resource, increased noise levels have no potential to affect any of the qualities of the bridge that could make it historically significant. The Carnall 4-H Building (SB 1594) exists in an altered setting along a busy highway with commercial and light industrial development in its immediate viewshed. Thus, setting cannot be considered an important character-defining feature of this property, and the increased noise levels would not affect any of the characteristics of the building that could qualify it for listing in the NRHP. The other six properties are modest residences located in mid-

twentieth-century residential neighborhoods and are unlikely to be individually eligible for listing in the NRHP. Even if the residences are considered eligible, the increased noise levels would not directly or indirectly affect the properties or diminish the qualities of the properties that identify them as mid-twentieth-century residences. Thus, the Preferred Alternative would result in no adverse effects to the unevaluated previously recorded resources located in the APE surrounding Ebbing ANG Base.

Traditional Resources

Ebbing ANG Base and FSRA contain no known traditional resources, and Tribal consultation to date has not identified any traditional resources in the project area or surrounding area that may be affected by the Preferred Alternative (see Volume II, **Appendix A**, Section A.3, for Tribal correspondence summary). As such, no effects to traditional resources are anticipated for the Preferred Alternative.

3.7.4.2 Affected Airspace

The primary source of effects to cultural resources beneath the affected airspace is through sound and vibration. The noise analysis has identified no significant noise effects associated with the use of airspace for the Preferred Alternative (see Section 3.3.4, *Noise, Preferred Alternative Environmental Consequences*). Noise levels would remain below 65 dB L_{dnmr} throughout the airspace. The largest changes in noise levels would occur within the Hog A MOA and Hog B MOA, with increases of 12.2 and 12.1 dB L_{dnmr}, respectively, but levels would remain below 58 dB L_{dnmr} in these areas. As described above, scientific studies of the effects of noise and vibration on multiple types of historic properties have concluded that overpressures generated by subsonic overflight were well below established damage thresholds (see Volume II, **Appendix C**, Section C.1.2.13). No adverse effects to historic properties under the airspace are expected at these levels. Visual intrusions under the Preferred Alternative would be minimal and would not represent an increase sufficient to cause adverse effects to the settings of cultural resources. Due to the high altitude of the overflights, small size of the aircraft, and the high speeds, the aircraft would not be readily visible to observers on the ground.

Proposed use of the airspace would be similar to ongoing training operations, although frequency would be increased under the Preferred Alternative. Given the current use of the airspace and the nature of the proposed future use of the project area, there would be no adverse effects to NRHP-eligible or -listed archaeological resources, architectural resources, or traditional cultural properties with implementation of the Preferred Alternative. The DAF is consulting with the Arkansas SHPO on its finding of effect for the Preferred Alternative (see Volume II, **Appendix A**, Section A.2.1.1).

3.7.5 Mitigations

Section 3.3.5, *Noise, Mitigations*, describes several potential adjustments in flight procedures the DAF is considering that can reduce noise levels to some degree. **Figure 3.7-2** depicts the 65 dB DNL noise contours based on the 5%, 50%, and 95% mitigated afterburner usage scenarios. Previously surveyed resource SB 1673, a house with unknown NRHP status, would fall outside the mitigated 65 dB DNL noise contours, and thus outside the APE, for all three mitigated noise scenarios. For the other historic properties, the analysis of effects presented in Section 3.7.4.1, *Ebbing ANG Base and Surrounding Area*, is applicable to both the mitigated and unmitigated scenarios.

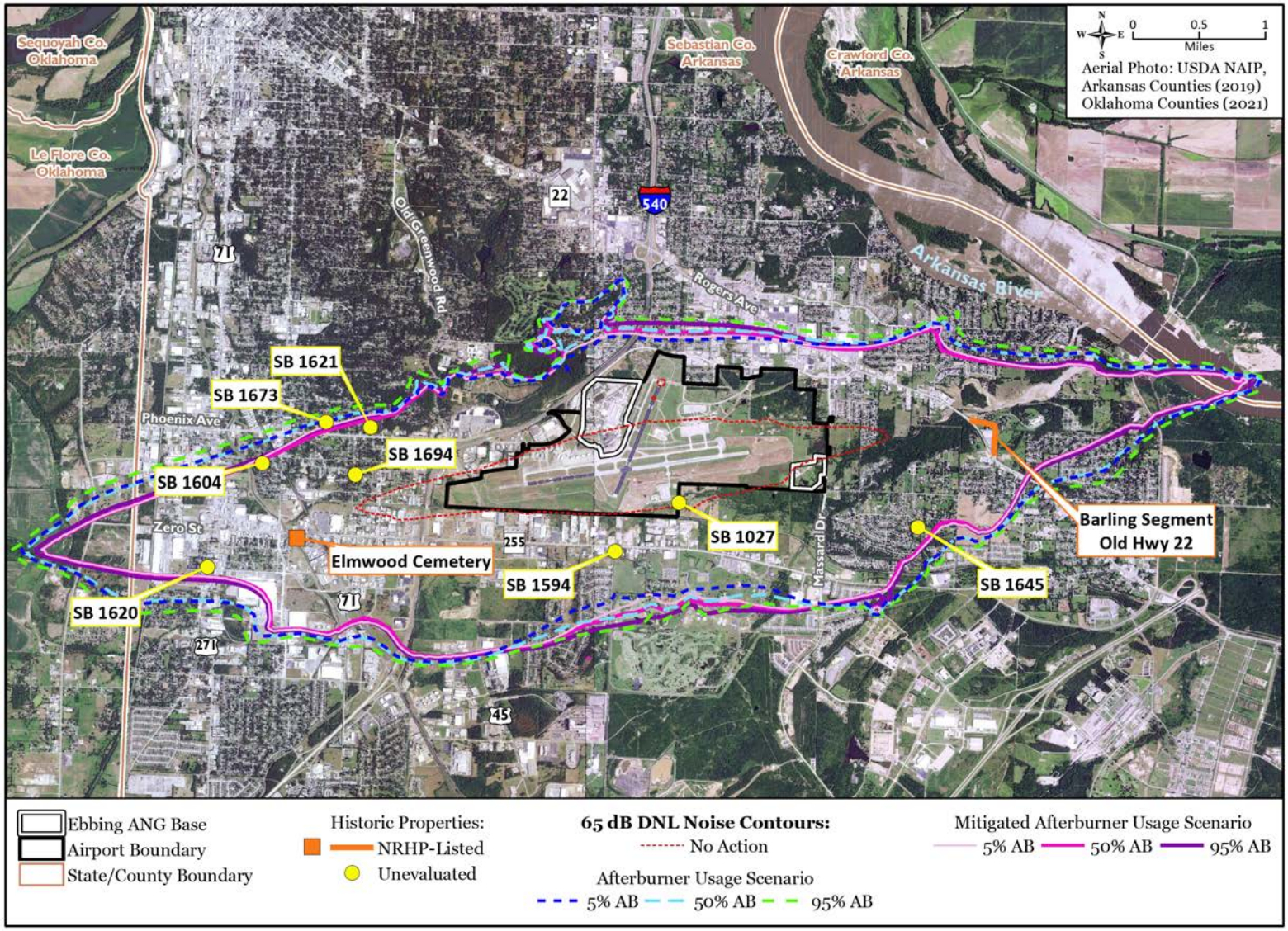


Figure 3.7-2. Map Depicting Historic Properties and Unevaluated Previously Recorded Resources Within the Noise Mitigation and Proposed Action 65 dB DNL Contours APE Surrounding Ebbing ANG Base

Sources: (Ebbing ANG Base, 2021; USDA-FSA-APFO, 2019a; USDA-FSA-APFO, 2019b; ESRI Data & Maps, 2019a; ESRI Data & Maps, 2019b; BRRC, 2022a; BRRC, 2022b; Arkansas Historic Preservation Program, 2022; USDA-FSA-APFO, 2021a)

As the Preferred Alternative would result in no adverse effects to historic properties, no mitigations are proposed to address effects to cultural resources. However, in the event of an inadvertent discovery during ground-disturbing operations, the following specific actions would occur.

- The project manager would cease work immediately, and the discovery would be reported to the 188 WG environmental manager, who would secure the location with an adequate buffer and notify the Commander and the NGB cultural resources manager.
- The environmental manager would then continue to follow ANG standard operating procedures for inadvertent discovery of cultural resources.

3.8 BIOLOGICAL RESOURCES

Biological resources are defined as the native and introduced terrestrial and aquatic plants and animals found in the ROI. For the purposes of this biological resources analysis, the ROI for the Preferred Alternative is defined as areas (habitats) within a 5-mile radius surrounding the installations, as well as existing airspace areas that would be used for aircraft training operations. The ROI accounts for areas that could potentially be affected by infrastructure and construction projects on the base and the areas surrounding the base that may experience changes to noise levels. The ROI generally includes the developed cantonment and airfield areas of the base and areas near but outside the base boundary. The airspace portion of the ROI for military aircraft flying out of Ebbing ANG Base (and FSRA) includes the training airspace presented on **Figure 2.2-2** (Ebbing ANG Base Operational Airspace and Ranges).

For the purposes of this analysis, biological resources were organized into three categories: vegetation, wildlife, and special status species. Vegetation includes existing plant communities within an area that generally determines ecological function and quality of available habitats, which in turn influences the composition, diversity, and abundance of animals. Wildlife includes all animals, including large and small mammals, birds, waterfowl, reptiles, amphibians, and invertebrates. Special status plant and wildlife species are those species subject to regulations under the authority of federal and state agencies. Aquatic resources are covered under Section 3.9, *Water Resources*.

3.8.1 Resource-Specific Analysis Methodology

To determine the potential impacts to biological resources under each alternative, the methodology used focused on the location of species or habitats in proximity to the proposed construction and lands beneath the airspace. Habitats that would be removed or impacted were quantified, and each was evaluated in the context of importance, species likely to be present, habitat function, sensitivity, and the availability of regionally similar resources. For the analysis of impacts associated with aircraft operations, flight patterns and flight elevations within the airspace and changes to the noise environment were evaluated. The analysis considered habitat in the context of the importance (legal, commercial, ecological, or scientific) of the resource where the Preferred Alternative and associated activities would occur. The analysis focused on vegetation, wildlife, and special status species (e.g., federally and/or state-listed, threatened, endangered or candidate species). Other species of conservation concern are addressed but are not analyzed to the same level of detail as those that are federally listed by the U.S. Fish and Wildlife Service (USFWS). Impacts that could result from implementation of FMS PTC include direct, indirect, temporary and permanent impacts associated with

construction and use of facilities, disturbance to wildlife from noise, and effects associated with aircraft operations (sorties and overflight).

3.8.2 Preferred Alternative Affected Environment

3.8.2.1 Ebbing ANG Base and Surrounding Area

Current and data for biological resources at Ebbing ANG Base and the surrounding area is provided by the installation and FSRA. Biological resources at Ebbing ANG Base are managed following the installation Integrated Natural Resources Management Plan (INRMP), which complies with federal, state, and local standards (ARANG, 2020). Biological surveys have been historically conducted in select portions of the installation. In 2019, focused flora and fauna and bat surveys were performed within the installation boundary (142 acres) to support the INRMP (ANG, 2020a; ANG, 2020b). In 2020, an analysis of biological resources was completed on the eastern portion of the FSRA (approximately 150 acres) to support a runway expansion project (Garver, 2022). However, biological resource surveys have not been conducted on the remaining airport property (approximately 1,400 acres) or in the surrounding areas.

3.8.2.1.1 Vegetation

Ebbing ANG Base and FSRA are within the Arkansas River Valley Plains ecoregion bounded by the Ozark and Ouachita Mountains to the north and south. Remnants of oaks (*Quercus* sp.), hickory (*Carya* sp.), shortleaf pine (*Pinus echinata*), eastern red cedar (*Juniperus virginiana*), and several thousand acres of Cherokee Prairie remain near the installation. While most of the areas immediately surrounding Ebbing ANG Base are developed (i.e., airport and industrial and residential properties), a number of natural areas exist within 5 miles, including four parks, Fort Chaffee Wildlife Management Areas, and the Arkansas River (ARANG, 2022).

Ebbing ANG Base covers about 142 acres and is comprised almost entirely (nearly 90 percent) of developed lands or managed and maintained landscape. During the 2019 biological field surveys, five vegetation communities were identified: (1) maintained/landscaped, (2) shrubland, (3) disturbed grassland, (4) woodland, and (5) wetland/wet meadow (ANG, 2020b). Further details on each vegetation community can be found in the installation INRMP (ARANG, 2020). A total of 105 plant species were identified, of which 82 percent are considered native and 8 percent are introduced species.

The proposed construction on Ebbing ANG Base is located in maintained/landscaped habitat, commonly associated with buildings and parking areas. This habitat is dominated by herbaceous grasses and forbs with sparsely dispersed trees such as eastern cottonwood (*Populus deltoides*) and loblolly pine (*Pinus taeda*) (ANG, 2020b). Woodlands consisting of a variety of native trees and herbaceous species surround ponds, streams, and the installation property boundary.

In the state of Arkansas, there are 35 noxious plants, 4 prohibited plants, and several species of insects and disease pests that have been declared a public nuisance (Arkansas Department of Agriculture Plant Industries, 2014). A total of 11 invasive plant species have been identified on Ebbing ANG Base (ARANG, 2020). Common invasive species include Bermuda grass (*Cynodon dactylon)* and Johnsongrass (*Sorghum halepense*).

Fort Smith Regional Airport (FSRA)

FSRA covers about 1,500 acres. The area was historically characterized as Massard Prairie but is now predominantly maintained (routinely mowed) upland and wetland herbaceous grasses and forbs, with forested areas (wetlands and uplands) and ponds (Garver, 2022). Dominant

vegetation includes winged elm (*Ulmus alata*), black cherry (*Prunus serotina*), southern catalpa (*Catalpa bignonioides*), Chinese privet (*Ligustrum sinense*), eastern red cedar (*Juniperus virginiana*), common persimmon (*Diospyros virginiana*), goldenrod (*Solidago* spp.), blackberry (*Rubus* spp.), and Buffalo grass (*Bouteloua dactyloides*) (Garver, 2022).

3.8.2.1.2 Wildlife

Since Ebbing ANG Base is almost entirely developed, wildlife on-site is comprised primarily of animals accustomed to disturbed areas and human activity. During the 2019 surveys of the installation, a total of 29 birds, 10 mammals (8 bats, a deer mouse [*Pipistrellus subflavus*], and an eastern cottontail [*Sylvilagus floridanus*]), 3 reptiles (Blanchard's cricket frog [*Acris blanchardi*], Mississippi mud turtle [*Kinosternon subrubrum*], and red-eared slider [*Trachemys scripta elegans*]), 1 mussel (*Corbicula* sp.), 1 fish species (channel catfish [*Ictalurus punctatus*]), and crayfish burrows were observed (ANG, 2020b; ARANG, 2020). These species are monitored and managed under the Natural Resources Program, as well as the U.S. Department of Agriculture (USDA) Animal and Plant Health Inspection Service (APHIS) for airport safety (USDA, 2022).

Eight bat species are known to occur at the installation (ANG, 2020a). These species include big brown bat (*Eptesicus fuscus*), silver-haired bat (*Lasinonycteris noctivagans*), eastern red bat (*Lasiurus borealis*), hoary bat (*Lasiurus cinereus*), evening bat (*Nycticeius humeralis*), little brown bat (*Myotis lucifugus*), eastern pipistrelle (*Perimyotis subflavus*), and one federally listed species, the gray bat (*Myotis grisescens*). Ponds, stormwater drainage, and the retention basin provide aquatic habitat for waterfowl, warm water fish, amphibians, and invertebrates (ARANG, 2020).

Fort Smith Regional Airport (FSRA)

Historical surveys for wildlife have been conducted on about 10 percent of the airport in support of the runway expansion/extension (Garver, 2022). Wildlife that could be expected in the area include small mammals, birds, reptiles, amphibians, and terrestrial and aquatic invertebrates (ARANG, 2022).

3.8.2.1.3 Special Status Species

Special status species known to occur or with the potential to occur on and near Ebbing ANG Base include species listed under the Endangered Species Act (ESA), state-listed species, migratory birds, bald eagles, and golden eagles. The Information for Planning and Consultation online system was accessed to identify current USFWS trust resources (e.g., migratory birds, species proposed or listed under ESA, interjurisdictional fishes, wetlands, and USFWS National Wildlife Refuge System lands) with potential to occur within the ROI for biological resources at Ebbing ANG Base (and FSRA) (USFWS, 2022a). The USFWS Arkansas Ecological Services Field Office provided an automated Official Species List via a Section 7 letter that identified six threatened and endangered species protected under the ESA, one candidate species, and no designated critical habitat within 5 miles of Ebbing ANG Base (USFWS, 2022a). In addition, based on a detection during field surveys, the federally listed gray bat may occur on the installation (ANG, 2020a; ARANG, 2020). **Table 3.8-1** presents federally listed and state-listed species known to occur or having the potential to occur in the project area.

Of the eight federally listed and candidate species listed in **Table 3.8-1**, only one has been documented on the installation.

The gray bat was recorded during 2019 acoustic bat surveys at Ebbing ANG Base (ANG, 2020a). Gray bats inhabit caves year-round. This habitat type is not known to occur in the vicinity of Ebbing ANG Base. The nearest known roosting and hibernating area is approximately 68 miles from the installation (ARANG, 2020). Therefore, occurrence on and near Ebbing ANG Base likely consists only of foraging or commuting individuals. Gray bats primarily feed over waterways and wetlands that are surrounded by forest habitat. Suitable foraging habitat in the vicinity of FSRA is present at Little Massard Creek, the large pond in the Ebbing ANG Base cantonment area, and along the forest edge at the northern cantonment area boundary (ANG, 2020a).

Two additional federally listed species have relatively high potential to occur within or near the Ebbing ANG Base boundary. The northern long-eared bat may occur due to the presence of roosting habitat, although the species has not been detected (ANG, 2020a). Suitable roosting habitat for the northern long-eared bat is underneath bark, in cavities or in crevices of both live trees and snags, or dead trees. The species has also been found, although less commonly, roosting in structures. In addition, approximately 10. 6 acres of habitat on the installation and 54 acres on the eastern end of the FSRA airfield is suitable for the federally listed American burying beetle *(Nicrophorus americanus*) (ANG, 2020b). The USFWS divides the American burying beetle's current range into three broad analysis areas based on geographic and ecological patterns. Ebbing ANG Base is located within the Southern Plains analysis area, which occurs primarily in Oklahoma but also encompasses small areas of Arkansas. Habitat for the American burying beetle generally consists of moist, sandy loam soil that contains organic matter.

Table 3.8-1. Special Status Species Known to Occur or With the Potential to Occur at Ebbing ANG Base (and FSRA)

Common Name	Scientific Name [a]	Status	Potential for Occurrence on Ebbing ANG Base (and FSRA) [b]
Mammals			
Gray bat	*Myotis grisescens*	SE, FE	O
Northern long-eared bat	*Myotis septentrionalis*	SE, FT	P
Indiana bat	*Myotis sodalis*	FE	P
Rafinesque's big-eared bat	*Corynorhinus rafinesquii*	SGCN	P
Little brown bat	*Myotis lucifugus*	SGCN	P
Birds			
Piping plover	*Charadrius melodus*	FT	U
Eastern black rail	*Laterallus jamaicensis* spp. *jamaicensis*	FT	U
Red knot	*Calidris canutus rufa*	FT	U
Invertebrates			
American burying beetle	*Nicrophorus americanus*	SE, FT	P
Monarch butterfly	*Danaus plexippus*	FC	P
Plants			
Maple-leaf oak	*Quercus acerifolia*	ST	U
Opaque prairie sedge	*Carex opaca*	SE	U

Sources: (USFWS, 2022a; ANG, 2020a; ANG, 2020b; ARANG, 2020)

Key: ANG = Air National Guard; FC = Federal Candidate; FE = Federal Endangered; FSRA = Fort Smith Regional Airport; FT = Federal Threatened; O = observed, P = potential; SE = State Endangered, SGCN = State species of greatest conservation need; ST = State Threatened; U = unlikely to occur; USFWS = U.S. Fish and Wildlife Service

Notes:

a. For details on species and habitat use, see the USFWS Environmental Conservation Online System (USFWS, 2022b).

b. Includes habitats within a 5-mile radius of the installation

Migratory Birds

Ebbing ANG Base (and FSRA) is located in the USFWS-designated Bird Conservation Region (BCR) 25, West Gulf Coastal Plain/Ouachitas, between the Central and Mississippi waterfowl migratory bird flyways) (NABCI, 2021a) (**Figure 3.8-1**). BCRs are ecologically distinct regions in North America with similar bird communities, habitats, and management issues (NABCI, 2021b). BCRs are the smallest geographic scale at which Birds of Conservation Concern (BCC) have been identified, and the lists of BCC species at this scale are expected to be the most useful for governmental agencies to consider in complying with the Migratory Bird Treaty Act and EO 13186, *Responsibilities of Federal Agencies To Protect Migratory Birds*. BCC are species, subspecies, and populations of migratory nongame birds that without additional conservation action are likely to become candidates for listing under the ESA (USFWS, 2021). A total of 22 migratory BCC may occur within BCR 25. Of these species, eight have the potential to occur on or near Ebbing ANG Base (**Table 3.8-2**). Within 5 miles of Ebbing ANG Base (and FSRA) is the Arkansas River, an important migratory path for waterfowl (ducks and geese) and numerous other species such as American white pelicans (*Pelecanus erythrorhynchos*) and sandhill cranes (*Grus canadensis*). Waterfowl typically migrate at night, with significant movements at dawn and dusk (ARANG, 2002). Large flocks of birds will pass in the near vicinity of the airport during fall (late October through December) and spring (March through early May). Aircraft operations and other human activities at FSRA discourage use of the area for habitat and follow a Bird Aircraft Strike Hazard (BASH) Plan that provides guidance for BASH reduction in areas where flying operations are conducted (ARANG, 2002).

Table 3.8-2. Migratory Birds with Potential to Occur at Ebbing ANG Base (and FSRA)

Common Name	Scientific Name	Season	Potential for Occurrence at Ebbing ANG Base (and FSRA)
American golden-plover	*Pluvialis dominica*	Spring	U
Southeastern American kestrel	*Falco sparverius paulus*	Winter/Spring/Summer	P
Kentucky warbler	*Oporornis formosus*	Spring/Summer	P
Lesser yellowlegs	*Tringa flavipes*	Spring	U
Prairie warbler	*Dendroica discolor*	Spring/Summer	P
Prothonotary warbler	*Protonotaria citrea*	Spring/Summer	P
Red-Headed woodpecker	*Melanerpes erythrocephalus*	Spring/Summer/Fall	P
Wood thrush	*Hylocichla mustelina*	Spring/Summer/Fall	P

Source: (USFWS, 2022c)
Key: ANG = Air National Guard; P = potential; U = unlikely to occur

Bald and Golden Eagles

In Arkansas, bald eagles are common and nest along rivers and lake shores throughout the state; however, no nests have been documented at the installation (ANG, 2020b; ARANG, 2020). Golden eagles are not common in Arkansas; populations are nonbreeding and scarce (Cornell University, 2022).

3.8.2.2 Affected Airspace

3.8.2.2.1 Vegetation and Wildlife

The affected airspace associated with the Ebbing ANG Base Preferred Alternative is located above the Arkansas Valley ecoregion. This ecoregion contains a mix of forests, woodlands, savanna, prairies, and pasturelands that support a wide variety of wildlife species. Large and

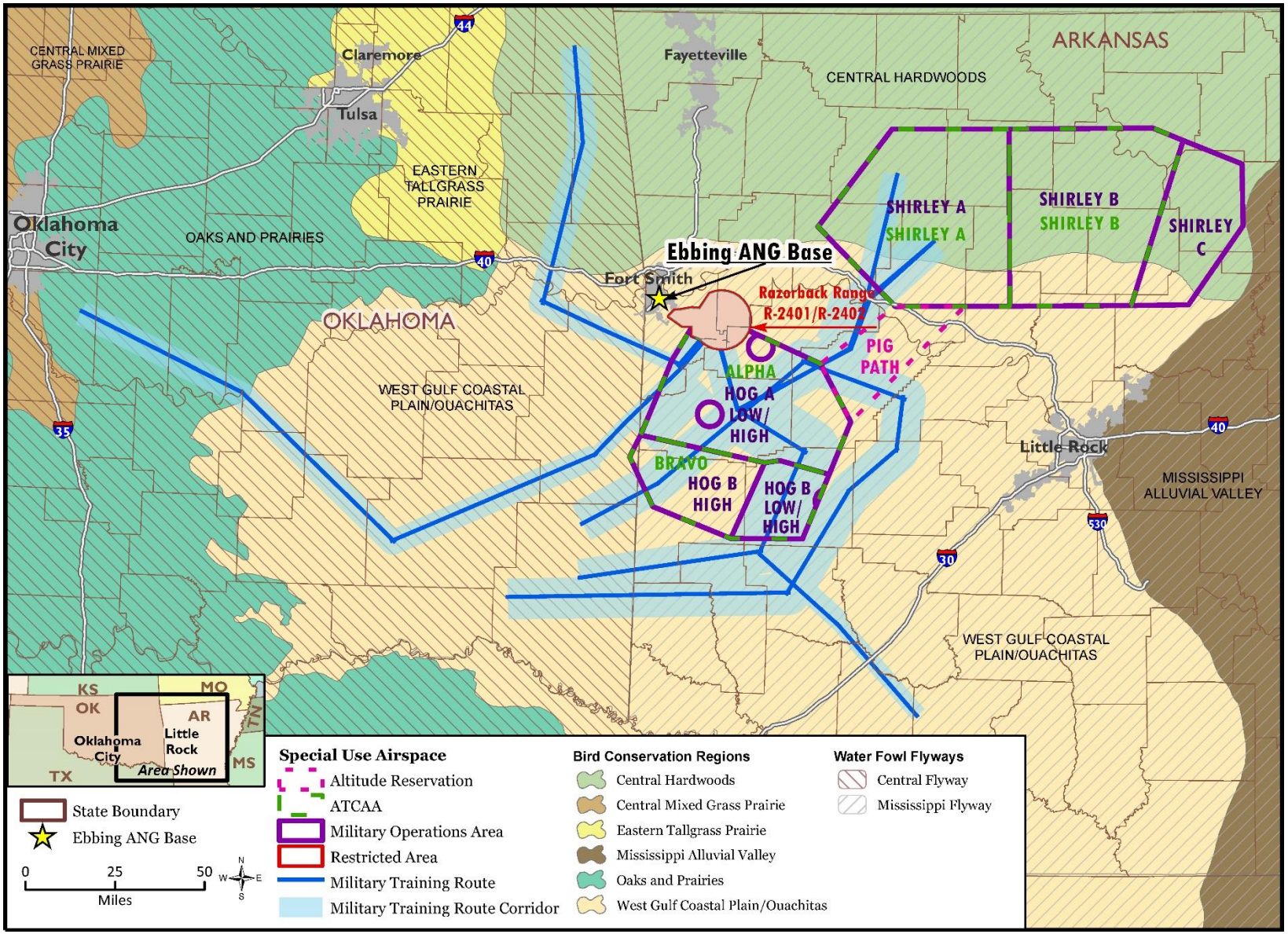


Figure 3.8-1. Ebbing ANG Base (and FSRA) Bird Conservation Regions

Sources: (Birds Canada and NABCI, 2014; USFWS, 2015); (Ebbing ANG Base, 2021; FAA, 2021a; FAA, 2021b; ESRI Data & Maps, 2019b; ESRI Data & Maps, 2019c; BRRC, 2022a)

small mammals are common, especially deer (*Odocoileus virginianus*), coyotes (*Canis latrans*), foxes (*Urocyon* sp. and *Vulpe*s sp.), bobcats (*Lynx rufus*), squirrels (*Sciurus* sp. and *Glaucomys* sp.), river otters (*Lontra canadensis*), armadillo (*Dasypus novemcinctus*), cottontail rabbits (*Sylvilagus floridanus*), opossums (*Didelphis virginiana*), skunks (*Mephitis* sp. and *Spilogale* sp.), bats, mice, and voles (iNaturalist, 2022). Songbirds, waterfowl, raptors, and various woodpecker species also occur throughout the region (Audubon, 2022). Additionally, over 100 species of amphibians and reptiles, including various species of frogs, toads, skinks, salamanders, turtles, lizards, and snakes, occur in Arkansas (Herps of Arkansas, 2021).

3.8.2.2.2 Special Status Species

Special status species with potential to occur under the affected airspace include species listed under the ESA, state-listed species, migratory birds, bald eagles, and golden eagles. Federally listed threatened and endangered species with potential to occur under the affected airspace, and with the potential to be impacted by noise or collision risks associated with aircraft operations, are presented in **Table 3.8-3**. The state status of these species is shown where applicable. Federally listed and candidate fish, reptiles, invertebrates, and plants and critical habitat for aquatic species have been omitted from the analysis, as ground disturbance would not occur under the training airspace, and aircraft would fly at elevations that would not substantially impact ground or aquatic species or critical habitat. Ordnance delivery and chaff and flare use would occur in training areas that are currently approved for these activities. Existing altitude and/or quantity restrictions on flare use would continue to apply.

Table 3.8-3 Federally Listed Species Known to Occur or With the Potential to Occur Under the Ebbing ANG Base Affected Airspace

Common Name	Scientific Name [a]	Status	Potential for Occurrence Under the Affected Airspace[b]
Mammals			
Ozark big-eared bat	*Corynorhinus (Plecotus) townsendii ingens*	SE, FE	P
Gray bat	*Myotis grisescens*	SE, FE	P
Northern long-eared bat	*Myotis septentrionalis*	SE, FT	P
Indiana bat	*Myotis sodalis*	FE	P
Birds			
Piping plover	*Charadrius melodus*	FT	P
Eastern black rail	*Laterallus jamaicensis* ssp. *jamaicensis*	FT	P
Red knot	*Calidris canutus rufa*	FT	P
Whooping crane	*Grus americana*	EXPN	P
Red-Cockaded woodpecker	*Picoides borealis*	FE	P

Source: (USFWS, 2022d)

Key: ANG = Air National Guard; EXPN = experimental population; FE = Federal Endangered; FT = Federal Threatened; P = potential to occur; ROI = region of influence; SE = State Endangered; USFWS = U.S. Fish and Wildlife Service

Notes:

a. For details on species and habitat use, see the USFWS Environmental Conservation Online System (USFWS, 2022b).

b. The ROI for federally listed species under the affected airspace only applies to bird and mammal species known to occur or with the potential to occur in these areas and that have the potential to be impacted by noise or collision risks associated with aircraft operations.

Numerous additional mammal, bird, fish, reptile, amphibian, invertebrate, and plant species that are listed as threatened or endangered by the State of Arkansas and State of Oklahoma could also occur under the affected airspace. However, as with federally listed species, only bats and birds would potentially be affected by aircraft noise and collisions. For information on state-listed species in the airspace portion of the ROI, refer to the AGFC website, Arkansas

Natural Heritage Commission website, Oklahoma Department of Wildlife Conservation website, and the installation INRMP (ARANG, 2020).

Migratory Birds

The affected airspace is located within the USFWS-designated BCR 25, West Gulf Coastal Plain/Ouachitas; BCR 24, Central Hardwoods; and BCR 21, Oaks and Prairies (**Figure 3.8-1**). A combined total of 60 migratory BCC may occur within these BCRs (USFWS, 2021), although the affected airspace coincides with only small portions of BCR 24 and BCR 21. For a full list of migratory bird species within these BCRs, please refer to the USFWS *Birds of Conservation Concern 2021 Migratory Bird Program* (USFWS, 2021).

Bald and Golden Eagles

In Arkansas, bald eagles are common, and habitats are present under the affected airspace. Bald eagles also occur in Oklahoma, although they are not as common. Golden eagles do not live in Arkansas or Oklahoma year-round but may occur as rare winter migrants in small numbers.

3.8.3 No Action Alternative

The affected environment under the No Action Alternative would reflect actions that are expected to have occurred by CY 2029. These are described in Section 3.12.2.6, *Cumulative Impacts*, *Biological Resources*. Implementation of the No Action Alternative (i.e., no beddown of the FMS PTC at Ebbing ANG Base) would not result in any additional impacts outside those described under Cumulative Impacts.

3.8.4 Preferred Alternative Environmental Consequences

The analysis of impacts to biological resources for the Preferred Alternative evaluates impacts in relation to the No Action Alternative (CY 2029); the affected environment at that time would be expected to be as described in Section 3.12.2.6, *Cumulative Impacts*, *Biological Resources*. Impacts to biological resources at Ebbing ANG Base (and FSRA) may occur from construction activities, an increase in personnel at the installation, and aircraft operations at the airfield and in the affected airspace. Potential impacts from aircraft strikes and noise to biological resources were assessed by reviewing the intensity of the potential impacts within the context of the affected environment (e.g., increased noise at an active airfield). Factors to considered in the analysis include the potential for the Preferred Alternative to result in the following impacts.

- Adverse impacts to state-listed species, migratory birds, eagles, and species proposed for listing and their habitats
- Long-term or permanent loss of unlisted species
- Substantial reduction, disturbance, degradation, fragmentation, or loss of native species' habitat or their populations
- Adverse impacts on a species' natural mortality rates, nonnatural mortality, reproductive success rates, or ability to sustain the minimum population levels necessary for population maintenance

If the USFWS determined that the Preferred Alternative "would be likely to jeopardize the continued existence of a federally listed threatened or endangered species or would result in

the destruction or adverse modification of federally designated critical habitat" the impact would be considered significant.

This analysis covers vegetation, wildlife, special status species and associated habitats, and critical habitats that are known to occur or have the potential to occur within the ROI that could be impacted by the Preferred Alternative. Due to the nature of the actions proposed within the training airspace, federally listed fish, amphibians, reptiles, invertebrates, plants, and critical habitat for aquatic species were excluded from extensive review and analysis because the proposed activities under the training airspace would not result in ground disturbance, substantial noise impacts at and near ground level would not be expected, and ordnance delivery and chaff and flare use would occur in locations already used and authorized for those purposes.

The DAF is undergoing informal consultation with the USFWS to ensure that the Preferred Alternative does not jeopardize the continued existence of federally listed species or destroy or adversely modify designated critical habitat (50 CFR § 17).

3.8.4.1 Ebbing ANG Base and Surrounding Area

Vegetation and Wildlife

Facility Requirements

Under the Preferred Alternative, temporary and permanent impacts would occur to vegetation and wildlife habitat at Ebbing ANG Base (and FSRA). Permanent impacts would affect maintained/landscaped habitat due to land clearing activities (see new impervious surface information in **Table 2.2-7**, Proposed Construction and Renovation Projects at Ebbing ANG Base [Preferred Alternative]). Vegetation subject to clearing could support foraging, nesting, and other behaviors for wildlife within these areas. Wildlife utilizing the proposed construction areas would be permanently displaced by the development; however, similar suitable habitats are available nearby. It is anticipated that wildlife would flush or flee to these areas upon disturbance. Under the Preferred Alternative, vegetation removal would remain consistent with the airport's Wildlife Hazard Management Plan (WHMP) by removing potential hazardous wildlife attractants on the airport.

Wildlife in the vicinity may be temporarily disturbed from the increase in construction-related noise and additional human activity. However, these species are generally tolerant of human presence and activity and would be expected to habituate, flush, or flee to similar habitats that are immediately available on and in the vicinity of the base. Additionally, noise resulting from the proposed construction and renovation activities would be localized, short-term, and only occur during daylight hours. As such, impacts to wildlife would not be considered significant.

Under the Preferred Alternative, on-site personnel would increase by about 30 percent (**Table 2.2-6**, Anticipated Preferred Alternative Increase in Number of Personnel at Ebbing ANG Base), and there would be an associated increase in general activity on the installation. Increased personnel and activity could result in potential collisions between wildlife and motor vehicles or displacement of wildlife around the cantonment area and airfield. The risk of collisions would be low, and wildlife would likely either acclimate to the increased activity or avoid the area entirely and relocate to nearby suitable habitat. Indirect impacts to vegetation and wildlife could also occur through the introduction of invasive noxious species. This may occur where ground surfaces are disturbed, providing opportunities for invasive species to establish and move into adjacent, undisturbed native habitats. To minimize the spread of

invasives, construction vehicles would utilize existing roads, limit parking, and establish driving and staging areas to previously developed areas. Additionally, Ebbing ANG Base would continue to implement the control methods defined in the INRMP and ARANG Integrated Pest Management Plan and USDA APHIS (i.e., minimizing ground disturbance and revegetating disturbed areas with native vegetation), which provides guidance on invasive species/weed control and management activities (ARANG, 2020).

Aircraft Operations

Under the Preferred Alternative at Ebbing ANG Base, annual aircraft operations would increase by up to 67 percent (**Table 2.2-1**, Current and Proposed Aircraft Operations at Fort Smith Regional Airport, Arkansas). An increase in aircraft operations at Ebbing ANG Base (and FSRA) could result in an increased potential for bird/wildlife-aircraft strikes, especially during takeoff and landing events (see BASH-related information in Section 3.8.2, *Preferred Alternative Affected Environment*). However, adherence to the existing ARANG BASH Plan would help continue the minimization of the risk for bird/wildlife-aircraft strikes to occur (ARANG, 2002). The BASH Plan is based on hazards from both resident and seasonal bird populations. Procedures for dispersing birds from the airfield, reporting hazardous bird activity, and altering flying operations would continue under implementation of the Ebbing ANG Base Preferred Alternative.

Additional aircraft operations would also increase the noise environment at Ebbing ANG Base (and FSRA) in the surrounding area (see Section 3.3.4, *Noise, Preferred Alternative Environmental Consequences*). A comprehensive evaluation of noise impacts to animal species is included in Volume II, **Appendix C**, *Noise Supporting Information*. A partial summary of the results of that analysis is included below. Animal species exhibit a wide variety of responses to noise. It is therefore difficult to generalize animal responses to noise disturbances or to draw inferences across species, as reactions to jet aircraft noise appear to be species-specific. Consequently, some animal species may be more sensitive than other species and/or may exhibit different forms or intensities of behavioral responses. For instance, wood ducks appear to be more sensitive and more resistant to acclimation to jet aircraft noise than Canada geese in one study. Similarly, wild ungulates seem to be more easily disturbed than domestic animals.

The literature does suggest that common responses include the “startle” or “fright” response and, ultimately, habituation. It has been reported that the intensities and durations of the startle response decrease with the numbers and frequencies of exposures, suggesting no long-term adverse effects. Most of the literature suggests that domestic animal species (i.e., cows, horses, chickens) and wildlife species exhibit adaptation, acclimation, and habituation after repeated exposure to jet aircraft noise and sonic booms.

Animal responses to aircraft noise appear to be somewhat dependent on, or influenced by, the size, shape, speed, proximity (vertical and horizontal), engine noise, color, and flight profile of aircraft. Helicopters also appear to induce greater intensities and durations of disturbance behavior as compared to fixed-wing aircraft. Some studies show that animals that have been previously exposed to jet aircraft noise exhibit greater degrees of alarm and disturbance to other objects creating noise, such as boats, people, and objects blowing across the landscape. Other factors influencing response to jet aircraft noise may include wind direction, speed, and local air turbulence; landscape structures (i.e., amount and type of vegetative cover); and, in the case of bird species, whether the animals are in the incubation/nesting phase.

Under the Ebbing ANG Base Preferred Alternative, it is anticipated that wildlife (such as bats, other small mammals, and birds) present in the immediate vicinity of the airfield would be affected by the increase in noise associated from the increase in aircraft operations. Noise levels associated with the Preferred Alternative exceeding 65 dB DNL would extend approximately 4 miles from each end of the FSRA main runway (**Figure 3.3-2**, Noise Contours Under Preferred Alternative, 95% Afterburner Use Scenario Near Ebbing ANG Base). Up to approximately 7,855 acres (95% afterburner scenario) in the surrounding area would be newly exposed to noise levels greater than 65 dB DNL. According to the analysis conducted in Section 3.4, *Land Use*, approximately 90 percent of this land is developed (agricultural, commercial, residential, etc.). Less than 10 percent includes public/quasi-public land or recreational land that may provide quality habitat for wildlife. Terrestrial species occurring on and near the installation are likely accustomed to noise levels associated with aircraft operations under baseline conditions. However, the increases in operational noise levels and the frequency of daily noise events could potentially cause impacts to wildlife in the form of startle affects, physiological changes to the auditory system, stress, hypertension, behavioral changes, and possible injury. The potential for wildlife occurrence and associated noise-related impacts would likely be greater in habitats such as the wooded and riparian areas located north, east, and southeast of the airfield. It is anticipated that wildlife on and near Ebbing ANG Base (and FSRA) could be impacted until they disperse from the area and relocate, as a result of the increase in the noise environment, or habituate to the elevated noise environment associated with military aircraft operations.

Special Status Species

Special status species known to occur or with the potential to occur at Ebbing ANG Base, FSRA, and in the surrounding area include species protected under the ESA (gray bat, northern long-eared bat, Indiana bat, piping plover, red knot, eastern black rail, and American burying beetle), state-listed species, migratory birds, bald eagles, and golden eagles. Potential impacts on state-listed species would be similar to those discussed for vegetation and wildlife in general in the preceding facility requirements and airfield operations subsections. The DAF is undergoing informal consultation with the USFWS to identify potential effects of the Preferred Alternative on federally listed species and to ensure that the Preferred Alternative does not jeopardize the continued existence of federally listed species. The DAF will complete Section 7 consultation under the ESA with the USFWS for the following effects determinations.

Gray Bat

Increased aircraft operations may cause indirect impacts to potential foraging habitat and increase the potential for bat-aircraft strikes in the area. Bats can present hazards to low-flying jet aircraft, especially near man-made structures, trees, caves, and crevices in the early evening around sunset, when bats are typically active. FAA's National Wildlife Strike Database documented 417 bat incidents between 1990 and 2010, where the greatest incident rate occurred at dusk, and more incidents occurred during aircraft landing than takeoff (Biondi et al., 2013). The Air Force Safety Center reported that bat strikes peak during the spring and fall, mainly between 9:00 p.m. and 9:00 a.m. (Peurach et al., 2009). Incidents coincide with bat behavior, including diel activity, migration, hibernation, and juvenile recruitment.

Bats occurring near the airfield could be struck during aircraft operations. However, the nearest known gray bat roosting and hibernating area is approximately 68 miles from the installation (ARANG, 2020). Given this distance and the fact that only one acoustic detection was recorded

during bat surveys on the base (ANG, 2020a), the likelihood of occurrence is low. Only about 4 percent of total airfield operations would take place between 10:00 p.m. and 7:00 a.m., decreasing the potential for strikes. Bat strikes at FSRA are uncommon under baseline conditions. Of the strikes at FSRA recorded in FAA's Wildlife Strike Database between 1992 and 2021, none involved bats (FAA, 2022a). An EA prepared for a wildlife hazard mitigation project at FSRA (FSRA, 2017) reported two confirmed bat strikes and two potential strikes between 1992 and 2017.

Although the increase in aircraft operations would increase the potential for gray bats to be struck, the low probability of occurrence, low number of documented bat strikes, and the timing of most aircraft operations indicate that the number of individuals impacted would be small and would not affect the viability of gray bat populations.

Exposure to high noise levels may affect bat behaviors, including effects on foraging success (Schaub et al., 2008; Allen et al., 2021). The potential for noise effects on foraging efficiency is dependent upon a species' echolocation call frequency relative to the noise frequency (Bunkley et al., 2015). One study found that foraging activity was not affected by low-level aircraft overflights at an airport, likely because the dominant aircraft noise frequencies were outside the echolocation frequency range of the species (Le Roux & Waas, 2012). In general, bats may be found roosting in noisy environments, and some species have demonstrated tolerance of high noise levels (Allen et al., 2010).

Under the Preferred Alternative, increased aircraft operations and associated noise could potentially affect foraging gray bats. Most of the land associated with increased noise levels is considered developed and fragmented, although some forested and riparian habitat is present. Gray bats could potentially be deterred from foraging or could experience reduced foraging efficiency. Affected animals would probably be able to forage in nearby suitable habitat. The potential for impacts would be reduced by the attenuation of high-frequency noise with increasing distance from the airfield and by the fact that only a small percentage of operations would occur after 10:00 p.m. Individuals could potentially habituate to the aircraft noise. Overall, the number of individuals impacted, and the level of impacts on individual bats, would likely be small and would not affect the viability of gray bat populations.

Based on the above discussion, implementation of the Preferred Alternative may affect, but is not likely to adversely affect, the gray bat.

Northern Long-Eared Bat

Impacts to northern long-eared bats would generally be the same as those described for the gray bat. During the summer and part of the fall and spring, individuals roost in forest habitats. Therefore, there is some potential for roosting in forested areas adjacent to Ebbing ANG Base. Increased noise levels associated with aircraft operations could potentially deter roosting near the airfield, requiring affected individuals to seek suitable habitat elsewhere. However, at least some bat species are tolerant of anthropogenic noise and may roost in noisy environments. The number of individuals potentially affected is expected to be small relative to population sizes. Implementation of the Preferred Alternative may affect, but is not likely to adversely affect, the northern long-eared bat.

Indiana Bat

Indiana bats roost in forested areas during summer and forage in forest and riparian habitats. Occurrence of this species is therefore possible, although the lack of captures or acoustic

detections during bat surveys (ANG, 2020a) suggests the potential is low. Impacts would generally be similar to those described for the gray bat. Based on the effects determination generated by the USFWS Information for Planning and Consultation online system, implementation of the Preferred Alternative would have no effect on the Indiana bat.

Piping Plover, Red Knot, and Eastern Black Rail

Under the Preferred Alternative, increased airfield operations would result in an increased potential for bird/wildlife-aircraft strikes. However, the potential for strikes involving the piping plover, red knot, or eastern black rail is low due to their unlikely occurrence in the area. Piping plover habitat is limited to a few areas associated with the Arkansas River. Migratory stopover habitat for the red knot is not present near the installation. The eastern black rail inhabits dense marsh vegetation, which does not occur on the installation but may be present along nearby wetlands. However, the species in not known to occur in the ROI. Continued adherence to the existing ARANG BASH Plan (ARANG, 2002) would reduce the risk of collisions. FAA's Wildlife Strike Database identifies 92 wildlife strikes at FSRA between 1992 and 2021 (FAA, 2022a). Of the 24 strikes where species or taxonomic group were known, none involved shorebirds. One strike involved egrets, but no other marsh-associated birds were identified.

These bird species would not be expected near construction areas due to lack of habitat and would, therefore, not be affected by construction noise or disturbance. Individuals present in the area and close enough to the airfield to detect noise produced by F-35 and F-16 aircraft could alter their behavior or avoid affected areas. However, due to the very low potential for occurrence, such effects are unlikely. The Preferred Alternative would have no effect on the piping plover, red knot, or eastern black rail.

American Burying Beetle

Under the Preferred Alternative, infrastructure projects would result in clearing of about 10.6 acres of maintained/landscaped areas near the airfield. The affected areas are located adjacent to existing structures, have been previously disturbed or developed, and likely have low potential to provide habitat for the American burying beetle. The affected area occurs in the context of over 16 million acres of suitable habitat in the Arkansas River portion of the Southern Plains analysis area. The USFWS considers habitat loss due to activities such as land development to present a low risk to the species in the Southern Plains region. Given the small area that would be affected and the probable lack of preferred habitat characteristics, no significant impacts would occur to suitable habitat, and the Preferred Alternative would have no effect on the American burying beetle.

Migratory Birds

Impacts to migratory birds (including BCC) would be the same as those previously discussed under the wildlife section. Adherence to the existing ARANG BASH Plan would help continue the minimization of the risk for bird/wildlife-aircraft strikes to occur (ARANG, 2002). Therefore, impacts to migratory birds under implementation of the Preferred Alternative would not be significant.

Bald and Golden Eagles

Bald and golden eagles are not known to nest at Ebbing ANG Base. The potential for aircraft collisions with soaring bald and golden eagles would be minimized by adherence to the existing ARANG BASH Plan (ARANG, 2002).

3.8.4.2 Affected Airspace

Wildlife

Under the Preferred Alternative, operations within the training airspace at Ebbing ANG Base would increase by 67.15 percent, from 38,275 operations under the No Action Alternative to 63,979 operations (see **Table 2.2-1**, Current and Proposed Aircraft Operations at Fort Smith Regional Airport, Arkansas). The change in frequency of operations would result in wildlife (i.e., birds and bats) flying within the airspace to have an increased risk for bird/wildlife-aircraft strikes. Aircraft training altitudes range from 100 to 30,000 feet MSL (see **Table 2.2-2**, Current and Preferred Alternative Airspace Altitudes, Supersonic Authorization Activity, and Operations (Ebbing ANG Base, Arkansas). The F-35 and F-16 aircraft would fly at higher altitudes, with the F-35 operating more than 90 percent of the time above 10,000 feet MSL. Most bird-aircraft strikes occur below 5,000 feet AGL, thus birds and bats flying at lower altitudes could be impacted during low-level training; however, training within these areas would only occur during 10 percent of the time. Additionally, the affected airspace is very large, and the probability of aircraft strike in the training airspace would be low. As such, impacts to wildlife from potential collision risk would not be considered significant.

Increased operations will result in a noticeable increase in noise levels within the training airspace. Maximum noise levels measured about 400 to 1,200 feet away from the F-35 and F-16 aircraft range from about 105 to 109 dB. In areas exposed to the highest noise levels, L_{dnmr} would increase to 61.9 dB, and the number of events exceeding 85 dB L_{max} per average day would increase to 5.5 (see Section 3.3.4, *Noise, Preferred Alternative Environmental Consequences*). Subsonic time-averaged aircraft noise levels (i.e., L_{dnmr}) in affected areas would increase by as much as 13 dB under the Preferred Alternative but would remain below 65 dB L_{dnmr} in all areas (see Section 3.3.4).

The effects of noise within the airspace can be influenced by other factors such as weather patterns; however, birds and bats exposed to daily noise levels may experience some disturbance (i.e. startle effects, freezing, flushing, fleeing, and/or impacts on individual fitness) as a result of the increased training events. However, species disturbances would be infrequent (spread out across the training airspace) and short-term, lasting only the duration of the overflight. As such, noise effects to wildlife under the affected airspace would not be considered significant.

Special Status Species

Impacts to the federally listed species presented in **Table 3.8-3**, as well as state-listed species and other special status species, would be the same as those previously discussed under the wildlife section. Given the minor potential for aircraft strikes and infrequent exposures (spread out across the training airspace, short-term, lasting only the duration of the overflight) to noise events, there would be no significant impacts to species listed under the ESA, state-listed species, migratory birds (including BCC), bald eagles, or golden eagles under implementation of the Preferred Alternative. As such, the DAF determines that implementation of the Preferred Alternative at Ebbing ANG Base may affect, but is not likely to adversely affect, federally listed species identified in **Table 3.8-3**. The DAF is currently in consultation with the USFWS under Section 7 of the ESA for concurrence on this determination. In addition, the DAF determines that implementation of the Preferred Alternative would have no effect to designated critical habitat.

Migratory bird species involved in bird-aircraft strikes would be considered an incidental taking and would be exempt from any permitting requirements. An infrequent special status bird- or bat-aircraft strike would not be expected. Therefore, the potential for federally listed or special status bird and bat aircraft collisions within the training airspace would not be considered significant.

3.8.5 Mitigations

In the absence of any significant impacts to biological resources, no mitigations have been identified. The following general measures would minimize impacts to biological resources.

- Vegetation removal will remain consistent with the airport's WHMP by removing potential hazardous wildlife attractants on the airport in accordance with FAA Advisory Circular 150/5200-33C.
- Measures to minimize the potential for bird/wildlife-aircraft strikes, as identified in the ARANG *188th Fighter Wing Bird Aircraft Strike Hazard Plan* (ARANG, 2002), would continue to be implemented.
- The ARANG *Integrated Pest Management Plan* would be implemented to reduce and minimize impacts from invasive species (ARANG, 2020).
- The ARANG *Integrated Natural Resources Management Plan Fort Smith Air National Guard Base* would be implemented to reduce and minimize impacts to sensitive species and habitats (ARANG, 2020).

3.9 WATER RESOURCES

Water resources include surface water, groundwater, wetlands, and floodplains. Surface water resources include lakes, rivers, and streams and are important for a variety of reasons, including economic, ecological, recreational, and human health factors. Groundwater includes the subsurface hydrologic resources of the physical environment; its properties are often described in terms of depth to aquifer or water table, water quality, and surrounding geologic composition. Wetlands are areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. Floodplains are lowland areas adjacent to surface waterbodies where flooding events periodically cover areas with water.

3.9.1 Resource-Specific Analysis Methodology

Factors considered in evaluating impacts related to water resources associated with implementation of a proposed action are water availability, water quality, adherence to applicable regulations, and existence of wetlands and floodplains. Impacts are measured by the potential to reduce water availability to existing users, to endanger public health or safety by creating or worsening health hazards or safety conditions, or to violate laws or regulations adopted to protect or manage water resources.

Wetland and flooding impacts are evaluated by determining if proposed construction is located in a wetland or a designated floodplain. Groundwater impacts are evaluated by determining if groundwater resources beneath the project site would be used for implementing a proposed

action or alternatives and, if so, by determining the potential to adversely affect those groundwater resources.

The ROI for water resources consists of each of the alternative installations, with additional information presented for the surrounding vicinity, where relevant. The ROI does not include land beneath the SUA since no ground disturbance or construction would occur.

3.9.2 Preferred Alternative Affected Environment

3.9.2.1 Ebbing ANG Base and Surrounding Area

Ebbing ANG Base and FSRA are located within the upper reaches of two sub-watersheds of Massard Creek. The first sub-watershed is located north of the primary runway and includes the main ANG base. Surface water from this sub-watershed is collected and eventually discharged through a network of in-ground conveyances and grass-lined ditches to an unnamed tributary of Massard Creek (ARANG, 2020). The second sub-watershed is located south of the primary runway. Surface water in this drainage is collected in various stormwater conveyances and flows into Little Massard Creek. There are no 303(d) waterways in the ROI for Ebbing ANG Base and the surrounding area.

Several jurisdictional waterways and one pond are located on the main ANG base (**Figure 3.9-1**). Two jurisdictional wetlands occur in the FTA area. These drainages and the pond are part of the network of conveyances and ditches that carry stormwater drainage. Flow varies in the drainages from ephemeral to intermittent (ARANG, 2020). Over 28 acres of wetlands have been identified on the eastern end of the runway on property owned by FSRA (Garver, 2022) (**Figure 3.9-1**). In addition to these wetlands, a desktop analysis was performed on the portions of FSRA associated with the Preferred Alternative. Several possible wetlands were identified during this analysis and are shown on **Figure 3.9-1.**

Floodplains at FSRA are located along the unnamed tributary to Massard Creek and along Little Massard Creek. There are no floodplains located on the main cantonment area of the base (**Figure 3.9-1**).

Fort Smith is underlain by a shallow, unconfined aquifer (Arkansas River Alluvial) and a deep, unconfined aquifer (Western Interior Plains Confining System). Both aquifers may provide potable water supplies (ARANG, 2020).

The National Oceanic and Atmospheric Administration (NOAA) National Centers for Environmental Information predicts that the frequency and intensity of extreme heat and extreme precipitation will increase in the State of Arkansas due to factors associated with climate change. Arkansas is also predicted to see an overall increase in winter precipitation. These changes are predicted to occur in the next 20 to 30 years (NOAA, 2022a) and would cause an unknown increase in flood events and flood levels. In the short term (6 to 7 years), any changes to surface water resources are anticipated to be minor.

3.9.3 No Action Alternative

The affected environment under the No Action Alternative would reflect actions that are expected to have occurred by CY 2029. These are described in Section 3.12.2.7, *Cumulative Impacts, Water Resources*. Implementation of the No Action Alternative (i.e., no beddown of the FMS PTC at Ebbing ANG Base) would not result in any additional impacts outside those described under Cumulative Impacts.

3.9.4 Preferred Alternative Environmental Consequences

The analysis of impacts to biological resources for the Preferred Alternative evaluates impacts in relation to the No Action Alternative (CY 2029); the affected environment that time would be expected to be as described in Section 3.12.2.7, *Cumulative Impacts, Water Resources*.

3.9.4.1 Ebbing ANG Base and Surrounding Area

Surface Water

No construction activities would occur within surface waters at Ebbing ANG Base or the surrounding areas (**Figure 3.9-1**). The planned F-35 RSS Complex (Building 500) will be within 38 feet of a waterway; no other proposed construction projects are closer than 50 feet to a waterway. With the exception of the arresting barrier access roads and portions of the F-35 RSS Complex and the wash rack three-bay ClearSpan, new construction will occur on existing impervious surfaces. Ground disturbance would be minimal and the projects would be completed in accordance with Unified Facilities Criteria (UFC) 3-210-10, *Low Impact Development* (as amended, 2016), and the Emergency Independence and Security Act (EISA) § 438 (42 U.S.C. § 17094); any increase in surface water runoff as a result of the proposed construction would be attenuated through the use of temporary and/or permanent drainage management features (i.e., use of porous materials, directing runoff to permeable areas, and use of detention basins to release runoff over time). The integration of Low Impact Development (LID) concepts incorporates site design and stormwater management principles to maintain the site's pre-development runoff rates and volumes to further minimize potential adverse impacts associated with increases in impervious surface area.

Prior to construction, the contractor would be required to obtain coverage under an Arkansas Construction Stormwater Permit in compliance with the Clean Water Act (CWA). A site-specific SWPPP to manage stormwater discharges during and after construction would be prepared. The DAF would specify compliance with the stormwater discharge permit in all of the contractor construction requirements. The plan would include site-specific management practices to eliminate or reduce sediment and non-stormwater discharges. Other management practices could include the use of water sprays during construction to keep soil from becoming airborne, use of silt fences, covering soil stockpiles, using secondary containment for hazardous materials, and revegetating the site in a timely manner. An NPDES stormwater permit for industrial activity would also be required.

Groundwater

The Preferred Alternative would not impact any public drinking water supplies, public water supply wells, or groundwater resources. Fort Smith is underlain by a shallow, unconfined aquifer (Arkansas River Alluvial) and a deep, unconfined aquifer (Western Interior Plains Confining System). Water in these aquifers occurs at depths greater than 40 feet (ARANG, 2020), and construction activities associated with the Preferred Alternative would not interact with these aquifers.

Wetlands

Approximately 0.1 acre of potential wetlands would be impacted by the construction of the proposed arresting barrier access roads. Prior to construction activities, a wetland delineation and jurisdictional determination would occur, and the results of that survey would be provided to USACE Little Rock District, Regulatory Branch. Should the jurisdictional determination and the final engineering design of the access roads show that wetland impacts are unavoidable, the DAF would apply for a Section 404 permit and coordinate any required mitigations with USACE.

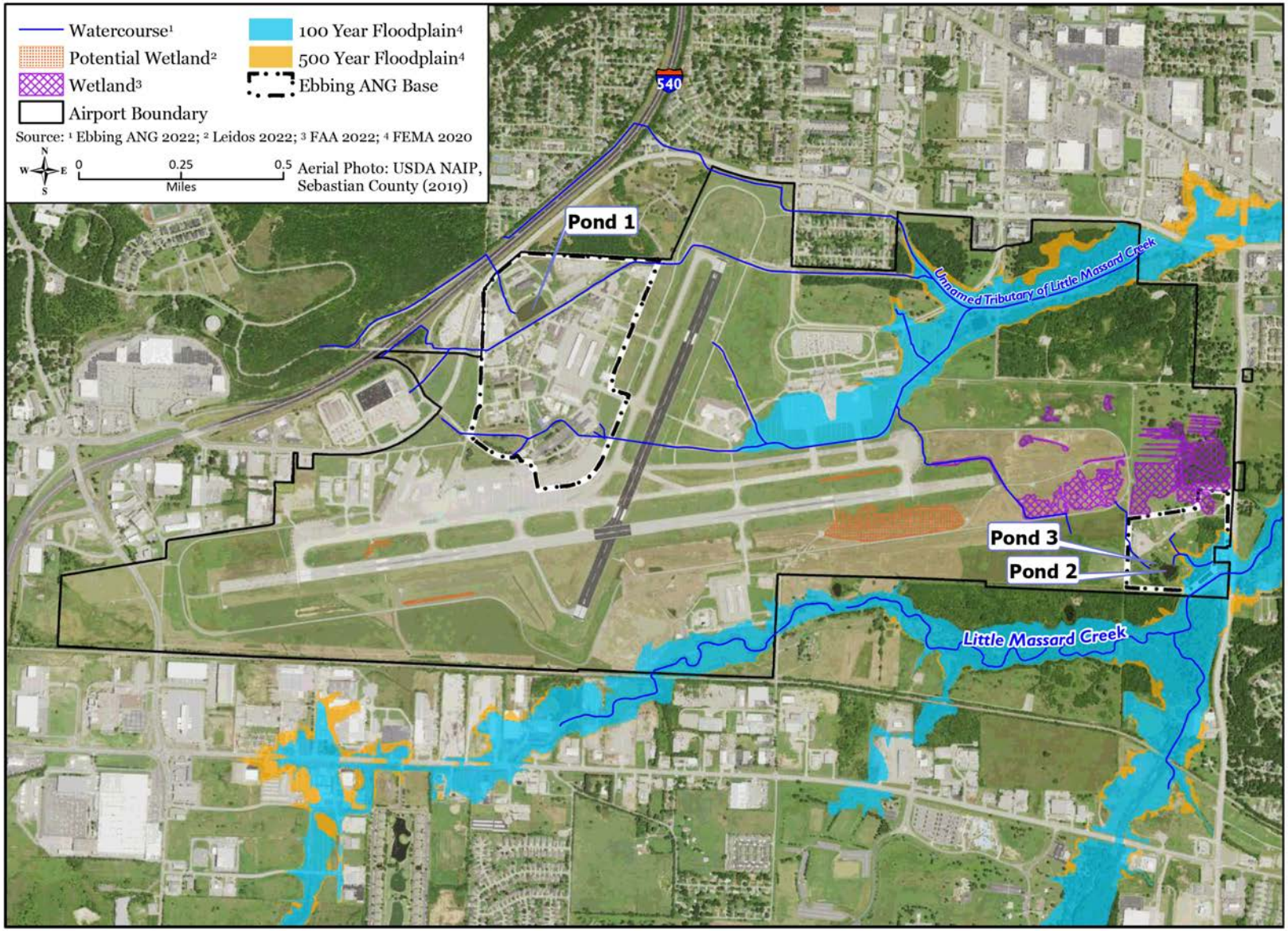


Figure 3.9-1. Surface Water Resources at Ebbing ANG Base (and FSRA)

Sources: (Ebbing ANG Base, 2021; USDA-FSA-APFO, 2019a; FEMA, 2021; Leidos, 2022)

Floodplains

No floodplains are located near any of the areas proposed for construction at Ebbing ANG Base and the surrounding area. The closest floodplain to proposed construction is the 100-year floodplain associated with an unnamed tributary of Little Massard Creek located north of the runway. This floodplain is located approximately 350 feet north of the proposed arresting barrier access road. The Preferred Alternative would not impact floodplains.

3.9.5 Mitigations

In the absence of any significant impacts to water resources, no mitigations have been identified. The following actions would be required as part of regulatory requirements.

- A wetland delineation and jurisdictional determination in the area of aircraft barrier arresting kits and supporting road infrastructure would be required under the CWA.
    - Barrier arresting kits and supporting access roads would be required to be designed to avoid any wetlands observed in the wetland delineation.
    - Any wetlands that would be unavoidable would require a CWA Section 404 permit and compensation of any unavoidable wetland impacts.
- Facilities would be required to comply with UFC 3-210-10, *Low Impact Development* (as amended, 2016), and EISA § 438 (42 U.S.C. § 17094); this would serve to maintain the site's pre-development runoff rates and volumes to minimize impacts from increased impervious surface area.

Ground-disturbance activities that comprise more than 1 acre would require stormwater construction permits under the NPDES and implementation of associated BMPs for erosion control. This serves to minimize potential impacts associated with soil erosion and surface water impacts during construction.

3.10 AIR QUALITY

Air quality relates to the presence of pollutants in the air. USEPA has determined that certain pollutants raise a concern for the health and welfare of the public. The major pollutants of concern, called "criteria pollutants," are carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), ozone, particulate matter with a diameter less than or equal to 10 microns (PM_{10}), particulate matter with a diameter less than or equal to 2.5 microns ($PM_{2.5}$), and lead. USEPA has established NAAQS for these pollutants (USEPA, 2022a).

Ambient air quality refers to the concentrations of pollutants in the air at a particular geographic location. Ambient air quality concentrations are generally reported as an amount of pollutant per unit of air (such as micrograms per cubic meter of air) or as a volume fraction of the air (e.g., parts per million). The ambient air quality concentrations at a particular location are determined by the interactions of air emissions, weather, and chemistry. Emission considerations include the types, amounts, and locations of pollutants emitted into the atmosphere. Meteorological (weather) considerations such as wind and precipitation affect the distribution, dilution, and removal of pollutant emissions. Chemical reactions can transform pollutant emissions into other chemical substances.

Greenhouse Gases

Greenhouse gases are gases that trap heat in the atmosphere. Both natural processes and human activities generate these emissions. The accumulation of greenhouse gases in the atmosphere regulates the Earth's temperature. Observations show that warming of the climate is unequivocal. The global warming observed over the past 50 years is due primarily to human-induced emissions of heat-trapping gases (IPCC, 2021). These emissions come mainly from the burning of fossil fuels (coal, oil, and gas), with contributions from forest clearing, agricultural practices, and other activities. To minimize greenhouse gas impacts, federal agencies and installations are required to comply with federal climate change policies.

Each greenhouse gas is assigned a value representing its global warming potential (the ability to trap heat) that is standardized to carbon dioxide, which has a global warming potential value of one. Emissions of a greenhouse gas can be multiplied by its global warming potential to calculate its emissions that would match the global warming potential of carbon dioxide emissions, which is referred to as its carbon dioxide equivalent.

3.10.1 Resource-Specific Analysis Methodology

The air quality analysis estimated air emissions that would be generated by construction and operational activities due to the proposed F-35A and F-16 missions with the use of the DAF Air Conformity Applicability Model (ACAM) version 5.0.17b (Solutio Environmental, Inc., 2019). Air quality impacts associated with proposed construction activities would result from (1) combustive emissions generated by fossil-fuel-powered equipment and (2) fugitive dust emissions (PM_{10}/$PM_{2.5}$) from operation of equipment on exposed soil. Proposed operations would generate emissions at Ebbing ANG Base due to (1) F-35A and F-16 aircraft operations, (2) aircraft engine maintenance and testing, (3) AGE, (4) space and water heating, and (5) personnel commuting activities. Proposed F-35A and F-16 aircraft operations also would occur within airspaces in proximity to Ebbing ANG Base. Detailed emissions assumptions and calculation methods are included in Volume II, **Appendix D**, *Air Quality Calculations*.

The air emissions estimated for proposed F-35 and F-16 operations are based on the same site-specific operational data as the project noise analyses. Both analyses of noise and air quality factor in the number and types of operations, location-specific flight patterns, aircraft power settings, and other relevant details. Site-specific representative time-in-mode cycles developed for the actions were used as inputs to ACAM. Calculations showing the aircraft time-in-mode metrics derived for the air quality analyses and the ACAM output reports are presented in Volume II, **Appendix D**, *Air Quality Calculations*.

Potential impacts to air quality are evaluated with respect to the affected environment and context and intensity of the impact in relation to relevant regulations, guidelines, and scientific documentation. The region surrounding Ebbing ANG Base and the proposed airspaces are in attainment of all NAAQS (less than 85 percent of any NAAQS) (USEPA, 2022b). Therefore, the analysis used the USEPA Prevention of Significant Deterioration (PSD) permitting threshold of 250 tons per year for criteria pollutants as indicators of the significance of projected air quality impacts within these project regions. The analysis uses this criterion, as the PSD permitting process applies to areas that attain a NAAQS. It is important to note that the proposed indicator thresholds only provide a clue to the potential impacts to air quality. If projected emissions were to exceed 250 tons per year, further analysis would be conducted to determine whether

impacts were significant. In such cases, if emissions do not contribute to an exceedance of an ambient air quality standard, then impacts would not be significant.

FAA Order 1050.1F applies to this aspect of the Preferred Alternative. The Order states that the significance threshold for air quality equates to an action that would cause pollutant concentrations to exceed the NAAQS or would increase the frequency or severity of any such existing violation. The DAF analysis methodology assumes that proposed emissions would not exceed the NAAQS if they would not exceed the emission indicator thresholds. If the analysis identifies an exceedance of an emission indicator threshold, the DAF methodology further evaluates the potential for an exceedance of the NAAQS, which is consistent with FAA policy.

The analysis of proposed aircraft operations is limited to operations that would occur within the lowest part of the atmosphere known as the mixing layer, because this is where the release of aircraft emissions would affect ground-level pollutant concentrations. In general, aircraft emissions released above the mixing layer would not appreciably affect ground-level air quality. In accordance with the General Conformity rule (40 CFR § 93 Subpart B), where the applicable State Implementation Plan (SIP) or Transportation Implementation Plan does not specify a mixing height, the federal agency can use 3,000 feet (914 meters) AGL as a default mixing height. Since the Arkansas and Michigan SIPs do not specify mixing heights, the analysis used 3,000 feet AGL as a default mixing height at both alternative locations. Additionally, the analysis did not estimate emissions for proposed aircraft operations within airspaces or training areas that would occur above 3,000 feet AGL.

3.10.2 Preferred Alternative Affected Environment

The air quality affected environment for Ebbing ANG Base includes the region surrounding the base airfield and areas underlying the proposed SUAs where project aircraft would operate within 3,000 feet AGL. These areas include the Hog A and Hog B MOAs, R-2401/2402, and connecting MTRs. The counties surrounding these areas currently attain all NAAQS. The affected environment for greenhouse gases is the global atmosphere.

3.10.2.1 Ebbing ANG Base and Surrounding Area

Sebastian County Air Emissions

In order to provide a reference for the air quality impact analysis at Ebbing ANG Base, the most recent annual air emissions for Sebastian County from the 2017 National Emissions Inventory are provided in **Table 3.10-1**. Data for FSRA include emissions from civilian aircraft operations.

Table 3.10-1. Sebastian County Annual Emissions – 2017

Emissions	Air Pollutant Emissions (tons per year)						
	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	VOC	CO_2e (MT) [a]
Sebastian County	31,903	4,501	315	9,000	3,263	17,902	1,161,034
Fort Smith Regional Airport	157	64	7	6	5	31	-

Source: (USEPA, 2022c)

Key: CO = carbon monoxide; CO_2e = carbon dioxide equivalent; GHG = greenhouse gas; MT = metric tons; NEI = National Emissions Inventory; NO_x = nitrogen oxides; $PM_{2.5}$ = particulate matter with a diameter less than or equal to 2.5 microns; PM_{10} = particulate matter with a diameter less than or equal to 10 microns; SO_2 = sulfur dioxide; VOC = volatile organic compound

Note:

a. No GHG emissions reported for Fort Smith Regional Airport in the NEI database.

Emissions generated from existing operations at Ebbing ANG Base mainly occur from on-road vehicles, fuel storage tanks, diesel-powered emergency electric generators, and natural-gas-

fired space and water heaters (AECOM Technical Services, Inc, 2021). The facility does not maintain any stationary source air permits for its operations, as no emission source is large enough to trigger permitting requirements.

3.10.2.2 Affected Airspace

Table 3.10-2 shows the specific counties that underlie the airspaces for Ebbing ANG Base and their current attainment statuses under the NAAQS. **Table 3.10-3** provides the annual emissions for these counties where proposed aircraft operations would occur below 3,000 feet AGL.

Table 3.10-2. Attainment Status for Counties Underlying Ebbing ANG Base Airspaces

Airspace	County	Status [(a)]
Hog A MOA	Franklin, Logan, Montgomery, Scott, Sebastian, Yell – Arkansas	Attainment or Unclassified for all pollutants
Hog B MOA	LeFlore - Oklahoma; Montgomery, Polk, Scott – Arkansas	Attainment or Unclassified for all pollutants
R-2401/2402	Franklin, Logan, Sebastian - Arkansas	Attainment or Unclassified for all pollutants

Key: ANG = Air National Guard; MOA = Military Operations Area; R- = Restricted Area
Note:
a. Source: (USEPA, 2022d)

Existing operations within R-2401/2402 generate minor amounts of emissions mainly from the use and detonation of munitions (AECOM Technical Services, Inc, 2021).

Table 3.10-3. Annual Emissions for Counties Underlying Ebbing ANG Base Airspaces – 2017

County	Airspace	Air Pollutant Emissions (tons per year)						
		CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC	CO_2e (MT)
Franklin	Hog A MOA	27,954	2,909	5,855	2,639	299	19,761	642,039
Logan		13,294	3,149	5,359	1,468	87	18,821	348,990
Montgomery		12,387	591	3,054	1,048	73	25,262	186,375
Scott		29,786	1,214	5,450	2,791	246	31,561	450,556
Sebastian		31,904	4,503	9,000	3,263	315	17,904	1,163,699
Yell		20,987	1,401	5,261	2,038	168	29,602	370,934
Total TPY		**136,312**	**13,766**	**33,979**	**13,247**	**1,189**	**142,911**	**3,162,593**
Le Flore (OK)	Hog B MOA	58,329	5,787	14,967	5,787	2,398	44,346	3,175,612
Montgomery		12,387	591	3,054	1,048	73	25,262	186,375
Polk		14,076	1,375	4,075	1,373	97	25,332	250,533
Scott		29,786	1,214	5,450	2,791	246	31,561	450,556
Total TPY		**114,577**	**8,967**	**27,546**	**10,998**	**2,814**	**126,500**	**4,063,076**
Franklin	R-2401 or R-2402	27,954	2,909	5,855	2,639	299	19,761	642,039
Logan		13,294	3,149	5,359	1,468	87	18,821	348,990
Sebastian		31,904	4,503	9,000	3,263	315	17,904	1,163,699
Total TPY		**73,152**	**10,560**	**20,214**	**7,370**	**701**	**56,486**	**2,154,728**

Source: (USEPA, 2022c)
Key: ANG = Air National Guard; CO = carbon monoxide; CO_2e = carbon dioxide equivalent; MOA = Military Operations Area; MT = metric tons; NO_x = nitrogen oxides; $PM_{2.5}$ = particulate matter with a diameter less than or equal to 2.5 microns; PM_{10} = particulate matter with a diameter less than or equal to 10 microns; R- = Restricted Area; SO_2 = sulfur dioxide; TPY = tons per year; VOC = volatile organic compound

Federal Class I Areas

Table 3.10-4 shows Federal Class I areas that occur within 50 miles of the Ebbing ANG Base airspaces. The Clean Air Act protects these areas from any appreciable deterioration of air quality caused by man-made air pollution.

Table 3.10-4. Federal Class I Areas in Relation to Ebbing ANG Base Airspaces

Class I Area	Entire Area (acres)	Area Underneath Airspace (acres)	Airspace Conflict	Distance to Nearest Airspace
Caney Creek Wilderness	14,325	6,158	Hog B High, Bravo ATCAA	Overlaps
Caney Creek Wilderness	14,325	493	IR-164, VR-1104	Overlaps
	Total	**6,651**	**Both above fields**	**Overlaps**
Upper Buffalo Wilderness	11.929 acres	215 acres	Shirley A MOA, Shirley A ATCAA	Overlaps
Hercules-Glades Wilderness	12,374 acres	0 acres	Shirley A MOA, Shirley A ATCAA	42.5 miles away

Source: (USEPA, 2015)
Key: ATCAA = Air Traffic Control Assigned Airspace; IR = Instrument Route; MOA = Military Operations Area; VR = Visual Route

3.10.3 No Action Alternative

The affected environment under the No Action Alternative would reflect actions that are expected to have occurred by CY 2029. These are described in Section 3.12.2.8, *Cumulative Impacts, Air Quality.* Implementation of the No Action Alternative (i.e., no beddown of the FMS PTC at Ebbing ANG Base) would not result in any additional impacts outside those described under Cumulative Impacts.

3.10.4 Preferred Alternative Environmental Consequences

The analysis of impacts to air quality for the Preferred Alternative evaluates impacts in relation to the No Action Alternative (CY 2029); the affected environment at that time would be expected to be as described in Section 3.12.2.8, *Cumulative Impacts, Air Quality*.

The air quality analysis estimated the magnitude of emissions that would result from construction and operation of the proposed F-35 and F-16 missions at Ebbing ANG Base against the No Action Alternative. Section 3.10.1, *Air Quality, Resource-Specific Analysis Methodology,* of this EIS presents the air quality analysis methodology. Volume II, **Appendix D**, *Air Quality Calculations*, presents the calculations used to estimate air pollutant emissions from proposed construction and operational sources for the Preferred Alternative.

The air quality analysis for the Preferred Alternative at Ebbing ANG Base evaluates F-35 takeoff operations based on three afterburner scenarios. Activity levels and resulting emissions for all other proposed operational activities attributed to the action would remain the same under each afterburner scenario.

The immediate area surrounding Ebbing ANG Base within Sebastian County attains all NAAQS (less than 85 percent of any NAAQS). Therefore, the analysis used the USEPA PSD permitting threshold of 250 tons per year for criteria pollutants as indicators of the significance of projected air quality impacts within the Ebbing ANG Base project region. If projected emissions exceeded 250 tons per year, further analysis was conducted to determine whether impacts were significant. In such cases, if emissions do not contribute to an exceedance of an ambient air quality standard, then impacts would not be significant.

3.10.4.1 Ebbing ANG Base and Surrounding Area

Base Facilities Construction

The Preferred Alternative at Ebbing ANG Base would require renovations of existing facilities and construction of new airfield facilities (e.g., training and maintenance facilities, hangars, and arresting barriers). Air quality impacts associated with proposed construction activities would result from (1) combustive emissions generated by fossil fuel-powered equipment and (2)

fugitive dust emissions (PM_{10}/$PM_{2.5}$) from operation of equipment on exposed soil. The air quality analysis conservatively assumed that the Preferred Alternative would complete all construction activities in the year 2023.

Inclusion of BMPs into proposed construction activities would reduce fugitive dust emissions generated from the use of construction equipment on exposed soil by 50 percent from uncontrolled levels (Countess Environmental, 2006).

USEPA began working to reduce lead emissions soon after its inception, issuing the first reduction standards in 1973, which called for a gradual phasedown of lead to one tenth of a gram per gallon by 1986. The average lead content in gasoline in 1973 was 2-3 grams per gallon or about 200,000 tons of lead a year. In 1975, passenger cars and light trucks were manufactured with a more elaborate emission control system which included a catalytic converter that required lead-free fuel. In 1995 leaded fuel accounted for only 0.6 percent of total gasoline sales and less than 2,000 tons of lead per year. Effective January 1, 1996, the Clean Air Act banned the sale of the small amount of leaded fuel that was still available in some parts of the country for use in on-road vehicles. USEPA said fuel containing lead may continue to be sold for off-road uses, including aircraft, racing cars, farm equipment, and marine engines. Any lead emitted from off-road construction equipment would be minimal to the extent that it is inconsequential.

Table 3.10-5 presents estimates of annual emissions that would occur from the infrastructure improvements for the proposed F-35 and F-16 missions at Ebbing ANG Base. These data show that even if all construction activities occurred in 1 year, the total construction emissions would be well below the annual significance indicators. Therefore, construction emissions associated with the Preferred Alternative would not result in significant air quality impacts.

Proposed construction equipment would emit hazardous air pollutants (HAPs) that potentially could impact public health. The main health risk from HAPs would occur in the form of particulates from the combustion of diesel fuel. Proposed construction over 1 year would emit 0.6 ton of diesel particulate matter that would occur from on-site equipment and trucks and the transport of materials by truck within the regional roadways. The intermittent release of these emissions over a large project area would result in very low ambient concentrations of HAPs in a localized area and, therefore, would produce minimal impacts to public health.

Table 3.10-5. Annual Preferred Alternative Construction Emissions at Ebbing ANG Base

Construction Year	Air Pollutant Emissions (tons per year)							
	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	VOC	Pb [a]	CO_2e (MT)
2023	**6.16**	**4.82**	**0.01**	**1.12**	**0.19**	**1.58**	**<0.00**	**1,202**
Significance indicator threshold	250	250	250	250	250	250	25	NA

Source: ACAM modeling results (see Volume II, Appendix D, *Air Quality Calculations*)
Key: ANG = Air National Guard; CO = carbon monoxide; CO_2e = carbon dioxide equivalent; MT = metric tons; NA = not applicable; NO_x = nitrogen oxides; $PM_{2.5}$ = particulate matter with a diameter less than or equal to 2.5 microns; PM_{10} = particulate matter with a diameter less than or equal to 10 microns; SO_2 = sulfur dioxide; VOC = volatile organic compound; Pb = lead
Note:
a. ACAM emissions for lead are 0.0 tons/year (Casteneda, 2022)

Aircraft Operations

Operation of the Preferred Alternative would generate air emissions from (1) F-35 and F-16 aircraft operations, (2) F-35 and F-16 engine maintenance and testing, (3) AGE, (4) space and

water heaters, (5) testing of diesel-powered electric generators, and (6) personnel commuting activities. The analysis employed the ACAM to estimate emissions from these activities. The air quality analysis assumed that the action would reach full operations and resulting emissions in CY 2029.

Table 3.10-6 summarizes the maximum annual operations emissions that would result from implementation of the maximum afterburner scenario of 95% at Ebbing ANG Base. Emissions would be slightly lower for scenarios with lower afterburner usages. For example, emissions from the 5% afterburner scenario would be no more than 5 percent lower for any air pollutant compared to emissions from the 95% afterburner scenario. The data in **Table 3.10-6** show that emissions from the Preferred Alternative would remain below the significance indicator of 250 tons per year for all criteria pollutants. Since the Ebbing ANG Base project region attains all NAAQS by a wide margin, these worst-case emissions increases would not contribute to an exceedance of a NAAQS. Therefore, operational emissions associated with the Preferred Alternative would not result in significant air quality impacts within the Ebbing ANG Base project region.

Table 3.10-6. Maximum Annual Operations Emissions for the Preferred Alternative at Ebbing ANG Base, Calendar Year 2029

Source	Air Pollutant Emissions (tons per year)							
	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	VOC	Pb [(b)]	CO_2e (MT)
Aircraft flight operations/engine trim tests	49.38	134.41	10.90	17.18	15.45	2.85	<0.00	31,948
Aircraft engine test cells	0.57	2.57	0.17	0.23	0.20	0.04	<0.00	514
Aerospace ground equipment	20.63	33.83	2.37	3.49	3.38	11.76	<0.00	1,781
Space and water heating	0.90	1.07	0.01	0.08	0.08	0.06	<0.00	1,289
Test emergency generators	0.03	0.05	0.01	0.01	0.01	0.01	<0.00	5
Personnel commuting activities	10.16	0.76	0.01	0.02	0.02	0.85	<0.00	829
Total Preferred Alternative emissions [(a)]	**81.67**	**172.69**	**13.46**	**21.00**	**19.14**	**15.57**	**<0.00**	**36,365**
Significance indicator threshold	250	250	250	250	250	250	25	NA

Source: ACAM modeling results (see Volume II, Appendix D, *Air Quality Calculations*)
Key: ANG = Air National Guard; CO = carbon monoxide; CO2e = carbon dioxide equivalent; MT = metric tons; NA = not applicable; NO_x = nitrogen oxides; $PM_{2.5}$ = particulate matter with a diameter less than or equal to 2.5 microns; PM_{10} = particulate matter with a diameter less than or equal to 10 microns; SO_2 = sulfur dioxide; VOC = volatile organic compound; Pb = lead
Notes:
a. As a result of rounding, the data in each column might not add up exactly to its "Total" row.
b. Jet fuels used in military and civilian aircraft (e.g., JP-8 and Jet-A) are complex mixtures of aliphatic and aromatic hydrocarbons made by blending various distillate stocks of petroleum with additives that do not contain any lead. Therefore, the emission factor for lead is 0.00 lb/1,000 lb fuel (Casteneda, 2022).

3.10.4.2 Affected Airspace

To quantify the air quality effects of the Preferred Alternative within Ebbing ANG Base airspaces and training areas, the analysis focused on F-35 and F-16 aircraft operations within the lowest 3,000 feet of the atmosphere. The airspaces or training areas where proposed aircraft operations would occur below 3,000 feet AGL include the Hog A MOA, Hog B MOA, Razorback Range, and MTRs.

Table 3.10-7 presents the annual emissions that would result from the operation of aircraft within airspaces and training areas under the Preferred Alternative. These data show that the proposed aircraft operations within these areas would result in air pollutant emissions within 3,000 feet AGL that would remain below the significance indicator of 250 tons per year for all

criteria pollutants. Therefore, the Preferred Alternative would not result in significant air quality impacts within any airspace or training area.

Table 3.10-7. Annual Operations Emissions for the Preferred Alternative Within Ebbing ANG Base Airspaces and Training Areas

Source	Air Pollutant Emissions (tons per year)							
	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	VOC	Pb	CO_2e (MT)
Aircraft operations	**0.50**	**28.84**	**1.36**	**1.51**	**1.35**	**0.04**	**<0.00**	**3,737**
Significance indicator threshold	250	250	250	250	250	250	25	NA

Source: ACAM modeling results (see Volume II, Appendix D, *Air Quality Calculations*)
Key: ANG = Air National Guard; CO = carbon monoxide; CO_2e = carbon dioxide equivalent; MT = metric tons; NA = not applicable; NO_X = nitrogen oxides; $PM_{2.5}$ = particulate matter with a diameter less than or equal to 2.5 microns; PM_{10} = particulate matter with a diameter less than or equal to 10 microns; SO_2 = sulfur dioxide; VOC = volatile organic compound; Pb = lead
Note: The emission factor for lead is 0.00 lb/1,000 lb fuel (Casteneda, 2022).

Due to the presence of pristine Class I areas within the project airspace region, proposed F-35 and F-16 emissions that occur within airspace units have the potential to impair visibility within some of these areas. The Class I areas of most concern include the Caney Creek Wilderness Area and Upper Buffalo Wilderness Area, as the Hog B High West and Shirley A MOAs, respectively, overlay small portions of these areas. All other airspace units would occur at a sufficient distance such that they would produce inconsequential air quality impacts within the Class I areas in the project region. Visibility impairment could occur from projected primary emissions of NO_2, SO_2, and PM_{10} or secondary formation of visibility reducing particulate matter in the atmosphere due to precursor emissions of volatile organic compounds (VOCs), NO_2, or SO_2. Visibility impairment from primary NO_2 emissions could occur as a brown-colored haze in the lower layer of the atmosphere. This situation usually would occur during the colder months of the year, when a lack of sunlight prevents the conversion of this pollutant to NO_x and oxygen. Visibility impairment due to primary PM_{10} emissions would occur in the form of plume blight or atmospheric discoloration from contrails. Visibility impairment due to the secondary formation of nitrate or sulfate particulates in the atmosphere from emissions of NO_x or SO_2 usually would occur in the warmer months of the year. This effect would take the form of regional haze, which would reduce regional visual range.

At full implementation, the Preferred Alternative would increase F-35 and F-16 operations within the Hog B High West MOA by 394 hours per year. About 9.6 square miles of the Caney Creek Wilderness Area would occur under the MOA or 1.5 percent of the total MOA. Therefore, on average, 98.5 percent of the proposed aircraft operations within the MOA would occur outside of and several miles away from the Wilderness Area. During periods when winds would transport proposed aircraft emissions within this airspace unit to the Wilderness Area, the associated dispersion would substantially dilute their concentrations upon arrival in the Wilderness Area. On average, project aircraft would operate about 5.9 hours per year over the Wilderness Area (1.5 percent of the total aircraft operations within the MOA). Proposed aircraft operations within the MOA would occur from about 3,500 to 15,500 feet AGL. Therefore, air emissions from this minimal duration of proposed aircraft operations at such a high altitude would not substantially degrade regional visibility within the Wilderness Area. The proposed aircraft operations also would produce plume blight that is visible over the Wilderness Area. However, due to the transitory nature of these emissions, they would not result in visibility impairment within this pristine area. Therefore, proposed aircraft operations would not

produce significant contributions to visibility impairment within the Caney Creek Wilderness Area.

At full implementation, the Preferred Alternative would increase F-35 and F-16 operations within the Shirley A MOA by 1,293 hours per year. About 0.5 square miles of the Upper Buffalo Wilderness Area would occur under the MOA or 0.02 percent of the total MOA. On average, project aircraft would operate about 0.3 hours over the Wilderness Area (0.02 percent of the total aircraft operations within the MOA). Proposed aircraft operations within the MOA would occur from about 9,000 to 16,000 feet AGL. Therefore, for the same reasons mentioned above for the Caney Creek Wilderness Area, proposed aircraft operations would not produce significant contributions to visibility impairment within the Upper Buffalo Wilderness Area.

3.10.5 Mitigations

In the absence of any significant impacts to air quality, no mitigations are identified that would reduce or would avoid air quality impacts from the Preferred Alternative. However, BMPs (such as dust suppression techniques) are available and would be incorporated into proposed construction activities to reduce fugitive dust emissions generated from the use of construction equipment on exposed soil. USEPA recommends in their scoping comments that the DAF consider implementing applicable aspects of the USEPA Construction Emission Control Checklist to reduce diesel and fugitive dust emissions from construction activities.

Although specific mitigations would not be necessary for reducing impacts to air quality at Ebbing ANG Base, the DAF evaluated mitigation measures to reduce noise impacts that would also affect air pollutant emissions due to altering flight patterns (see Section 3.3.5, *Noise, Mitigations*). As a result, ACAM was used to calculate the annual emissions from operating under the mitigated flight scenarios. **Table 3.10-8** provides a comparison of the total annual emissions in the end-state under the mitigated flight scenarios as compared to the unmitigated Preferred Alternative emissions.

While emissions would decrease slightly overall, there would not be any notable difference in annual emissions in the ROI. There would continue to be no exceedances of significance indicator thresholds and no significant impact on air quality in the ROI.

Table 3.10-8. Comparison of Annual Operations Emissions for the Mitigated Flight Scenario at Ebbing ANG Base, Calendar Year 2029

Source	Air Pollutant Emissions (tons per year)							
	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	VOC	Pb [(b)]	CO_2e (MT)
Total Unmitigated Emissions [(a)]	**81.67**	**172.69**	**13.46**	**21**	**19.14**	**15.57**	**<0.00**	**36,365**
Total Mitigated Flight Scenario Emissions	**79.24**	**169.41**	**13.21**	**20.71**	**18.88**	**15.57**	**<0.00**	**35,875**
Net Change in Emissions	-2.43	-3.28	-0.25	-0.29	-0.26	0.00	<0.00	-490.10
Significance indicator threshold	250	250	250	250	250	250	25	NA

Source: ACAM modeling results (see Volume II, Appendix D, *Air Quality Calculations*)

Key: ANG = Air National Guard; CO = carbon monoxide; CO_2e = carbon dioxide equivalent; MT = metric tons; NA = not applicable; NO_X = nitrogen oxides; Pb = lead; $PM_{2.5}$ = particulate matter with a diameter less than or equal to 2.5 microns; PM_{10} = particulate matter with a diameter less than or equal to 10 microns; SO_2 = sulfur dioxide; VOC = volatile organic compound

Notes:

a. As a result of rounding, the data in each column might not add up exactly to its "Total" row.

b. Jet fuels used in military and civilian aircraft (e.g., JP-8 and Jet-A) are complex mixtures of aliphatic and aromatic hydrocarbons made by blending various distillate stocks of petroleum with additives that do not contain any lead. Therefore, the emission factor for lead is 0.00 lb/1,000 lb fuel (Casteneda, 2022).

3.11 PREFERRED ALTERNATIVE IMPACT AND MITIGATION SUMMARY

The following provides an impact summary of the analyses presented in Chapter 3 for the Preferred Alternative. Significance determinations were derived based on analysis and specific criteria or guidelines as described in each respective resource section. Impacts summarized in **Table 3.11-1** are described as "significant," "not significant," "neutral," or "no effect" per the definitions outlined in Section 2.6, *Environmental Comparison of Alternatives*.

Overall, the DAF has identified potential significant adverse impacts related to noise, and relative noise effects to land use and socioeconomics, around Ebbing ANG Base. Other impacts identified for Ebbing ANG Base and the surrounding area are generally not significant in nature, and impacts to resources within and under the training airspace would generally be neutral or have no effect.

Within the context of analysis in this document, and as presented in **Table 3.11-1,** "installation" refers to Ebbing ANG Base and the area immediately surrounding the base and airfield (to include land areas underneath airspace surrounding the airfield), and "airspace" refers to SUA, which includes Restricted Areas, MTRs, MOAs, and ATCAAs and associated land areas underneath.

Table 3.11-1. Summary of Preferred Alternative and No Action Impacts

Resource Area	Preferred Alternative		No Action	
	Installation	Airspace	Installation	Airspace
Noise	Significant [Section 3.3.4]	Not Significant [Section 3.3.4]	Neutral [Section 3.3.3/3.12]	Neutral [Section 3.3.3]
Land Use	Significant [Section 3.4.4]	Not Significant [Section 3.4.4]	Neutral [Section 3.4.3]	Neutral [Section 3.4.3]
Socioeconomics	Not Significant [Section 3.5.4]	No Effect [Section 3.2]	Neutral [Section 3.5.3]	Neutral [Section 3.5.3]
Environmental Justice and Children	Significant [Section 3.6.4]	Not Significant [Section 3.2]	Neutral [Section 3.6.3]	Neutral [Section 3.6.3]
Cultural Resources	Not Significant [Section 3.7.4]	No Effect [Section 3.7.4]	Neutral [Section 3.7.3]	Neutral [Section 3.7.3]
Biological Resources	Not Significant [Section 3.8.4]	Not Significant [Section 3.8.4]	Neutral [Section 3.8.3]	Neutral [Section 3.8.3]
Water Resources	Not Significant [Section 3.9.4]	No Effect [Section 3.2]	Neutral [Section 3.9.3]	Neutral [Section 3.9.3]
Air Quality	Not Significant [Section 3.10.4]	Not Significant [Section 3.10.4]	Neutral [Section 3.10.3]	Neutral [Section 3.10.3]
Safety	Not Significant [Section 3.2]	Not Significant [Section 3.2]	Neutral [Section 3.2]	Neutral [Section 3.2]
Soils and Geology	Not Significant [Section 3.2]	No Effect [Section 3.2]	Neutral [Section 3.2]	Neutral [Section 3.2]
Hazardous Materials and Waste/Solid Waste	Not Significant [Section 3.2]	Not Significant [Section 3.2]	Neutral [Section 3.2]	Neutral [Section 3.2]
Infrastructure/ Transportation	Not Significant [Section 3.2]	No Effect [Section 3.2]	Neutral [Section 3.2]	Neutral [Section 3.2]
Airspace	Neutral [Section 3.2]			

Notes:
Red = significant impacts
Yellow = impacts considered to not be significant
Green = neutral or no effects

Within the context of the discussion below, mitigations are those actions identified by the DAF, either through consultation with regulatory agencies or independently, that are specific to implementation of the Preferred Alternative that would serve to avoid, minimize, rectify, reduce or eliminate, or compensate for significant impacts. Actions associated with permits required to implement the Preferred Alternative (such as NPDES permits requiring a SWPPP) are not considered mitigations within this context.

The following sections summarize significant impacts and impacts considered to not be significant for each resource area, identified with red and yellow shading, respectively, in **Table 3.11-1**. Resources experiencing neutral or no effects identified as "green" are not discussed in this summary.

3.11.1 Noise

Potential impacts associated with noise under the Preferred Alternative related to airspace would not be significant, as time-averaged noise levels would remain below 65 dB. Impacts under the Preferred Alternative related to the installation would be significant, as up to an additional 7,855 acres of land would be affected by 65 dB DNL or greater, and up to an additional 12,654 people would be affected by 65 dB DNL or greater. In addition, the Preferred Alternative would result in an increase in the number of speech interference events, noise interference events in schools, and sleep disturbance events in the region surrounding Ebbing ANG Base.

Mitigations

As a result of significant noise impacts identified under the Preferred Alternative, the following noise mitigations are under consideration by the DAF to minimize the impacts of the Preferred Alternative (more detail is provided in Section 3.3.5, *Noise, Mitigations*):

- Reduce the number of flying operations.
- Adjust runway usage patterns so that loud overflights occur less frequently over areas of greater noise sensitivity.
- Increase the distance between aircraft and noise-sensitive locations by increasing altitudes or adjusting routing.
- Place restrictions on late-night flying.
- Limit afterburner usage.
- Reduced power departures.

The potential mitigation scenarios being considered would reduce DNL relative to the unmitigated operational scenario in some areas while other areas would see a minor increase. The total off-base/airport land area exposed to noise levels exceeding 65 dB DNL would be reduced by 10%, 12%, and 15% relative to the unmitigated 5%, 50%, and 95% afterburner scenarios, respectively. The estimated number of residents exposed to noise levels greater than 65 dB DNL would be reduced by 11%, 15%, and 20% relative to the unmitigated 5%, 50%, and 95% afterburner scenarios, respectively.

3.11.2 Land Use

Potential impacts associated with land use under the Preferred Alternative related to airspace would not be significant. Undeveloped areas would have low-to-moderate adverse effects on low-to-moderately noise-sensitive land uses and areas. Low-level overflights may have a

minor-to-moderate adverse impact on persons engaged in outdoor recreational activities. Moderate-to-high adverse impacts would occur on some wilderness users and their experience of primitive recreation.

Potential impacts associated with land use under the Preferred Alternative related to the installation would be significant. Total off-base land exposed to noise levels of 65 dB DNL and greater would expand from 202 acres to 8,062 acres. Residential land exposure would increase from 11 acres to 1,821 acres. Noise levels of 70 dB DNL and above would affect 485 acres, and levels of 75 dB DNL and greater would affect 174 acres of residential land. These conditions are generally considered incompatible. A mixture of commercial use land (1,297 acres) is also newly exposed to marginally compatible and incompatible noise levels. About 510 acres of public/quasi-public land is exposed to noise of 65 dB DNL and greater. Overall, implementation of the Preferred Alternative would have significant impacts on residential land uses surrounding the airport. Commercial and public/quasi-public uses in the surrounding area could experience moderate adverse impacts.

Mitigations

As a result of significant land use compatibility impacts identified under the Preferred Alternative, mitigation for areas surrounding Ebbing ANG Base would focus on achieving compatible indoor noise exposure based on the specific uses of affected occupied and inhabited structures. Noise mitigations presented previously would serve as mitigating measures in this regard.

The total off-base/airport residential land area (acres) exposed to noise levels exceeding 65 dB DNL would be reduced by between 6% and 14% depending on afterburner usage relative to the same unmitigated scenarios; residential acres exposed to noise levels exceeding 70 dB DNL would be reduced by between 11% and 19% depending on afterburner usage relative to the same unmitigated scenarios; residential acres exposed to noise levels exceeding 75 dB DNL would be reduced by between 50% and 58% depending on afterburner usage relative to the same unmitigated scenarios; residential land area exposed to more than 80 dB DNL would be reduced from 1 acre to 0 acre under all mitigated afterburner scenarios.

3.11.3 Socioeconomics

The estimated number of people within the 65 dB DNL or greater noise contours for the 5%, 50%, and 95% afterburner scenarios under the Preferred Alternative increase over the No Action from 66 to between 10,635 and 12,730, while housing units affected increase over the No Action from 18 to between 2,579 and 3,014.

The action would result in a less than 1-percent increase in local population. Some beneficial impacts due to the additional population would occur and increases in noise could potentially decrease property values by 0.2 to 2.0 percent per dB increase.

Mitigations

Noise mitigations under consideration by the DAF detailed in Section 3.3.5, *Noise, Mitigations*, would decrease the number of residents and housing units exposed to noise levels of 65 dB DNL or greater and minimize adverse noise impacts to residential areas newly exposed to noise levels of 65 dB DNL or greater. Depending on the mitigation scenario, the total affected population could be reduced by between 11% and 20% and total affected housing units by between 12% and 20% versus unmitigated noise.

3.11.4 Environmental Justice and Children

Potential impacts associated with environmental justice and children under the Preferred Alternative related to airspace would not be significant. Time-averaged noise for populations under airspace would remain under impact thresholds.

Potential impacts associated with environmental justice and children under the Preferred Alternative related to the installation would be significant. Impacts are based on the percentages of populations within the greater than 65 dB DNL noise zones, which would result in disproportionately high and adverse human health or environmental effects on minority populations. The Preferred Alternative would also result in noise impacts that may disproportionately affect children. In addition, the elderly could be significantly impacted.

Mitigations

Noise mitigations under consideration by the DAF as described in Section 3.3.5, *Noise, Mitigations*, would result in approximately 7% to 15% less minority population affected and between 13% and 21% low-income population affected by 65 dB DNL depending on afterburner scenario as compared to unmitigated noise. Similarly, potential noise mitigations would result in an estimated reduction of between 9% and 19% children and between 14% and 21% elderly potentially affected depending on afterburner scenario as compared to unmitigated noise.

In addition to the noise mitigations, the following apply to environmental justice and children:

- Conducted a digital campaign and posted notices specifically targeted toward potentially affected environmental justice communities to provide notification of the availability of the Draft EIS and dates and times for participation in the virtual public meetings.
- Distributed copies of the Draft EIS to the local libraries located within the environmental justice communities.
- Ensured that virtual public meetings had a call-in number, to facilitate participation if Internet access was not available.
- Held virtual public meetings on different days and times to increase accessibility.
- Posted records of the virtual public meetings on the project website for additional access to project information.

3.11.5 Cultural Resources

No significant impacts have been identified to historic properties under the airspace. No effect is anticipated to cultural resources under the Preferred Alternative related to airspace, as no effects to archaeological resources, architectural resources, or traditional cultural properties are anticipated. Consultation with Native American Tribes and the Arkansas SHPO are still in process. The Oklahoma SHPO found that the Preferred Alternative would result in no historic properties affected below the airspace in Oklahoma.

Potential impacts associated with cultural resources under the Preferred Alternative related to the installation would not be significant, as no impacts to archaeological or traditional cultural properties are anticipated; no adverse effects to architectural resources have been identified. Consultations with Native American Tribes and the Arkansas SHPO are still in process.

Mitigations

Previously surveyed resource SB 1673, a house with unknown NRHP status, would fall outside the mitigated 65 dB DNL noise contours, and thus outside the APE, for all three mitigated noise scenarios. As the Preferred Alternative would result in no adverse effects to historic properties, no mitigations are proposed to address impacts to cultural resources. However, in the event of an inadvertent discovery during ground-disturbing operations, the following specific actions would occur.

- The project manager would cease work immediately, and the discovery would be reported to the 188 WG environmental manager, who would secure the location with an adequate buffer and notify the Commander and the NGB cultural resources manager.
- The environmental manager would then continue to follow ANG standard operating procedures for inadvertent discovery of cultural resources.

3.11.6 Biological Resources

Potential impacts associated with biological resources under the Preferred Alternative would not be significant. Impacts to vegetation and wildlife would not be considered significant. The Preferred Alternative may affect, but is not likely to adversely affect, federally listed species. Section 7 consultation with the USFWS is ongoing.

Mitigations

In the absence of any significant impacts to biological resources, no mitigations have been identified. The following general measures would minimize impacts to biological resources.

- Vegetation removal will remain consistent with the airport's WHMP by removing potential hazardous wildlife attractants on the airport, in accordance with FAA Advisory Circular 150/5200-33C.
- Measures to minimize the potential for bird/wildlife-aircraft strikes, as identified in the ARANG *188th Fighter Wing Bird Aircraft Strike Hazard Plan* (ARANG, 2002), will continue to be implemented.
- The ARANG Integrated Pest Management Plan will be implemented to reduce and minimize impacts from invasive species (ARANG, 2020).

ESA Section 7 consultation with the USFWS regarding the Preferred Alternative is ongoing. Any potential mitigations identified as a result of consultation with the USFWS under ESA Section 7 will be identified in the Final EIS and ROD.

3.11.7 Water Resources

Potential impacts associated with water resources under the Preferred Alternative related to the installation would not be significant, as any impacts to surface water, groundwater, and wetlands would be minimized through required design elements, permit-related BMPs, and installation management practices. Field wetland delineations would be required prior to ground-disturbance activities. No impacts to floodplains are anticipated.

Mitigations

In the absence of any significant impacts to water resources, no mitigations have been identified. The following actions would be required as part of regulatory requirements.

- A wetland delineation and jurisdictional determination in the area of aircraft barrier arresting kits and supporting road infrastructure would be required under the CWA.
- Barrier arresting kits and supporting access roads would be required to be designed to avoid any wetlands observed in the wetland delineation.
- Any wetlands that would be unavoidable would require a CWA Section 404 permit and compensation of any unavoidable wetland impacts.
- Facilities would be required to comply with UFC 3-210-10, *Low Impact Development* (as amended, 2016) and EISA § 438 (42 U.S.C. §17094); this would serve to maintain the site's pre-development runoff rates and volumes to minimize impacts from increased impervious surface area.
- Ground-disturbance activities that comprise more than 1 acre would require stormwater construction permits under the NPDES and implementation of associated BMPs for erosion control. This serves to minimize potential impacts associated with soil erosion and surface water impacts during construction.

3.11.8 Air Quality

Potential impacts associated with air quality under the Preferred Alternative related to airspace would not be significant. Analysis of the air quality data showed that the proposed aircraft operations within the areas under the airspace would result in air pollutant emissions within 3,000 feet AGL that would not exceed any annual significance indicator threshold emissions from the Preferred Alternative.

Potential impacts associated with air quality under the Preferred Alternative related to the installation would not be significant. Emissions from the Preferred Alternative would remain below significance indicator thresholds of 250 tons per year (25 tons per year for lead). Since the Ebbing ANG Base project region attains all NAAQS, these worst-case emissions increases would not contribute to an exceedance of a NAAQS.

Mitigations

In the absence of any significant impacts to air quality, no mitigations are identified that would reduce or avoid significant impacts from the Preferred Alternative. However, BMPs (such as dust suppression techniques) are available and would be incorporated into proposed construction activities to reduce fugitive dust emissions generated from the use of construction equipment on exposed soil. USEPA recommends in their scoping comments that the DAF consider implementing applicable aspects of the USEPA Construction Emission Control Checklist to reduce diesel and fugitive dust emissions from construction activities.

Implementation of noise mitigations, which include altering flight profiles, would not have any notable effect on air emissions. Emissions of all criteria pollutants would remain below significance indicator thresholds, and there would be no significant impacts to air quality.

3.12 CUMULATIVE IMPACTS

CEQ regulations implementing NEPA require that the cumulative impacts of a Proposed Action and Alternatives be assessed (40 CFR Parts 1500–1508). A cumulative impact is defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what

agency (federal or nonfederal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR 1508.7).

3.12.1 Reasonably Foreseeable Future Actions and Predictable Environmental Trends ("Foreseeable Actions and Trends")

This discussion identifies reasonably foreseeable future actions and predictable environmental trends (hereinafter referred to as "foreseeable actions and trends") in the areas that are considered as part of resource analysis. These actions and trends inform the anticipated condition of the affected environment for the No Action Alternative (projected for CY 2029) and establish the baseline against which the Preferred Alternative is evaluated. **Table 3.12-1** summarizes this information. Within the context of this document, past and present actions are already included as part of the Affected Environment under each resource area.

Predictable environmental trends considered in this EIS are trends generally agreed upon by the greater scientific community and/or those that could result from foreseeable actions. A future action is considered a foreseeable action for this EIS if it is (1) included in a federal, state, or local planning document; (2) likely to occur based on the recommendations of federal, state, or local planning agencies; (3) an existing permit application; or (4) a fiscal appropriation that is likely (or reasonably certain) to occur. For purposes of this analysis, foreseeable actions were considered if they could result in potential impacts that could have temporal or geographic overlap with potential effects of the Proposed Action.

For analysis purposes, foreseeable actions are limited in scope to 2029/2030, as projects beyond 10 years from publication of this document are too speculative in nature to be adequately addressed; in such cases these are identified in the context of environmental trends (e.g., community development, population growth, etc.).

Table 3.12-1. Preferred Alternative – Reasonably Foreseeable Future Actions and Environmental Trends

Aspect	Description	Timeframe	Resources Potentially Affected
Reasonably Foreseeable Future Actions			
188th Wing Fort Smith Municipal Airport Installation Development Plan (IDP) Task 8 Final Submittal (ARANG, 2022)	The IDP Program Needs identified 23 planning actions and/or projects. These projects would encompass demolition, renovation, and new construction, along with infrastructure updates.	2022-2030	Air quality, noise, safety, earth, water, biological and cultural resources, infrastructure, land use, and socioeconomics
Fort Chaffee Redevelopment Authority - Chaffee Crossing 2021 Annual Report (FCRA, 2022)	• Mars Petcare will undergo a $145 million dollar manufacturing expansion of 200,000 square feet, adding 120 new jobs. • TGE Global Entertainment will construct a 92,000-square foot film making studio with up to 150 jobs on 20 acres. • Sixteen new neighborhoods were started in 2021 with 1,040 residential units representing $200 million in capital investments.	Construction in 2022-2025	Air quality, noise, earth, water, biological and cultural resources, infrastructure, land use, and socioeconomics

Table 3.12-1. Preferred Alternative – Reasonably Foreseeable Future Actions and Environmental Trends

Aspect	Description	Timeframe	Resources Potentially Affected
Fort Smith Regional Airport Passenger Facility Charge (PFC) Projects (FAA, 2021c)	PFC projects include (1) rehabilitation of Runway 07/25, (2) construction of security screening checkpoint improvements, (3) installation of perimeter security fencing, (4) replacement of terminal building boiler system, and (5) replacement of terminal lighti control system.	2021-2022	Air quality, noise, safety, earth, water, biological and cultural resources, infrastructure, land use, and socioeconomics
Fort Smith Regional Airport Runway 8-26 Extension (Garver, 2022)	Projects include (1) construction of a 1,300-foot runway extension to Runway 8-26 and blast pad, extension of Taxiway A, relocation of RPZ and acquisition of 0.53 acre for RPZ, security fence relocation, and relocation and upgrade of airport lighting systems and antennas.	Construction starts in 2022; completion in 2023	Airspace, air quality, noise, safety, earth, water, biological and cultural resources, infrastructure, land use, socioeconomics, and environmental justice
Arkansas Department of Aeronautics (ADOA), 2036 Arkansas Statewide Airport System Plan Update (ADOA, 2021)	Two municipal airports (Bentonville and Melbourne) beneath/or immediately adjacent to the training military airspace are projected to move from Level 2 to Level 3 due to projected use and expected growth. Bentonville and Mountain View-Wilcox are being recommended for inclusion in the National Plan of Integrated Airport Systems and are eligible for FAA funding of improvements. Mena Intermountain Municipal, beneath the Hog MOA, would be elevated to Level 5.	Completion by 2030	Airspace, air quality, noise, safety, earth, water, biological and cultural resources, infrastructure, land use, socioeconomics, and environmental justice
Arkansas Department of Transportation I-49 Extension I-40 to Arkansas Highway 22 (Trobaugh, 2022)	The new section of I-49 will be 13.6 miles long and cost an estimated $787 million. It would extend north from Arkansas Highway 22 near Barling in Sebastian County to the interchange of I-40 and I-49 at Alma in Crawford County.	Possible start in 2023, with construction through 2030	Air quality, noise, earth, water, biological and cultural resources, infrastructure, land use, and socioeconomics
Proposed Veterans Administration Hospital (ARANG, 2022)	A vacant parcel of land to the north of Ebbing ANG Base cantonment (west side) is a proposed site for the VA hospital.	Under construction, opening in 2022	Air quality, noise, earth, water, biological and cultural resources, infrastructure, land use, and socioeconomics
Predictable Environmental Trends			
Climate Change	The U.S. Global Change Research Program estimates in the Fourth National Climate Assessment that annual average temperatures in Arkansas by late in the century (2071 to 2100) will increase from 4 to 7 degrees Fahrenheit compared to conditions from 1986 to 2015, based on lower and higher emission scenarios (U.S. Global Change Research Program, 2018). Predictions of long-term environmental impacts in the Southeast region that encompasses Arkansas include an increase in days with heavy precipitation and flooding, warmer nights, an increase in ambient ozone concentrations, an increase in wildfires, and changes to ecosystems.		All resources

Table 3.12-1. Preferred Alternative – Reasonably Foreseeable Future Actions and Environmental Trends

Aspect	Description	Timeframe	Resources Potentially Affected
Population/demographic trends	This would include changes in population and demographics within the affected environment. Trends are detailed within Section 3.5, *Socioeconomics*, and Section 3.6, *Environmental Justice and Children*. These may be the direct result of other reasonably foreseeable future actions identified (such as roadway improvements and housing construction).		Socioeconomics and environmental justice
Trends in property values	This would include changes in property values within the affected environment. Trends are detailed in Section 3.5, *Socioeconomics*.		Socioeconomics
Community development trends	Notwithstanding the reasonably foreseeable future actions identified above, this accounts for the overall trend of community development as represented by a combination of identified projects and those that may occur in the future that are not captured in this document (e.g., projects that may arise over time).		Natural resources, socioeconomics, air quality
Air emissions trends	This would include changes in air emissions that could result in an increase or reduction in criteria pollutant emissions within the affected environment. Trends are detailed in Section 3.10, *Air Quality*.		Air quality

Key: 188 WG = 188th Wing; ADOA = Arkansas Department of Aeronautics; ANG = Air National Guard; AR DOT = Arkansas Department of Transportation; FAA = Federal Aviation Administration; I- = Interstate; IDP = Installation Development Plan; MOA = Military Operations Area; PFC = Passenger Facility Charge; RPZ = runway protection zone; U.S. = United States; VA = Veterans Administration

3.12.2 Cumulative Impacts Analysis

Because the Preferred Alternative would not be fully realized until 2029, analysis of the Preferred Alternative's environmental consequences already includes the potential impacts associated with a combination of foreseeable actions and trends. Therefore, analysis of the Preferred Alternative is a de-facto cumulative impacts analysis. As an example, a foreseeable action at Ebbing ANG Base is the completion of the FSRA runway extension. This is expected to be completed in 2023. Under Noise, the No Action Alternative represents the noise environment in the year 2029 with consideration of the runway expansion and increases in commercial air operations up until 2029. Analysis of the Preferred Alternative assesses the effect of the Preferred Alternative on the noise environment inclusive of the noise condition in 2029. This is, in effect, a cumulative impact analysis, because analysis of the Preferred Alternative already includes foreseeable actions as they are part of the baseline condition against which the Preferred Alternative is analyzed.

3.12.2.1 Noise

Ebbing ANG Base and Surrounding Area

Growth in operational tempo is expected to occur at Ebbing ANG Base and FSRA regardless of the Preferred Alternative. As shown in **Table 2.2-1** (Current and Proposed Aircraft Operations at Fort Smith Regional Airport, Arkansas) the total number of aircraft operations conducted annually in CY 2029 is expected to have increased by approximately 11 percent relative to current conditions. The roughly 38,000 annual operations forecasted to occur in CY 2029 include approximately 1,000 operations flown by Blue Air, a civilian firm that supports military training. Blue Air operates a fleet of small propeller-driven aircraft and helicopters, which

generate noise levels comparable to civilian small propeller-driven aircraft and helicopters currently operating at the airfield.

An eastward extension of RWY 8-26 by 1,300 feet is scheduled to have occurred prior to CY 2029 regardless of the Preferred Alternative. The effects of the proposed runway extension on the acoustic environment are described in the 2022 Runway Extension EA (Garver, 2022), which is hereby incorporated by reference. The runway extension noise analysis identified minor increases in noise levels to the east of the airfield and minor decreases to the west of the airfield, but no increases of equal to or greater than 1.5 dB DNL at noise-sensitive locations were found (Garver, 2022). For the purposes of this EIS analysis, the proposed action that is described in the Runway Extension EA is assumed to have occurred as planned prior to CY 2029. Noise conditions described in this EIS reflecting reasonably foreseeable future actions differ somewhat from forecasted CY 2028 noise levels included in the Runway Extension EA. These differences are the result of several factors, which are described the Noise Technical Report for Ebbing ANG Base (BRRC, 2022a).

Foreseeable construction, demolition, renovation, and infrastructure upgrade projects on Ebbing ANG Base and FSRA will continue to generate localized noise level increases at and near the project site while construction is under way. In the context of an active airfield, these temporary and localized noise increases have minimal effects. Construction projects proposed on Fort Chaffee and in other nearby areas would also result in noise increases that are temporary and localized. After construction is completed, the increased tempo of human activities in newly developed areas would be consistent with other nearby land areas that are already urbanized. Ambient average noise levels would remain within the range predicted by NPS for the area surrounding Ebbing ANG Base and FSRA.

Aircraft noise levels reflecting the foreseeable future actions and trends described above are shown in **Figure 3.12-1**. There would be 202 acres of land outside the airport boundary and an estimated 66 residents exposed to noise levels exceeding 65 dB DNL based on analysis of reasonably foreseeable future actions at Ebbing ANG Base (and FSRA) (**Table 3.12-2**). Noise-sensitive areas exposed to noise levels between 60 and 65 dB DNL, which include residences and places of worship, would experience aircraft noise that is substantial but less likely to be considered significant.

Table 3.12-2. Acres and Estimated Population Outside the Airport Boundary Exposed to DNL of 65 dB or Greater Associated With Reasonably Foreseeable Future Actions at Ebbing ANG Base (and FSRA)

DNL (dB)	Noise Levels Associated with Reasonably Foreseeable Future Actions	
	Acres	Estimated Population
65–69	202	66
70–74	5	0
75–79	0	0
80–84	0	0
≥85	0	0
Total	**207**	**66**

Source: Data derived from noise analysis and GIS data (see Figure 3.12-1)
Key: ≥ = greater than or equal to; ANG = Air National Guard; dB = decibels; DNL = day-night average sound level; FSRA = Fort Smith Regional Airport

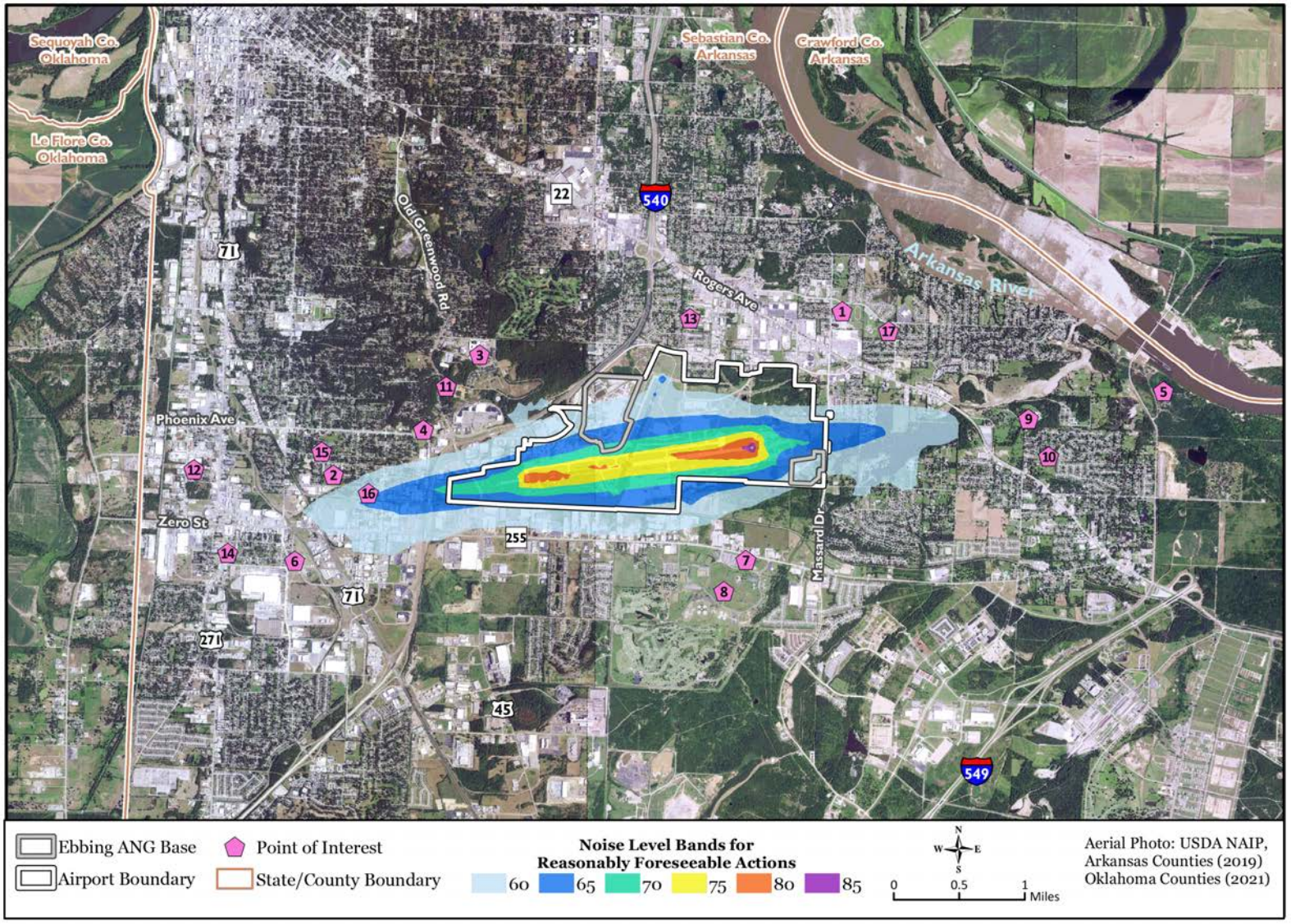


Figure 3.12-1. Noise Levels Associated With Reasonably Foreseeable Future Actions at Ebbing ANG Base (and FSRA)

Sources: (Ebbing ANG Base, 2021; USDA-FSA-APFO, 2019a; USDA-FSA-APFO, 2019b; ESRI Data & Maps, 2019a; ESRI Data & Maps, 2019b; USDA-FSA-APFO, 2021a; USDA-FSA-APFO, 2021b; BRRC, 2022a)

Noise levels at several representative noise-sensitive locations (shown in **Figure 3.12-1**) are uniformly below 65 dB DNL (**Table 3.12-3**) based on analysis of reasonably foreseeable future actions. The locations selected for analysis are not intended to be a complete list of all locations near Ebbing ANG Base (and FSRA) that could be considered noise-sensitive. The locations are "representative" in that the noise levels presented for these locations are approximately the same as noise levels in nearby areas, which may contain other noise-sensitive locations.

Table 3.12-3. Day-Night Average Sound Level at Representative Noise-Sensitive Locations Near Ebbing ANG Base (and FSRA) Associated With Reasonably Foreseeable Future Actions

Representative Noise-Sensitive Location		DNL (dBA)
Description	ID	
Valley Behavioral Health Hospital	9	56
Mercy Crest Assisted Living	10	50
Mercy Clinic Primary Care	11	51
Blossoms Rehab and Nursing Center	12	49
Cliff Terrace Church	13	51
Bridge Church	14	53
Trinity Church of the Nazarene	15	55
Vineyard Community Church	16	64
New Life Church	17	50
Springhill Park Campground	5	52
Evans Boys and Girls Club	6	56
Parrott Island Waterpark	7	55
Ben Geren Regional Park	8	56
Chaffin Middle School	1	48
Carnall Elementary	2	57
Southside High School	3	49
Raymond Orr Elementary School	4	55

Source: (BRRC, 2022a)
Key: ANG = Air National Guard; dBA = A-weighted decibels; DNL = day-night average sound level; FSRA = Fort Smith Regional Airport; ID = identification number

Based on analysis of reasonably foreseeable future actions, the number of outdoor noise events per average hour with the potential to interfere with speech at the representative noise-sensitive locations ranges from two to four during the "daytime" hours (7:00 a.m. to 10:00 p.m.) (**Table 3.12-4**). For the purposes of this analysis, it was conservatively assumed that any event exceeding 50 dB has some potential to interfere, at least momentarily, with speech and other forms of communication involving listening.

Table 3.12-4. Number of Outdoor Noise Events With Potential to Interfere With Speech Near Ebbing ANG Base (and FSRA) Associated With Reasonably Foreseeable Future Actions

Representative Noise-Sensitive Location		Annual Average Outdoor Daily Events per Daytime Hour
Description	ID	
Valley Behavioral Health Hospital	9	2
Mercy Crest Assisted Living	10	2
Mercy Clinic Primary Care	11	3
Blossoms Rehab and Nursing Center	12	2
Cliff Terrace Church	13	3
Bridge Church	14	2
Trinity Church of the Nazarene	15	3
Vineyard Community Church	16	4
New Life Church	17	3

Table 3.12-4. Number of Outdoor Noise Events With Potential to Interfere With Speech Near Ebbing ANG Base (and FSRA) Associated With Reasonably Foreseeable Future Actions

Representative Noise-Sensitive Location		Annual Average Outdoor Daily Events per Daytime Hour
Description	ID	
Springhill Park Campground	5	2
Evans Boys and Girls Club	6	3
Parrott Island Waterpark	7	4
Ben Geren Regional Park	8	3
Chaffin Middle School	1	3
Carnall Elementary	2	3
Southside High School	3	3
Raymond Orr Elementary School	4	4

Source: (BRRC, 2022a)
Key: ANG = Air National Guard; FSRA = Fort Smith Regional Airport; ID = identification number

Noise interference with learning in schools is of particular concern because noise can interrupt communication or interfere with concentration. The DoD Noise Working Group guidelines recommend that exterior noise levels during the school day not exceed a 60 dB 8-hour equivalent noise level ($L_{eq\text{-}8hr}$), as that would indicate that interior classroom noise levels likely exceed a recommended 40 dB maximum background noise level (DoD Noise Working Group, 2009). The $L_{eq\text{-}8hr}$ and number of events with potential to interfere with speech per average daytime hour based on analysis of reasonably foreseeable future actions is listed for several schools and other noise-sensitive locations in **Table 3.12-5**.

Table 3.12-5. Noise Levels at Schools Near Ebbing ANG Base (and FSRA) Based on Analysis of Reasonably Foreseeable Future Actions

Representative Noise-Sensitive Location		Indoor			
		Windows Open		Windows Closed	
Description	ID	$L_{eq\text{-}8h}$ (dB)	Events per Hour	$L_{eq\text{-}8h}$ (dB)	Events per Hour
Chaffin Middle School	1	<40	-	<40	-
Carnall Elementary	2	43	2	<40	1
Southside High School	3	<40	-	<40	-
Raymond Orr Elementary School	4	41	1	<40	-

Source: (BRRC, 2022a)
Key: - = approximately zero; < = less than; ANG = Air National Guard; dB = decibels; FSRA = Fort Smith Regional Airport; ID = identification number; $L_{eq\text{-}8h}$ = 8 hour equivalent noise level

As noted in **Table 2.2-4** (Current and Preferred Alternative Night Operations at Ebbing ANG Base, Arkansas, and FSRA), approximately 4 percent of total operations at FSRA occur during the late-night period between 10:00 p.m. and 7:00 a.m. based on reasonably foreseeable future actions. These operations have increased likelihood of causing sleep disturbance and result in a likelihood of awakening at least once per night of 1 percent or less with windows open or closed. The lack of quality sleep has the potential to affect health and concentration. The analysis also accounts for standard building attenuation of 15 dB and 25 dB with windows open and closed, respectively. Sleep disturbance probabilities listed for parks and schools are not intended to imply that people regularly sleep in parks or schools but instead are indicative of impacts in nearby residential areas.

Analysis of reasonably foreseeable future actions finds that noise levels exceeding 80 dB DNL do not affect areas outside the airport boundary, and the risk of potential hearing loss outside airport boundaries is minimal in accordance with DoD policy (DoD Noise Working Group, 2013a).

Table 3.12-6. Percent of People Awakened by Aircraft Noise at Least Once per Night Near Ebbing ANG Base (and FSRA) Associated With Reasonably Foreseeable Future Actions

Representative Noise-Sensitive Location		Annual Average Nightly (10:00 p.m. to 7:00 a.m.) Probability of Awakening (%)	
Description	ID	Windows Open	Windows Closed
Valley Behavioral Health Hospital	9	1%	0%
Mercy Crest Assisted Living	10	1%	0%
Mercy Clinic Primary Care	11	1%	0%
Blossoms Rehab and Nursing Center	12	1%	0%
Cliff Terrace Church	13	1%	0%
Bridge Church	14	1%	0%
Trinity Church of the Nazarene	15	1%	0%
Vineyard Community Church	16	1%	1%
New Life Church	17	1%	0%
Springhill Park Campground	5	1%	0%
Evans Boys and Girls Club	6	1%	1%
Parrott Island Waterpark	7	1%	1%
Ben Geren Regional Park	8	1%	1%
Chaffin Middle School	1	1%	0%
Carnall Elementary	2	1%	1%
Southside High School	3	1%	0%
Raymond Orr Elementary School	4	1%	1%

Source: (BRRC, 2022a)
Key: % = percent; ANG = Air National Guard; FSRA = Fort Smith Regional Airport; ID = identification number

In on-base and on-airport areas with high noise levels, existing occupational noise exposure prevention procedures, such as hearing protection and monitoring, are undertaken in compliance with all applicable Occupational Safety and Health Administration (OSHA) and the DAF and FAA occupational noise exposure regulations.

Affected Airspace

No major changes to operations in training airspace and ranges are expected to occur prior to CY 2029. Land development projects on Fort Chaffee or in nearby areas is expected to increase the tempo of human activities in certain areas, as is noted in Section 3.3.2.1, *Ebbing ANG Base and Surrounding Area*. Construction activity would generate localized and temporary increases in noise levels. Day-to-day operations in newly developed areas would result in noise levels comparable to levels in nearby areas that have already been developed. As a result, the acoustic environment is expected to remain relatively the same as the current condition.

3.12.2.2 Land Use

Ebbing ANG Base and Surrounding Area

The newly relocated RPZ associated with FAA's FSRA runway extension project includes an estimated 0.53 acre of residential property outside the airport boundary. The airport plans to gain control of this land through a permanent easement and convert the land to aeronautical use in compliance with FAA standards. There is currently no development on this 0.53-acre area (Garver, 2022). The remainder of this RPZ is located entirely on airport property.

The runway extension would expand the noise exposure contours to the east (see **Figure 3.3-1,** Ebbing ANG Base Airspace Noise Levels Under Current Conditions (denoted '"NA"')), affecting 202 acres with noise levels of 65 dB DNL or higher, outside the airport boundary. **Table 3.12-7** tabulates noise exposure levels for surrounding areas by land use in acres. Under the No Action Alternative, about 11 acres of residential land is exposed to incompatible noise levels of 65 dB

DNL to 70 dB DNL, mostly to the east of RWY 8/26, in the Wellington Park subdivision and a few small parcels to the west of the runway. Other land uses exposed to noise levels of 65 dB DNL and greater (including agricultural/open-space/vacant land, commercial, industrial, and transportation/roadways) are noise compatible. Some open space to the east of the runway is zoned as Commercial Neighborhood and is platted for development (Garver, 2022). The proposed use (and noise compatibility) is not yet known. **Table 3.12-3** (Day-Night Average Sound Level at Representative Noise-Sensitive Locations Near Ebbing ANG Base (and FSRA) Associated With Reasonably Foreseeable Future Actions) presents noise levels at specific noise-sensitive locations in the area surrounding the airport, such as schools, places of worship, care facilities and hospitals, and parks. These locations provide additional contextual information about noise conditions and compatibility in the surrounding area.

Table 3.12-7. Noise Exposure of Surrounding Land Use Under No Action Alternative at Ebbing ANG Base (in Acres)

Land Use	dB DNL					
	≥65<70	≥70<75	≥75<80	≥80<85	≥85	*Total*
Agricultural/open space/vacant	73	1	0	0	0	*74*
Commercial	21	4	0	0	0	*25*
Industrial	59	0	0	0	0	*59*
Public/quasi-public	9	0	0	0	0	*9*
Recreation	0	0	0	0	0	*0*
Residential	11	0	0	0	0	*11*
Roadway/transportation	29	0	0	0	0	*29*
Unclassified	0	0	0	0	0	*0*
Water	0	0	0	0	0	*0*
Total	**202**	**5**	**0**	**0**	**0**	**207**

Source: (BRRC, 2022a)
Key: ≥ = greater than or equal to; < = less than; dB = decibels; DNL = day-night average sound level

Chaffee Crossing southeast of the airport is a large urban redevelopment project with mixed uses. It is sufficiently distant from the airport to avoid compatibility issues under extended-runway conditions.

The city will continue to need and review new housing projects, particularly affordable housing, in the areas surrounding the airport. The city's review and approval process can ensure compatibility of new development for low-, medium-, and high-density housing by incorporating FAA-recommended land use parameters. Development surrounding Ebbing ANG Base (and FSRA) will likely convert some vacant parcels into commercial/industrial uses in the vicinity of the airport over the next 5 to 10 years. These uses are generally compatible with current noise levels. Future development of uses that congregate people (such as sports facilities, lodging establishments, or healthcare facilities) in areas within the 65 dB DNL footprint may conflict with land use compatibility guidelines.

Affected Airspace

No specific large-scale infrastructure or development projects are identified for the training airspace ROI; however, some major improvement projects are likely to occur on the ground, for roads, infrastructure, and private commerce and industry.

Stresses of climate change are influencing wildlife and ecosystems. This may affect management of many specially managed areas, requiring adjustments in actions taken to conserve and manage resources. While these are not yet specified, changes may require

resources and staff and adjustments in how specially managed areas are used. Hunting seasons may shift in response to changes in wildlife behavior patterns and breeding.

During the recent past, influenced by the pandemic, outdoor recreation has increased. Work-from-home options in some industries has also influenced where people choose to live. These trends could increase the use of recreational areas by both state residents and out-of-state visitors. The ROI has historically been very popular for recreation, hunting, and fishing all year.

The expansion of communication networks may involve installation of new infrastructure. Cellular towers are often sited on high points in the landscape. Because siting of these projects is not yet determined, compatibility of new projects (cellular, solar arrays, and wind farms) is unknown. Various federal and/or state agencies are involved in the permitting and approval of new infrastructure.

3.12.2.3 Socioeconomics

Ebbing ANG Base and Surrounding Area

Population

As previously shown on **Table 3.5-1**, between the years 2000 and 2019, overall population in the state of Arkansas, Sebastian County, and the city of Fort Smith have increased at average annual growth rates of 0.61 percent, 0.55 percent, and 0.47 percent, respectively. **Table 3.12-8** shows population projections for these areas in CY 2029 based on the assumption that populations in each area would continue to grow at the same average annual growth rate.

Table 3.12-8. Population Projections, Ebbing ANG Base ROI

Area	Census 2020	CY 2029	Average Annual Growth Rate (Census 2020–CY 2029)
Arkansas	3,011,524	3,180,202	0.61%
Sebastian County	127,799	134,207	0.55%
Fort Smith City	89,142	92,982	0.47%

Sources: (AEDI, 2002a; AEDI, 2002b; AEDI, 2002c; USCB, 2019a; USCB, 2021a)
Key: % = percent; ANG = Air National Guard; CY = calendar year; ROI = region of influence

The Arkansas State Data Center provides population projections for the state and the county based on historical population data from 1980 through the year 2013 (AEDI, 2018). Point forecasts for the state and the county for CY 2029 reported by the Arkansas State Data Center, based on 2013 population estimates, suggest that the population in CY 2029 will be 3,249,267 people in the state of Arkansas and 138,551.9 people in Sebastian County (AEDI, 2018). The estimated values shown in **Table 3.12-8** are less than the point forecasts for the state and the county for CY 2029 as reported by the Arkansas State Data Center. However, population projections shown in **Table 3.12-8** are within the lower confidence limits for CY 2029 reported by the Arkansas State Data Center (AEDI, 2018).

Employment and Income

Median household income in the state of Arkansas, Sebastian County, and the city of Fort Smith increased by 2.16 percent, 1.77 percent, and 1.48 percent between 2010 and 2019 (USCB, 2010a; USCB, 2019b). Per capita income also increased by 2.50 percent, 1.71 percent, and 1.64 percent in the state, county, and city during the same time period (USCB, 2010a; USCB, 2019b). Between 2011 and 2019, the unemployment rate decreased annually from a high of 8.3 percent in 2011 to 3.3 percent in 2019 (BLS, 2021a; BLS, 2021d). Between 2019 and 2020, the unemployment rate jumped up to 6 percent in the county (BLS, 2021b). Unemployment rates

are expected to return to 2019 levels and remain within a similar range as what was experienced the last several years.

Between 2010 and 2019, the total full-time and part-time employment in the county reported by the Bureau of Economic Analysis decreased at an average annual rate of approximately 0.22 percent, mostly as a result of decline in employment associated with the manufacturing industry and the mining, quarrying, and oil and gas extraction industry (BEA, 2021a). Between 2010 and 2019, the construction industry increased at an average annual rate of 0.28 percent and continues to comprise approximately 5 percent of total employment in the county. Construction employment would be expected to increase to around 4,073 jobs in CY 2029, or 5.2 percent of total employment. Continued annual employment growth in the industry would be necessary to support ongoing and reasonably foreseeable future construction activities, such as those identified in **Table 3.12-1** (Preferred Alternative – Reasonably Foreseeable Future Actions/Environmental Trends).

Sebastian County is one of six counties in Arkansas that comprises the Western Arkansas Workforce Development Area (WDA). The total employment in the Western Arkansas WDA in 2018 was estimated at 119,394 jobs and forecasted to reach 127,959 jobs by 2028, representing a net growth of 8,565 jobs (7.17 percent change) during the 10-year period (Arkansas Division of Workforce Services, 2018). The industries projected to experience the largest growth in terms of employment (or number of jobs) between 2018 and 2028 in the Western Arkansas WDA include the education and health services industry (15.93 percent), followed by the leisure and hospitality industry (15.72 percent) and the government industry (12.05 percent) (Arkansas Division of Workforce Services, 2018).

The 188 WG is currently amongst the top 20 largest employers in the Fort Smith MSA (Fort Smith Regional Chamber of Commerce, 2022). The Fort Smith MSA includes five counties, including Sebastian, Crawford, and Franklin Counties in Arkansas and Le Flore and Sequoyah Counties in Oklahoma. Defense spending throughout the Fort Smith MSA supports nearly 3,500 jobs, $160 million in labor income, and generates over $240 million in gross state product (Arkansas Economic Development Commission, 2016). The total economic impact in Sebastian County alone, based upon assigned strength of the Arkansas National Guard personnel, is estimated at over $72 million (Arkansas National Guard, 2020). Current personnel and expenditures associated with the 188 WG would be anticipated to continue at similar levels to support the active installation and existing mission.

Housing

According to the U.S. Census Bureau, the median value of owner-occupied units in Sebastian County has increased from $108,000 in 2010 to $123,100 in 2019 (USCB, 2010b; USCB, 2019c). This represents an overall increase in the median value of owner-occupied homes of approximately 13.98 percent between 2010 and 2019 at an average annual rate of approximately 1.46 percent. During the same time period, the number of housing units has increased overall but at a declining rate with an average of 334 additional total housing units per year in the county (USCB, 2010b; USCB, 2019c).

As of January 2022, the median listing price in Sebastian County was $165,000, trending up 3.2 percent from the previous year (Realtor.com, 2022a). Between January 2020 and January 2021, the median listing price increased by 14.6 percent year-over-year (Realtor.com, 2022a). The median house price in the county has risen considerably over the last several years due to

strong demand, low mortgage rates, and lack of inventory from labor and material shortages as well as general supply chain challenges. Housing prices are expected to continue to rise in the short run but taper off as mortgage rates increase and new construction becomes available. Construction of 16 new neighborhoods starting in 2021 with 1,040 residential units in the area would contribute to the number of available homes in the area (Chaffee Crossing, 2022).

Education

Total student enrollment in Sebastian County between the 2010–2011 and 2018–2019 school years increased by 263 students, representing an average annual growth of 0.16 percent (ADE, 2012; ADE, 2018). School enrollment during the 2019–2020 school year and 2020–2021 school year showed a decline from the previous year by 0.28 percent and 1.9 percent, respectively (ADE, 2019; ADE, 2020). The decline in enrollment during these school years is attributed to the pandemic. However, total student enrollment during the 2021–2022 school year is up from the previous year by 217 students, suggesting that public schools are starting to rebound from the pandemic effects but are still short of 2019 levels (ADE, 2021c).

3.12.2.4 Environmental Justice and Children

Ebbing ANG Base and Surrounding Area

This discussion focuses on the foreseeable actions and trends through CY 2029 that would potentially affect populations of minority, low income, children, and elderly. Section 3.12.1, *Foreseeable Actions and Trends*, describes these future actions, and Section 3.5, *Socioeconomics*, discusses population trends in more detail. The following environmental trends were evaluated.

- The Fort Smith Comprehensive Plan describes goals including enhancing community character; promoting sound growth and development; growing and diversifying the economy; and uniting people, institutions, and government (City of Fort Smith, 2014). The plan projects a modest increase in annual population growth from 0.6 to 0.8 percent and employment growth from 0.62 to 0.75 percent. As a result, these trends would likely continue, and there could be the potential for more environmental justice and aged populations located within the ROI.
- Population growth for Sebastian County is estimated to be 0.55 percent per year based on U.S. Census Bureau trends described in Section 3.5.2.1, *Socioeconomics, Ebbing ANG Base and Surrounding Area*. Children showed a slight decline of 1.4 percent (USCB, 2021c). Comparison of trends for minority and low-income populations from the 2010 to 2020 census data are not recommended by the U.S. Census Bureau because they changed the questionnaire to measure race and ethnicity in the last census (USCB, 2021c). Overall, however, race alone or in combination groups experienced increases in population. As a result, these trends would likely continue. Therefore, population growth could result in a greater percentage of minority and low-income populations located within the greater than 65 dBA DNL noise zones. Based on the trends, the number of children may decrease over time.
- Growth in operational tempo is expected to occur at Ebbing ANG Base and FSRA regardless of the Preferred Alternative. As shown in the noise section (Section 3.3.2.1, *Ebbing ANG Base and Surrounding Area, Foreseeable Actions and Trends*), the total number of aircraft operations conducted annually in CY 2029 is expected to increase by approximately 11 percent relative to current conditions. These increases are included under the No Action

Alternative for comparison. An eastward extension of RWY 8-26 by 1,300 feet is scheduled to have occurred prior to CY 2029 regardless of the Preferred Alternative. The effects of the proposed runway extension on the acoustic environment are described in the Runway Extension EA, which is hereby incorporated by reference (Garver, 2022).

The effects of the proposed runway extension on environmental justice communities are described in the Runway Extension EA, which is hereby incorporated by reference (Garver, 2022). Using the defined ROI and COC for this EIS, the total affected population located within these noise zones is 66 persons. The greater than 65 dBA DNL noise zones extend into the following block groups:

- Census Tract 12.02, Block Group 3, has a higher percentage of low-income population (34.1 percent) compared to Sebastian County (18.5 percent).
- Census Tract 13.05, Block Group 4, has a higher percentage of elderly (24.1 percent) compared to Sebastian County (15.6 percent).
- It should be noted that in the Runway Extension EA, high minority and low-income populations were defined as populations equal to or greater than 50 percent of the total population. No disproportionately high or adverse impacts to environmental justice populations were anticipated (Garver, 2022). The EA found that the runway expansion would result in a minor change to noise, and no land use changes were anticipated.

3.12.2.5 Cultural Resources

Ebbing ANG Base and Surrounding Area

The 2022 Installation Development Plan for Ebbing ANG Base (ARANG, 2022) outlines several proposed capital improvements including new construction, renovations, and demolitions within the existing boundaries of the base (see Section 3.3.1, *Noise, Resource-Specific Analysis Methodology*). Since there are no historic properties identified at Ebbing ANG Base, as described above, these future actions have no potential to affect historic properties on base.

The City of Fort Smith Regional Airport Passenger Facility Charge Projects were addressed by categorical exclusions, and the RWY 8-26 extension is the subject of an environmental assessment. Available documentation indicates that the Passenger Facility Charge Projects are all located on previously disturbed land within the airport and have no potential to affect historic properties. The direct APE for the RWY 8-26 extension was subject to a Phase I Cultural Resources Survey, which did not identify any historic properties. Likewise, no effects to historic properties were identified within the indirect/auditory APE for the runway extension. The SHPO concurred with a finding of no historic properties affected on August 11, 2021 (Garver, 2022, p. 33).

Section 3.3.1 identifies two other major developments in the surrounding area: the continued development of Chaffe Crossing and the extension of I-49. These projects are outside the APE for the Preferred Alternative, but they represent large-scale construction projects involving significant ground disturbance with the potential to directly affect cultural resources and alter the landscape of the region. As such, they are indicative of regional development trends that could affect the overall inventory of cultural resources in and around the city of Fort Smith.

3.12.2.6 Biological Resources

Ebbing ANG Base and Surrounding Area

Reasonably foreseeable future actions (Section 3.12.1, *Foreseeable Actions and Trends*) through CY 2029 at Ebbing ANG Base (and FSRA) considers the increased aircraft operations at FSRA with the planned runway expansion. This project would remove pond and woodland habitat that would cause impacts and decrease available habitat for bats, invertebrates, reptiles, mammals, and plant species (Garver, 2022). The project would also expand the 65 dB day-night sound level (DNL) by approximately 17 acres, surrounding the entire airport (Garver, 2022). The effects of the proposed runway extension on biological resources are further described in the Runway Expansion EA (Garver, 2022).

Another foreseeable future action for this region includes the airport improvements being considered for the Bentonville, Melbourne, Mountain View-Wilcox, and Mena Municipal Airports. These improvements could result in increased aircraft operations at each airfield. Increased aircraft operations would increase the potential for wildlife to be affected by noise and increase the risk for BASH. Potential effects for both the MOA expansion or airport improvement actions in the region would be addressed by FAA, Ebbing ANG Base/FSRA, and other concerned interests, as necessary, to mitigate any impacts they may have on biological resources within this region.

Climate change is predicted to alter natural trends in Arkansas. Annual increases in temperature and precipitation could lead to increased vegetation growth and an elevated risk of inland flooding, particularly in areas along major rivers (USEPA, 2016). If the plant growing season were to be extended, additional food could be available for animal taxa such as birds, mammals, and invertebrates. An increase in wildlife presence in the area may result in an increase in BASH and wildlife conflicts. Climate change may also cause wildlife to change distribution patterns in search of food and suitable habitats. Any associated shift in species historical range and distribution may increase the potential presence of federally and/or state-listed, threatened, endangered, or candidate species.

Affected Airspace

Reasonably foreseeable future actions within the airspace (Section 3.12.1, *Foreseeable Actions and Trends*) through CY 2029 at Ebbing ANG Base include ongoing and future operations. The total number of aircraft operations conducted annually in CY 2029 is expected to have increased by approximately 10 percent relative to current conditions (see Section 3.3.2, *Noise, Preferred Alternative Affected Environment*). Another potential foreseeable action is the future altitude expansion of the Shirley and Hog ATCAAs from FL 290 to FL 500, along with a corridor that would connect these two MOAs/ATCAAs in between 11,000 feet MSL to FL 500.

Changes to wildlife species distribution patterns from climate change may affect the occurrence of animals, such as migratory birds, within the airspace immediately surrounding Ebbing ANG Base/FSRA. If the plant growing season were to be extended, an increase in available food could result in more birds utilizing suitable habitat under the airspace, potentially leading to increased BASH risk at various altitudes.

3.12.2.7 Water Resources

Ebbing ANG Base and Surrounding Area

Reasonably foreseeable future actions and environmental trends that could impact water resources at Ebbing ANG Base would include additional development within the watershed leading to increases in surface water runoff and changes in precipitation due to climate change. Known development in the watershed includes additional construction, demolition, and infrastructure projects associated with FSRA and the Fort Chaffee Redevelopment Authority as described in Section 3.12.1, *Foreseeable Actions and Trends*.

3.12.2.8 Air Quality

Ebbing ANG Base and Surrounding Area

This discussion focuses on the reasonably foreseeable future actions and trends through CY 2029 that would potentially affect air quality. Section 3.12.1, *Foreseeable Actions and Trends*, describes these future actions and trends in more detail.

Projections of future emissions for Sebastian County are not available. Potential annual emissions for the end-state year CY 2029 in Sebastian County were forecasted based on (1) a linear trend of the most recent three National Emissions Inventory datasets and, alternatively, (2) application of the County population growth factor (5.5 percent increase from 2017 to 2029) (see Section 3.5, *Socioeconomics*) to the 2017 County emissions. For FSRA, the Terminal Area Forecast projections were used to estimate annual CY 2029 emissions for airport operations. **Table 3.12-9** shows that, based on linear trends, county emissions in CY 2029 of CO and VOCs could continue to decrease, while NO_x, SO_2, and particulate matter could increase. Alternatively, all pollutant emissions in CY 2029 could increase by 5.5 percent compared to 2017.

Table 3.12-9. Potential Sebastian County Projected Emissions for Calendar Year 2029

Emissions	Year	Air Pollutant Emissions (tons per year)						
		CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	VOC	CO_2e (MT)
Sebastian County	2011	36,083	4,487	272	7,584	2,317	24,558	888,258
Sebastian County	2014	32,721	4,924	367	7,452	2,878	22,863	899,667
Sebastian County	2017	31,903	4,501	315	9,000	3,263	17,902	1,161,034
Sebastian County Forecast – Linear Trends	**2029**	**23,118**	**4,672**	**416**	**11,544**	**5,176**	**5,135**	**1,664,926**
Sebastian County Forecast – Population Increase	**2029**	**33,658**	**4,749**	**329**	**9,492**	**3,439**	**18,887**	**1,224,891**
Fort Smith Regional Airport	2017	157	64	7	6	5	31	-
Fort Smith Regional Airport – TAF	**2029**	**167**	**68**	**7**	**6**	**5**	**33**	**-**

Source: (USEPA, 2022e)
Key: CO = carbon monoxide; CO_2e = carbon dioxide equivalent; MT = metric tons; NO_x = nitrogen oxides; $PM_{2.5}$ = particulate matter with a diameter less than or equal to 2.5 microns; PM_{10} = particulate matter with a diameter less than or equal to 10 microns; SO_2 = sulfur dioxide; TAF = Terminal Area Forecast; VOC = volatile organic compound

The entire state of Arkansas attained all of the NAAQS in year 2020 (Arkansas Division of Environmental Quality, 2021). It is expected that with the implementation of existing and future air regulations and greenhouse gas initiatives, Sebastian County would continue to attain all NAAQS through CY 2029. Emissions for CY 2029 are expected to approximate those presented in **Table 3.12-9**, which would not be substantial enough to result in any exceedances of the NAAQS. Therefore, use of the attainment area emission indicator thresholds of 250 tons per year for the analysis of proposed emissions would be applicable for conditions in CY 2029.

The U.S. Global Change Research Program estimates in the *Fourth National Climate Assessment* that annual average temperatures in Arkansas by late century (2071 to 2100) will increase from 4 to 7 degrees Fahrenheit compared to conditions from 1986 to 2015, based on lower and higher emission scenarios (U.S. Global Change Research Program, 2018). Predictions of long-term environmental impacts in the Southeast region that encompasses Arkansas include an increase in days with heavy precipitation and flooding, warmer nights, an increase in ambient ozone concentrations, an increase in wildfires, and changes to ecosystems.

While Ebbing ANG Base has adapted its operations to manage recent climatic changes, exacerbation of climate conditions in the future could increase the cost of proposed operations and could impede operations during extreme events. Additional measures could be needed to mitigate such impacts over the operational life expectancy of the Preferred Alternative.

Affected Airspace

For the same reasons mentioned above for the Ebbing ANG Base region, it is expected that the counties that underlie the project airspaces would continue to attain the NAAQS through CY 2029. Therefore, use of the attainment area emission indicator thresholds of 100/250 tons per year for the analysis of proposed emissions would be applicable for conditions in CY 2029.

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4. ALTERNATIVE 2 (SELFRIDGE ANG BASE)

This chapter provides an overview of Selfridge ANG base, addresses the affected environment and environmental consequences, including analysis of issues with potential significance at Selfridge ANG Base and associated airspace relative to Alternative 2, and briefly addresses issues with the potential for no or *de minimis* impacts (meaning too small to be meaningful or taken into consideration). Section 4.2, *Alternative 2 – Issues/Resources Not Carried Forward for Detailed Analysis*, discusses issues/resources where, based on preliminary analysis or previous analyses, the impacts are expected to be *de minimis* or not significant and do not warrant more detailed analysis.

Within the context of the analysis in this chapter, mitigations are those actions identified by the DAF, either through consultation with regulatory agencies or independently, that are specific to implementation of Alternative 2 that would serve to avoid, minimize, rectify, reduce or eliminate, or compensate for significant impacts. Actions associated with permits required to implement Alternative 2 (such as NPDES permits requiring a SWPPP) are not considered mitigations within this context; however, they are considered within the context of the analyses as these do serve to manage or minimize impacts.

4.1 SELFRIDGE ANG BASE OVERVIEW

The 127 WG of the Michigan ANG is located at Selfridge ANG Base in Harrison Township, Macomb County, Michigan, approximately 20 miles north of Detroit, Michigan, on the shore of Lake St. Clair (**Figure 1.2-3**, Selfridge ANG Base Area Map). Selfridge ANG Base occupies approximately 3,077 acres and is a Joint Military Community home to many diversified DoD and Department of Homeland Security units, including the ANG, Army, Navy, Marine Corps, Coast Guard and Customs and Border Protection, and Border Patrol. The 127 WG is the host unit at Selfridge ANG Base. The 127 WG's federal mission is to provide trained, equipped, and motivated airlift, fighter, and support resources serving the community, state, and nation (127 WG, 2021b).

The 127 WG also maintains a state mission of protecting life and property and preserving peace, order, and public safety. These missions are accomplished through emergency relief support during natural disasters such as floods, earthquakes, and forest fires; search and rescue operations; support to civil defense authorities; maintenance of vital public services; and counterdrug operations. The 127 WG supports two DAF major commands—Air Combat Command and Air Mobility Command—flying two distinctly different missions in the A-10 Thunderbolt II, a close air support aircraft, and KC-135 Stratotanker, an aerial refueler with global reach (127 WG, 2021b).

4.2 ALTERNATIVE 2 – ISSUES/RESOURCES NOT CARRIED FORWARD FOR DETAILED ANALYSIS

Based on review of the details of the Alternative 2, previous NEPA analysis,[15] and the Selfridge

[15] 40 CFR § 1509.1(f)(1) requires that the lead agency identify and eliminate from detailed study the issues that are not significant or have been covered by prior environmental review(s), narrowing the discussion of these issues in the statement to

ANG Base and SUA affected environment, potential impacts associated with the following issues and/or resources have been determined to not be considered significant under Alternative 2 (**Table 4.2-1**). In the context of **Table 4.2-1** and within this chapter, "airspace" refers to SUA, which includes Restricted Areas, MTRs, MOAs, and ATCAAs, while "installation" includes the area surrounding the installation and the associated airfield (to include the immediate airspace).

Table 4.2-1. Alternative 2 – Issues/Resources Not Carried Forward for Detailed Analysis

Resource Area	Affected Environment		Summary of Rationale for No Detailed Analysis
	Installation	Airspace	
Socio-economics	Yes	No	Socioeconomic impacts with respect to the installation are addressed in detail in Section 4.5.4. With regard to airspace, the socioeconomic aspect of potential impacts to lands underlying SUA was not evaluated for similar reasons as described under the Preferred Alternative in **Table 3.2-1**.
Environmental Justice	Yes	No	Environmental justice impacts with respect to the installation are addressed in detail in Section 4.6.4. With regard to airspace, the environmental justice aspect of potential impacts to lands underlying SUA was not evaluated for similar reasons as described for the Preferred Alternative in **Table 3.2-1**.
Airspace	Yes	Yes	There are no formal airspace change proposals associated with Alternative 2 at this time. Airspace would be utilized and scheduled as per existing conditions. Airspace capacity can accommodate additional FMS PTC aircraft. This resource area has not been carried forward for further, detailed analysis under Alternative 2.
Hazardous Materials and Waste/Solid Waste	Yes	Yes	Because Selfridge ANG Base currently accommodates several flying missions, there would be no substantive change in the utilization of typical aerospace hazardous materials and resulting generation of hazardous waste would not affect installation generator status or result in significant impacts. While some construction sites would interact with known ERP sites (see **Figure 4.2-1**), in accordance with AFI 32-7020, *The Environmental Restoration Program*, construction, modifications, and/or additions to existing buildings can occur on or in proximity to existing ERP sites. Accordingly, the appropriate organizations (e.g., installation planners, ERP managers, design engineers) must consider a compatible land use based on current site conditions and the selected or projected remedial action alternatives. If contaminated media (e.g., soil, vapor, groundwater) is encountered during the course of site preparation (e.g., clearing, grading) or site development (e.g., excavation for installation of building footers) for proposed construction activities, work would cease until the 127 WG environmental manager establishes an appropriate course of action for the construction project to ensure that applicable federal and state agency notification requirements are met, and to arrange for agency consultation as necessary if existing ERP/Area of Concern sites are affected (USAF, 2020b; NGB, 2019). Construction activities, to include the handling, mitigation, and disposal or other disposition of contamination (e.g., soils) discovered before or during the construction activity, would be managed following the intent of all applicable legal requirements. The ERP manager would be consulted during the CERCLA process and prior to implementation of this project to ensure worker safety. PFAS-related issues would be handled according to AFGM 2019-32-01, similar to the Preferred Alternative. Use of chaff and flares has been shown to have no significant impacts to the environment (USAF, 2021; USAF, 2020a; USAF, 2014; USAF, 2003). Impacts associated with solid waste from additional personnel and during construction would not result in additional hardships on local solid waste landfills. Contractors would be required to comply with federal, state, and local regulations for the collection and disposal of municipal solid waste from the base. C&D debris, including debris contaminated with hazardous waste, ACM, LBP, or other hazardous components, would be managed in accordance with AFMAN 32-

a brief presentation of why they will not have a significant effect on the human environment or providing a reference to their coverage elsewhere.

Table 4.2-1. Alternative 2 – Issues/Resources Not Carried Forward for Detailed Analysis

Resource Area	Affected Environment		Summary of Rationale for No Detailed Analysis
	Installation	Airspace	
			7002 and the installation's ISWMP and HWMP. ERP sites would be managed according to the DAF and NGB protocols and federal, state, and local regulations. This resource area has not been carried forward for further, detailed analysis under Alternative 2.
Safety	Yes	Yes	The potential for aircraft mishaps is low, and standard airfield safety procedures would be implemented as per current flying missions at Selfridge ANG Base. Potential for aircraft mishaps would be similar to that as described under the Preferred Alternative in **Table 3.2-1**. Accident Potential Zone compatibility and BASH are addressed in Section 4.4, *Land Use*, and Section 4.8, *Biological Resources*, respectively.
Infrastructure	Yes	No	Infrastructure usage and changes would be consistent with installation development plans and would not involve substantive changes in utility use or infrastructure changes outside the boundary of Selfridge ANG Base. Most development projects associated with the Alternative 2 involve renovations to existing buildings, and construction of a few new facilities within developed portions of the installation has readily available utility and transportation connections. Additionally, infrastructure changes and use would be comparable to that experienced under existing Selfridge ANG Base flying missions. Utility use and impacts to transportation would be minimal, given the anticipated increase in personnel and dependents associated with the FMS PTC. Existing utility infrastructure and road networks have the capacity to accommodate the volume associated with the addition of approximately 30 percent more personnel, as well as temporary increases associated with the transient nature of foreign military training units, without stressing the existing local and regional systems or significantly affecting level of service. Therefore, impacts associated with infrastructure under Alternative 2 would not be considered significant, and this resource area has not been carried forward for further, detailed analysis under Alternative 2.
Visual Resources	Yes	Yes	Potential impacts associated with visual resources would be similar to those as described for the Preferred Alternative in **Table 3.2-1** and thus not significant. Visual impacts are not discussed further under Alternative 2.
Natural Resources and Energy Supply	Yes	No	Potential impacts associated with natural resources and energy supply would be similar to those as described for the Preferred Alternative in **Table 3.2-1** and thus not significant. Visual impacts are not discussed further under Alternative 2.
Water Resources (including wetlands and floodplains)	Yes	No	Impacts to installation water resources are discussed in detail in Section 4.9.4. With respect to airspace, no ground-disturbing activities or change in the use of water resources (to include wetlands) would occur in the regions below the airspace proposed for use. Therefore, analysis of water resources under airspace has not been carried forward in for Alternative 2.
Soils and Geology	Yes	No	Ground disturbance would occur, and activities involving more than an acre of land area would require an NPDES permit and associated implementation of sediment and erosion control measures. Based on information from previous analysis of development activities at Selfridge ANG Base (NGB, 2019; USAF, 2020b), impacts would not be expected to negatively affect soil productivity on the base, and impacts would not be considered significant. Potential soil erosion impacts would be minimized through implementation of permit requirements designed to avoid, minimize, or mitigate soil erosion from construction-related activities (e.g., development of Soil Erosion and Sedimentation Plans, Stormwater Pollution Prevention Plans, use of sediment erosion control mechanisms, etc.). This resource area is not analyzed further under Alternative 2.

Key: 127 WG = 127th Wing; ACM = asbestos-containing materials; AFGM = Air Force Guidance Memorandum; AFI = Air Force Instruction; AFMAN = Air Force Manual; ANG = Air National Guard; C&D = construction and demolition; CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act; DAF = Department of the Air Force; ERP = Environmental Restoration Program; FMS = Foreign Military Sales; HWMP = Hazardous Waste Management Plan; ISWMP = Integrated Solid Waste Management Plan; LBP = lead-based paint; NGB = National Guard Bureau; NPDES = National Pollutant Discharge Elimination System; PTC = Pilot Training Center; SUA = Special Use Airspace; USAF = United States Air Force

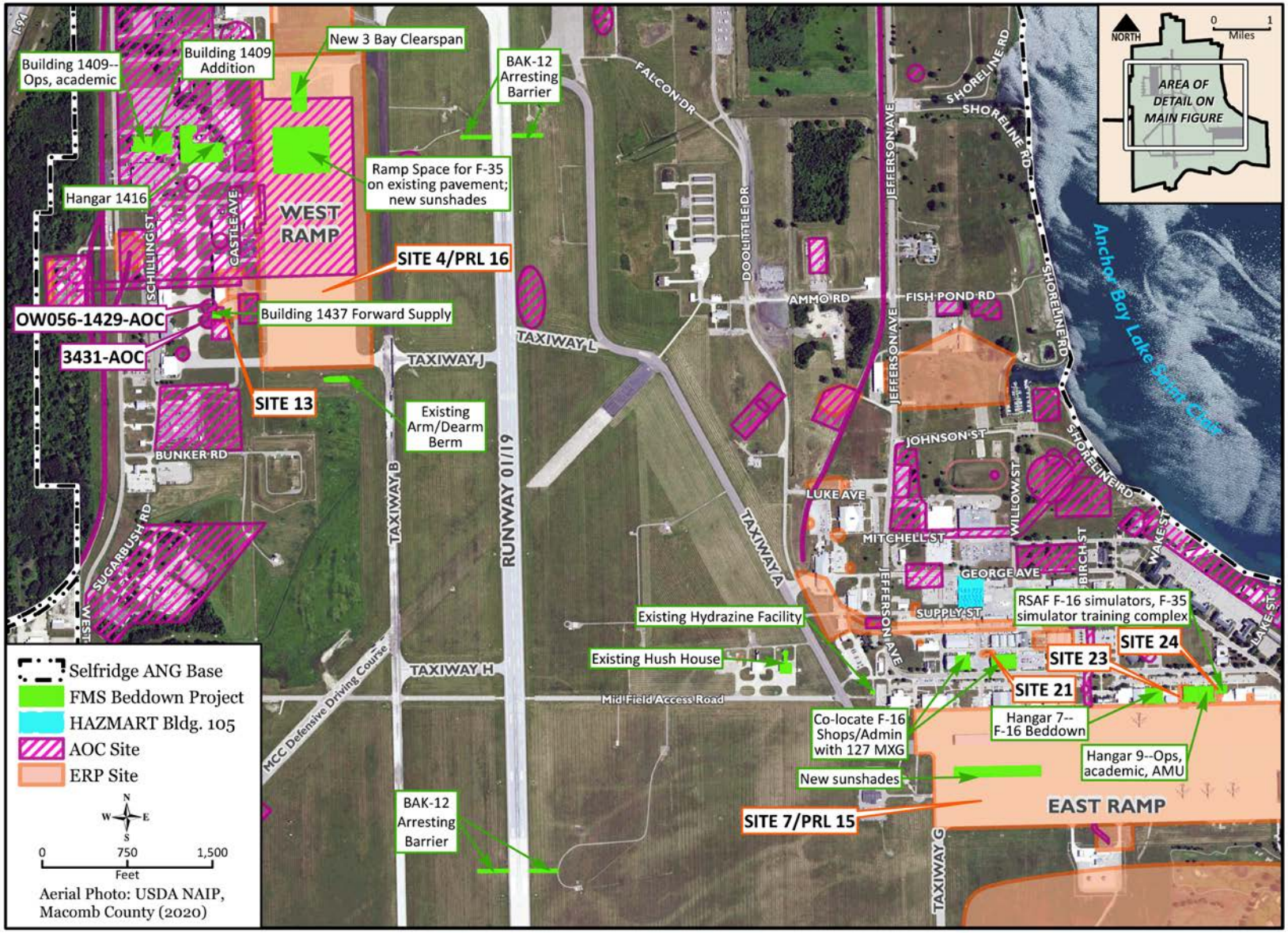

Figure 4.2-1. Selfridge ANG Base Environmental Restoration Program Sites

Sources: (Selfridge ANG Base, 2021; USDA-FSA-APFO, 2020)

4.3 NOISE

The description of the acoustic environment resource included in Section 3.3, *Noise*, for Ebbing ANG Base also applies to Selfridge ANG Base.

4.3.1 Resource-Specific Analysis Methodology

The methods used to assess impacts at Ebbing ANG Base, which are described in Section 3.3.1 (*Noise, Resource-Specific Analysis Methodology*), were also used to assess impacts at Selfridge ANG Base with the following exceptions.

- In accordance with AFI 32-1015, *Integrated Installation Planning*, and AFI 32-1015, *Integrated Installation Planning*, DoD noise modeling program NOISEMAP (version 7.3) was used to model noise associated with all aircraft operations at Selfridge ANG Base. Baseline noise levels, which reflect current operational parameters and DoD noise modeling policy, are lower than noise levels published in the 2009 Air Installations Compatible Use Zones (AICUZ) Report (127 WG, 2009). Changes in noise contour extent reflect updated operational parameters as well as updates to DoD noise modeling policy. Current DoD policy requires that DNL be calculated for an average annual day (i.e., a day with 1/365 of total annual operations), whereas the noise contours contained in the 2009 AICUZ Report reflect an average busy day (i.e., a day with 1/260 of total annual operations).
- Flight procedures currently in use at Selfridge ANG Base (e.g., pattern altitudes) were used as the basis for modeling proposed F-16 and F-35 flying operations. Local flying procedures used at Selfridge ANG Base differ from those used at Ebbing ANG Base.

4.3.2 Alternative 2 Affected Environment

4.3.2.1 Selfridge ANG Base and Surrounding Area

The acoustic environment on Selfridge ANG Base and in the immediately surrounding area is dominated by aircraft operations noise. The installation supports approximately 21,000 airfield operations annually by a mixture of jet-powered and propeller-driven fixed-wing aircraft and helicopters.

Non-aircraft noise sources on Selfridge ANG Base include ground vehicle operations (e.g., delivery vehicles, employee commutes, etc.) and equipment use (e.g., heating ventilation and air conditioning systems). The area surrounding Selfridge ANG Base is primarily urbanized, and the acoustic environment in most nearby land areas when aircraft operations are not under way is dominated by other human-generated noises such as vehicle traffic. A large-scale study by the NPS associated measured sound levels to characteristics of the surrounding environment (e.g., land cover, nighttime light level) and generated a nationwide ambient sound map (NPS, 2020). The NPS study estimates average ambient noise levels in urbanized land areas near Selfridge ANG Base to be approximately 49 dB, while levels in less-densely populated areas further from the base are estimated to be as low as 40 dB. It is worth noting that, while the ambient sound levels predicted by the NPS are stated using a median sound level metric (including both times of quiet and louder sounds), they are not directly comparable to the federal standard of DNL. However, the estimated values do provide a useful description of the ambient conditions in the affected area, for which no measured sound levels are available.

Under current conditions, noise levels due to aircraft noise exceeding 65 dB DNL do not extend beyond installation boundaries (**Figure 4.3-1**). Areas exposed to noise levels between 60 and 65

dB DNL would also experience substantial aircraft noise, but impacts would be less likely to be considered significant. Noise levels under current conditions at several representative noise-sensitive locations are below 65 dB DNL (**Table 4.3-1**). The noise-sensitive locations listed are not intended to be an exhaustive list of locations that could be considered to be noise-sensitive. Noise levels stated at these locations, which are shown in **Figure 4.3-1,** are similar to noise levels in nearby areas, which may contain other noise-sensitive locations.

Table 4.3-1. Day-Night Average Sound Level at Representative Noise-Sensitive Locations Near Selfridge ANG Base Under Current Conditions

Representative Noise-Sensitive Location		DNL (dB)
Description	ID	
McLaren Macomb General Hospital	1	36
Harbor Light Salvation Army Rehabilitation Center	2	41
Gateway Church	4	48
Faith Christian Center	5	46
Northridge Baptist Church	6	46
Tried Stone Missionary Baptist Church	7	41
Martin Chapel African Methodist Episcopal Zion Church	8	42
Faith Missionary Baptist Church	9	45
Knox Presbyterian Church	10	43
Saint Louis Catholic Community	11	37
Kensington Church	12	48
Brigantine Estates	13	51
City of Mount Clemens	14	35
Residence closest to South Base Perimeter	15	54
Dean A Naldrett School	16	40
Green Elementary School	17	46
Frederick V Pankow Center	18	46
Tots Learning Center	19	42
L'Anse Creuse Adult Education School	20	45
South River School	21	49
Future Scholars Learning Center	22	37
St. Mary Preschool	23	38
Trinity Lutheran Church School	24	36
L'Anse Creuse High School	25	43
L'Anse Creuse Middle School	26	42
Emma V. Loobestael Elementary School	27	38
Joseph Carkenord Elementary School	28	48
Austin Catholic High School	29	46

Source: (BRRC, 2022c)
Key: ANG = Air National Guard; dB = decibels; DNL = day-night average sound level; ID = identification number

The number of noise events per average daytime hour with the potential to interfere with outdoor speech at the representative noise-sensitive locations is one or less under current conditions (**Table 4.3-2**). For the purposes of this analysis, it was conservatively assumed that any event exceeding 50 dB has some potential to interfere at least momentarily with speech and other forms of communication involving listening. Results are calculated for people speaking indoors with windows open, in which case the building is assumed to provide 15 dB noise reduction, and with windows closed, in which case the building is assumed to provide 25 dB noise-level reduction.

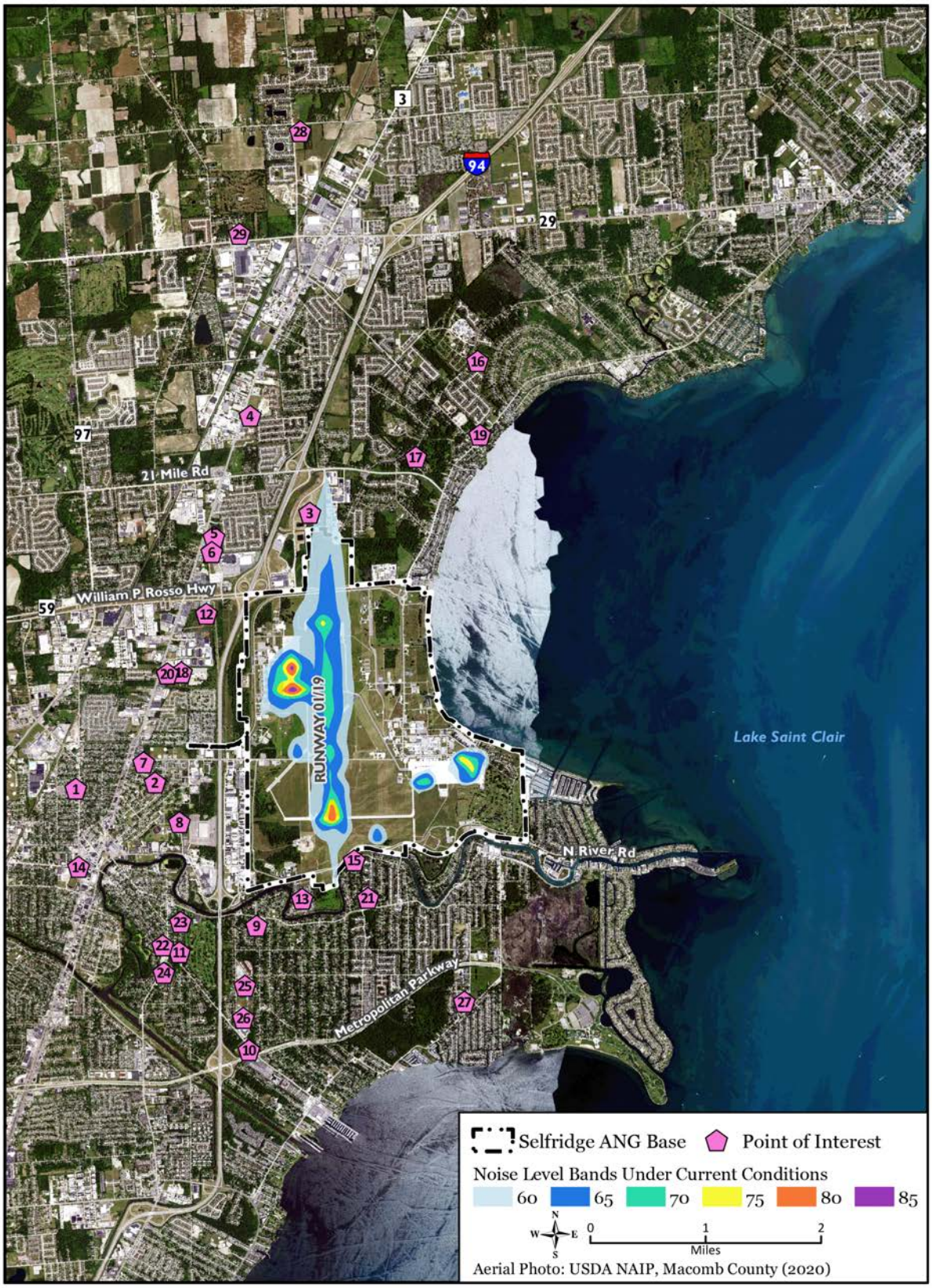

Figure 4.3-1. Noise Levels Under Current Conditions at Selfridge ANG Base

Sources: (Selfridge ANG Base, 2021; BRRC, 2022d; USDA-FSA-APFO, 2020)

Table 4.3-2. Number of Outdoor Noise Events With Potential to Interfere With Speech Near Selfridge ANG Base Under Current Conditions

Representative Noise-Sensitive Location		Annual Average Daily Indoor Daytime (7:00 a.m. to 10:00 p.m.) Events per Hour	
Description	ID	Windows Open	Windows Closed
McLaren Macomb General Hospital	1	-	-
Harbor Light Salvation Army Rehabilitation Center	2	-	-
Gateway Church	4	1	-
Faith Christian Center	5	1	-
Northridge Baptist Church	6	1	-
Tried Stone Missionary Baptist Church	7	-	-
Martin Chapel African Methodist Episcopal Zion Church	8	-	-
Faith Missionary Baptist Church	9	-	-
Knox Presbyterian Church	10	-	-
Saint Louis Catholic Community	11	-	-
Kensington Church	12	1	-
Brigantine Estates	13	1	-
City of Mount Clemens	14	-	-
Residence closest to South Base Perimeter	15	1	-
Dean A Naldrett School	16	-	-
Green Elementary School	17	1	1
Frederick V Pankow Center	18	1	-
Tots Learning Center	19	1	-
L'Anse Creuse Adult Education School	20	1	-
South River School	21	1	-
Future Scholars Learning Center	22	-	-
St. Mary Preschool	23	-	-
Trinity Lutheran Church School	24	-	-
L'Anse Creuse High School	25	-	-
L'Anse Creuse Middle School	26	-	-
Emma V. Loobestael Elementary School	27	-	-
Joseph Carkenord Elementary School	28	1	1
Austin Catholic High School	29	1	-

Source: (BRRC, 2022c)
Key: ANG = Air National Guard; ID = identification number

Noise interference with learning in schools is of particular concern because noise can interrupt communication or interfere with concentration. The DoD Noise Working Group guidelines recommend that exterior noise levels during the school day not exceed 60 dB $L_{eq\text{-}8hr}$, as that would indicate that interior classroom noise levels likely exceed a recommended 40 dB maximum background noise level (DoD Noise Working Group, 2009). The $L_{eq\text{-}8hr}$ does not exceed the DoD Noise Working Group criteria, and number of events with potential to interfere with speech per average daytime hour are one or less under current conditions with windows open or with windows closed (**Table 4.3-3**).

Nighttime flying results in estimated probabilities of awakening at least once per night 3 percent or less at noise-sensitive locations if windows are open (**Table 4.3-4**). If windows are closed, the probability of being awakened by aircraft noise at least once per night is 1 percent or less. Current sleep disturbance probabilities listed for parks and schools are not intended to imply that people regularly sleep in parks or schools, but instead are indicative of impacts in nearby residential areas. Flight operations between 10:00 p.m. and 7:00 a.m. make up approximately 7 percent of total operations under current conditions.

Table 4.3-3. Noise Levels at Schools Near Selfridge ANG Base Under Current Conditions

School Description	ID	Outdoor L_{eq-8hr} (dB)	Speech Interference	
			Windows Open	Windows Closed
			Events per Hour	Events per Hour
Dean A Naldrett School	16	42	-	-
Green Elementary School	17	48	1	1
Frederick V Pankow Center	18	46	1	-
Tots Learning Center	19	43	1	-
L'Anse Creuse Adult Education School	20	45	1	-
South River School	21	50	1	-
Future Scholars Learning Center	22	37	-	-
St. Mary Preschool	23	39	-	-
Trinity Lutheran Church School	24	36	-	-
L'Anse Creuse High School	25	43	-	-
L'Anse Creuse Middle School	26	43	-	-
Emma V. Loobestael Elementary School	27	39	-	-
Joseph Carkenord Elementary School	28	49	1	1
Austin Catholic High School	29	46	1	-

Source: (BRRC, 2022c)
Key: ANG = Air National Guard; dB = decibels; ID = identification number; L_{eq-8hr} = 8-hour equivalent noise level

Table 4.3-4. Percent of People Awakened by Aircraft Noise at Least Once per Night Near Selfridge ANG Base Under Current Conditions

Representative Noise-Sensitive Location		Annual Average Nightly (10:00 p.m. to 7:00 a.m.) Probability of Awakening (%)	
Description	ID	Windows Open	Windows Closed
McLaren Macomb General Hospital	1	1%	0%
Harbor Light Salvation Army Rehabilitation Center	2	1%	0%
Gateway Church	4	1%	1%
Faith Christian Center	5	2%	0%
Northridge Baptist Church	6	3%	1%
Tried Stone Missionary Baptist Church	7	1%	0%
Martin Chapel African Methodist Episcopal Zion Church	8	1%	0%
Faith Missionary Baptist Church	9	2%	1%
Knox Presbyterian Church	10	1%	0%
Saint Louis Catholic Community	11	1%	0%
Kensington Church	12	3%	1%
Brigantine Estates	13	2%	1%
City of Mount Clemens	14	0%	0%
Residence closest to South Base Perimeter	15	2%	1%
Dean A Naldrett School	16	1%	0%
Green Elementary School	17	1%	0%
Frederick V Pankow Center	18	3%	1%
Tots Learning Center	19	1%	0%
L'Anse Creuse Adult Education School	20	2%	1%
South River School	21	2%	1%
Future Scholars Learning Center	22	1%	0%
St. Mary Preschool	23	1%	0%
Trinity Lutheran Church School	24	1%	0%
L'Anse Creuse High School	25	1%	0%
L'Anse Creuse Middle School	26	1%	0%

Table 4.3-4. Percent of People Awakened by Aircraft Noise at Least Once per Night Near Selfridge ANG Base Under Current Conditions

Representative Noise-Sensitive Location		Annual Average Nightly (10:00 p.m. to 7:00 a.m.) Probability of Awakening (%)	
Description	ID	Windows Open	Windows Closed
Emma V. Loobestael Elementary School	27	0%	0%
Joseph Carkenord Elementary School	28	1%	0%
Austin Catholic High School	29	1%	0%

Source: (BRRC, 2022c)
Key: % = percent; ANG = Air National Guard; dB = decibels; ID = identification number; $L_{eq\text{-}8hr}$ = 8-hour equivalent noise level

Noise levels exceeding 80 dB DNL do not affect off-installation areas under current conditions, and the risk of off-installation potential hearing loss is minimal in accordance with DoD policy (DoD Noise Working Group, 2013a).

In on-base and on-airport areas with high noise levels, existing occupational noise exposure prevention procedures, such as hearing protection and monitoring, are undertaken in compliance with all applicable OSHA and DAF occupational noise exposure regulations.

4.3.2.2 Affected Airspace

Training airspace associated with Selfridge ANG Base is used by a wide variety of military aircraft including fighter, bomber, cargo, reconnaissance, and helicopters. As noted in **Table 2.3-2** (Current and Alternative 2 Airspace Altitudes, Supersonic Authorization, and Operations (Selfridge ANG Base, Michigan)), the floor altitudes of overland MOAs (i.e., Pike West and Steelhead) are 6,000 feet above MSL. The floor altitude of the overwater Pike East MOA is 300 feet AGL, and the floor altitude of Restricted Area airspaces (i.e., R-4201A/B) is the surface. The MOAs are overlain by ATCAA, which are used in combination with the MOAs. Although aircraft overflights are heard and may sometimes be disturbing, noise levels beneath these airspace units are below 65 dB L_{dnmr} under current conditions. Noise levels when no military operations are underway (i.e., ambient noise levels) are low in training airspace (**Figure 4.3-2**). Based on results of a study conducted by the NPS, average sound levels in developed portions of these areas are 48 dB, while remote portions could be 33 dB (NPS, 2020). While ambient sound levels predicted by the NPS are stated using a median sound level (including both times of quiet and louder sounds), they are not directly comparable to the L_{dnmr} metric. However, the range of values does provide a useful description of ambient conditions in the area of interest.

4.3.3 No Action Alternative

Noise levels within the affected environment under the No Action Alternative would reflect actions that are expected to have occurred by CY 2029 (described in Section 4.12.2.1, *Cumulative Impacts, Noise*). However, because there are no foreseeable future actions or trends that are expected to alter noise levels at Selfridge ANG Base prior to CY 2029, noise levels at Selfridge ANG Base would remain as described in Section 4.3.2.1, *Selfridge ANG Base and Surrounding Area*. Implementation of the No Action Alternative (i.e., no beddown of the FMS PTC at Selfridge ANG Base) would not result in any additional impacts outside those described under Cumulative Impacts.

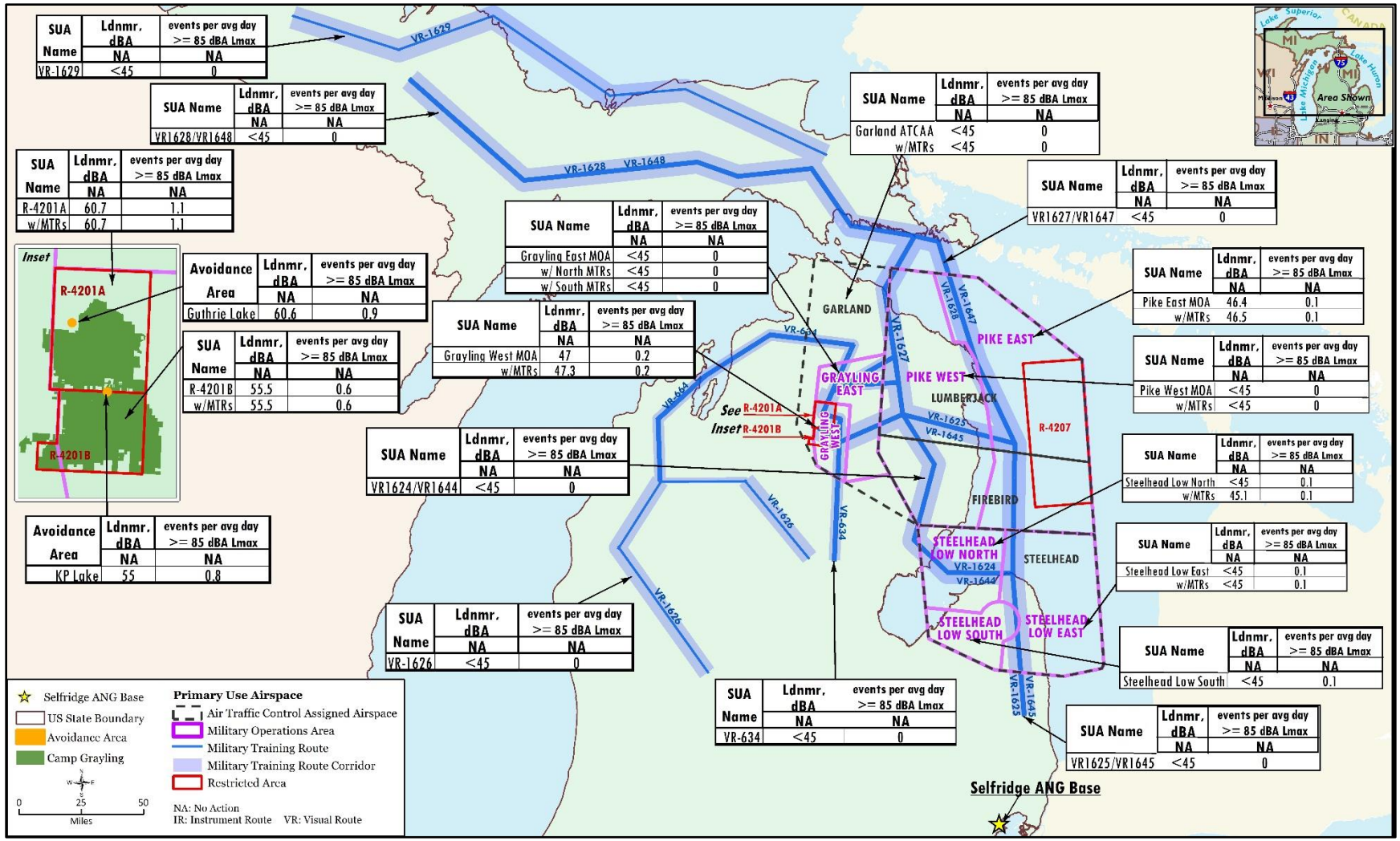

Figure 4.3-2. Selfridge ANG Base Associated Training Airspace Noise Levels With Reasonably Foreseeable Future Actions (denoted "NA")

Sources: (ESRI Data & Maps, 2019a; ESRI Data & Maps, 2019c; USCB, 2018a; FAA, 2021a; FAA, 2021b; BRRC, 2022d; Selfridge ANG Base, 2021)

4.3.4 Alternative 2 Environmental Consequences

The analysis of noise impacts for Alternative 2 evaluates impacts in relation to the No Action Alternative (CY 2029); because there are no foreseeable future actions or trends that are expected to alter noise levels at Selfridge ANG Base or beneath the affected airspace prior to CY 2029, the affected environment would be expected to remain as described in Section 3.3.2.2, *Affected Airspace*.

Personnel changes and facilities construction/renovation that would occur under Alternative 2 are similar to changes and activities that would occur at Ebbing ANG Base under the Preferred Alternative. As noted previously in Section 3.3.4, *Noise, Preferred Alternative Environmental Consequences*, noise level changes associated with personnel changes and facilities construction are minor and limited primarily to areas on installation that are not noise-sensitive. Therefore, noise impacts associated with personnel changes and facilities construction/renovation under Alternative 2 are not analyzed further.

4.3.4.1 Selfridge ANG Base and Surrounding Area

The high-performance tactical aircraft proposed to be bedded down at Selfridge ANG Base under Alternative 2 are very loud. The precise noise level experienced on the ground during flight operations depends on the aircraft and also on how the aircraft is flown. For example, aircraft departures that make use of the afterburner generate a different noise signature than departures that do not use the afterburner. As the F-35 program has matured over the past years, information from other DAF installations indicates that F-35 pilots are using afterburner on a higher number of takeoffs than had been expected previously. Use of the afterburner allows the aircraft to accelerate faster and reach takeoff airspeeds earlier than standard military power departures. During afterburner takeoffs, the aircraft typically leaves the ground sooner and is at slightly higher altitudes throughout the climb out compared to standard military power takeoffs.

During afterburner takeoffs, F-35 pilots typically turn the afterburner off at approximately 10,000 feet from brake release to conserve fuel and avoid accelerating beyond airspeeds allowable near an installation. After turning the afterburner off, the aircraft continues its climb at standard military power (i.e., the same power setting used by pilots conducting standard military power takeoffs). At locations perpendicular to the runway, the increased noise generated by the afterburner results in maximum noise levels being slightly louder, as measured in A-weighted sound levels, than standard military power takeoffs.

However, locations further down the aircraft flight path are overflown at slightly higher altitudes and the same engine power setting during afterburner takeoffs than during standard military power takeoffs. As a result, afterburner takeoff overflight noise levels are often slightly less loud than standard military power takeoff noise levels at locations beyond the end of the runway due to the difference in the distance between the aircraft and the noise-sensitive location. For this EIS, the DAF evaluated three different scenarios for F-35A and F-35B afterburner use: (1) 5% of departures, (2) 50% of departures, and (3) 95% of departures (referred to as the 5%, 50%, and 95% afterburner scenarios, respectively).

Table 4.3-5 lists individual calculated overflight noise levels for F-35A, F-35B, F-16, and representative military transient aircraft at a representative location near the installation (Chesterfield Township Police Department). At this location, the F-35A, F-35B, and F-16C afterburner departures would generate noise levels comparable to those generated by military

power departures conducted by the same aircraft type. Overflights of this location during arrivals and closed patterns would be flown at reduced engine power settings but are also typically at lower altitudes than departure overflights. As a result, certain arrival and closed pattern overflights generate noise levels comparable to departures. F-35A, F-35B, and F-16 aircraft are louder than the fixed-wing jet aircraft (i.e., A-10 and KC-135) currently based at Selfridge ANG Base while in equivalent flight configurations. F-35B aircraft would not conduct STOVL operations, which have a distinctive noise signature, at Selfridge ANG Base.

Table 4.3-5. Individual Overflight Noise Levels at a Representative Location Near Selfridge ANG Base

Aircraft	Operation Type	Engine Power	Slant Distance (feet) [(a)]	L_{max} (dB)
F-35A (Military Power)	Departure	100% ETR	1,035	110
F-35A (Afterburner Power)		150% ETR	1,136	109
F-35B (Military Power)		100% ETR	1,304	106
F-35B (Afterburner Power)		150% ETR	1,463	105
F-16C (Military Power)		93% NC	867	107
F-16C (Afterburner Power)		93% NC	916	107
KC-135		82.5% NF	541	92
A-10		100% NC	1,217	92
F-35A	Arrival	40% ETR	371	110
F-35B		55% ETR	371	109
F-16C		84% NC	416	95
KC-135		60% NF	433	90
A-10		90% NC	369	101
F-35A	Closed Pattern	80% ETR	1,120	106
F-35B		55% ETR	371	109
F-16C		93% NC	773	108
KC-135		82% NF	451	93
A-10		97% NC	1,019	92

Source: (BRRC, 2022c)
Key: % = percent; ANG = Air National Guard; dB = decibels; ETR = engine throttle ratio; L_{max} = maximum noise level; NC = core engine speed; NF = engine fan speed
Note:
a. During typical afterburner departure, afterburner has been de-selected (such that the aircraft is flying at military power) prior to the aircraft passing the location being described in this table.

Several categories of potential noise impacts associated with aircraft operations under Alternative 2 are discussed in the following Sections 4.3.4.1.1 through 4.3.4.1.6.

4.3.4.1.1 Annoyance and Land Use Compatibility

Calculated time-averaged noise levels (dB DNL) under Alternative 2 (95% afterburner scenario) would increase significantly relative to the No Action Alternative levels (**Figure 4.3-3**, **Figure 4.3-4**, and **Figure 4.3-5**). Noise levels exceeding 65 dB DNL would extend approximately 5 miles north of the runway and approximately 3 miles south of the runway. Noise-sensitive areas exposed to noise levels between 60 and 65 dB DNL, which include residences, places of worship, recreational areas, and schools, would also experience substantial aircraft noise, but impacts would be less likely to be considered significant. Less-frequent F-35 afterburner departures under the 5% and 50% afterburner scenarios generate slightly lower DNL to either side of the Selfridge ANG Base runway. Along the primary departure flight paths, DNL is slightly lower under the 95% afterburner departure scenario than under the 5% or 50% afterburner scenarios; this is because takeoff and climb out are more rapid for an afterburner departure than a military power departure, as has been discussed previously.

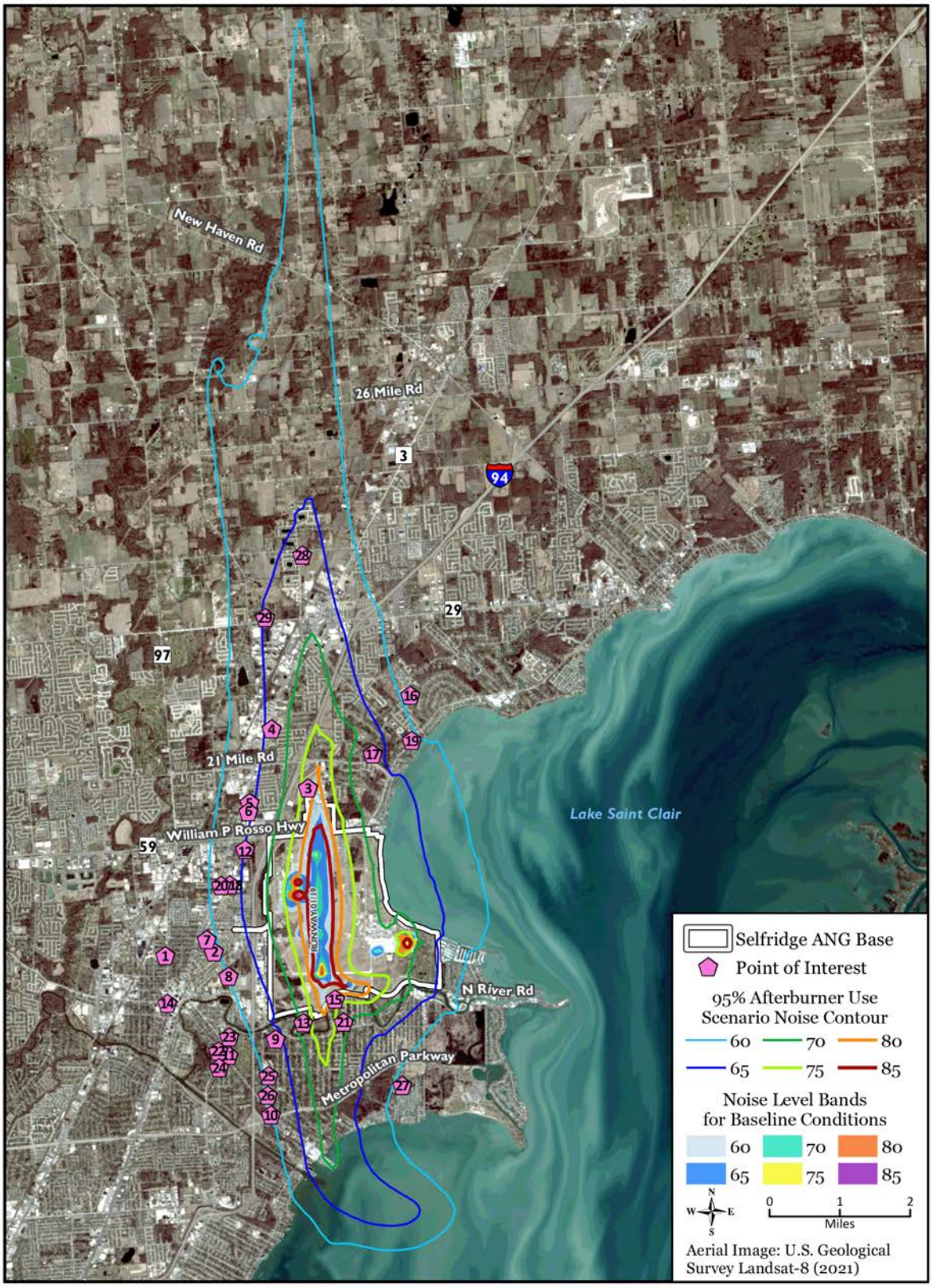

Figure 4.3-3. Noise Contours Under Alternative 2, 95% Afterburner Usage Scenario Near Selfridge ANG Base

Sources: (USGS, 2021; BRRC, 2022d; Selfridge ANG Base, 2021; ESRI Data & Maps, 2019a)

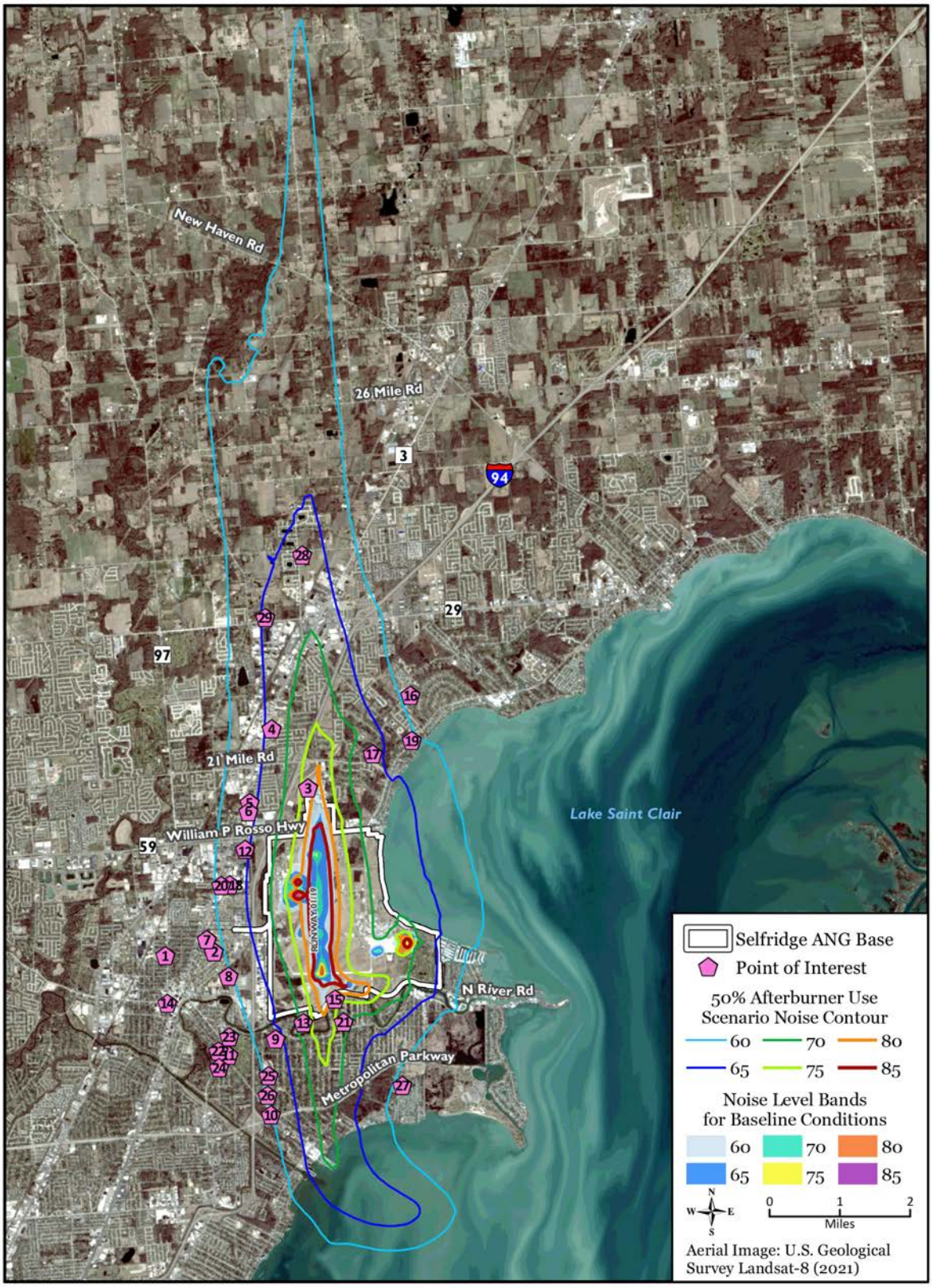

Figure 4.3-4. Noise Contours Under Alternative 2, 50% Afterburner Usage Scenario Near Selfridge ANG Base

Sources: (USGS, 2021; BRRC, 2022d; Selfridge ANG Base, 2021; ESRI Data & Maps, 2019a)

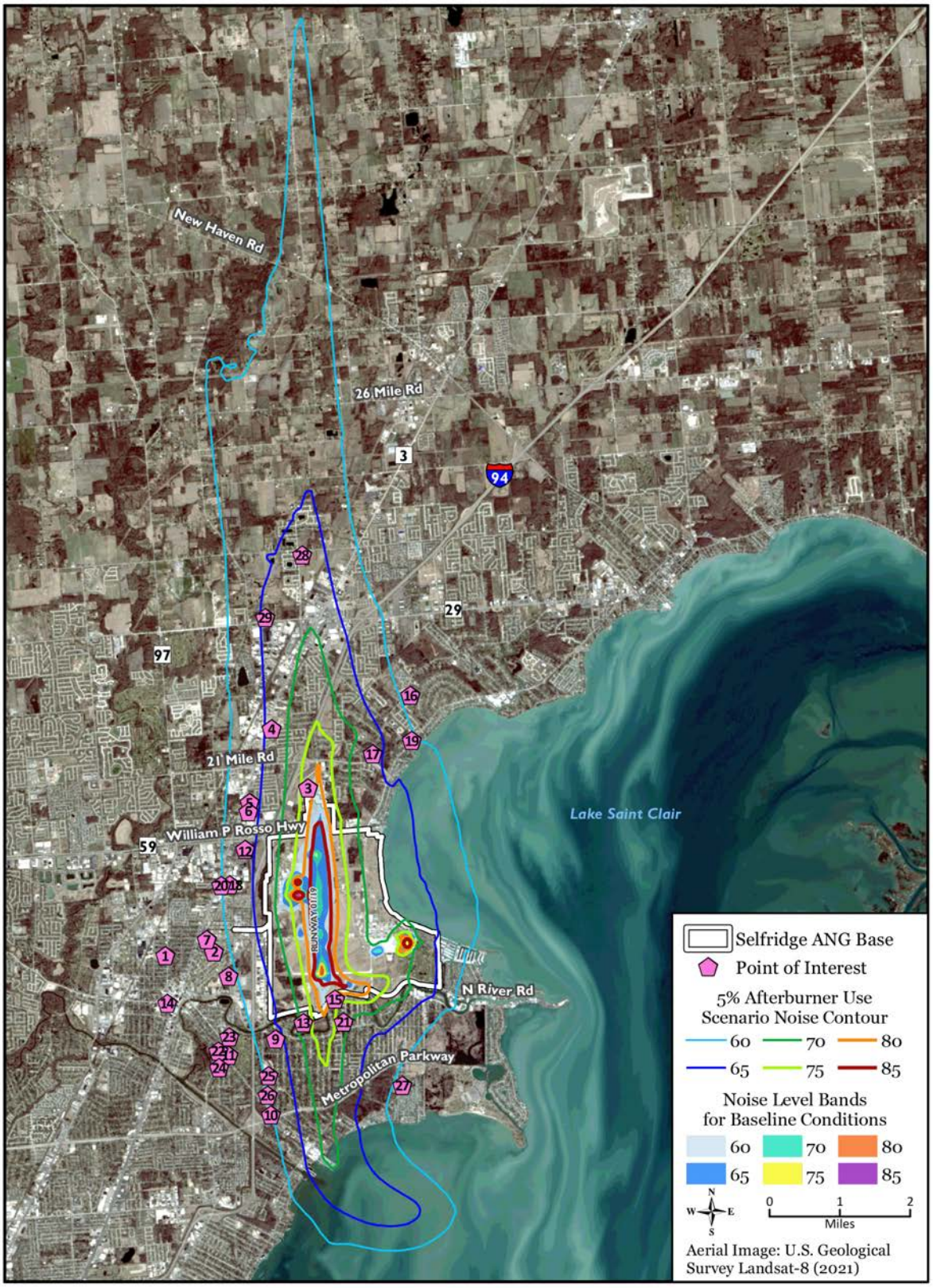

Figure 4.3-5. Noise Contours Under Alternative 2, 5% Afterburner Usage Scenario Near Selfridge ANG Base

Sources: (USGS, 2021; BRRC, 2022d; Selfridge ANG Base, 2021; ESRI Data & Maps, 2019a)

Social surveys have found that people are consistently more likely to become annoyed by aircraft noise at higher DNL and are less likely to become annoyed at lower DNL (Schultz, 1978; Finegold et al., 1994; Miedema & Vos, 1998). A recent nationwide survey conducted by FAA suggests that people are currently more likely to represent themselves as being highly annoyed than was indicated in older social surveys when exposed to the same aircraft DNL (FAA, 2022b). Noise levels greater than 65 dB DNL are considered incompatible with noise-sensitive land uses, such as residential, in accordance with DoD guidelines.

Under Alternative 2, the number of acres of off-base land at greater than 65 dB DNL would increase to 6,847, 7,021, and 7,171 acres for the 5%, 50%, and 95% afterburner scenarios, respectively (**Table 4.3-6**).

Table 4.3-6. Off-Base Acres of Land at 65 dB DNL or Greater Under Alternative 2 Afterburner Usage Scenarios

DNL (dB)	No Action	Alternative 2					
		5% Afterburner		50% Afterburner		95% Afterburner	
	Acres	Acres	Change	Acres	Change	Acres	Change
65–69	0	4,825	4,825	4,994	4,994	5,135	5,135
70–74	0	1,532	1,532	1,538	1,538	1,548	1,548
75–79	0	459	459	462	462	465	465
80–84	0	31	31	27	27	23	23
≥85	0	0	0	0	0	0	0
Total	**0**	**6,847**	**6,847**	**7,021**	**7,021**	**7,171**	**7,171**

Source: Data derived from noise analysis and GIS data (see Figure 4.3-3, Figure 4.3-4, and Figure 4.3-5)
Key: ≥ = greater than or equal to; % = percent; dB = decibels; DNL = day-night average sound level

The estimated number of people affected by noise levels greater than 65 dB DNL under the 5%, 50%, and 95% afterburner scenarios would be 18,098, 18,417, and 18,799, respectively (**Table 4.3-7**).

Table 4.3-7. Estimated Number of Residents Exposed to Noise Levels Greater Than 65 dB DNL Under Alternative 2 Afterburner Usage Scenarios

DNL (dB)	No Action	Alternative 2					
		5% Afterburner		50% Afterburner		95% Afterburner	
	Residents	Residents	Change	Residents	Change	Residents	Change
65–69	0	10,513	10,513	10,871	10,871	11,294	11,294
70–74	0	6,599	6,599	6,559	6,559	6,519	6,519
75–79	0	986	986	987	987	986	986
80–84	0	0	0	0	0	0	0
≥85	0	0	0	0	0	0	0
Total	**0**	**18,098**	**18,098**	**18,417**	**18,417**	**18,799**	**18,799**

Source: Data derived from noise analysis and GIS data (see Figure 4.3-3, Figure 4.3-4, and Figure 4.3-5)
Key: ≥ = greater than or equal to; % = percent; dB = decibels; DNL = day-night average sound level

Additional noise calculations were run at several representative noise-sensitive locations, which are depicted in **Figure 4.3-3**. Noise levels would exceed 65 dB DNL at seven of the locations studied under the 5% afterburner scenario, at seven locations under the 50% afterburner scenario, and at eight locations under the 95% afterburner scenario (**Table 4.3-8**). Changes in noise levels would be considered significant at all locations where the proposed noise level would exceed 65 dB DNL.

Table 4.3-8. Day-Night Average Sound Level at Representative Noise-Sensitive Locations Under Alternative 2

Location Description	ID	No Action	Alternative 2					
			5% Afterburner		50% Afterburner		95% Afterburner	
			DNL	Change	DNL	Change	DNL	Change
McLaren Macomb General Hospital	1	36	52	+16	53	+17	53	+17
Harbor Light Salvation Army Rehabilitation Center	2	41	58	+17	59	+18	59	+18
Gateway Church	4	48	66	+18	66	+18	66	+18
Faith Christian Center	5	46	63	+17	64	+18	64	+18
Northridge Baptist Church	6	46	63	+17	64	+18	64	+18
Tried Stone Missionary Baptist Church	7	41	57	+16	58	+17	59	+18
Martin Chapel African Methodist Episcopal Zion Church	8	42	59	+17	60	+18	60	+18
Faith Missionary Baptist Church	9	45	63	+18	64	+19	64	+19
Knox Presbyterian Church	10	43	60	+17	60	+17	60	+17
Saint Louis Catholic Community	11	37	56	+19	56	+19	57	+20
Kensington Church	12	48	63	+15	64	+16	65	+17
Brigantine Estates	13	51	71	+20	71	+20	71	+20
City of Mount Clemens	14	35	51	+16	52	+17	52	+17
Residence closest to South Base Perimeter	15	54	78	+24	78	+24	78	+24
Dean A Naldrett School	16	40	59	+19	59	+19	59	+19
Green Elementary School	17	46	66	+20	66	+20	66	+20
Frederick V Pankow Center	18	46	61	+15	62	+16	63	+17
Tots Learning Center	19	42	61	+19	61	+19	61	+19
L'Anse Creuse Adult Education School	20	45	60	+15	61	+16	62	+17
South River School	21	49	71	+22	71	+22	71	+22
Future Scholars Learning Center	22	37	55	+18	55	+18	55	+18
St. Mary Preschool	23	38	57	+19	57	+19	57	+19
Trinity Lutheran Church School	24	36	55	+19	55	+19	55	+19
L'Anse Creuse High School	25	43	61	+18	61	+18	61	+18
L'Anse Creuse Middle School	26	42	60	+18	60	+18	60	+18
Emma V. Loobestael Elementary School	27	38	59	+21	59	+21	59	+21
Joseph Carkenord Elementary School	28	48	67	+19	67	+19	66	+18
Austin Catholic High School	29	46	66	+20	66	+20	66	+20

Source: (BRRC, 2022c)
Key: % = percent; + = plus; DNL = day-night average sound level; ID = identification number

4.3.4.1.2 Speech Interference

Overflight events that exceed 50 dB, even momentarily, have some potential to interfere with speech. The number of potential outdoor speech-interference events would increase by as much as four per average daytime hour under the three afterburner scenarios (**Table 4.3-9**). Speech-interference events are brief, lasting only for the duration of the overflight. Speech-interference event-counts assume that the people involved in conversation do not raise their voices to talk over the aircraft noise.

Table 4.3-9. Number of Outdoor Speech-Interference Events per Average Daytime Hour Under Alternative 2 Afterburner Usage Scenarios

Location Description	ID	No Action	Alternative 2					
			5% Afterburner		50% Afterburner		95% Afterburner	
		Events	Events	Change	Events	Change	Events	Change
McLaren Macomb General Hospital	1	1	4	+3	4	+3	4	+3
Harbor Light Salvation Army Rehabilitation Center	2	2	5	+3	5	+3	5	+3
Gateway Church	4	2	5	+3	5	+3	5	+3
Faith Christian Center	5	2	6	+4	6	+4	6	+4
Northridge Baptist Church	6	2	6	+4	6	+4	6	+4
Tried Stone Missionary Baptist Church	7	2	5	+3	5	+3	5	+3
Martin Chapel African Methodist Episcopal Zion Church	8	2	5	+3	5	+3	5	+3
Faith Missionary Baptist Church	9	2	5	+3	5	+3	5	+3
Knox Presbyterian Church	10	1	4	+3	4	+3	4	+3
Saint Louis Catholic Community	11	1	4	+3	4	+3	4	+3
Kensington Church	12	3	6	+3	6	+3	6	+3
Brigantine Estates	13	2	5	+3	5	+3	5	+3
City of Mount Clemens	14	1	4	+3	4	+3	4	+3
Residence closest to South Base Perimeter	15	2	5	+3	5	+3	5	+3
Dean A Naldrett School	16	2	5	+3	5	+3	5	+3
Green Elementary School	17	2	5	+3	5	+3	5	+3
Frederick V Pankow Center	18	2	6	+4	6	+4	6	+4
Tots Learning Center	19	2	5	+3	5	+3	5	+3
L'Anse Creuse Adult Education School	20	2	6	+4	6	+4	6	+4
South River School	21	2	5	+3	5	+3	5	+3
Future Scholars Learning Center	22	1	4	+3	4	+3	4	+3
St. Mary Preschool	23	1	4	+3	4	+3	4	+3
Trinity Lutheran Church School	24	1	4	+3	4	+3	4	+3
L'Anse Creuse High School	25	1	4	+3	4	+3	4	+3
L'Anse Creuse Middle School	26	1	4	+3	4	+3	4	+3
Emma V. Loobestael Elementary School	27	1	4	+3	4	+3	4	+3
Joseph Carkenord Elementary School	28	1	5	+4	5	+4	5	+4
Austin Catholic High School	29	1	5	+4	5	+4	5	+4

Source: (BRRC, 2022c)
Key: % = percent; + = plus; ID = identification number

4.3.4.1.3 Classroom Noise

Noise interference with learning in schools is of particular concern because noise can interrupt communication or interfere with concentration. The DoD Noise Working Group guidelines recommend that exterior noise levels during the school day not exceed 60 dB $L_{eq\text{-}8hr}$, as that would indicate that interior classroom noise levels likely exceed a recommended 40 dB maximum background noise level (DoD Noise Working Group, 2009). All of the schools studied except Future Scholars Learning Center, St. Mary Preschool, and Trinity Lutheran Church School would exceed criteria levels under all afterburner scenarios (**Table 4.3-10**). The number of indoor noise events with potential to interfere with speech per average daytime hour would increase by as much as four with windows open and by as much as three with windows closed under the afterburner usage scenarios (**Table 4.3-11**).

Table 4.3-10. School Day Equivalent Noise Levels Under Alternative 2 Afterburner Usage Scenarios

Location Description	ID	No Action (Outdoor)	Alternative 2 (Outdoor)					
			5% Afterburner		50% Afterburner		95% Afterburner	
		L_{eq-8hr} (dB)	L_{eq-8hr} (dB)	Change	L_{eq-8hr} (dB)	L_{eq-8hr} (dB)	L_{eq-8hr} (dB)	Change
Dean A Naldrett School	16	42	60	+18	60	+18	60	+18
Green Elementary School	17	48	68	+20	68	+20	68	+20
Frederick V Pankow Center	18	46	62	+16	64	+18	64	+18
Tots Learning Center	19	43	62	+19	62	+19	62	+19
L'Anse Creuse Adult Education School	20	45	61	+16	62	+17	63	+18
South River School	21	50	72	+22	72	+22	72	+22
Future Scholars Learning Center	22	37	56	+19	56	+19	56	+19
St. Mary Preschool	23	39	58	+19	58	+19	58	+19
Trinity Lutheran Church School	24	36	55	+19	56	+20	56	+20
L'Anse Creuse High School	25	43	61	+18	62	+19	62	+19
L'Anse Creuse Middle School	26	43	60	+17	60	+17	60	+17
Emma V. Loobestael Elementary School	27	39	60	+21	60	+21	60	+21
Joseph Carkenord Elementary School	28	49	67	+18	67	+18	66	+17
Austin Catholic High School	29	46	66	+20	66	+20	65	+19

Source: (BRRC, 2022c)

Key: % = percent; + = plus; dB = decibels; ID = identification number; L_{eq-8h} = 8-hour equivalent noise level

Table 4.3-11. School Day Potential Speech Interference Events Under Alternative 2 Afterburner Usage Scenarios

Location Description	ID	No Action (Windows Open)	Alternative 2 (Windows Open)					
			5% Afterburner		50% Afterburner		95% Afterburner	
		Events	Events	Change	Events	Change	Events	Change
Dean A Naldrett School	16	-	3	+3	3	+3	3	+3
Green Elementary School	17	1	4	+3	4	+3	4	+3
Frederick V Pankow Center	18	1	3	+2	3	+2	3	+2
Tots Learning Center	19	1	4	+3	4	+3	4	+3
L'Anse Creuse Adult Education School	20	1	3	+2	3	+2	3	+2
South River School	21	1	3	+2	3	+2	3	+2
Future Scholars Learning Center	22	-	2	+2	2	+2	2	+2
St. Mary Preschool	23	-	2	+2	2	+2	2	+2
Trinity Lutheran Church School	24	-	2	+2	2	+2	2	+2
L'Anse Creuse High School	25	-	3	+3	3	+3	3	+3
L'Anse Creuse Middle School	26	-	3	+3	3	+3	3	+3
Emma V. Loobestael Elementary School	27	-	3	+3	3	+3	3	+3
Joseph Carkenord Elementary School	28	1	3	+2	3	+2	3	+2
Austin Catholic High School	29	1	3	+2	3	+2	3	+2
Location Description	**ID**	**No Action (Windows Closed)**	**Alternative 2 (Windows Closed)**					
			5% Afterburner		50% Afterburner		95% Afterburner	
		Events	Events	Change	Events	Change	Events	Change
Dean A Naldrett School	16	-	2	+2	2	+2	2	+2
Green Elementary School	17	1	3	+2	3	+2	3	+2
Frederick V Pankow Center	18	-	2	+2	2	+2	2	+2
Tots Learning Center	19	-	2	+2	2	+2	2	+2
L'Anse Creuse Adult Education School	20	-	2	+2	2	+2	2	+2
South River School	21	-	3	+3	3	+3	3	+3
Future Scholars Learning Center	22	-	1	+1	1	+1	1	+1
St. Mary Preschool	23	-	1	+1	2	+2	2	+2
Trinity Lutheran Church School	24	-	1	+1	1	+1	1	+1
L'Anse Creuse High School	25	-	2	+2	2	+2	2	+2
L'Anse Creuse Middle School	26	-	1	+1	1	+1	1	+1
Emma V. Loobestael Elementary School	27	-	2	+2	2	+2	2	+2
Joseph Carkenord Elementary School	28	1	3	+2	3	+2	3	+2
Austin Catholic High School	29	-	1	+1	1	+1	1	+1

Source: (BRRC, 2022c)
Key: % = percent; + = plus; ANG = Air National Guard; ID = identification number

4.3.4.1.4 Sleep Disturbance

Nighttime flying, which is required as training for certain missions, has an increased likelihood of causing sleep disturbance. The lack of quality sleep has the potential to affect health and concentration. Approximately 5 percent of total operations would be conducted during the late-night period between 10:00 p.m. and 7:00 a.m. The overall number of operations would increase substantially under Alternative 2 relative to the No Action Alternative. The probability of being awakened at least once per night was calculated using the same method described for the Preferred Alternative in Section 3.3.1.1.4, *Noise, Resource-Specific Analysis Methodology, Sleep Disturbance*. As shown in **Table 4.3-12** and **Table 4.3-13**, the maximum likelihood of awakening at any of the locations would increase to as high as 8 percent with windows open and to as high as 5 percent with windows closed under the Alternative 2 afterburner usage scenarios. The analysis also accounts for standard building attenuation of 15 dB and 25 dB with windows open and closed, respectively. Sleep disturbance probabilities listed for parks and schools are not intended to imply that people regularly sleep in parks or schools, but instead are indicative of impacts in nearby residential areas.

4.3.4.1.5 Potential Hearing Loss

No residential areas would be exposed to noise levels at or exceeding 80 dB DNL under Alternative 2 afterburner usage sub-alternative. Therefore, the risk of off-installation potential hearing loss is minimal in accordance with DoD policy (DoD Noise Working Group, 2013a).

4.3.4.1.6 Workplace Noise

Workplace noise would continue to be managed in accordance with applicable regulations to minimize hearing-loss risk for people working on Selfridge ANG Base. The USAF Hearing Conservation Program is designed to protect workers from the harmful effects of hazardous noise by identifying all areas where workers are exposed to hazardous noise and requiring hearing protection and monitoring as necessary. Off-installation workplaces exposed to noise levels exceeding 80 dB DNL would utilize workplace hearing conservation programs to identify and mitigate hearing loss risk among employees. Customers at businesses exposed to noise levels exceeding 80 dB DNL would not be expected to be exposed to these noise levels for sufficient time to pose a risk of long-term hearing loss.

4.3.4.2 Affected Airspace

Noise levels beneath training airspace associated with Selfridge ANG Base would increase under Alternative 2 by as much as 13.1 dB relative to the No Action Alternative, but noise levels would not exceed 65 dB L_{dnmr} beneath any airspace units except R-4201A (**Figure 4.3-6**). Noise levels in **Figure 4.3-6** are calculated for areas that underlie SUA (e.g., MOAs and/or Restricted Areas), MTRs, or both. The land area beneath R-4201A is primarily owned by DoD or is open and undeveloped. Low-density residential areas are located in the RA footprint to the west and south of Camp Grayling Joint Military Training Complex (CGJMTC). Noise levels in excess of 65 dB L_{dnmr} are associated with higher percent of the population being annoyed and a greater likelihood of activity interference. The increase in noise levels in areas beneath R-4201 would be significant, as assessed using FAA significance criteria. Increases in noise level to levels below 65 dB L_{dnmr} are also impactful, and this is particularly true for areas with low ambient noise levels. As noted in Section 4.3.2.2, *Noise, Alternative 2 Affected Environment, Affected Airspace*, much of the area beneath the Alpena airspace complex is sparsely populated, and ambient noise levels in the areas are expected to be low.

Table 4.3-12. Percent of People Awakened by Aircraft Noise at Least Once per Night Near Selfridge ANG Base Under Alternative 2 Afterburner Usage Scenarios With Windows Open

Location Description	ID	No Action (Windows Open)	Alternative 2 (Windows Open)					
			5% Afterburner		50% Afterburner		95% Afterburner	
		% Awakened	% Awakened	Change	% Awakened	Change	% Awakened	Change
McLaren Macomb General Hospital	1	1%	3%	+2%	3%	+2%	3%	+2%
Harbor Light Salvation Army Rehabilitation Center	2	1%	4%	+3%	4%	+3%	4%	+3%
Gateway Church	4	1%	7%	+6%	7%	+6%	7%	+6%
Faith Christian Center	5	2%	7%	+5%	7%	+5%	7%	+5%
Northridge Baptist Church	6	3%	7%	+4%	7%	+4%	7%	+4%
Tried Stone Missionary Baptist Church	7	1%	4%	+3%	4%	+3%	4%	+3%
Martin Chapel African Methodist Episcopal Zion Church	8	1%	4%	+3%	4%	+3%	4%	+3%
Faith Missionary Baptist Church	9	2%	4%	+2%	4%	+2%	4%	+2%
Knox Presbyterian Church	10	1%	3%	+2%	3%	+2%	3%	+2%
Saint Louis Catholic Community	11	1%	3%	+2%	3%	+2%	3%	+2%
Kensington Church	12	3%	7%	+4%	7%	+4%	8%	+5%
Brigantine Estates	13	2%	5%	+3%	5%	+3%	5%	+3%
City of Mount Clemens	14	0%	2%	+2%	2%	+2%	2%	+2%
Residence closest to South Base Perimeter	15	2%	6%	+4%	6%	+4%	6%	+4%
Dean A Naldrett School	16	1%	4%	+3%	4%	+3%	4%	+3%
Green Elementary School	17	1%	6%	+5%	6%	+5%	6%	+5%
Frederick V Pankow Center	18	3%	6%	+3%	6%	+3%	6%	+3%
Tots Learning Center	19	1%	5%	+4%	5%	+4%	5%	+4%
L'Anse Creuse Adult Education School	20	2%	6%	+4%	6%	+4%	6%	+4%
South River School	21	2%	5%	+3%	5%	+3%	5%	+3%
Future Scholars Learning Center	22	1%	2%	+1%	3%	+2%	3%	+2%
St. Mary Preschool	23	1%	3%	+2%	3%	+2%	3%	+2%
Trinity Lutheran Church School	24	1%	2%	+1%	2%	+1%	2%	+1%
L'Anse Creuse High School	25	1%	3%	+2%	3%	+2%	3%	+2%
L'Anse Creuse Middle School	26	1%	3%	+2%	3%	+2%	3%	+2%
Emma V. Loobestael Elementary School	27	0%	2%	+2%	2%	+2%	2%	+2%
Joseph Carkenord Elementary School	28	1%	7%	+6%	7%	+6%	7%	+6%
Austin Catholic High School	29	1%	6%	+5%	6%	+5%	6%	+5%

Source: (BRRC, 2022c)
Key: % = percent; + = plus; ANG = Air National Guard; ID = identification number

Table 4.3-13. Percent of People Awakened by Aircraft Noise at Least Once per Night Near Selfridge ANG Base Under Alternative 2 Afterburner Usage Scenarios With Windows Closed

Location Description	ID	No Action (Windows Closed)	Alternative 2 (Windows Closed)					
			5% Afterburner		50% Afterburner		95% Afterburner	
		% Awakened	% Awakened	Change	% Awakened	Change	% Awakened	Change
McLaren Macomb General Hospital	1	0%	1%	+1%	1%	+1%	1%	+1%
Harbor Light Salvation Army Rehabilitation Center	2	0%	1%	+1%	1%	+1%	1%	+1%
Gateway Church	4	1%	4%	+3%	4%	+3%	4%	+3%
Faith Christian Center	5	0%	3%	+3%	3%	+3%	3%	+3%
Northridge Baptist Church	6	1%	3%	+2%	3%	+2%	4%	+3%
Tried Stone Missionary Baptist Church	7	0%	1%	+1%	1%	+1%	1%	+1%
Martin Chapel African Methodist Episcopal Zion Church	8	0%	2%	+2%	2%	+2%	2%	+2%
Faith Missionary Baptist Church	9	1%	2%	+1%	2%	+1%	2%	+1%
Knox Presbyterian Church	10	0%	2%	+2%	2%	+2%	2%	+2%
Saint Louis Catholic Community	11	0%	1%	+1%	1%	+1%	1%	+1%
Kensington Church	12	1%	4%	+3%	4%	+3%	4%	+3%
Brigantine Estates	13	1%	3%	+2%	3%	+2%	3%	+2%
City of Mount Clemens	14	0%	1%	+1%	1%	+1%	1%	+1%
Residence closest to South Base Perimeter	15	1%	3%	+2%	3%	+2%	3%	+2%
Dean A Naldrett School	16	0%	2%	+2%	2%	+2%	2%	+2%
Green Elementary School	17	0%	3%	+3%	3%	+3%	3%	+3%
Frederick V Pankow Center	18	1%	3%	+2%	3%	+2%	3%	+2%
Tots Learning Center	19	0%	2%	+2%	2%	+2%	2%	+2%
L'Anse Creuse Adult Education School	20	1%	2%	+1%	2%	+1%	3%	+2%
South River School	21	1%	3%	+2%	3%	+2%	3%	+2%
Future Scholars Learning Center	22	0%	1%	+1%	1%	+1%	1%	+1%
St. Mary Preschool	23	0%	1%	+1%	1%	+1%	1%	+1%
Trinity Lutheran Church School	24	0%	1%	+1%	1%	+1%	1%	+1%
L'Anse Creuse High School	25	0%	2%	+2%	2%	+2%	2%	+2%
L'Anse Creuse Middle School	26	0%	2%	+2%	2%	+2%	2%	+2%
Emma V. Loobestael Elementary School	27	0%	1%	+1%	1%	+1%	1%	+1%
Joseph Carkenord Elementary School	28	0%	5%	+5%	5%	+5%	5%	+5%
Austin Catholic High School	29	0%	4%	+4%	4%	+4%	4%	+4%

Source: (BRRC, 2022c)
Key: % = percent; ANG = Air National Guard; ID = identification number

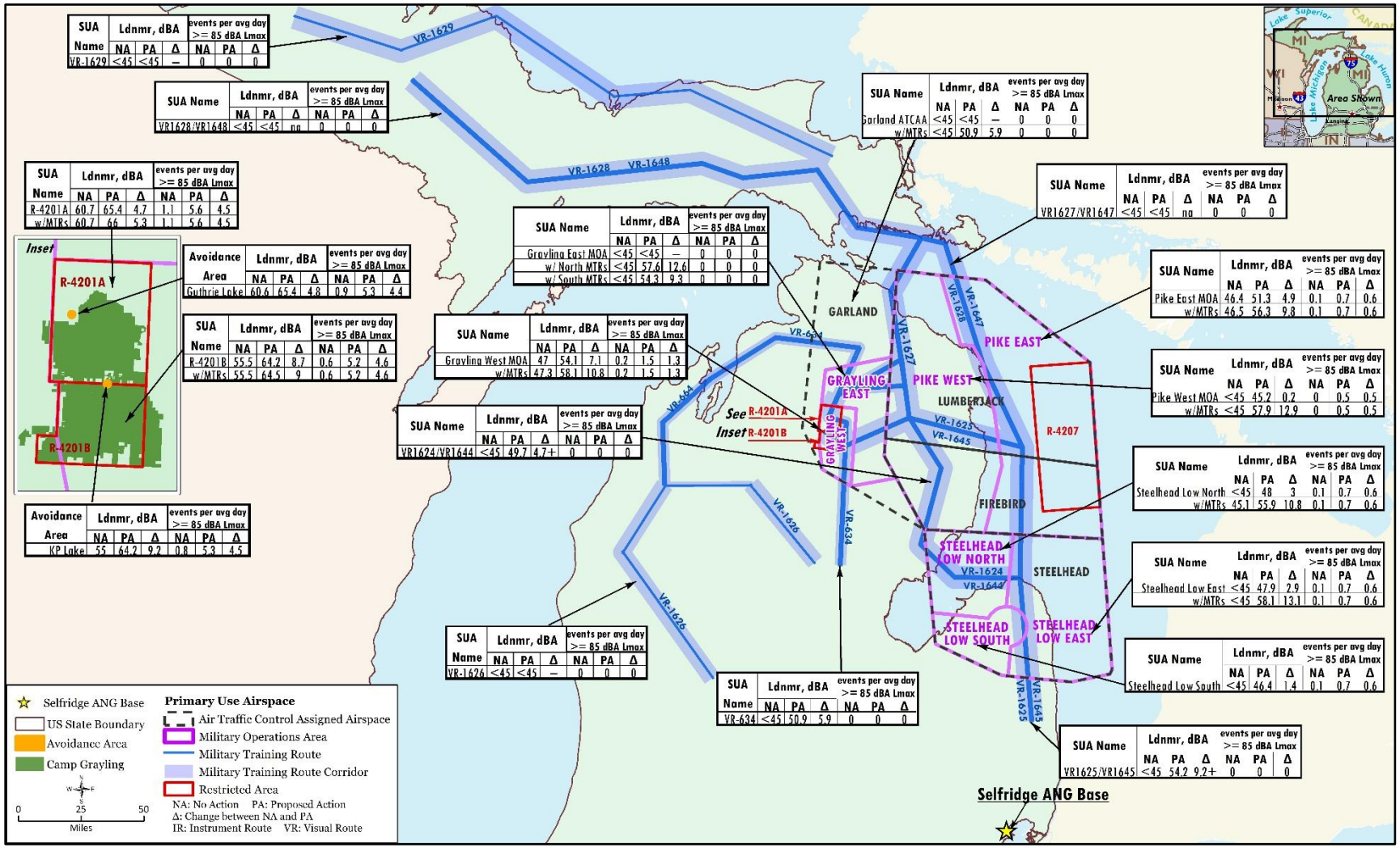

Figure 4.3-6. Selfridge ANG Base Associated Training Airspace Noise Levels Under Alternative 2 (denoted "PA")

Sources: (BRRC, 2022d; Selfridge ANG Base, 2021; ESRI Data & Maps, 2019a; ESRI Data & Maps, 2019c; FAA, 2021a; FAA, 2021b; USCB, 2018a)

To provide a more complete picture than is provided by L_{dnmr} alone, an approximate average number of overflights exceeding 85 dB L_{max} per day was calculated (**Figure 4.3-6**). In areas beneath the RAs, the number of events exceeding 85 dB L_{max} per average day would increase from approximately one to approximately six. Other areas would see increases to lesser numbers of events per average day.

Increased tempo of supersonic operations over land at altitudes above 30,000 feet MSL in ATCAAs overlying the Pike East, Pike West, and Steelhead MOAs under Alternative 2 would result in supersonic noise levels near the center of the airspace, increasing from less than 45 dB CDNL to 46 dB CDNL. Although sonic booms would be heard somewhat more frequently, the highest supersonic noise level (46 dB CDNL) is well below impact thresholds. Sonic booms generated at altitudes above 10,000 feet MSL in portions of the Pike East MOA more than 15 miles from the shore and in R-4207 would also increase in frequency. Booms generated over open water have limited ability to affect people, as effects would be limited to recreational and commercial boaters.

Alternative 2 includes munitions training in R-4201 with munitions types that are being used on the range currently. As shown in **Figure 4.3-7**, peak noise levels in excess of 115 dBP generated by A-10 aircraft gunnery (30-millimeter rounds) affect a larger area than is affected by the same noise levels generated by F-16 aircraft (20-millimeter rounds) or F-35 aircraft (25-millimeter rounds). During proposed firing of 25-millimeter rounds, peak noise levels of between 115 and 130 dBP would affect residences immediately west of the CGJMTC boundary. During proposed firing of 20-millimeter rounds, noise levels in excess of 115 dBP would remain within range boundaries. Inert practice bombs generate only minimal noise on impact. Noise levels generated by employment of Mark 82 high-explosive bombs at CGJMTC is described in detail in the *Michigan Army National Guard Installation Compatible Use Zone Study*, which is hereby incorporated by reference. The area affected by noise levels greater than 115 dBP can extend approximately 5.5 miles from the Mark 82 target location during unfavorable atmospheric conditions (APHC, 2021). There are currently approximately 600 rockets, 66,000 cannon rounds, and 96 Mark 82 high-explosive bombs employed in R-4201A annually. Areas near CGJMTC also experience noise events associated with heavy artillery, demolitions, and small arms training. The addition of 43,000 cannon rounds and up to 16 Mark 82 high-explosive bombs per year under Alternative 2 would increase the number of potentially disturbing noise events experienced in areas near the range. However, in the context of ongoing range activities, the increases would not be expected to measurably affect overall time-averaged munitions noise levels.

4.3.5 Mitigations

There are no specific legal limits that apply to military noise. In 1972, Congress passed the Noise Control Act, which imposed limitations on source noise levels of several types of equipment. However, because noise controls could, in some cases, reduce the combat effectiveness of military equipment, military equipment was exempted from these requirements. For the same reason, FAA limitations on civilian aircraft noise do not apply to military aircraft. The DAF participated in the Federal Interagency Committee on Urban Noise development of noise levels and land use compatibility associated with airfields. Noise impacts are defined based on published guidelines on the compatibility of various land uses with noise and published scientific documents on noise effects.

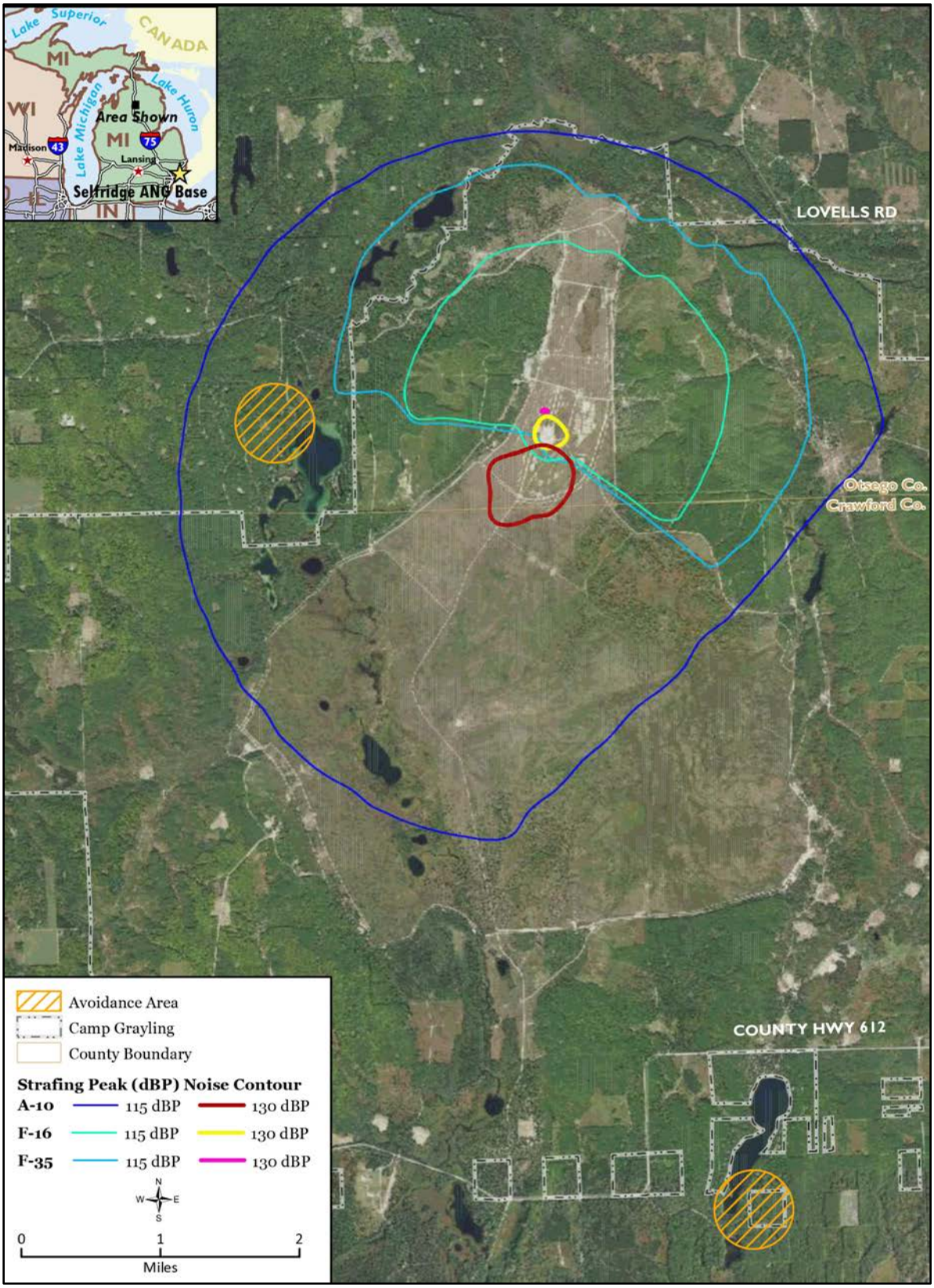

Figure 4.3-7. Air-to-Ground Gunnery Peak Noise Levels (dBP) Generated by A-10, F-16, and F-35 Aircraft

Sources: (BRRC, 2022d; Selfridge ANG Base, 2021; ESRI Data & Maps, 2019b; ESRI Data & Maps, 2019c; USGS, 2021)

There are noise mitigations available: (1) where sound is reduced at the source and (2) where sound is reduced at the receptor for airfield noise within the 65 dB and over noise-sensitive receptors and land uses.

The Office of the Secretary of Defense's OLDCC has been authorized to administer a grant program for attenuating off-base noise impacts from military aircraft. OLDCC is in the process of establishing the guidelines for this new authority. "Community Noise Mitigation" is an initiative being undertaken as a result of recently enacted legislation to understand noise mitigation needs of communities experiencing 65 dB DNL or louder noise, and to develop a mechanism to support noise mitigation actions by these affected communities. Approximately 205 active and reserve installations have been identified with potential "covered facilities" as defined by Section 8136 of the Consolidated Appropriations Act, 2021 (P.L. 116-260), which include hospitals, daycare facilities, schools, facilities serving senior citizens, and private residences within 1 mile of a military installation or another location at which military fixed-wing aircraft are stationed or exposed to 65 dB DNL or greater noise levels.

Congress has limited the amount of money available to make these grants to $18,750,000 for programs at or near reserve component installations, of which $5,000,000 shall be for grants to communities for which a nearby military installation has transitioned to a new type or model of aircraft after January 1, 2019. The Community Noise Mitigation program is not authorized to buy noise-exposed homes.

There are a number of mitigation options available to property owners depending on the noise exposure and the condition and construction of the building. Sealing air gaps is usually the first step. One approach to sound mitigation is to add rigidity and mass so that sound pressure waves do not penetrate the building shell. Replacing acoustically poor–performing windows and doors, adding layers of gypsum board to the walls, and adding sound insulation to the wall cavities are techniques to harden the exterior. Another approach to increase the fraction of noise energy absorbed by walls is to stagger the wall studs on an expanded sill plate or add resilient channels behind the drywall.

The DAF currently proposes primarily near-term, source-based noise mitigations. Longer-term, receptor-based mitigations (i.e., OLDCC grant programs) are subject to Congressional authorizations to allow for Agency obligations when they become available.

As described in Section 4.3.4, *Alternative 2 Environmental Consequences*, aircraft noise levels would increase relative to the No Action Alternative under all Alternative 2 scenarios. As mentioned in Section 4.3.1, *Resource-Specific Analysis Methodology*, FMS aircraft at Selfridge ANG Base would be expected to operate in accordance with the installation-specific military aircraft flying guidance developed for the current A-10 flying mission. These procedures evolved over several years to balance operational efficiency and flexibility against potential reductions in noise impacts associated with certain operational restrictions. The primary purpose of installation-specific military aircraft flying guidance is to ensure safety of flight while also maximizing training goals met per flying hour. There is typically some cost, in terms of operational efficiency, associated with adding restrictions to change current flight procedures. Example of such measures include the following.

- **Reduce the number of flying operations.** The proposed numbers of sorties and practice approaches to be conducted by F-35 and F-16 aircraft were calculated to meet minimum training requirements, with allowances for noneffective sorties (e.g., maintenance or weather mission cancellations). Flying a lesser number of sorties or practice approaches would not allow the unit to meet minimum training requirements. Conducting sorties or practice approaches at other locations is a possibility; these operations would occur during certain events such as off-station Large Force Exercises or combat deployments. Selfridge ANG Base does not have a designated auxiliary airfield to support practice approaches, the Alpena CRTC and other locations, such as nearby civilian airfields, cannot be assumed available for use. To ensure that impacts are not underestimated aircraft noise levels at Selfridge ANG Base were modeled under the assumption that all sorties and practice approaches would be conducted at home station.
- The DNL noise metric is relatively insensitive to changes in operations counts, making operations reductions a less effective method for achieving DNL reductions than other operational changes. For example, a 50 percent reduction in the frequency of all operations would result in a DNL reduction at all locations of only 3 dB. Less extreme adjustments in operations tempo would yield only minimal effect on DNL.
- **Adjust runway usage patterns so that loud overflights occur less frequently over areas of greater noise sensitivity.** Currently, runway selection for approaches and departures is made based on considerations including winds, noise sensitivities, and air-traffic flows at nearby airfields. Flight safety is improved by flying into the wind during landing and takeoff. There are noise sensitive areas located beyond both ends of the runway (RWY 1 and 19). Therefore, adjusting runway usage patterns to emphasize use of either RWY 1 (northward traffic flow) or RWY 19 (southward traffic flow) would simply shift noise from one sensitive area to another. No changes to the existing runway selection procedure are proposed at this time.
- **Increase the distance between aircraft and noise-sensitive locations by adjusting routing.** As mentioned previously, F-35 and F-16 flight operations were modeled as flying the same procedures followed by A-10 aircraft currently. These flight procedures were refined over several years to provide the greatest safety and operational efficiency, while also minimizing noise to the extent practicable. For example, departures toward the south typically turn towards the east and continue climbing while above Lake Saint Clair (which is relatively noise insensitive). Wing leadership meets regularly with subordinate units to discuss issues including potential adjustments to flying procedures that could improve safety/effectiveness and/or reduce noise impacts. While it is possible that procedures at Selfridge ANG Base could be modified after initiation of the FMS PTC flying mission, no modifications are known at this time that would not result in unacceptable impacts to safety and/or operational efficiency.
- **Place restrictions on late-night flying.** Late-night flying (i.e., between 10:00 p.m. and 7:00 a.m.) makes up a small fraction (4 percent or less) of total operations expected to be flown by F-35 and F-16 aircraft at Selfridge ANG Base. Further reductions in the number of late-night flights would limit operational flexibility, preventing aircrews from accomplishing night training during portions of the year when the sun sets late in the day. Limiting runway usage, altitudes, or routing specifically during these times could decrease safety and/or reduce operational effectiveness, as described above. No restrictions on late-night flying are proposed at this time.

- **Limit afterburner usage.** Several F-35 afterburner usage scenarios were analyzed as part of the EIS, covering the range of expected afterburner use. Scenarios with 5% and 50% F-35 afterburner usage would result in less-extensive noise impacts than the 95% afterburner scenario, as detailed in Section 4.3.4, *Alternative 2 Environmental Consequences*.
- **Reduced-power departures.** Full power (either military power or afterburner) is required during departures to get the aircraft to speeds and altitudes that provide the best margins of safety. However, once the aircraft has accelerated to an ideal climb airspeed (300 knots), the engine power setting can be reduced without a reduction in safety of flight. Whereas non-reduced-power departures continue to accelerate from 300 to 350 knots while also continuing to climb, reduced-power departures would use only enough engine power to maintain 300 knots during the continued climb. Reduced engine power settings result in lower noise levels, but the reduced airspeed results in departure noise events lasting slightly longer. The potential mitigation scenario being considered includes F-35 aircraft conducting reduced-power departures.

Impacts associated with potential mitigations under consideration are described briefly below. As more information is gained via public and agency input throughout the NEPA process, mitigation measures will be further refined. Operational mitigation measures deemed to be operationally feasible and that provide considerable noise impacts reductions will be described in the Final EIS. Mitigated noise impacts associated with these altered operational parameters will also be described in the Final EIS.

As shown in **Figure 4.3-8**, the potential mitigation scenario being considered would reduce DNL relative to the unmitigated (original) operational scenario in some areas while other areas would see a minor increase. The total off-base/airport land area exposed to noise levels exceeding 65 dB DNL would be reduced by 11%, 14%, and 16% relative to the original (unmitigated) 5%, 50%, and 95% afterburner scenarios, respectively (**Table 4.3-14**). The estimated number of residents exposed to noise levels greater than 65 dB DNL would be reduced by 9%, 13%, and 16% relative to the original (unmitigated) 5%, 50%, and 95% afterburner scenarios, respectively (**Table 4.3-15**).

Table 4.3-14. Off-Base Acres of Land at 65 dB DNL or Greater Near Selfridge ANG Base Under Original (Unmitigated) and Potential Mitigations Being Considered for Each Afterburner Usage Scenario

DNL (dB)	No Action	Alternative 2 – Selfridge ANG Base								
		5% Afterburner Scenario			50% Afterburner Scenario			95% Afterburner Scenario		
	Acres	Unmitigated	Mitigated	Change	Unmitigated	Mitigated	Change	Unmitigated	Mitigated	Change
65–69	0	4,825	4,383	-9%	4,994	4,440	-11%	5,135	4,492	-13%
70–74	0	1,532	1,242	-19%	1,538	1,224	-20%	1,548	1,202	-22%
75–79	0	459	423	-8%	462	380	-18%	465	331	-29%
80–84	0	31	14	-55%	27	9	-67%	23	6	-74%
≥85	0	0	0	n/a	0	0	n/a	0	0	n/a
Total	**0**	**6,847**	**6,062**	**-11%**	**7,021**	**6,053**	**-14%**	**7,171**	**6,031**	**-16%**

Source: Data derived from noise profile analysis and GIS data (see Figure 4.3-8)
Key: ANG = Air National Guard; dB = decibel; DNL = day-night average sound level

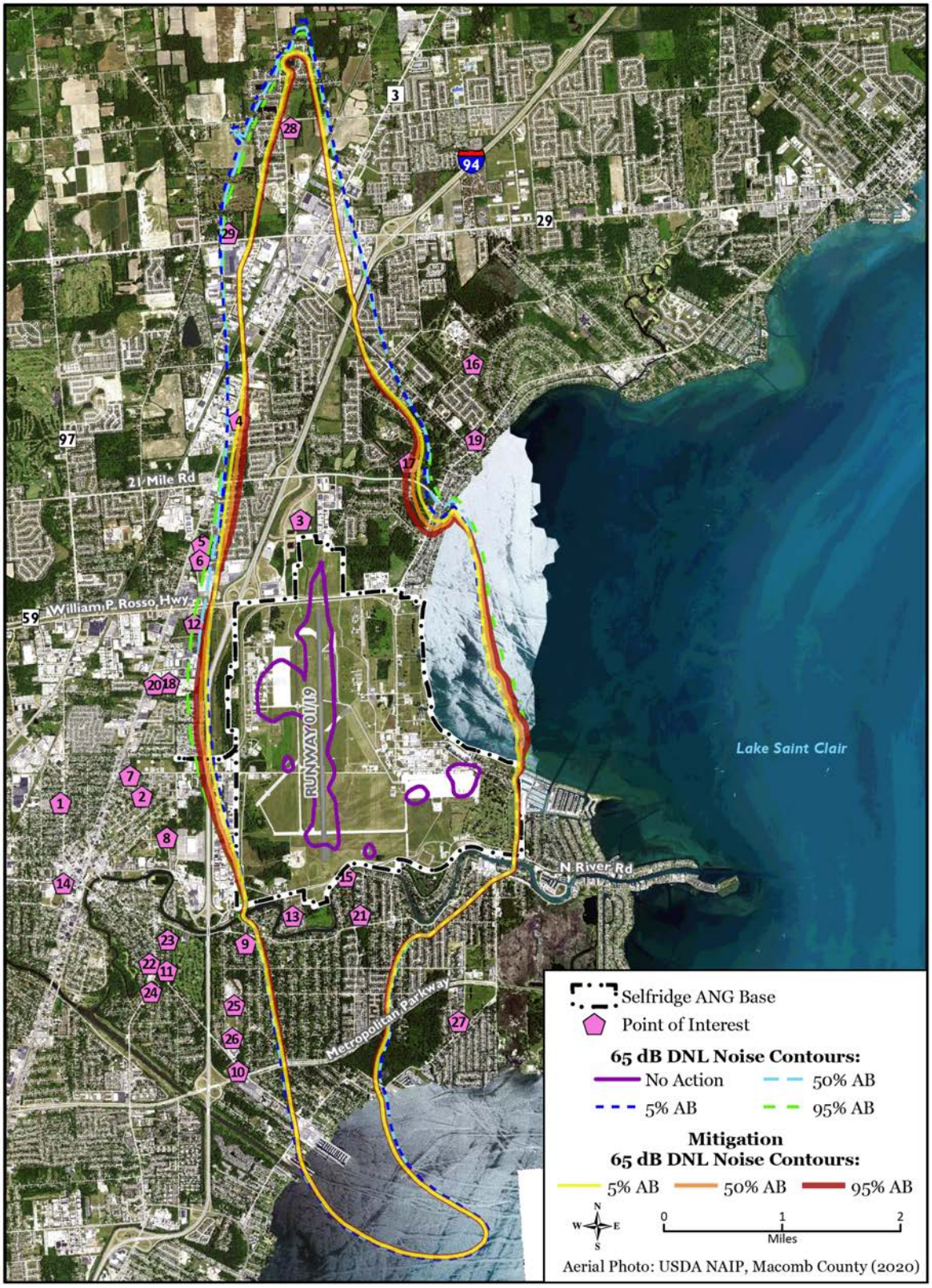

Figure 4.3-8. Comparison of 65 dB DNL Noise Contours for Mitigated and Original Operations Under Preferred Alternative F-35 Afterburner Use Scenario Near Selfridge ANG Base

Sources: (BRRC, 2022c; Selfridge ANG Base, 2021; USDA-FSA-APFO, 2020; BRRC, 2022d)

Table 4.3-15. Estimated Number of Residents Exposed to Noise Levels Greater Than 65 dB DNL Near Selfridge ANG Base Under Original (Unmitigated) and Potential Mitigations Being Considered for Each Afterburner Usage Scenario

DNL (dB)	No Action	Alternative 2 – Selfridge ANG Base								
		5% Afterburner			50% Afterburner			95% Afterburner		
	Residents	Unmitigated	Mitigated	Change	Unmitigated	Mitigated	Change	Unmitigated	Mitigated	Change
65–69	0	10,513	10,494	<1%	10,871	10,519	-3%	11,294	10,511	-7%
70–74	0	6,599	5,001	-24%	6,559	4,771	-27%	6,519	4,568	-30%
75–79	0	986	895	-9%	987	803	-19%	986	694	-30%
80–84	0	0	0	n/a	0	0	n/a	0	0	n/a
≥85	0	0	0	n/a	0	0	n/a	0	0	n/a
Total	**0**	**18,098**	**16,390**	**-9%**	**18,417**	**16,093**	**-13%**	**18,799**	**15,773**	**-16%**

Source: Data derived from noise profile analysis and GIS data (see Figure 4.3-8)
Key: ANG = Air National Guard; dB = decibel; DNL = day-night average sound level

The DNL at locations studied with potential mitigations being considered would differ from the unmitigated scenario by values ranging from reductions of up to 2 dB to increases of up to 1 dB. Notable differences include Austin Catholic High School which does not exceed 65 dB DNL under the 5% and 50% mitigated afterburner usage scenarios. Also, under the 95% afterburner scenario, Gateway Church, Kensington Church, and Austin Catholic High School would not exceed 65 dB DNL with potential mitigations being considered.

The number of noise events per average daytime hour with potential to interfere with speech would remain the same at all locations under all afterburner usage scenarios except at one location under the 5% afterburner scenario where the number would increase by 1 with windows open as a result of the mitigations currently being considered.

All schools that would exceed criteria $L_{eq(8hr)}$ under the original (unmitigated) scenario would also exceed the criteria $L_{eq(8hr)}$ under the potential mitigation scenario being considered. The $L_{eq(hr)}$ at some locations would decrease by as much as 3 dB while other locations would remain the same or increase by up to 1 dB under any of the afterburner usage scenarios. The number of indoor events per average hour with potential to interfere with speech would remain the same or increase by 1 as a result of the mitigations currently being considered.

The probability of being awakened at least once per night would remain the same or decrease by one at the locations studied as a result of the mitigations currently being considered.

Potential hearing loss risk would be minimal in accordance with DoD policy under the potential mitigation scenario being considered and also under the original unmitigated scenario.

4.4 LAND USE

The definition of this resource is described in Section 3.4, *Land Use*.

4.4.1 Resource-Specific Analysis Methodology

The method for analyzing land use impacts at Selfridge ANG Base and training airspace is the same as described in Section 3.4.1.1, *Ebbing ANG Base and Surrounding Area*, and Section 3.4.1.2, *Affected Airspace*, to include issues not analyzed for land use compatibility under Alternative 2. However, the analysis of land use compatibility around Selfridge ANG Base uses noise and safety criteria defined in the DoD Instruction (DoDI) 4165.57, *Air Installation Compatible Use Zones (AICUZ)*, as opposed to FAA criteria utilized under the Preferred

Alternative. These are provided in Volume II, **Appendix B**, *Land Use Supporting Information*, Table 1 and Table 2.

4.4.2 Alternative 2 Affected Environment

4.4.2.1 Selfridge ANG Base and Surrounding Area

This EIS draws from the recently completed DAF F-35A Operational Beddown EIS (USAF, 2020b) to describe land use conditions and the jurisdiction in the vicinity of the installation.

Selfridge ANG Base is located in Macomb County in southeast Michigan. The base is bounded by Harrison Township to the west, south, and southeast. Chesterfield Township is located to the north and Lake St. Clair to the east. **Figure 4.4-1** shows land use directly south of Selfridge ANG Base is primarily residential, with small sections of commercial, parks/open space, and public/semi-public use. Residential and marina/harbor waterfront areas are between the base and the lake to the southeast. South of North River Road, along the waterfront, residential land use is intermixed with commercial use and recreational use with parks and public pathways. The area to the west, between the Base and I-94 is predominantly industrial use or open space. Further west beyond I-94, land use of Selfridge ANG Base is a mix of various land uses, including manufacturing, commercial, public/semi-public, manufactured homes, parks/open space, and residential. Similar land uses occur to the north of Selfridge ANG Base, with a mixture of agricultural/open-space/vacant land, water, public/quasi-public land, residential areas, and commercial use intermixed with light industrial businesses. A former water area (shown on **Figure 4.4-1** as #2 in the north accident potential zone [APZ] I) is zoned for a planned unit development (PUD) and has two stormwater detention ponds. Further north, residential land predominates with commercial use at key intersections and along major roadways. An area categorized as water (shown on **Figure 4.4-1** as #1 in APZ II) is open/vacant land undergoing a partnership arrangement with Chesterfield Township and Six Rivers land conservancy to protect this area from future incompatible development. A small area of commercial land (shown on **Figure 4.4-1** as #3 in the north APZ I) is currently vacant and was rezoned in 2018 for commercial use within a PUD.

Land use planning in the area surrounding Selfridge ANG Base is accomplished by Macomb County, Chesterfield Township, and Harrison Township together. Rather than developing county-wide plans or growth policies, the Macomb County Planning Commission assists local units of governments, such as Harrison and Chesterfield Townships, in establishing their own land use goals and plans. Harrison Township has also incorporated the Selfridge ANG Base AICUZ study into its master plan and planning principles (USAF, 2020b).

Currently, no off-base areas experience noise levels at or greater than 65 dB DNL. Some off-base residential areas immediately to the south of the runway have experienced incompatible noise levels greater than 65 dB DNL in the past.

Figure 4.4-1 also illustrates clear zones (CZs) and APZs at Selfridge ANG Base. **Table 4.4-1** indicates that 23 acres of incompatible residential development are within the southern CZ, a zone where no occupied uses should occur. Also, both the north and south CZ are traversed by major public roadways—North River Road in the south and William P Rosso Highway in the north. Both of these roads comply with runway obstacle clearance criteria. Selfridge ANG Base owns the majority of the land in the northern CZ and has purchased easements in the remainder of the land that prevent incompatible development (USAF, 2020b). In the southern CZ, the majority of the area south of the Clinton River has been developed as single-family

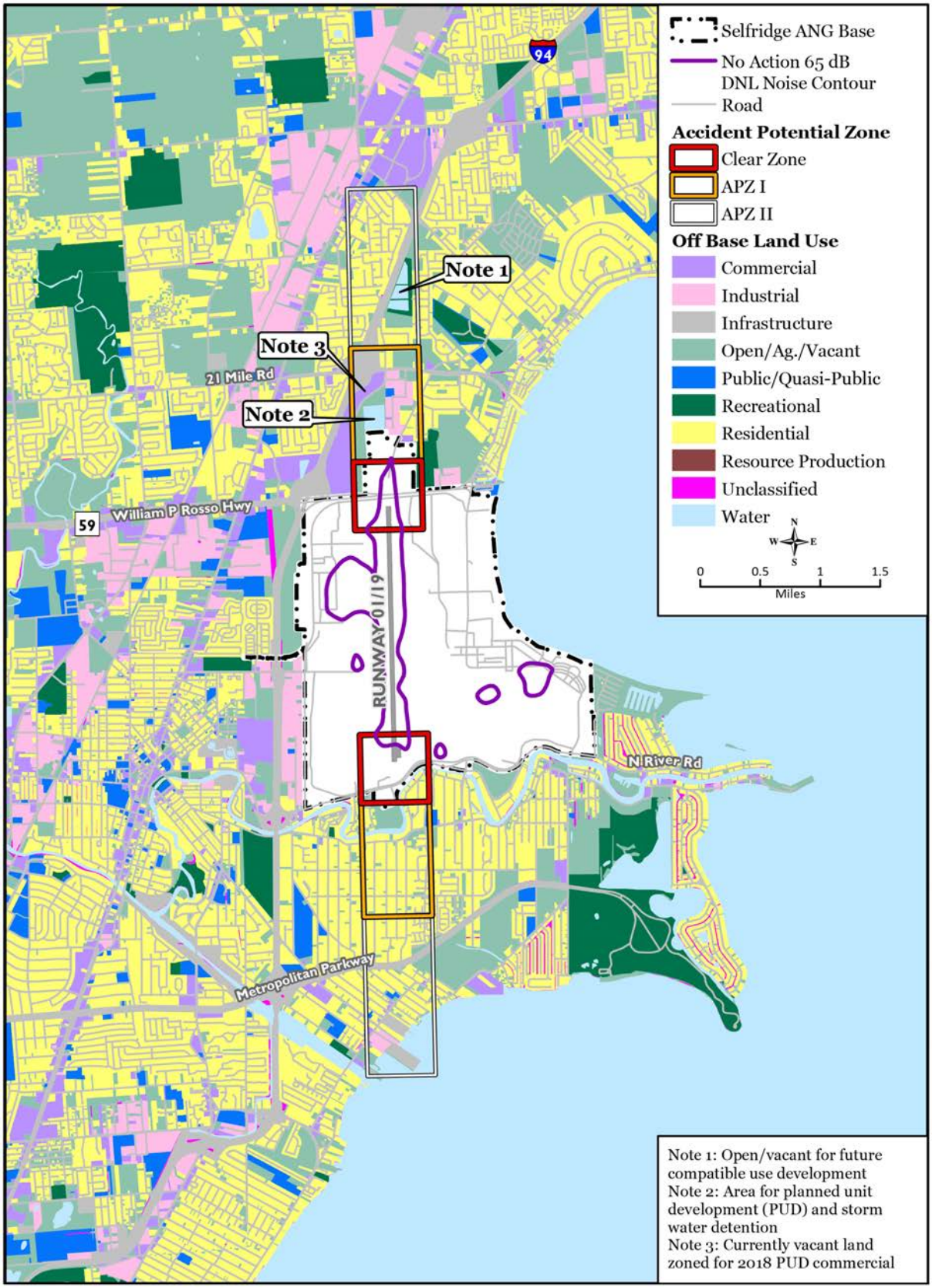

Figure 4.4-1. Land Use Surrounding Selfridge ANG Base

Sources: (Southeast Michigan Council of Governments, 2022; BRRC, 2022c; ESRI Data & Maps, 2019a)

residential for several decades. This residential area has been excluded from eminent domain acquisition per a 1979 Secretary of the Air Force memo (USAF, 2020b), and a waiver package is currently under review by NGB.

Table 4.4-1. Land Use Within the APZs and CZs - Selfridge ANG Base (acres)

Land Use	CZ	APZ I	APZ II
Agricultural/open space/vacant	24	131	112
Commercial	0	29	14
Industrial	0	50	16
Public/quasi public [a]	0	6	4
Recreational [b]	7	4	17
Residential	23	267	475
Transportation	10	118	212
Unclassified [c]	0	0	0
Water [d]	10	36	113
Selfridge ANG Base	338	47	0
Total	**412**	**688**	**963**

Source: Data derived from GIS data (see Figure 4.4-1)
Key: ANG = Air National Guard; APZ = accident potential zone; CZ = clear zone
Notes:
a. The public/quasi-public land – North APZ I includes a police station (marginally compatible); south APZ II includes a mostly vacant lot with industrial-type structures by L'Anse Creuse High School.
b. Residential land is incompatible within south CZ. South APZ I mostly includes low- to medium-density single-family residential (marginally compatible), and higher-density residential is incompatible in APZ I.
c. Unclassified lands coincide with major arterial roadways and waterfront marinas.
d. Water land use includes section of the Clinton River.

4.4.2.2 Affected Airspace

The area underlying the training airspace (14,516,870 acres/22,683 square miles), referred to as the ROI, is within the jurisdictional boundaries of the state of Michigan. The underlying area is 52 percent land and 48 percent water. **Table 4.4-2** shows that about 43 percent of this area is managed by various federal and state surface owners/managers. Federal (28 percent) and state (15 percent) lands generally have defined purposes and management frameworks that support the public interest, ranging from extractive and productive uses to passive use and conservation.

Table 4.4-2. Surface Management in the ROI – Alternative 2

Surface Management	Area (Acres)	Portion of ROI (%)
Federal	3,987,010	27.5%
Local [a]	9,700	0.1%
Non-government organization [b]	11,020	0.1%
Private [c]	70,280	0.5%
State [d]	2,150,120	14.8%
Tribal [e]	5,910	0.0%
Total Managed Area	**6,234,040**	**42.9%**
Not a Managed Area [f]	8,282,830	57.1%
Alternative 2 footprint (ROI) [g]	14,516,870	

Source: (USGS, 2020)
Key: % = percent; ROI = region of influence
Notes:
a. Owned/managed by a local authority (public land)
b. Usually owned by a private entity (such as Nature Conservancy) used for conservation purposes
c. Similar to above; private land designated for specific management purpose
d. Owned/managed by the state of Michigan (public land)
e. Tribal land; part of a designated Indian reservation; includes small portions of six Tribes
f. Private land with no designated purpose, or areas of Great Lakes not under governmental management
g. Total area underlying the combined footprint of the training airspace for Alternative 2

The ROI encompasses portions of 19 counties, including Alcona, Alpena, Arenac, Charlevoix, Cheboygan, Chippewa, Crawford, Emmet, Huron, Iosco, Mackinac, Montgomery, Ogemaw, Oscoda, Otsego, Presque, Isle, Roscommon, Sanilac, and Tuscola. The ROI includes 5,910 acres of tribal land, comprised portions of six Indian reservations. Tribal authorities manage the uses of the lands in their sovereign areas. Only one town, Alpena, has a population over 5,000, although there are several small rural communities throughout the region and along lake shorelines. Many of the lakeshore communities swell in population during the summer months.

The terrain is predominantly flat with some areas of higher elevation and rolling terrain. The land is carved out by morainic lakes and is mostly covered by forest, agricultural fields, and pastureland. Industries and livelihoods are mostly centered around providing local services, tourism, forestry, resource extraction (mostly gravel, limestone, and dolomite), agriculture, utility industries, recreation (hunting and fishing), and natural gas production. Land use associated with these industries and businesses are scattered throughout the region, and many involve outdoor activities.

Figure 4.4-2 shows the managed land areas within the ROI. The managed federal lands underlying the training airspace are listed in Volume II, **Appendix B**, *Land Use Supporting Information*, Table 8: Federal Managed Areas in the ROI – Alternative 2, Table 10: Wilderness Areas in the ROI – Alternative 2, and Table 11: Wild and Scenic Rivers in the ROI – Alternative 2. Under federal management, the ROI includes all or portions of five national forests, four national wildlife refuges, a research natural area and Thunder Bay National Marine sanctuary, four recreation-focused areas and trails, portions of four roadless areas, and two military reserves. Areas under state management are numerous and listed in **Appendix B** Section B.1.4 (Supporting Information for the Selfridge ANG Base Region of Influence – Alternative 2). These state-managed areas include 20 state parks, 7 Great Lakes bottomland preserves, portions of 15 state forest areas, several state and forest natural areas, 5 state recreation areas, and 38 state game and Wildlife Management Areas.

Areas identified as “not managed” in **Table 4.4-2** above include a large amount of water area managed by the NOAA Thunder Bay National Marine Sanctuary. The remainder of the Great Lakes water areas are under the management of the state of Michigan. The remaining area (land-based) is private land, which is under the jurisdiction of various local authorities (county and municipal). A small amount of land held by private entities (such as non-government organizations) for specific purposes, mostly conservation, would fall under the management controls of county ordinances and state laws.

The ROI includes portions of seven Wilderness Areas (see Volume II, **Appendix B**, *Land Use Supporting Information*, Table 10: Wilderness Areas in the ROI – Alternative 2). The locations of these areas are shown on **Figure 4.4-2**. Two of these Wilderness Areas are under management of the USFWS, Beaver Basin Wilderness is managed by the NPS, and the remaining four are managed by the U.S. Forest Service.

The ROI overlies portions of 15 Wild and Scenic Rivers (including river branches) (see Volume II, **Appendix B**, *Land Use Supporting Information*, Table 11: Wild and Scenic Rivers in the ROI – Alternative 2). The table indicates the length of each river and length of segments by value for wild, scenic, and recreational qualities.

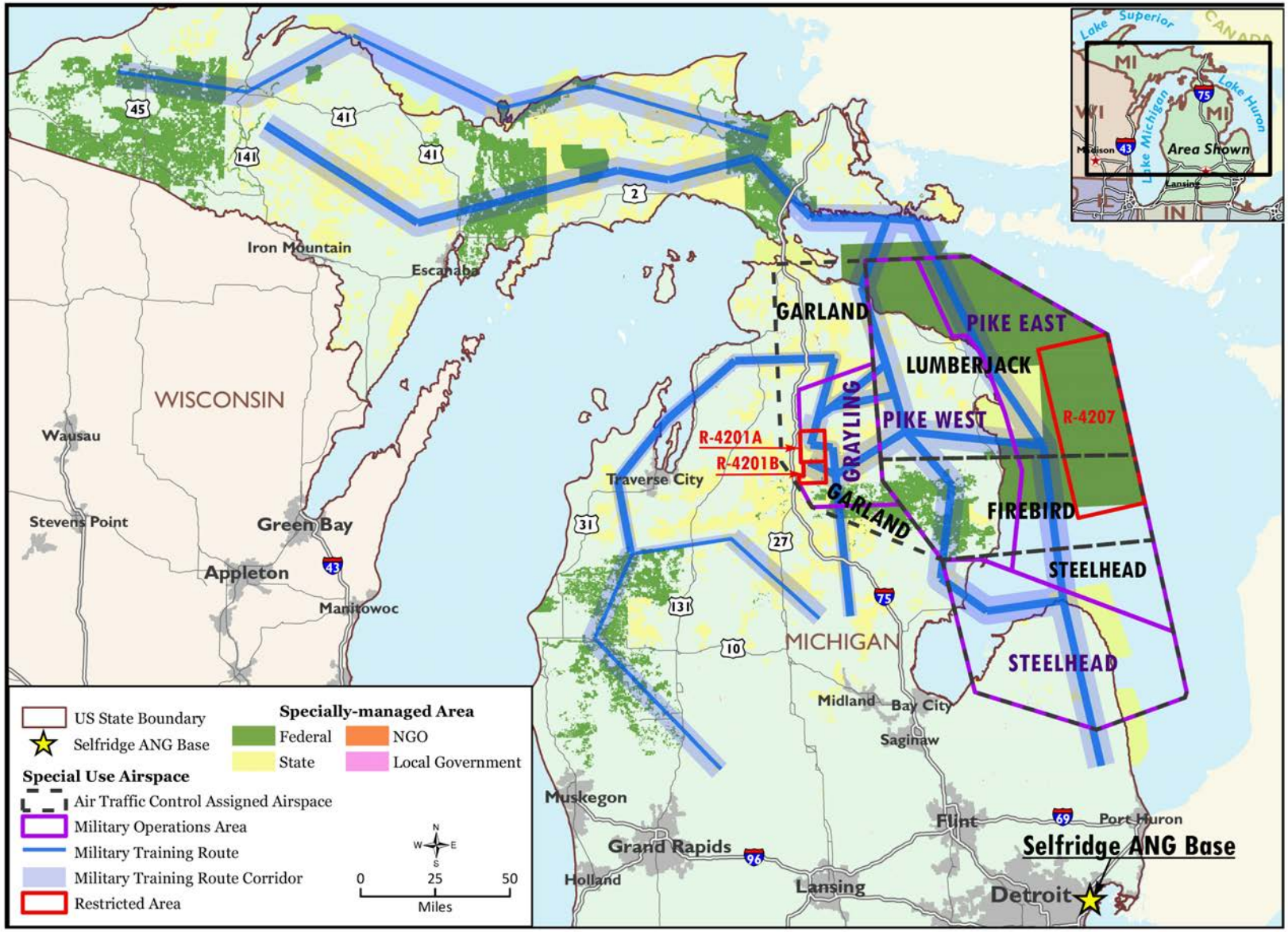

Figure 4.4-2. Surface Management and Specially Managed Areas in the ROI – Alternative 2

Sources: (ESRI Data & Maps, 2019a; ESRI Data & Maps, 2019c; USCB, 2018a; FAA, 2021a; FAA, 2021b; USGS, 2020)

Like the Preferred Alternative, the ROI for Alternative 2 includes networks of road, communications, and utility infrastructure. The ROI has historically been very popular for recreation, hunting and fishing all year, and lakeside uses and vacation-home use during the summer. Land under R-4201 overlies DoD-owned Grayling Range, encompassing about 147,000 acres.

One of the primary uses and values of the land within the ROI is outdoor recreation. The state of Michigan has extensive forests, game management areas, lakes, and streams. Hunting, fishing, and hiking/biking are among the most popular outdoor activities. The Michigan Department of Natural Resources (DNR) manages licensing of fishing and hunting, sets bag limits based on wildlife populations, establishes the season for various species, and manages lotteries for some species. Also popular are winter sports and snowmobiling, camping, scenic driving, off-road vehicle riding, horseback riding, mushroom gathering, shooting, swimming and boating, nature viewing, and historical observation and study. Due to the popularity and impact of recreation on the economy, DNR has established the Office of Outdoor Recreation Industry. This office estimates that 63 percent of Michigan residents participate in outdoor activity annually. Recreation on Wild and Scenic Rivers provides exceptional opportunities for remote and challenging experiences, particularly for rafting and fishing. The Ontanagon River and its branches are highly valued for recreational qualities. Similarly, Wilderness Areas provide solitude and/or primitive and unconfined recreation where motorized equipment is not allowed.

The ROI is crisscrossed by an extensive network of recreational trails, for single-use (just one type of conveyance such as pedestrian, equestrian, and snow mobile) or multiple use. Most of these trails are under the management of a state agency but maintained by local volunteer organizations. The ROI overlies portions of North County National Scenic Trail, managed by the NPS. The trail is 4,700 miles in length and extends across eight states.

CGJMTC is the largest national guard training center in the country and includes a variety of large artillery, mortar, tank ranges, and maneuver courses. The primary purpose and use of this range is to support military training missions. Interstate 75 (I-75) passes through the range, dividing it into a southern and northern portion. The town of Grayling is between the western and eastern portions of the range. The area around Grayling Military Reservation is predominantly forested with interspersed agriculture. The area has many creeks and streams used for fishing and hunting; however, there is no public access for fishing and hunting on Grayling Range. Hartwick Pines State Park is located to the northeast of the reservation.

Currently, small arms activity exposes a small residential cluster of homes around Guthrie Lake to incompatible noise (between 87 and 104 dB peak noise) in the north portion (APHC, 2021). About 130 acres of private inholdings are exposed to incompatible peak noise levels. In the south portion of CGJMTC, a small amount of land outside the range boundary is exposed to 87 and 104 dB peak noise levels, but none has incompatible uses. Similarly, the same area of residential use around Guthrie Lake experiences incompatible noise levels between 62 and 70 CDNL from large-caliber sources and noticeable-to-very loud single-event peak noise levels (APHC, 2021). To manage incompatible noise in surrounding areas, CGJMTC has implemented noise abatement procedures for aircraft operating in the associated airspace, including

avoidance of the City of Grayling, Guthrie Lake, Hartwick Pines State Park, Margrethe Lake, and Wakely Lake, and 500-foot minimum altitude restrictions.

4.4.3 No Action Alternative

The affected environment under the No Action Alternative would reflect actions that are expected to have occurred by CY 2029. These are described in Section 4.12.2.2, *Cumulative Impacts, Land Use*. Implementation of the No Action Alternative (i.e., no beddown of the FMS PTC at Selfridge ANG Base) would not result in any additional impacts outside those described under Cumulative Impacts.

4.4.4 Alternative 2 Environmental Consequences

The analysis of land use impacts for Alternative 2 evaluates land use compatibility in relation to changes in noise exposure from the No Action Alternative (CY 2029); the affected environment at that time would be expected to be as described in Section 4.12.2.2, *Cumulative Impacts*, *Land Use*.

4.4.4.1 Selfridge ANG Base and Surrounding Area

The analysis of land use impacts for areas surrounding Selfridge ANG Base considers land use compatibility in relation to changes in noise exposure. **Table 4.4-3** quantifies the affected land use types by acres within 5 dB DNL increments. The table also provides information on compatibility of affected land use using the DoD compatibility guidelines from Volume II, **Appendix B**, *Land Use Supporting Information*, Table 1. **Figure 4.4-3** displays the land uses within the area affected by 65 dB DNL and greater under Alternative 2 for the 95% afterburner scenario. The 95% afterburner scenario has a slightly larger footprint than the 5% and 50% scenarios and, therefore, is used as the basis for the compatibility assessment. Note, however, that the 5% afterburner scenario footprint is narrower and extends slightly further north and south than the 95% condition (see **Figure 4.3-5**).

Under Alternative 2, noise exposure of 65 dB DNL and greater would newly affect 7,170 acres of off-base land surrounding the Selfridge ANG Base airfield. **Table 4.4-3** shows that 2,177 acres of residential land is newly exposed to incompatible noise levels of greater than or equal to 65 dB DNL. Of this, noise levels greater than or equal to 65 dB DNL (but below 70 dB DNL) would affect 1,309 acres, and noise levels greater than or equal to 70 dB DNL (but below 75 dB DNL) would affect 743 acres. Existing homes have some degree of noise attenuation from current construction. For these areas, NLR construction and/or modifications are recommended to achieve indoor-to-outdoor reductions of 25 and 30 dB DNL. For 125 acres of residential land exposed to projected noise of greater than or equal to 75 dB DNL, residential land use and related structures are not compatible under DoDI 4165.70, *Real Property Management*, guidelines.

Commercial uses (423 acres) surrounding the airfield are generally suitable with projected noise levels of up to 80 dB DNL exposure with appropriate NLR construction for indoor occupied areas where the public is received. Only 1 acre of commercial land exceeds greater than or equal to 80 dB DNL, and only wholesale, hardware and building equipment and farms equipment sales are compatible with this level of noise with 35 dB NLR for inside areas. Similarly, industrial, transportation, and infrastructure uses are generally compatible, with

appropriate NLR for occupied structures, except for 10 acres exposed to greater than or equal to 80 dB DNL, which is not suitable for precision manufacturing at the north end of the airfield.

Table 4.4-3. Land Use Compatibility and Noise Exposure Surrounding Selfridge ANG Base (95% Afterburner Condition) – Alternative 2 (in Acres)

95% Afterburner Scenario	dB DNL (Acres Exposed)				
Land Use	**≥65<70**	**≥70<75**	**≥75<80**	**≥80<85**	***Total***
Agricultural/open space/vacant [1]	797	216	126	3	1,142
Commercial [2]	291	103 [a]	28 [a]	1 [b]	423
Industrial [3]	482	23 [i]	37 [i]	10 [d]	552
Public/quasi-public [4]	80 [i]	18 [f]	2 [g]	1	101
Recreation [5] [h]	96	56	20	0	172
Residential [6] [i]	1,309	743	125	0	2,177
Transportation/infrastructure [7] [j]	609	316	80	1	1,006
Unclassified	20	0	0	0	20
Water	1,450	73	47	7	1,577
Total	**5,134**	**1,548**	**465**	**23**	**7,170**

Source: (Southeast Michigan Council of Governments, 2022)

Key: ≥ = greater than or equal to; < = less than; % = percent; ANG = Air National Guard; dB = decibels; DNL = day-night average sound level; FAA = Federal Aviation Administration; GIS = geographic information system; NLR = noise level reduction

Notes:

Green = Compatible; Orange = Some uses allowed, with conditions as noted; Red = Incompatible

GIS data was aggregated into selected categories to allow correlation to FAA guidelines to the extent possible, as listed below.

Use table in conjunction with Volume II, Appendix B, *Land Use Supporting Information*, Table 1.

1. Agricultural use exceptions include livestock farming incompatible at levels greater than 75 dB DNL. Associated residential buildings are allowed up to 75 dB DNL with NLR of at least 25 dB and 30 dB.
2. Commercial includes offices, business, professional, wholesale and large-item retail, hardware, and general retail.
3. Industrial includes general manufacturing, photographic and optical, and productive uses (mining, fishing, resource extraction and production).
4. Public/quasi-public includes schools, hospitals, nursing homes, churches, concert halls, and government buildings.
5. Recreation includes outdoor arenas and performance spaces, parks, zoos, golf courses, stables, water parks, amusement parks, resorts, and camps. Associated structures where public gather generally require NLR construction.
6. Residential includes residential single and multi-unit dwellings and transient lodging. Mobile home parks are not allowed at levels ≥65 dB DNL.
7. Transportation/infrastructure includes roads, rail, utility infrastructure, and parking. Associated inhabited structures require appropriate NLR construction.

a. Commercial retail, restaurants, professional offices, malls, shopping centers, home improvement stores, wholesale, hardware and building equipment and farms equipment sales are suitable with 25 and 30 dB NLR construction for ≥70 and ≥75 dB DNL exposure, respectively.
b. Only wholesale, hardware and building equipment and farms equipment sales are suitable with NLR 35 dB.
c. Land use consists of industrial uses and manufacturing with appropriate NLR construction for public and occupied areas as per Volume II, Appendix B, Table 1.
d. Land is not suitable for precision manufacturing.
e. Hospitals, schools, and development services require NLR 25 dB. Nursing homes do not recommend but require NLR of 25 dB.
f. Nursing homes do not recommend but require NLR 30 dB. Schools, hospitals, child care and developmental services, nursing homes, churches, concert halls, and government buildings are suitable with requisite NLR construction (see Volume II, Appendix B, Table 1).
g. Schools, hospitals, and child care and developmental services are incompatible.
h. Outdoor music and amphitheaters are not suitable at levels greater than 65 dB. Sports arenas require special sound systems. Other indoor sports activities require NLR up to 80 dB DNL locations. Locations ≥75 dB DNL are only suitable for outdoor recreation. No recreational activities in areas are exposed to ≥80 dB DNL.
i. NLR construction for residential and transient lodging are exposed to ≥65<75 of 25–30 dB. There is no residential use ≥75 dB DNL. Transient lodging requires 35 dB NLR ≥75<80 dB DNL. There is no transient lodging ≥80 dB DNL. Residential (including transient lodging) is generally prohibited except where the community determines that residential or school uses must be allowed; measures to achieve outdoor-to-indoor NLR of at least 25 dB in DNL 65–70 and 30 dB in DNL 70–75 should be incorporated into building codes. Normal residential construction can be expected to provide a NLR of 20 dB; thus, the reduction requirements are often stated as 5, 10, or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year-round. However, the use of NLR criteria will not eliminate outdoor noise problems. NLR of at least 25 dB in DNL 65-70 and 30 dB in DNL 70-75 should be incorporated into building codes.
j. Transportation and infrastructure are generally acceptable in noise exposures up to 85 dB DNL. Associated occupied structures will require recommended NLR. Telephone, cellular, and radio communication are not recommended at ≥80 dB DNL.

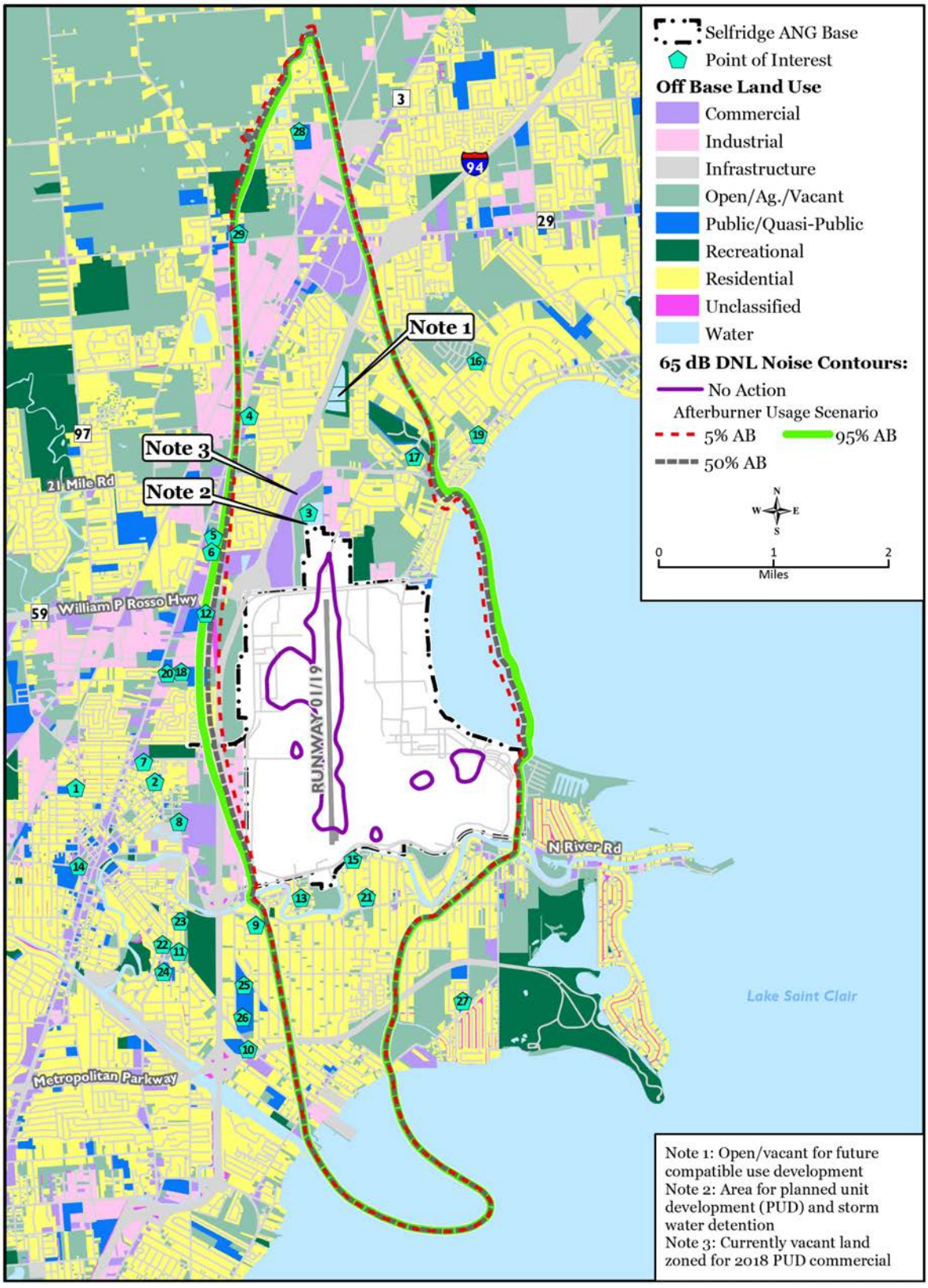

Figure 4.4-3. Noise Exposure and Land Use Surrounding Selfridge ANG Base – Alternative 2

Sources: (Southeast Michigan Council of Governments, 2022; BRRC, 2022c; Selfridge ANG Base, 2021; ESRI Data & Maps, 2019a)

The public/quasi-public land use category includes a variety of uses, including schools, hospitals, nursing homes, churches, concert halls, government buildings, and other cultural facilities. Some of these facilities may be situated within residential or commercial use areas. To assist with interpreting effects on these varied uses, **Table 4.3-8** (Day-Night Average Sound Level at Representative Noise-Sensitive Locations Under Alternative 2) provides projected noise exposure for selected noise-sensitive schools, places of worship, parks, and healthcare facilities surrounding the airfield. In general, these uses are acceptable up to 75 dB DNL exposure with recommended indoor-to-outdoor NLR construction (see Volume II, **Appendix B**, *Land Use Supporting Information*, Table 1). Three acres exposed to noise levels of greater than or equal to 75 dB DNL are incompatible.

Recreational use accounts for 172 acres that would experience noise levels greater than or equal to 65 dB DNL but less than 80 dB DNL. All outdoor uses are compatible with these levels. Indoor recreation facilities would require appropriate NLR construction to meet compatibility guidelines.

The category of agricultural/open-space/vacant land accounts for 1,142 acres. The exposed area includes little-to-no commercial agriculture. Open space and vacant land are compatible with projected noise levels but have the potential for future development. Permits and approval of future development by adjacent jurisdictions would minimize incompatible development provided that updated noise exposure maps are used in these processes.

Almost 1,600 acres of water along the Clinton River and Lake St. Clair would experience noise levels of greater than or equal to 65 dB DNL up to 85 dB DNL. Recreational use of these water bodies is compatible with these levels, but some users may experience the increase in noise from aircraft operations at the airfield as detrimental.

Overall, projected noise impacts on land use compatibility are significant due to the substantial increase in residential land exposed to incompatible noise levels.

4.4.4.2 Affected Airspace

Impacts on land use under the affected airspace (also called the airspace ROI or SUA) associated with Alternative 2 are similar to those described for the Preferred Alternative airspace ROI, described in Section 3.4.1.2, *Land Use, Resource-Specific Analysis Methodology, Affected Airspace*. This section focuses on the specific change in noise exposure under Alternative 2 and how this impacts the land uses underlying the Selfridge ANG Base airspace ROI.

Overall, underlying the MOAs and MTRs, noise increases would range from 0 to 13.1 L_{dnmr} (11.8 DNL), with projected levels ranging from less than 45 dBA L_{dnmr} up to 58 dBA L_{dnmr}/57 DNL. Where MTRs overlap with the Steelhead East Low MOA, Grayling East MOA, and Pike West MOA, the increases would be substantial and noticeable for people who reside in the area. However, the projected noise levels are compatible with all land use categories, including residential, in areas with development or active industrial/resource production operations, according to AICUZ guidelines (see Volume II, **Appendix B**, *Land Use Supporting Information*, Table 1). Avoidance of inhabited locations and structures by a minimum of 500 feet AGL provides a small reduction in overhead noise under the low MOAs. Most of the underlying region affected by these changes in noise exposure is undeveloped land (not urbanized), supporting natural resource productive uses or outdoor recreation. Both fishing and hunting are popular and have coexisted with some level of military use of the SUA. Projected noise levels are compatible with underlying uses, but in quiet areas, the increases may have minor-to-

moderate impacts on uses that benefit from quiet surroundings. Residents in small communities may notice the increase in daily noise.

Projected noise levels in the areas under the restricted airspace associated with CGJMTC would increase by 5 to 9 dBA L_{dnmr}/DNL to levels up to 66 L_{dnmr}/65 dB DNL. Levels greater than 65 dBA L_{dnmr}/DNL are not compatible with noise-sensitive uses (see Section 3.4.1.2, *Land Use, Resource-Specific Analysis Methodology, Affected Airspace*) such as residential use and some specially protected areas. Dispersed homes in the surrounding area and private inholdings on CGJMTC may experience incompatible noise levels. Overflight of the town of Grayling and Guthrie Lake area is avoided, reducing noise exposure by a small amount.

Peak noise levels from proposed air gunnery strafing operations by the F-35 A and F-16 proposed operations would be less than current peak levels of A-10 aircraft and would be contained within the CGJMTC boundary. Residents in homes underlying R-4201 and R-4202 and around Guthrie Lake and KP Lake in the north portion of CGJMTC would experience a noticeable increase in loud single events from aircraft using the restricted airspace, with events greater than 85 dBA L_{max} increasing from about one every day to five per day. These noise intrusions may annoy some residents, but it is unlikely that surrounding land uses would change since areas around CGJMTC have experienced some degree of elevated aircraft and munitions-related noise for decades. Additional information on noise effects on speech communication are provided in the noise analysis in Section 4.3.4.2, *Noise, Alternative 2 Environmental Consequences, Affected Airspace*.

Supersonic operations in the overlying ATCAAs (see **Figure 2.3-2**, Selfridge ANG Base Operational Airspace and Ranges) would cause a minimal increase from 45.0 to 45.6 CDNL. This would remain well below threshold levels for compatible land use in the underlying region. People may hear a few additional sonic booms each year, particularly in areas underlying the Pike MOAs. Supersonic operations would have minimal impact on land use.

Six of the seven Wilderness Areas underlying the Alternative 2 SUA are in the Upper Peninsula region of Michigan. The areas would experience little change in noise from activity on overlying MTRs with noise levels remaining below 45 dBA L_{dnmr} with no change in loud overflights (greater than 85 dBA L_{max}). Most of the Michigan Islands National Wildlife Refuge Wilderness Area under the Pike West MOA would experience minimal increase in noise, however, the portions underlying VR1625/1645 would experience noise levels of 57.9 dBA L_{dnmr}/56.3 DNL and substantial increases of 11 to 13 dBA in these underlying areas. Loud overflights (greater than 85 dBA L_{max}) increasing from about one per week to about two or three per week. This would represent a moderate-to-high impact on this Wilderness Area, affecting two characteristic qualities for wilderness (solitude and primitive recreation and natural qualities affecting wildlife) (see Volume II, **Appendix B**, *Land Use Supporting Information*, Section B.1.2.3). Effects on wildlife and ecological systems under Alternative 2 are addressed in more detail in Section 4.8.4.2, *Biological Resources, Alternative 2 Environmental Consequences, Affected Airspace*. Overall, wilderness resources would experience low impacts under Alternative 2.

Section 3.4.4.2, *Land Use, Preferred Alternative Environmental Consequences, Affected Airspace*, describes potential effects on Wild and Scenic Rivers and the users of these resources. Under Alternative 2, 11 Wild and Scenic Rivers (listed in Volume II, **Appendix B**, *Land Use Supporting Information*, Table 11: Wild and Scenic Rivers in the ROI – Alternative 2) would experience minimal change in noise, and 1 river, the AuSable Wild and Scenic River under the Pike West MOA, would experience a minor 0.5 dBA L_{dnmr}/DNL increase with levels of 45.2 dBA

L_{dnmr}/DNL and up to one or two loud overflights (greater than 85 dBA L_{max}) per week. Occasional low overflights would have no effect on scenic qualities but could annoy recreators on rare occasions. Overall, noise effects and overflights would result in minimal adverse effects on Wild and Scenic Rivers under Alternative 2.

For recreational uses, the projected changes in noise would vary in underlying areas and are generally minimal (similar to those described in Section 3.4.4.2, *Land Use, Preferred Alternative Environmental Consequences, Affected Airspace*). Overall, impacts on most recreational uses from projected noise exposure and loud overflights would remain low and not noticeably different to current conditions in most underlying locations, including the North Country Trail. Potential for startle effects from loud single overflights is low but can have adverse effects on individuals partaking in high-risk recreational activities requiring concentration. Local clubs or individuals should coordinate the locations and times of these activities with airspace managers to minimize impacts.

Noise from military overflights would have minimal impact on the continued management of these areas by various state and federal agencies (see Section 3.4.4.2, *Land Use, Preferred Alternative Environmental Consequences, Affected Airspace*). Established protocols and coordination of management actions can minimize potential conflicts between multiple uses, fire management activities, and military aircraft operations. Specific impacts on biological or cultural resources are addressed in Section 3.8.4.2 (*Biological Resources, Affected Airspace*) and Section 3.7.4.2 (*Cultural Resources, Affected Airspace*). Coordination between permitting authorities, FAA, and the DAF minimizes the potential for development of incompatible large-scale infrastructure and energy projects in the future.

4.4.5 Mitigations

4.4.5.1 Selfridge ANG Base and Surrounding Areas

Section 4.3.5, Noise, Mitigations, describes several potential adjustments in flight procedures the DAF is considering that can reduce noise levels to some degree. **Figure 4.4-4** depicts the 65 dB DNL noise contours based on the 5%, 50%, and 95% mitigated afterburner usage scenarios as shown in **Table 4.4-4**, **Table 4.4-5**, and **Table 4.4-6**.

As shown in **Figure 4.4-4** and **Table 4.4-4**, **Table 4.4-5**, and **Table 4.4-6**, the potential mitigation scenarios being considered would reduce DNL relative to the unmitigated operational scenarios in some areas while other areas would see a minor increase. Of particular note, the total off-base/airport residential land area (acres) exposed to noise levels exceeding 65 dB DNL under the mitigated 5% afterburner scenario would be reduced by 3% relative to the unmitigated scenario; residential acres exposed to noise levels exceeding 70 dB DNL would be reduced by 21% relative to the unmitigated scenario; residential acres exposed to noise levels exceeding 75 dB DNL would be reduced by 11% relative to the unmitigated scenario; no residential land area would be exposed to more than 80 dB DNL under mitigated or unmitigated scenarios.

The total off-base/airport residential land area exposed to noise levels exceeding 65 dB DNL under the mitigated 50% afterburner scenario would be reduced by 5% relative to the unmitigated scenario; residential land areas exposed to noise levels exceeding 70 dB DNL would be reduced by 21% relative to the unmitigated scenario; residential land areas exposed to noise levels exceeding 75 dB DNL would be reduced by 21% relative to the unmitigated scenario; no residential land area would be exposed to more than 80 dB DNL under mitigated or unmitigated scenarios.

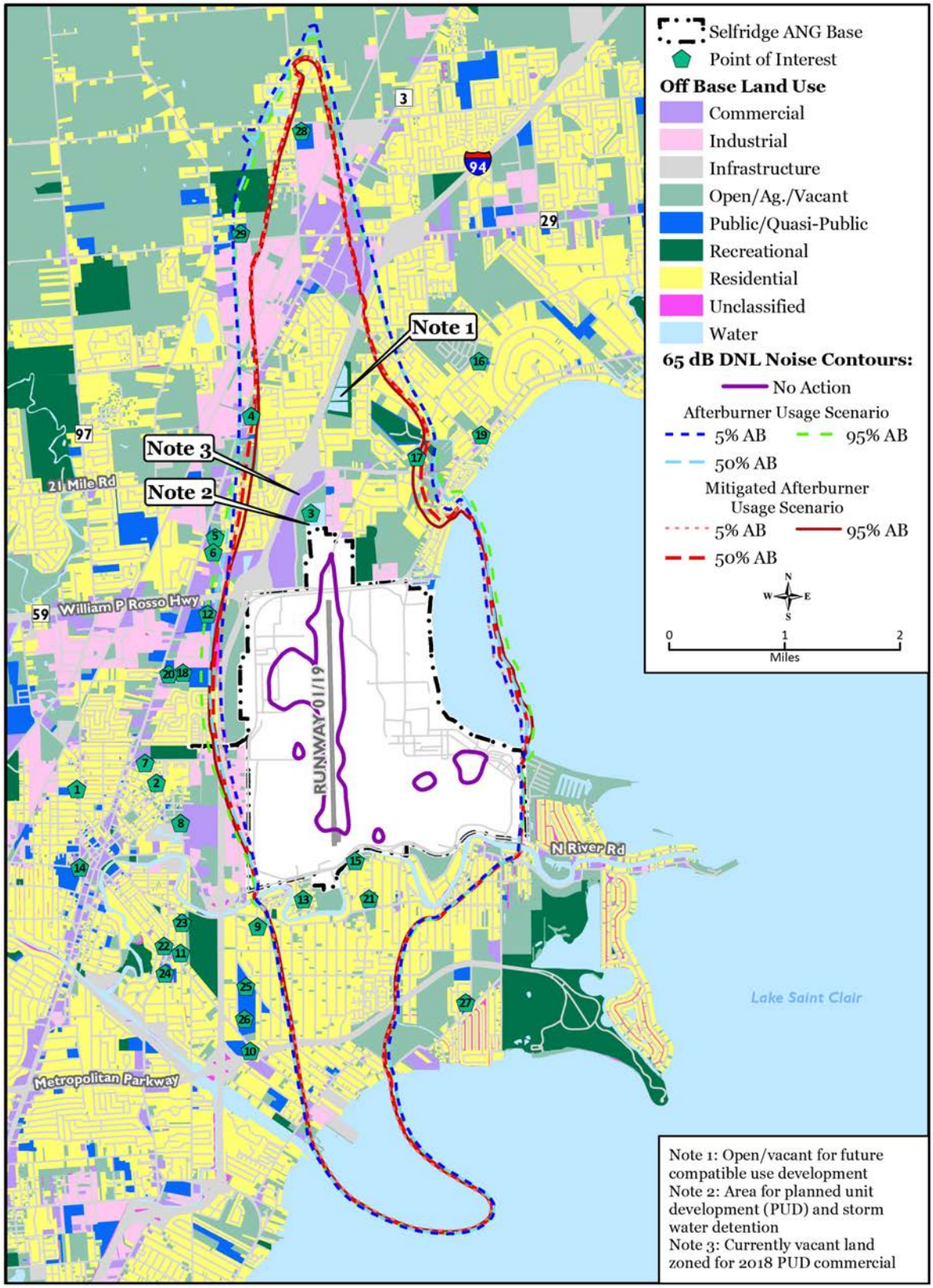

Figure 4.4-4. Noise Exposure and Land Use Surrounding Selfridge ANG Base – Alternative 2 – Mitigated

Sources: (Southeast Michigan Council of Governments, 2022; ESRI Data & Maps, 2019a; Selfridge ANG Base, 2021; BRRC, 2022d)

Table 4.4-4. Land Use Compatibility and Noise Exposure Surrounding Selfridge ANG Base Unmitigated (U) versus Mitigated (M) 5% Afterburner Condition

Land Use Category	65 dB DNL (acres)			% Change	70 dB DNL (acres)			% Change	75 dB DNL (acres)			% Change	> 80 dB DNL (acres)			% Change	Total (acres)				% Change
	NA	U	M		NA	U	M		NA	U	M		NA	U	M		NA	U	M	Change	
Agricultural/Open Space/Vacant	0	809	674	-17%	0	198	174	-12%	0	129	116	-10%	0	4	2	-50%	0	1,140	966	-174	-15%
Commercial	0	273	236	-14%	0	118	88	-25%	0	23	22	-4%	0	1	0	-100%	0	415	346	-69	-17%
Industrial	0	438	330	-25%	0	18	20	11%	0	34	39	15%	0	14	6	-57%	0	504	395	-109	-22%
Public/Quasi-Public	0	65	58	-11%	0	19	12	-37%	0	1	3	200%	0	2	0	-100%	0	87	73	-14	-16%
Recreational	0	108	55	-49%	0	62	49	-21%	0	15	14	-7%	0	0	0	0%	0	185	118	-67	-36%
Residential	0	1,239	1,208	-3%	0	751	590	-21%	0	126	112	-11%	0	0	0	0%	0	2,116	1,910	-206	-10%
Roadway	0	559	546	-2%	0	301	255	-15%	0	86	68	-21%	0	1	1	0%	0	947	870	-77	-8%
Unclassified	0	4	4	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%	0	4	4	0	0%
Water	0	1,330	1,272	-4%	0	65	54	-17%	0	45	49	9%	0	9	5	-44%	0	1,449	1,380	-69	-5%
Total	**0**	**4,825**	**4,383**	**-9%**	**0**	**1,532**	**1,242**	**-19%**	**0**	**459**	**423**	**-8%**	**0**	**31**	**14**	**-55%**	**0**	**6,847**	**6,062**	**-785**	**-11%**

Source: Data derived from GIS data (see Figure 4.3-8, Figure 4.4-4, and Table 4.3-14)
Key: % = percent; - = minus; ANG = Air National Guard Base; dB = decibels; DNL = day-night average sound level; M = mitigated; NA = No Action Alternative; U = unmitigated

Table 4.4-5. Land Use Compatibility and Noise Exposure Surrounding Selfridge ANG Base Unmitigated (U) versus Mitigated (M) 50% Afterburner Condition

Land Use Category	65 dB DNL (acres)			% Change	70 dB DNL (acres)			% Change	75 dB DNL (acres)			% Change	> 80 dB DNL (acres)			% Change	Total (acres)				% Change
	NA	U	M		NA	U	M		NA	U	M		NA	U	M		NA	U	M	Change	
Agricultural/Open Space/Vacant	0	812	665	-18%	0	205	175	-15%	0	128	105	-18%	0	3	1	-67%	0	1,148	946	-202	-18%
Commercial	0	283	236	-17%	0	110	88	-20%	0	25	19	-24%	0	1	0	-100%	0	419	343	-76	-18%
Industrial	0	457	343	-25%	0	22	22	0%	0	35	40	14%	0	12	2	-83%	0	526	407	-119	-23%
Public/Quasi-Public	0	63	57	-10%	0	18	12	-33%	0	2	3	50%	0	2	0	-100%	0	85	72	-13	-15%
Recreational	0	103	56	-46%	0	59	48	-19%	0	18	11	-39%	0	0	0	0%	0	180	115	-65	-36%
Residential	0	1,271	1,203	-5%	0	747	568	-24%	0	125	99	-21%	0	0	0	0%	0	2,143	1,870	-273	-13%
Roadway	0	594	565	-5%	0	309	256	-17%	0	83	54	-35%	0	1	1	0%	0	987	876	-111	-11%
Unclassified	0	18	9	-50%	0	0	0	0%	0	0	0	0%	0	0	0	0%	0	18	9	-9	-50%
Water	0	1,393	1,306	-6%	0	68	55	-19%	0	46	49	7%	0	8	5	-38%	0	1,515	1,415	-100	-7%
Total	**0**	**4,994**	**4,440**	**-11%**	**0**	**1,538**	**1,224**	**-20%**	**0**	**462**	**380**	**-18%**	**0**	**27**	**9**	**-67%**	**0**	**7,021**	**6,053**	**-968**	**-14%**

Source: Data derived from GIS data (see Figure 4.3-8, Figure 4.4-4, and Table 4.3-14)
Key: % = percent; - = minus; ANG = Air National Guard Base; dB = decibels; DNL = day-night average sound level; M = mitigated; NA = No Action Alternative; U = unmitigated

Table 4.4-6. Land Use Compatibility and Noise Exposure Surrounding Selfridge ANG Base Unmitigated (U) versus Mitigated (M) 95% Afterburner Condition

Land Use Category	65 dB DNL (acres)			% Change	70 dB DNL (acres)			% Change	75 dB DNL (acres)			% Change	> 80 dB DNL (acres)			% Change	Total (acres)				% Change
	NA	U	M		NA	U	M		NA	U	M		NA	U	M		NA	U	M	Change	
Agricultural/ Open Space/ Vacant	0	797	657	-18%	0	216	178	-18%	0	126	90	-29%	0	3	1	-67%	0	1,142	926	-216	-19%
Commercial	0	291	241	-17%	0	103	85	-17%	0	28	16	-43%	0	1	0	-100%	0	423	342	-81	-19%
Industrial	0	482	354	-27%	0	23	25	9%	0	37	39	5%	0	10	0	-100%	0	552	418	-134	-24%
Public/Quasi-Public	0	80	53	-34%	0	18	11	-39%	0	2	3	50%	0	1	0	-100%	0	101	67	-34	-34%
Recreational	0	96	58	-40%	0	56	47	-16%	0	20	10	-50%	0	0	0	0%	0	172	115	-57	-33%
Residential	0	1,309	1,195	-9%	0	743	549	-26%	0	125	83	-34%	0	0	0	0%	0	2,177	1,827	-350	-16%
Roadway	0	609	581	-5%	0	316	250	-21%	0	80	43	-46%	0	1	1	0%	0	1,006	875	-131	-13%
Unclassified	0	20	13	-35%	0	0	0	0%	0	0	0	0%	0	0	0	0%	0	20	13	-7	-35%
Water	0	1,451	1,340	-8%	0	73	57	-22%	0	47	47	0%	0	7	4	-43%	0	1,578	1,448	-130	-8%
Total	**0**	**5,135**	**4,492**	**-13%**	**0**	**1,548**	**1,202**	**-22%**	**0**	**465**	**331**	**-29%**	**0**	**23**	**6**	**-74%**	**0**	**7,171**	**6,031**	**-1,140**	**-16%**

Source: Data derived from GIS data (see Figure 4.3-8, Figure 4.4-4, and Table 4.3-14)
Key: % = percent; - = minus; ANG = Air National Guard Base; dB = decibels; DNL = day-night average sound level; M = mitigated; NA = No Action Alternative; U = unmitigated

The total off-base/airport residential land area exposed to noise levels exceeding 65 dB DNL under the mitigated 95% afterburner scenario would be reduced by 9% relative to the unmitigated scenario; residential land areas exposed to noise levels exceeding 70 dB DNL would be reduced by 26% relative to the unmitigated scenario; residential land areas exposed to noise levels exceeding 75 dB DNL would be reduced by 34% relative to the unmitigated scenario; no residential land area would be exposed to more than 80 dB DNL under mitigated or unmitigated scenarios.

In addition to operational noise mitigations, the DAF would focus on continuing an active AICUZ program and providing updated operations and noise information to surrounding jurisdictions. As discussed in Section 3.3.5, as more information is gained via public and agency input throughout the NEPA process, mitigation measures will be further refined. Operational mitigation measures deemed to be operationally feasible and that provide considerable noise impacts reductions will be described in the Final EIS. Mitigated noise impacts associated with these altered operational parameters will also be described in the Final EIS.

4.4.5.2 Affected Airspace

One Wilderness Area (Michigan Islands National Wildlife Wilderness Area) would experience adverse effects on wilderness characteristics of solitude and natural qualities under Alternative 2. Raising floor altitudes of overlying SUA or defining an overflight avoidance area could minimize noise over this protected area.

4.5 SOCIOECONOMICS

The definition of socioeconomic resources is the same as described for the Preferred Alternative under Section 3.5, *Socioeconomics*.

4.5.1 Resource-Specific Analysis Methodology

The socioeconomic impact analysis methodology for Alternative 2 is the same as for the Preferred Alternative as described in Section 3.5.1 (*Socioeconomics, Resource-Specific Analysis Methodology*). The ROI for socioeconomics associated with Alternative 2 includes the county, township, and/or cities associated with Selfridge ANG Base, as well as those that are or would be affected by noise generated at the airfield. For reasons outlined in the DAF *F-35A Operational Beddown Air National Guard EIS* (USAF, 2020b), the socioeconomic aspect of potential impacts to lands underlying the airspace was not evaluated. Potential socioeconomic impacts to lands underlying SUA were not evaluated because airspace use would be consistent with ongoing actions, and there would be no development or other socioeconomic-related activities occurring under the airspace as a result of the Preferred Alternative.

4.5.2 Alternative 2 Affected Environment

4.5.2.1 Selfridge ANG Base and Surrounding Area

The 127 WG of the Michigan ANG is located at Selfridge ANG Base in Harrison Township, Macomb County, Michigan, which comprises the ROI for this alternative. The affected environment represents the current status of the resource using the best available, most current data.

Population

Population information for the state of Michigan, Macomb County, and Harrison Township is presented in **Table 4.5-1**. Overall, the population of Harrison Township increased by 518 people between 2000 and 2019. This represents a 0.11-percent average annual growth rate between the years 2000 and 2019. Macomb County experienced a higher average annual growth rate than the township (0.52 percent), while the state experienced a lower average annual growth rate than the township (0.01 percent) during the same time period. According to the 2020 Census, the population in Harrison Township decreased by 2.66 percent from 2019 estimates (USCB, 2019a; USCB, 2021b).

Table 4.5-1. Current Population, Selfridge ANG Base ROI

Area	Census 2000	Census 2010	Estimate 2019	Average Annual Growth Rate (2000–2019)	Census 2020	Y-O-Y Growth (2019–2020)
Michigan	9,938,444	9,883,640	9,965,265	0.01%	10,077,331	1.12%
Macomb County	788,149	840,978	870,325	0.52%	881,217	1.25%
Harrison Township	24,461	24,587	24,979	0.11%	24,314	-2.66%

Sources: (State of Michigan, 2022; Macomb County, 2022a; USCB, 2019a; USCB, 2021b)
Key: % = percent; ANG = Air National Guard; ROI = region of influence; Y-O-Y = year-over-year

Current personnel numbers at Selfridge ANG Base are shown in **Table 2.3-6** (Alternative 2 Increase in Number of Personnel at Selfridge ANG Base). There are currently an estimated 1,927 personnel at Selfridge ANG Base.

Employment and Income

Table 4.5-2 provides employment and income data for the state of Michigan, Macomb County, and Harrison Township. Median household income and per capita income in Harrison Township were higher than the county and the state (USCB, 2019b). The unemployment rate in 2019 was 4.1 percent in the state of Michigan and 4.3 percent in Macomb County (BLS, 2021a). As of 2020, the unemployment rates in the state and county were approximately 9.9 percent and 12 percent, respectively (BLS, 2021c). Annual average unemployment rates rose in 2020 throughout all regions and states. As previously mentioned in Section 3.5.2.1 (*Socioeconomics, Preferred Alternative Affected Environment, Ebbing ANG Base and Surrounding Area*), the Bureau of Labor Statistics reported that "the deterioration in the labor market in 2020 reflected the impact of the coronavirus (COVID-19) pandemic and efforts to contain it" (BLS, 2021c).

Table 4.5-2. Current Employment and Income Statistics, Selfridge ANG Base ROI

Area	Median Household Income (2019)	Per Capita Income (2019)	Labor Force (2019)	Employed (2019)	Unemployed (2019)	Unemployment Rate (2019)
Michigan	$57,144	$31,713	4,949,480	4,748,011	201,469	4.1%
Macomb County	$62,855	$32,238	452,587	432,975	19,612	4.3%
Harrison Township	$64,883	$38,254	NA [(a)]	NA [(a)]	NA [(a)]	NA [(a)]

Sources: (BLS, 2021a; USCB, 2019b)
Key: % = percent; ANG = Air National Guard; ROI = region of influence
Note:
a. NA = not available from the Bureau of Labor Statistics Local Area Unemployment Statistics.

Table 4.5-3 shows the total number of jobs by industry in Macomb County. Overall, the total number of full-time and part-time jobs has increased by an average annual rate of 2.13 percent

between 2010 and 2019. Between 2019 and 2020, the total number of jobs decreased by 8.66 percent, from 455,381 jobs in 2019 to 415,956 jobs in 2020. The largest industry in terms of the number of employees during the years 2010, 2019, and 2020 was the manufacturing industry, followed by the retail trade industry and the health care and social assistance industry (BEA, 2021b).

Table 4.5-3. Current Number of Jobs by Industry, Macomb County

Industry	2010		2019		Average Annual Growth Rate (2010–2019)	2020		Y-O-Y Growth Rate (2019–2020)
	Number of Jobs	Percent of Total	Number of Jobs	Percent of Total		Number of Jobs	Percent of Total	
Farm employment	782	0.21%	889	0.20%	1.44%	843	0.20%	-5.17%
Forestry, fishing, and related activities	(D) [a]	(NA)	267	0.06%	(NA)	245	0.06%	-8.24%
Mining, quarrying, and oil and gas extraction	(D) [a]	(NA)	313	0.07%	(NA)	276	0.07%	-11.82%
Utilities	363	0.10%	381	0.08%	0.54%	370	0.09%	-2.89%
Construction	20,154	5.35%	27,911	6.13%	3.68%	25,907	6.23%	-7.18%
Manufacturing	48,407	12.85%	72,294	15.88%	4.56%	62,823	15.10%	-13.10%
Wholesale trade	12,063	3.20%	12,443	2.73%	0.35%	11,286	2.71%	-9.30%
Retail trade	44,894	11.92%	50,019	10.98%	1.21%	46,493	11.18%	-7.05%
Transportation and warehousing	9,020	2.40%	20,886	4.59%	9.78%	20,305	4.88%	-2.78%
Information	3,146	0.84%	3,243	0.71%	0.34%	3,629	0.87%	11.90%
Finance and insurance	13,037	3.46%	13,930	3.06%	0.74%	13,972	3.36%	0.30%
Real estate and rental and leasing	16,653	4.42%	19,692	4.32%	1.88%	18,828	4.53%	-4.39%
Professional, scientific, and technical services	28,931	7.68%	39,150	8.60%	3.42%	37,301	8.97%	-4.72%
Management of companies and enterprises	5,083	1.35%	5,910	1.30%	1.69%	5,981	1.44%	1.20%
Administrative and support and waste management	28,481	7.56%	27,301	6.00%	-0.47%	24,192	5.82%	-11.39%
Educational services	5,228	1.39%	6,021	1.32%	1.58%	5,442	1.31%	-9.62%
Health care and social assistance	42,198	11.20%	47,974	10.53%	1.44%	45,149	10.85%	-5.89%
Arts, entertainment, and recreation	5,697	1.51%	6,605	1.45%	1.66%	4,952	1.19%	-25.03%
Accommodation and food services	27,079	7.19%	32,884	7.22%	2.18%	24,786	5.96%	-24.63%
Other services (except government and government enterprises)	22,705	6.03%	27,531	6.05%	2.16%	24,669	5.93%	-10.40%
Government and government enterprises	41,892	11.12%	39,737	8.73%	-0.59%	38,507	9.26%	-3.10%
Total employment	**376,604**	**100.00%**	**455,381**	**100.00%**	**2.13%**	**415,956**	**100.00%**	**-8.66%**

Source: (BEA, 2021b)
Key: % = percent; NA = not available; Y-O-Y = year-over-year
Note:
a. (D) = not provided by the Bureau of Labor Statistics to avoid disclosure of confidential information; however, estimates are included in higher-level totals

The number of jobs in the construction industry grew at an average annual rate of 3.68 percent, from 20,154 jobs in 2010 to 27,911 jobs in 2019 (BEA, 2021b). The construction industry comprised around 5.35 percent to 6.23 percent of total employment during the years shown in **Table 4.5-3**.

The 127 WG of the Michigan ANG is an important contributor to the local and regional economy. As of September 30, 2020, the 127 WG was comprised of 2,064 workforce personnel, of which 9 people (0.44 percent) were contractors, 588 people (28.49 percent) were civilian, 202 people (9.79 percent) were active guard reserve, and 1,265 people (61.29 percent) were guard/reserves (127 WG, 2020). Total fiscal year 2020 expenditures totaled over $159 million. The largest capital improvement projects included taxiway repairs, concrete repairs, roof repairs, and parking lot repairs (127 WG, 2020).

Housing

As shown in **Table 4.5-4**, in 2019 there were an estimated 1,158 vacant housing units in Harrison Township and an estimated 19,614 vacant housing units in Macomb County (USCB, 2019c). The median housing value in Harrison Township was higher than the county and the state. The overall vacancy rate for housing was 9.1 percent in Harrison Township and 5.4 percent in Macomb County. Both rates were lower than the vacancy rate for Michigan, which was 14.4 percent (USCB, 2019c).

Table 4.5-4. Current Housing Characteristics, Selfridge ANG Base ROI

Area	Housing Units (2019)	Median Housing Value (2019)	Vacant Housing Units (2019)	
			Number	Percent [a]
Michigan	4,596,198	$154,900	661,157	14.4%
Macomb County	366,016	$166,800	19,614	5.4%
Harrison Township	12,783	$193,100	1,158	9.1%

Source: (USCB, 2019c)
Key: % = percent; ANG = Air National Guard; ROI = region of influence
Note:
a. Percentages are rounded to the nearest tenth.

Education

The Macomb Intermediate School District (ISD) is the largest ISD in the state of Michigan and serves all 21 public school districts, charter schools, and private/parochial schools in Macomb County (Macomb County, 2022b). The total number of students enrolled and the total staff count during the 2020–2021 school year for the Macomb ISD are presented in **Table 4.5-5**.

Table 4.5-5. Current School Enrollment, Selfridge ANG Base ROI

Area	Students (number)	Total Staff (Number)
Macomb Intermediate School District	120,464	24,224

Source: (Michigan School Data, 2022)
Key: ANG = Air National Guard; ROI = region of influence

4.5.3 No Action Alternative

The affected environment under the No Action Alternative reflects actions that are expected to have occurred by CY 2029. These are described in Section 4.12.2.3, *Cumulative Impacts, Socioeconomics*. Potential direct, indirect, and induced benefits to the local economy resulting from construction activities and additional wages and income from the personnel associated

with the foreign training units would not be realized under this alternative. Increased demands on housing and educational services associated with incoming personnel and dependents would also not be realized under this alternative.

4.5.4 Alternative 2 Environmental Consequences

The analysis of socioeconomic impacts for Alternative 2 evaluates impacts in relation to the No Action Alternative (CY 2029); the affected environment at that time would be expected to be as described in Section 4.12.2.3, *Cumulative Impacts, Socioeconomics*.

4.5.4.1 Selfridge ANG Base and Surrounding Area

Population

Approximately 1,185 personnel and dependents would be associated with the Alternative 2. Under a maximum impact scenario, if all of the personnel and dependents relocated from outside the area, the total population would increase by 1,185 people by CY 2029, which would be an increase of approximately 0.13 percent of the projected population in Macomb County and 0.01 percent of the projected population in the state of Michigan compared to the No Action Alternative. Although unlikely and not anticipated, if all incoming personnel would migrate within the city of Fort Smith, the additional 1,185 people would result in a population change of 4.83 percent compared to the No Action Alternative. It should be noted that population projections estimated for CY 2029, shown in **Table 4.5-6**, are less than the CY 2030 population projections reported by the Michigan Department of Technology, Management and Budget (DTMB) for the state and the county. Based on estimates from the Michigan DTMB (2022), an additional 1,185 people by CY 2029 would represent an even lower percent change in the total population than shown in **Table 4.5-6**.

As detailed in **Table 2.3-6** (Alternative 2 Increase in Number of Personnel at Selfridge ANG Base), Alternative 2 would be anticipated to result in an increase in base personnel over No Action Alternative estimates of approximately 384 personnel, representing a 20-percent increase in base personnel.

Incoming personnel would be anticipated to begin arriving late 2023 and would occur in stages, which would result in less impacts than if the change in population occurred all at once. Since the overall change in population would be less than 1 percent in the county, and the incoming population would arrive over several years, the population change associated with Alternative 2 at Selfridge ANG Base would not be significant.

Table 4.5-6. Population, Selfridge ANG Base ROI, Alternative 2

Area	Census 2020	CY 2029 (No Action)	Alternative 2	Change from No Action to Alternative 2	Percent Change from No Action to Alternative 2
Michigan	10,077,331	10,090,204	10,091,389	1,185	0.01%
Macomb County	881,217	923,605	924,790	1,185	0.13%
Harrison Township	24,314	24,557	25,742	1,185	4.83%

Sources: (State of Michigan, 2022; Macomb County, 2022a; USCB, 2019a; USCB, 2021b)
Key: % = percent; ANG = Air National Guard; CY = calendar year; ROI = region of influence

Employment and Income

New construction, demolition, and modifications to facilities and infrastructure would result in direct, indirect, and induced economic impacts in terms of employment and income in the ROI. Cost details regarding the facilities and infrastructure are not available at the time of this EIS.

However, it would be anticipated that construction, demolition, and renovations for base facilities and infrastructure would result in near-term economic benefits to the ROI, driven by an increase in construction spending. Construction-related impacts would last for the duration of the activities. Under the assumption that construction employment would continue to follow trends described in Section 4.3.2.1, *Noise, Alternative 2 Affected Environment, Selfridge ANG Base and Surrounding Area*, there would be no additional permanent population increase beyond projected, as the local construction workforce would be expected to meet the labor demand.

The increase and departure of personnel related to the FMS PTC beddown and associated range support is still being determined based on the total aircraft on base at any one time (see Section 2.2.2, *Personnel/Manpower*). However, during the timeline between CY 2023 and CY 2029, the incoming personnel would result in beneficial impacts to the local economy from additional wages and income. The direct employment (number of jobs) of 384 personnel associated with operations would result in indirect and induced employment and income in the ROI. The additional defense spending would result in a greater economic impact of the defense industry to the ROI compared to the No Action Alternative. The increase in employment and income would be beneficial but not significant.

Housing

Potential impacts to housing under this alternative would be similar to those described for the Preferred Alternative in Section 3.5.4.1, *Socioeconomics, Preferred Alternative Environmental Consequences, Ebbing ANG Base and Surrounding Area*. Under a maximum case scenario, it would be assumed that all 384 personnel would migrate to the area and would require one housing unit each, in which case an additional 384 housing units would be demanded. Based on population and housing trends between 2000 and 2019, an average 1,165 housing units are added to the total number of housing units in Macomb County, which has supported an average annual population growth of 0.52 percent (USCB, 2010b; USCB, 2019c). Therefore, additional housing units may be required to support the end-state personnel numbers. The increased cost of housing and the availability of jobs would be expected to increase corresponding to the average number of people per household. Housing costs could continue to rise as supply tries to catch up with demand before leveling off as new housing is constructed. Any lack of affordable homes in the interim may require homebuyers to expand their search to include areas outside their desired location and price range. The construction of two planned developments within the next 5 years, including the development of 60 single-family homes south of the base and development of multi-family single-story housing with 50 to 70 units north of the base, would absorb some of the additional and immediate increase in demand (USAF, 2020b). Additionally, since personnel associated with the foreign training units would arrive and depart in stages, housing may become more readily available, depending on the timing of arrival and departure of personnel. It would be anticipated that personnel would choose housing in the ROI based on several factors such as the length of their stay, market conditions (e.g., house and rent prices and availability) and personal preferences (e.g., proximity to amenities, school districts).

A concern expressed during the public scoping comment period was the potential noise impacts on the health of residents and property. In particular, a common concern of noise as it relates to housing is the potential impact noise would have on property values. Potential impacts to property values are discussed previously in Section 3.5.4.1, *Socioeconomics, Preferred Alternative Environmental Consequences, Ebbing ANG Base and Surrounding Area*. As discussed in Section 3.5.4.1, the range of impacts of 0.2 to 2.0 percent per dB of noise increase serves as a

rough estimate of potential impacts to property values. According to the most recent American Community Survey 5-year estimate from the U.S. Census Bureau, the median value of an owner-occupied home in Macomb County is $166,800 (USCB, 2019c). Based on the median value of an owner-occupied home, noise impacts could potentially discount property values between $333 per increase in dB DNL to $3,336 per increase in dB DNL.

Table 4.5-7 shows the estimated number of people and housing units within the 65 dB DNL or greater noise contours for each afterburner scenario under Alternative 2. Recommended noise mitigations to minimize adverse noise impacts are provided in Section 4.3.5, *Noise, Mitigations*. The number of affected population and affected housing units under Alternative 2 with implementation of noise mitigations are shown in Section 4.5.5, *Socioeconomics, Mitigations*.

Table 4.5-7. Population and Housing Within the 65 dB DNL or Greater Noise Contours Under Alternative 2

Affected Units	No Action Alternative	Alternative 2		
		5% Afterburner Scenario	50% Afterburner Scenario	95% Afterburner Scenario
Total affected population	0	18,098	18,417	18,799
Total affected housing units	0	5,855	5,968	6,099

Sources: (USCB, 2019h; USCB, 2019i)
Key: % = percent; dB = decibels; DNL = day-night average sound level

Education

The methodology to calculate the number of school-aged children associated with the incoming personnel is the same as described for the Preferred Alternative in Section 3.5.4.1 (*Socioeconomics, Preferred Alternative Environmental Consequences, Ebbing ANG Base and Surrounding Area*). As described in Section 3.5.4.1, approximately 64.7 percent of the 801 dependents associated with the incoming personnel, or approximately 518 dependents, would be children. Under a maximum case scenario, all 518 dependents would be of school age and would be enrolled in the ROI. Children of school age would be of varying ages and would attend the many schools throughout the ROI. Additional students may result in larger class sizes and additional pressures on resources and expenditures. However, additional students would also contribute to revenue generated. Based on a decade-long trend of declining enrollment numbers throughout Macomb County ISD, potential impacts to educational services from the additional students may be beneficial but would not be significant.

4.5.5 Mitigations

Section 4.3.5, *Noise, Mitigations*, describes several potential adjustments in flight procedures the DAF is considering that can reduce noise levels to some degree. These mitigations would reduce adverse noise impacts to residential areas and reduce the number of residents and housing units newly exposed to noise levels of 65 dB DNL or greater. Residential areas potentially affected by the mitigated noise profiles are shown in Section 4.4.5, *Land Use, Mitigations*, in **Figure 4.4-4**.

Implementation of Alternative 2 with noise mitigations would result in fewer estimated residents and housing units within the 65 dB DNL or greater noise contours than Alternative 2 without noise mitigations (see **Table 4.5-8**).

Table 4.5-8. Population and Housing Within the 65 dB DNL or Greater Noise Contours Under Alternative 2 with Mitigations

Affected Units	5% Afterburner Scenario	50% Afterburner Scenario	95% Afterburner Scenario
Alternative 2 (Unmitigated)			
Total affected population	18,098	18,417	18,799
Total affected housing units	5,855	5,968	6,099
Alternative 2 (Mitigated)			
Total affected population	16,390	16,093	15,773
Total affected housing units	5,287	5,193	5,095
Difference (%) Between Unmitigated and Mitigated			
Total Affected Population	-9%	-13%	-16%
Total Affected housing units	-10%	-13%	-16%

Sources: (USCB, 2019h; USCB, 2019i)
Key: % = percent; dB = decibels; DNL = day-night average sound level

4.6 ENVIRONMENTAL JUSTICE AND CHILDREN

The definition of environmental justice, children, and elderly is the same as described for the Preferred Alternative under Section 4.6, *Environmental Justice and Children*.

The DAF also evaluates impacts to other sensitive populations, including the children and elderly, and defines children, ROI, and COC (DAF, 2020).

- **ROI** – The ROI is the administrative area containing the best available and most appropriate units that underlie the affected area (DAF, 2020). Data collected for any given ROI is used to quantitatively characterize the demographic composition of the affected area and is used to determine whether environmental justice populations are present in the area affected by Alternative 2 and, if so, whether there may be disproportionate effects to these communities. In this case, the ROI includes the U.S. Census Bureau Block Groups.
- **COC** – The COC is the smallest set of U.S. Census Bureau data encompassing the ROI and is used to establish thresholds of comparison. In other words, the COC is data representing comparison data to which the demographic data in the ROI will be compared, to identify if there are "meaningfully greater" percentages. It is through the establishment of COC threshold data that it is determined whether environmental impacts would disproportionately affect environmental justice communities and populations. In this case the COC is Macomb County.

4.6.1 Resource-Specific Analysis Methodology

For minority and low-income populations, an analysis was conducted to identify the extent to which minority and low-income populations reside within the ROI determined to be Census Block Groups. If the percentage of minority and low-income populations in the ROI is higher than the COC, in this case, Macomb County, it would be considered to have a disproportionately higher minority or low-income population. For children and elderly, the same methodology was used to determine if effects were considered disproportionate.

4.6.2 Alternative 2 Affected Environment

4.6.2.1 Selfridge ANG Base and Surrounding Area

The affected environment represents the status of the resource using the best available, most current data. The resource areas considered for potential disproportionate environmental and human health effects in minority and low-income communities and disproportionate health and safety risks to children include the following: noise, land use, and air quality.

Noise

The ROI for this analysis regarding environmental justice communities and noise is the area within the greater than 65 dBA DNL noise zones generated by airborne noise associated with Selfridge ANG Base. FAA considers all land uses to be compatible at noise levels below 65 dBA DNL. Therefore, 65 dBA DNL or greater is considered the threshold for adverse impacts on populations, including environmental justice communities, children, and the elderly.

Selfridge ANG Base has a current flying mission of the A-10 Thunderbolt II, a close air support aircraft, and the KC-135 Stratotanker, an aerial refueler with global reach. The 65 dBA DNL contours do not extend beyond installation boundaries and do not include any people or households.

As shown in **Table 4.6-1**, the minority population within Michigan is 25.0 percent, compared to Macomb County with 21.0 percent. Harrison Township has the lowest percent minority population with 14.7 percent. The low-income population is approximately 14.4 percent of the total population in Michigan and lower (10.6 percent) in Macomb County. The percentage for Harrison Township is even lower with 9.1 percent. Children range from 21.9 percent in the state, 21.3 percent in the county, and 17.3 percent in Harrison Township. The percentages of elderly are similar among the state (16.7 percent), county (16.6 percent), and township (17.6 percent) population.

Table 4.6-1. Demographic Data for Michigan, Macomb County, and Harrison Township

Area	Total Population	Minority		Low-Income			Children		Elderly	
		Number	Percent	Population for Whom Poverty is Calculated	Number	Percent	Number	Percent	Number	Percent
Michigan	9,965,265	2,487,865	25.0%	9,741,628	1,398,527	14.4%	2,177,878	21.9%	1,666,343	16.7%
Macomb County	870,325	182,508	21.0%	861,656	90,984	10.6%	184,922	21.3%	144,390	16.6%
Harrison Charter Township	24,979	3,663	14.7%	24,849	2,248	9.1%	4,319	17.3%	4,393	17.6%

Sources: (USCB, 2019a; USCB, 2019f; USCB, 2019g)
Key: % = percent

Land Use

The affected environment for land use within the context of environmental justice includes associated environmental justice and aged populations within APZs, which are incompatible with residential land uses according to the DAF AICUZ guidelines. Based on the F-35A Operational Beddown EIS conducted in 2020 that includes Selfridge ANG Base, there are no environmental justice–related communities within current APZs (USAF, 2020b).

Air Quality

The ROI for air quality under Alternative 2 is Macomb County (see Section 4.10, *Air Quality*). Demographic data for the county are shown in **Table 4.6-1**.

4.6.3 No Action Alternative

The affected environment under the No Action Alternative would reflect actions that are expected to have occurred by CY 2029. These are described in Section 4.12.2.4, *Cumulative Impacts, Environmental Justice*. Implementation of the No Action Alternative (i.e., no beddown of the FMS PTC at Selfridge ANG Base) would not result in any additional impacts outside those described under Cumulative Impacts.

4.6.4 Alternative 2 Environmental Consequences

The analysis of environmental justice impacts for Alternative 2 evaluates impacts in relation to the No Action Alternative (CY 2029); the affected environment at that time would be expected to be as described in Section 4.12.2.4, *Cumulative Impacts, Environmental Justice*.

4.6.4.1 Selfridge ANG Base and Surrounding Area

Noise

This environmental justice, children, and elderly analysis for noise impacts consists of the area within the 65 dBA DNL or greater noise contours generated by airborne noise as a result of beddown of the FMS aircraft. As stated in DoDI 4165.57, *Air Installations Compatible Use Zones (AICUZ)*, DoD considers all land uses to be compatible at noise levels below 65 dBA DNL. Therefore, 65 dBA DNL or greater was considered the threshold for adverse impacts on populations, including environmental justice communities, children, and the elderly.

Table 4.6-2 presents the minority, low-income, and age characteristics of the population from the most recent data. Based on these data, five block groups have minority populations greater than the COC of Macomb County at 21.0 percent. Four block groups have low-income populations greater than Macomb County at 10.6 percent. Eight block groups have a higher percentage of children compared to the county with 21.3 percent, while 11 block groups have a higher percentage of elderly compared to the county at 16.6 percent.

Figure 4.6-1 and **Figure 4.6-2** show the locations of minority and low-income populations that would occur within the noise zones (e.g., greater than 65 dBA DNL noise zones). Based on the percentages of populations located within the greater than 65 dBA DNL noise zones (**Table 4.6-2**), Alternative 2 would result in disproportionately high and adverse human health or environmental effects on:

- Minority populations (Census Tract 2211, Block Group 2; Census Tract 2221.01, Block Group 2; Census Tract 2472, Block Group 2; Census Tract 2473, Block Group 3; and Census Tract 2475, Block Group 2)
- Low-income populations (Census Tract 2221.01, Block Group 2; Census Tract 2471, Block Group 1; and Census Tract 2475, Block Groups 1 and 2).

Alternative 2 would also result in environmental health risks and safety risks that may disproportionately affect children, and impacts to the elderly would be significant.

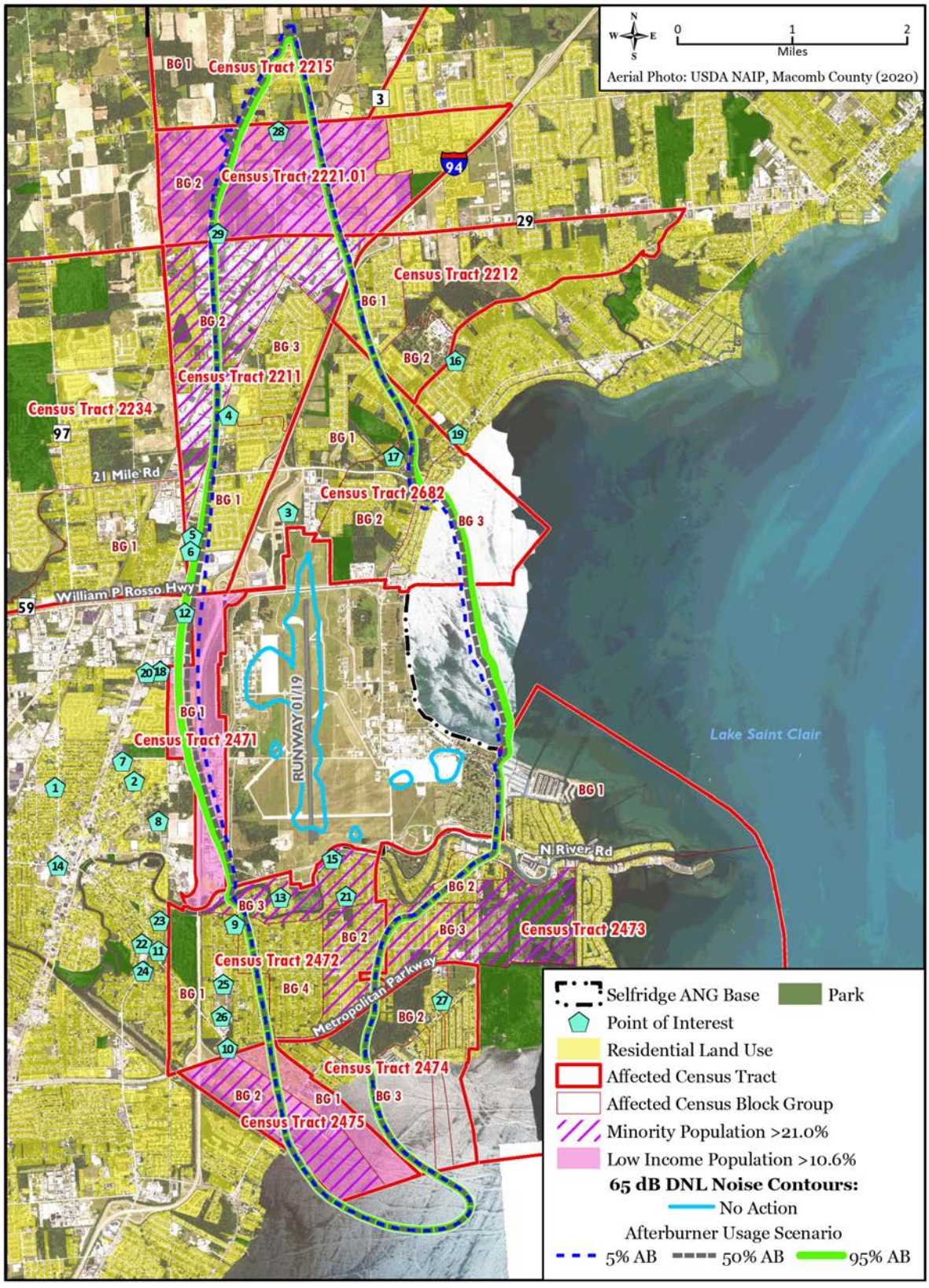

Figure 4.6-1. Selfridge ANG Base Environmental Justice and – Alternative 2

Sources: (Southeast Michigan Council of Governments, 2022; ESRI Data & Maps, 2019a; Selfridge ANG Base, 2021; BRRC, 2022c; USDA-FSA-APFO, 2020; USCB, 2020; USCB, 2022)

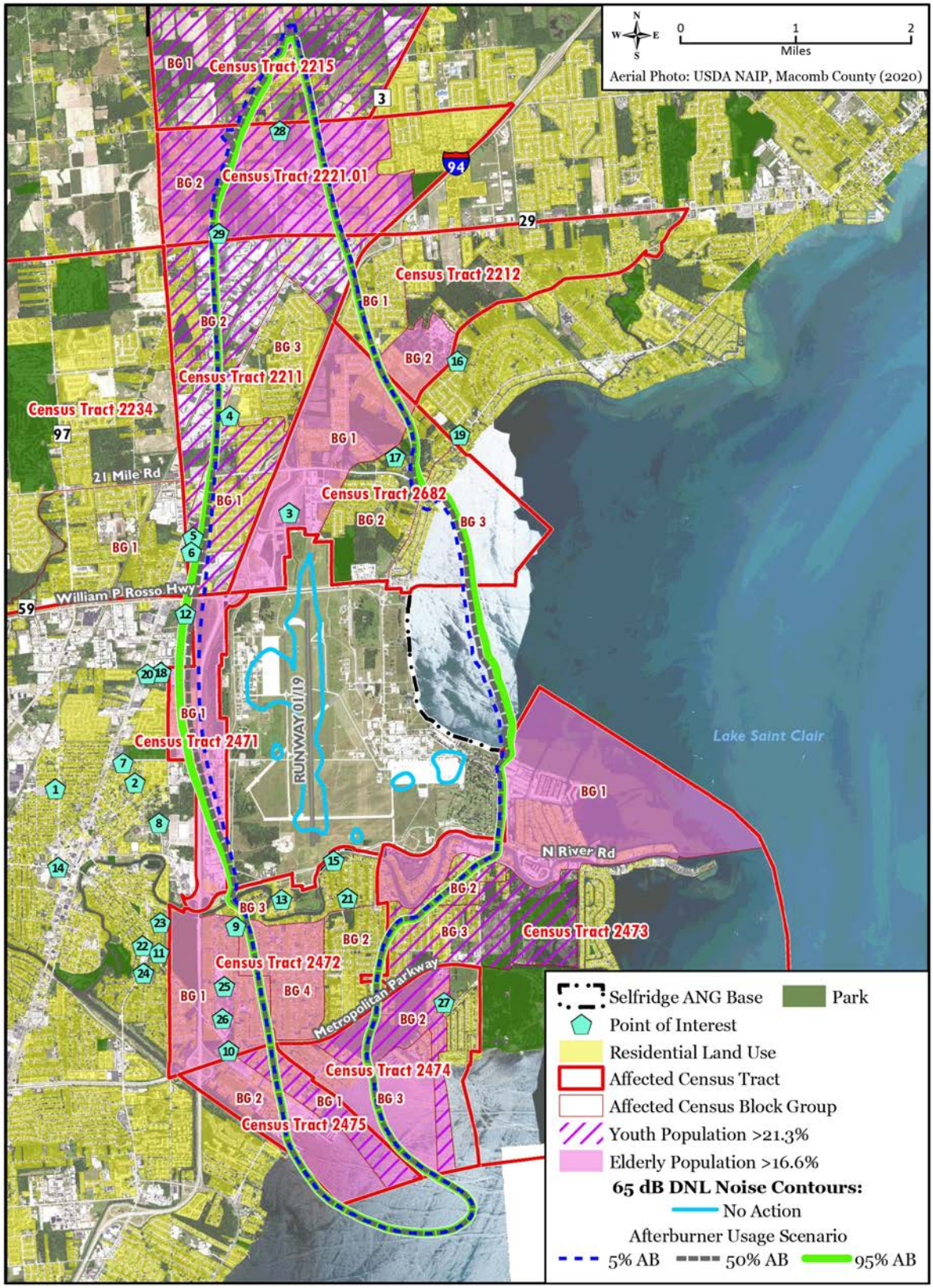

Figure 4.6-2. Selfridge ANG Base Children/Elderly and Noise – Alternative 2

Sources: (Southeast Michigan Council of Governments, 2022; ESRI Data & Maps, 2019a; Selfridge ANG Base, 2021; BRRC, 2022c; USDA-FSA-APFO, 2020; USCB, 2020; USCB, 2022)

Table 4.6-2. Communities Within the Greater than 65 dBA DNL Noise Zones at Selfridge ANG Base – Alternative 2

Area	Total Population	Minority		Low-Income			Children		Elderly	
		Number	Percent (a)(b)	Population for Whom Poverty is Calculated (c)	Number	Percent (a)(b)	Number	Percent (a)(b)	Number	Percent (a)(b)
Michigan	**9,965,265**	**2,487,865**	**25.0%**	**9,741,628**	**1,398,527**	**14.4%**	**2,177,878**	**21.9%**	**1,666,343**	**16.7%**
Macomb County	**870,325**	**182,508**	**21.0%**	**861,656**	**90,984**	**10.6%**	**184,922**	**21.3%**	**144,390**	**16.6%**
Harrison Charter Township	**24,979**	**3,663**	**14.7%**	**24,849**	**2,248**	**9.1%**	**4,319**	**17.3%**	**4,393**	**17.6%**
Census Tracts and Block Groups										
Census Tract 2211	7,116	719	10.1%	6,980	345	4.9%	1,818	25.6%	571	8.0%
Block Group 1	2,827	226	8.0%	2,749	39	1.4%	809	28.6%	160	5.7%
Block Group 2	1,438	405	28.2%	1,383	98	7.1%	487	33.9%	47	3.3%
Block Group 3	2,851	88	3.1%	2,848	208	7.3%	522	18.3%	364	12.8%
Census Tract 2212	6,004	848	14.1%	5,946	308	5.2%	1,109	18.5%	960	16.0%
Block Group 1	2,644	333	12.6%	2,644	131	5.0%	517	19.6%	223	8.4%
Block Group 2	187	16	8.6%	187	0	0.0%	34	18.2%	86	46.0%
Census Tract 2215	1,394	198	14.2%	1,394	80	5.7%	394	28.3%	174	12.5%
Block Group 1 (d)	1,394	198	14.2%	1,394	80	5.7%	394	28.3%	174	12.5%
Census Tract 2221.01	5,665	1,087	19.2%	5,420	764	14.1%	1,514	26.7%	650	11.5%
Block Group 2	2,029	491	24.2%	2,008	483	24.1%	533	26.3%	381	18.8%
Census Tract 2234	10,741	1,355	12.6%	10,725	254	2.4%	2,576	24.0%	1,671	15.6%
Block Group 1	2,557	296	11.6%	2,557	147	5.8%	521	20.4%	415	16.2%
Census Tract 2471	857	143	16.7%	857	332	38.7%	166	19.4%	175	20.4%
Block Group 1*	857	143	16.7%	857	332	38.7%	166	19.4%	175	20.4%
Census Tract 2472	6,845	1,027	15.0%	6,830	236	3.5%	1,156	16.9%	1,029	15.0%
Block Group 1	1,203	0	0.0%	1,188	14	1.2%	138	11.5%	286	23.8%
Block Group 2	2,357	575	24.4%	2,357	149	6.3%	433	18.4%	211	9.0%
Block Group 3	1,819	382	21.0%	1,819	0	0.0%	349	19.2%	273	15.0%
Block Group 4	1,466	70	4.8%	1,466	73	5.0%	236	16.1%	259	17.7%
Census Tract 2473	6,316	549	8.7%	6,316	195	3.1%	1,133	17.9%	1,244	19.7%
Block Group 1	1,720	0	0.0%	1,720	88	5.1%	166	9.7%	443	25.8%
Block Group 2	877	16	1.8%	877	0	0.0%	230	26.2%	53	6.0%
Block Group 3	2,232	517	23.2%	2,232	107	4.8%	624	28.0%	266	11.9%
Census Tract 2474	2,488	190	7.6%	2,430	68	2.8%	444	17.9%	482	19.4%
Block Group 2	822	148	18.0%	822	28	3.4%	206	25.1%	160	19.5%
Block Group 3	963	35	3.6%	905	0	0.0%	109	11.3%	164	17.0%

Table 4.6-2. Communities Within the Greater than 65 dBA DNL Noise Zones at Selfridge ANG Base – Alternative 2

Area	Total Population	Minority		Low-Income			Children		Elderly	
		Number	Percent (a)(b)	Population for Whom Poverty is Calculated (c)	Number	Percent (a)(b)	Number	Percent (a)(b)	Number	Percent (a)(b)
Census Tract 2475	1,823	296	16.2%	1,823	307	16.8%	340	18.7%	367	20.1%
Block Group 1	598	20	3.34%	598	132	22.1%	128	21.4%	106	17.7%
Block Group 2	1,225	276	22.5%	1,225	175	14.3%	212	17.3%	261	21.3%
Census Tract 2682	3,848	230	6.0%	3,841	124	3.2%	684	17.8%	568	14.8%
Block Group 1	1,911	116	6.1%	1,904	30	1.6%	362	18.9%	346	18.1%
Block Group 2	1,142	32	2.8%	1,142	71	6.2%	228	20.0%	126	11.0%
Block Group 3	795	82	10.3%	795	23	2.9%	94	11.8%	96	12.1%

Sources: (USCB, 2019a; USCB, 2019f; USCB, 2019g)

Key: % = percent; ANG = Air National Guard; dBA = A weighted decibels; DNL = day-night average sound level

Notes:

a. Areas shaded gray indicate where block group percentages are greater than the county percentages.

b. Percentages are rounded to the nearest tenth.

c. Population for whom poverty is calculated is based on persons for whom the Census Bureau can determine poverty status and, therefore, may differ from the total population (USCB, 2021d).

d. There is only one block group in this census tract; therefore, the census tract and block group have the same numbers.

The Preferred Alternative would result in an increase of the total population estimated to reside within the 65 dBA DNL or greater noise zones. To compare the total population versus those considered minority and low-income, estimates of population numbers were determined using the weighted average of the population residing within the residential portion of the block group and based on the U.S. Census Bureau American Community Survey 5-year estimates for 2015–2019. **Table 4.6-3** shows the comparison of the number of people within the greater than 65 dBA DNL for the No Action Alternative and Alternative 2 under three potential afterburner scenarios. The beddown of the FMS aircraft would result in an increase in people located within the greater than 65 dBA DNL noise zones with an increase of 11 percent minority and 5 percent low-income populations. As shown, the majority of the total affected population would not be identified as minority or low income.

Table 4.6-3. Selfridge ANG Base Comparison of Total, Minority, and Low-Income Populations Within the Greater than 65 dBA DNL Noise Zones

Community	No Action Alternative	5% Afterburner Scenario	50% Afterburner Scenario	95% Afterburner Scenario
Total affected population	0	18,098	18,417	18,799
Estimated minority population	0	1,922 (11%)	1,958	2,009
Estimated low-income population	0	897 (5%)	954	1,044

Sources: (USCB, 2019a; USCB, 2019g)
Key: % = percent; dB = decibels; DNL = day-night average sound level

A similar analysis was conducted for children and elderly populations and is shown in **Table 4.6-4**. The total affected population within the noise zones would increase along with the percentage of children (20 percent) and elderly (13 percent).

Table 4.6-4. Selfridge ANG Base Comparison of Total, Children, and Elderly Populations Within the Greater than 65 dBA DNL Noise Zones

Community	No Action Alternative	5% Afterburner Scenario	50% Afterburner Scenario	95% Afterburner Scenario
Total affected population	0	18,098	18,417	18,799
Estimated children	0	3,646 (20%)	3,713	3,798
Estimated elderly	0	2,348 (13%)	2,390	2,450

Source: (USCB, 2019f)
Key: % = percent; dB = decibels; DNL = day-night average sound level

Land Use

As discussed in Section 4.4, *Land Use*, Alternative 2 would increase the amount of residential land within the greater than 65 dBA DNL noise zones. Residential uses within these noise zones would not be compatible. These zones would include residents within block groups with a higher percentage of minority and low-income populations within the greater than 65 dBA DNL noise zones and would be considered a disproportionately high and adverse human health or environmental effect. In addition, the block groups with a higher percentage of children would be considered a disproportionate environmental health or safety risk. Impacts to the elderly would be significant. Under Alternative 2, APZs would not change; given that there are no identified environmental justice-related populations within existing APZs, there would be no related safety impacts.

Air Quality

As discussed in Section 4.10, *Air Quality*, NO_x emissions from Alternative 2 would exceed the General Conformity *de minimis* thresholds. The NO_x emission increases would trigger the requirement for a positive general conformity determination, which would ensure that the alternative would conform to the applicable SIP and would result in less than significant air quality impacts. As a result, disproportionately high and adverse human health or environmental effects to minority and low-income populations would not occur under Alternative 2.

4.6.5 Mitigations

Section 4.3.5, *Noise, Mitigations*, describes several potential adjustments in flight procedures the DAF is considering that can reduce noise levels to some degree, which would in turn reduce adverse noise impacts to environmental justice communities, children, and the elderly exposed to noise levels of 65 dB DNL or greater. Implementation of Alternative 2 with noise mitigations would result in fewer environmental justice and aged communities within the 65 dB DNL or greater noise zones than without noise mitigations. **Figure 4.6-3** shows the locations of minority and low-income populations that would occur within the noise zones (e.g., greater than 65 dBA DNL noise zones) with and without operational mitigations under Alternative 2. **Figure 4.6-4** presents children and elderly populations within the noise zones with and without mitigations under Alternative 2.

Table 4.6-5 provides a comparison of minority and low-income populations under Alternative 2 with and without mitigations under each afterburner scenario. **Table 4.6-6** shows a comparison for children and elderly with and without mitigations under each afterburner scenario. The estimates of population numbers use the weighted average of the population residing within the residential portion of the block group and based on the U.S. Census Bureau American Community Survey 5-year estimates for 2015–2019.

Table 4.6-5. Selfridge ANG Base Comparison of Total, Minority, and Low-Income Populations Within the 65 dB DNL or Greater Noise Zones With and Without Mitigation

Community	5% Afterburner Scenario			50% Afterburner Scenario			95% Afterburner Scenario		
	Unmitigated	Mitigated	Change	Unmitigated	Mitigated	Change	Unmitigated	Mitigated	Change
Total affected population	18,098	16,390	-9%	18,417	16,093	-13%	18,799	15,773	-16%
Estimated minority	1,922	1,695	-12%	1,958	1,676	-14%	2,009	1,657	-18%
Estimated low income	897	776	-13%	954	787	-18%	1,044	818	-22%

Sources: (USCB, 2019a; USCB, 2019g)
Key: % = percent; ANG = Air National Guard; dB = decibels; DNL = day-night average sound level

Table 4.6-6. Selfridge ANG Base Comparison of Total, Children, and Elderly Populations Within the Greater than 65 dBA DNL Noise Zones With and Without Mitigations

Community	5% Afterburner Scenario			50% Afterburner Scenario			95% Afterburner Scenario		
	Unmitigated	Mitigated	Change	Unmitigated	Mitigated	Change	Unmitigated	Mitigated	Change
Total affected population	18,098	16,390	9%	18,417	16,093	13%	18,799	15,773	16%
Estimated children	3,646	3,267	10%	3,713	3,198	14%	3,798	3,119	18%
Estimated elderly	2,348	2,136	9%	2,390	2,115	12%	2,450	2,093	15%

Source: (USCB, 2019f)
Key: % = percent; ANG = Air National Guard; dBA = A-weighted decibels; DNL = day-night average sound level

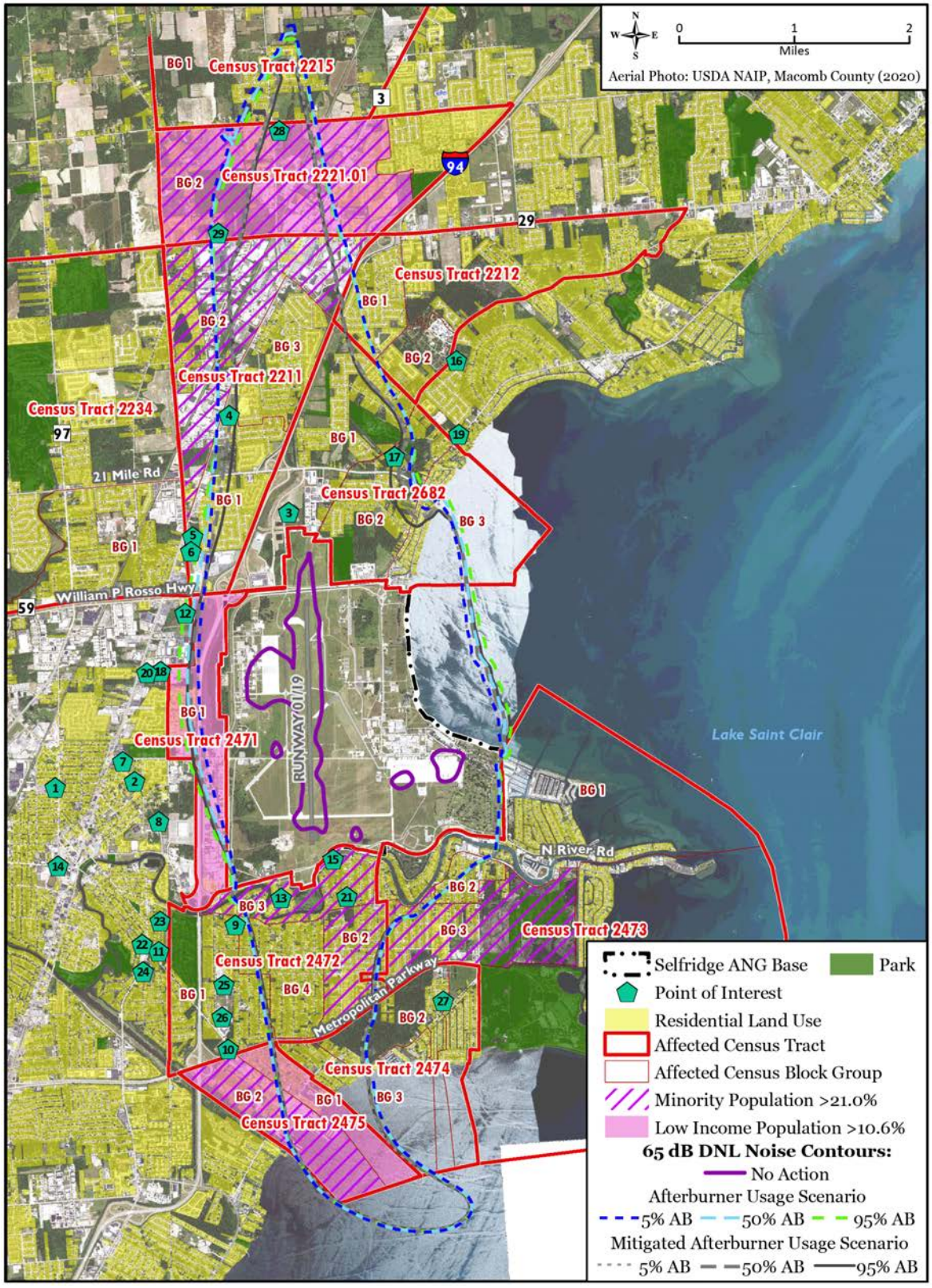

Figure 4.6-3. Selfridge ANG Base Environmental Justice and Noise With and Without Mitigations – Alternative 2

Sources: (Southeast Michigan Council of Governments, 2022; ESRI Data & Maps, 2019a; Selfridge ANG Base, 2021; BRRC, 2022c; USDA-FSA-APFO, 2020; USCB, 2020; USCB, 2022; BRRC, 2022d)

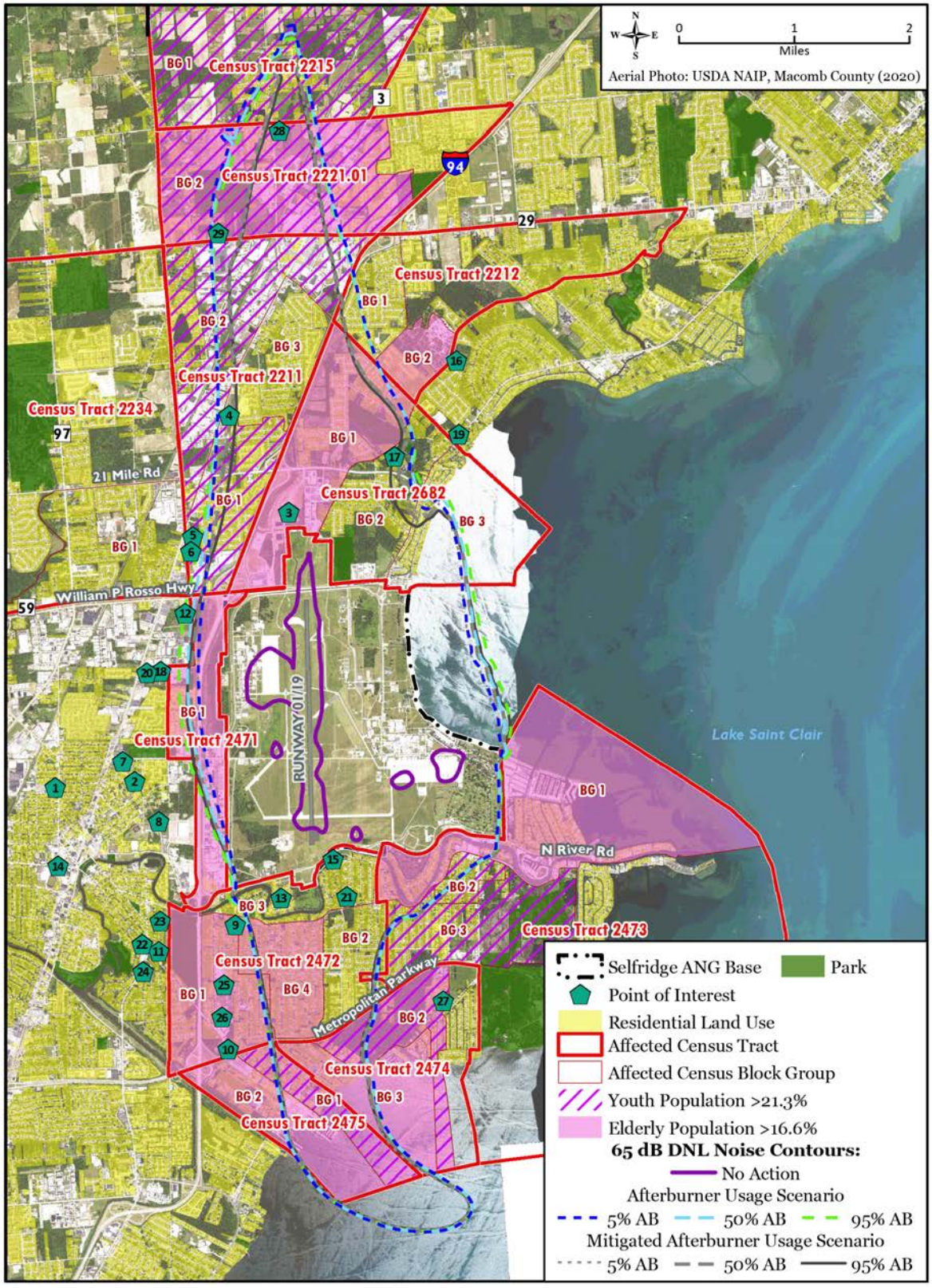

Figure 4.6-4. Selfridge ANG Base Children/Elderly and Noise With and Without Mitigations – Alternative 2

Sources: (Southeast Michigan Council of Governments, 2022; ESRI Data & Maps, 2019a; Selfridge ANG Base, 2021; BRRC, 2022c; USDA-FSA-APFO, 2020; USCB, 2020; USCB, 2022; BRRC, 2022d)

The DAF does not have authority to expend appropriated funds on facilities that are not under their direct control; therefore, no sound proofing of individual residences can occur. The DAF would update the AICUZ study once the beddown is complete and operational tempo and afterburner use is in place. The updated AICUZ would include pilot interviews to verify that the aircraft operations are similar to what was projected in this EIS. In addition, the DAF would continue to work with local communities.

In addition to exploring operational mitigations, the DAF made a good-faith effort to communicate with environmental justice and aged communities to inform them about the project and methods to participate in the EIS process, including the following:

- Conducted a digital campaign and posted notices specifically targeted toward potentially affected environmental justice communities to provide notification of the availability of the Draft EIS and dates and times for participation in the virtual public meetings.
- Distributed copies of the Draft EIS to various libraries located within environmental justice communities.
- Ensured that virtual public meetings had a call-in number, to facilitate participation if Internet access was not available.
- Held virtual public meetings on different days and times to increase accessibility.
- Posted records of the virtual public meetings on the project website for additional access to project information.

4.7 CULTURAL RESOURCES

Definitions pertinent to cultural resources are presented in Section 3.7, *Cultural Resources*.

4.7.1 Resource-Specific Analysis Methodology

The analysis methodology employed is the same as described in Section 3.7.1, *Cultural Resources, Resource-Specific Analysis Methodology*.

The APE includes the proposed construction and renovation projects described in **Table 2.3-7** (Proposed Construction and Renovation Projects at Selfridge ANG Base), Selfridge ANG Base, the off-base land exposed to greater than 65 dB DNL (accounting for the greatest potential effect depending on 5%, 50%, or 95% afterburner usage), and the area under the airspace and MTRs to be utilized for Alternative 2. The APE accounts for foreseeable effects to historic properties by Alternative 2, including physical, visual, and audible effects associated with implementation of the action at Selfridge ANG Base, as well as an increase in noise associated with the aircraft training use of the associated airspace. Sixty-five dB DNL is the upper threshold for ambient sound on residential properties before there would be effects.

4.7.2 Alternative 2 Affected Environment

4.7.2.1 Selfridge ANG Base and Surrounding Area

Archaeological Resources

The F-35A Operational Beddown EIS describes known archaeological resources at Selfridge ANG Base (USAF, 2020b). According to the 2017 survey, the *Selfridge ANG Base Integrated Cultural*

Resource Management Plan, and the SHPO records review results, there are 12 known archaeological sites at Selfridge ANG Base. Since completion of that EIS, the NGB sponsored the evaluation and Phase II testing of 10 of the 12 archaeological sites at Selfridge ANG Base, including 8 sites in the North Clear Zone and 2 sites in the South Clear Zone. Based on the investigations, NGB determined nine sites were ineligible for listing in the NRHP. One of these ineligible sites was reported to be a location for burials. NGB recommended the site for archaeological monitoring should any ground-disturbing activity occur there. For the tenth site, a historic cemetery and prehistoric artifact scatter not fully evaluated in the 2021 study, NGB recommended additional Phase II testing, including a ground penetrating radar survey (Brockington and Associates, 2021). The NGB has not yet consulted with the Michigan SHPO on these findings and determinations.

Architectural Resources

The F-35A Operational Beddown EIS describes known architectural resources at Selfridge ANG Base (USAF, 2020b) based on a comprehensive survey of Selfridge ANG Base completed in 2017 (ANG, 2017). As NGB determined in the 2017 survey, historic properties at Selfridge ANG Base consist of two NRHP-eligible historic districts: the 400-Series Housing Historic District and the Cantonment Area Historic District, which in total include 96 contributing buildings (**Figure 4.7-1**). Selfridge ANG Base contains no eligible architectural resources outside of the districts and no individually eligible architectural resources. The Michigan SHPO concurred with the findings in September 2019.

Outside Selfridge ANG Base, the area exposed to greater than 65 dB DNL contains mid-twentieth- through early twenty-first-century residential development with pockets of commercial development (**Figure 4.7-2**). Based on Michigan SHPO survey data, there is one previously surveyed historic architectural resource located in the APE south of the base. The William Tucker House (P24089) is a one-story log house constructed in 1784 with additions and modifications dating to the early to mid-twentieth century. SHPO staff determined that the William Tucker House is eligible for listing in the NRHP in 1981 (Michigan SHPO, 1981). In the APE north of the base, the Chesterfield Township municipal property contains two historic resources that have been moved from their original locations: the Weller School (P26545) and the Kolping Chapel (P3254). The Kolping Chapel was listed in the NRHP in 1996 when it was located at its original location on the opposite side of Sugarbush Road in the now-closed Kolping Park (NPS, 2014; Michigan SHPO, 2022). SHPO staff determined the Weller School eligible for listing in the NRHP in October 1997, after it was already relocated to the Chesterfield Historical Village (Michigan SHPO, 1997).

Traditional Resources

As described in the F-35A Operational Beddown EIS, there are no known traditional resources at Selfridge ANG Base (USAF, 2020b). The DAF is seeking input from the federally recognized Tribes identified in Volume II, **Appendix A**, *Public and Agency Involvement*, regarding any traditional resources that may be affected by Alternative 2. To date, the DAF has received comments from seven Tribes, none of which have identified resources that may be affected by Alternative 2 (see Volume II, **Appendix A**, Section A.3, for summaries of Tribal correspondence).

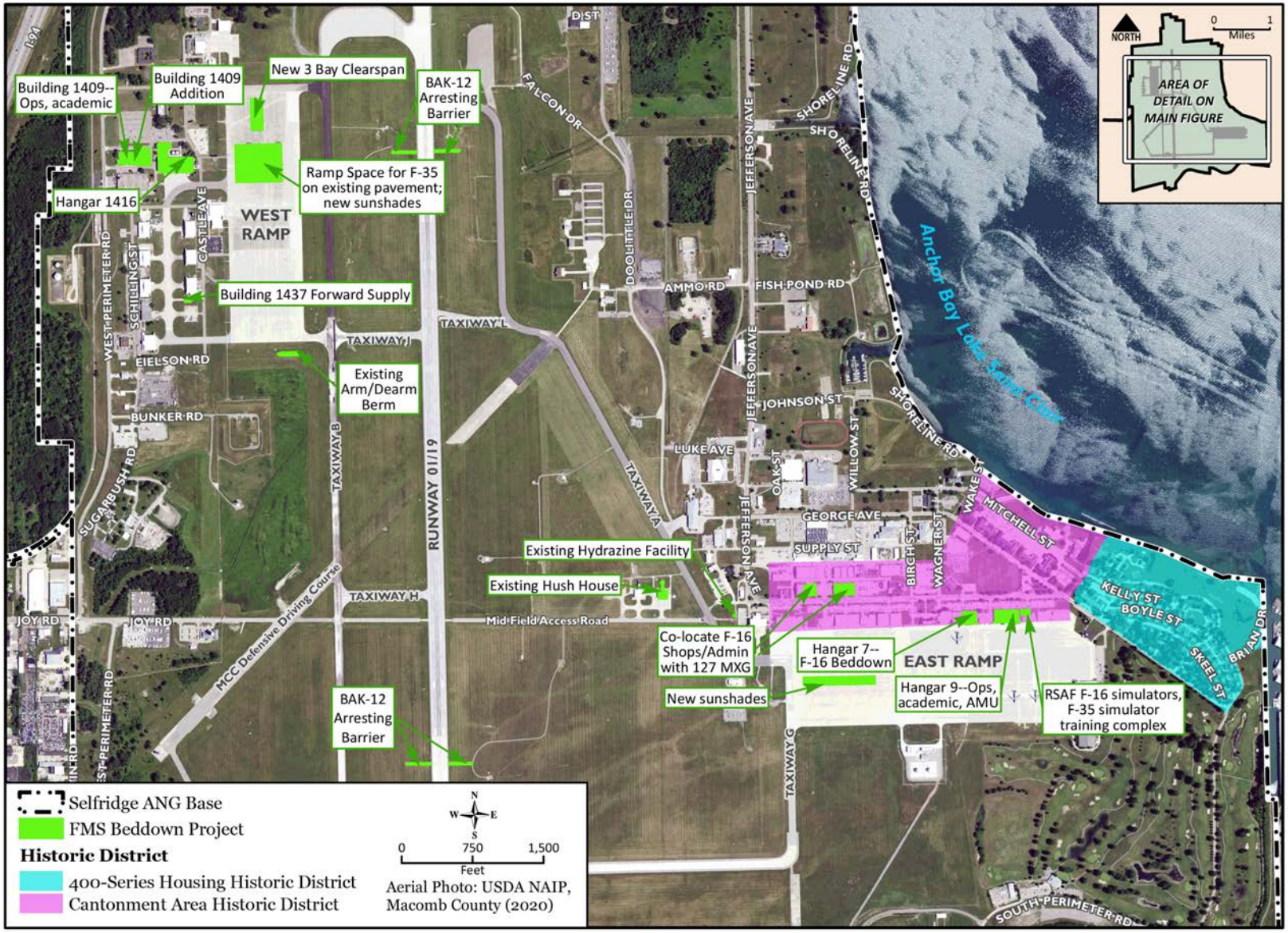

Figure 4.7-1. Map Depicting Historic Properties Within the APE at Selfridge ANG Base

Sources: (Selfridge ANG Base, 2021; USDA-FSA-APFO, 2020; ANG, 2017)

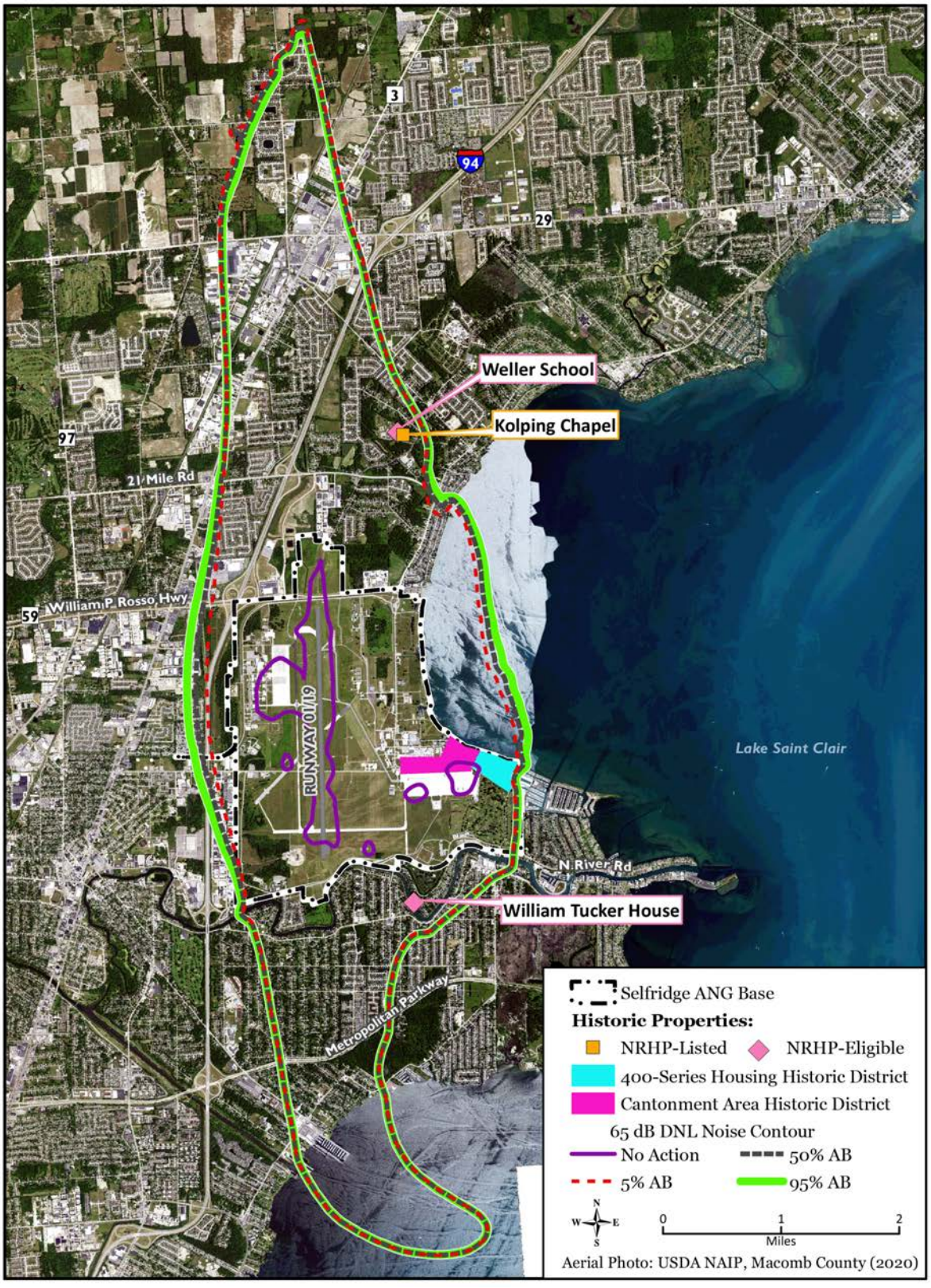

Figure 4.7-2. Map Depicting Historic Properties Within the 65 dB DNL Contour APE Surrounding Selfridge ANG Base

Sources: (Selfridge ANG Base, 2021; ESRI Data & Maps, 2019a; Michigan SHPO, 2022; USDA-FSA-APFO, 2020; BRRC, 2022c)

4.7.2.2 Affected Airspace

There are 85 NRHP-listed properties located under the airspace and MTRs associated with the Selfridge ANG Base alternative, including 52 buildings, 21 structures, 10 districts, and 2 sites (NPS, 2014). No American Indian reservations or known traditional cultural properties underlie the airspace. Tribal consultation efforts to identify other traditional resources within the APE are described above in Section 4.7.2.1 above in the *Traditional Resources* subsection.

4.7.3 No Action Alternative

The affected environment under the No Action Alternative would reflect actions that are expected to have occurred by CY 2029. These are described in Section 4.12.2.5, *Cumulative Impacts, Cultural Resources*. Implementation of the No Action Alternative (i.e., no beddown of the FMS PTC at Selfridge ANG Base) would not result in any additional impacts outside those described under Cumulative Impacts.

4.7.4 Alternative 2 Environmental Consequences

The analysis of impacts to cultural resources for Alternative 2 evaluates impacts in relation to the No Action Alternative (CY 2029); the affected environment at that time would be expected to be as described in Section 4.12.2.5, *Cumulative Impacts, Cultural Resources*. Effects to historic properties resulting from Alternative 2 may include physical and visual effects associated with construction and renovation projects on Selfridge ANG Base, operational noise effects to areas surrounding the base, and noise effects to resources below the airspace to be utilized under Alternative 2. The DAF has completed consultation with the Michigan SHPO and consultation is underway with interested Tribes to assess the effects of Alternative 2 to historic properties, in accordance with Section 106 of the NHPA. On January 11, 2022, the DAF sent letters initiating Section 106 consultation with the Michigan SHPO and initiating government-to-government consultation with potentially interested federally recognized Tribes. To date, the DAF has received comments from seven Tribes, none of which have identified resources that may be affected by Alternative 2 (see Volume II, **Appendix A**, Section A.3, for summaries of Tribal correspondence). On May 5, 2022, the DAF sent a second consultation letter and supporting documentation to the Michigan SHPO, all Tribes requesting consultation, and all unresponsive Tribes, seeking comment on the DAF's finding of *no adverse effects to historic properties*. On July 21, 2022, the Michigan SHPO concurred with a finding of no adverse effects (see Volume II, **Appendix A**, Section A.2.1.2).

4.7.4.1 Selfridge ANG Base and Surrounding Area

Archaeological Resources

There are no previously recorded archaeological historic properties within the APE for Alternative 2. Furthermore, construction for Alternative 2 would occur within previously disturbed land. Therefore, undiscovered cultural resources are not anticipated during implementation of Alternative 2 at Selfridge ANG Base. However, in the event of an inadvertent discovery during ground-disturbing operations, the following specific actions would occur in accordance with Standard Operating Procedure 6.3 of the Integrated Cultural Resources Management Plan for Selfridge ANG Base (127 WG, 2021a):

- The project manager would cease work immediately and the discovery would be reported to the 127 WG environmental manager, who would secure the location with an adequate buffer and notify the Commander and the NGB cultural resources manager.
- The environmental manager would then continue to follow ANG inadvertent discovery protocol (127 WG, 2021a).

Under these conditions, there would be no adverse effects to archaeological resources with implementation of this alternative.

Architectural Resources

There are no historic properties in the West Ramp area of Selfridge ANG Base, and therefore development activities within the West Ramp area would have no effect on historic properties.

Alternative 2 development projects at the East Ramp of Selfridge ANG Base would require renovations to contributing buildings within the NRHP-eligible Cantonment Area Historic District and new construction in and within the viewshed of the district. Specific impacts to contributing resources of the historic district include the following:

- Hangar 9 (constructed in 1932, contributing) would be renovated for FMS F-16 squadron operations, classrooms for flying training, aircraft egress system maintenance, and maintenance debrief areas.
- Buildings 117 and 120 (two warehouses constructed in 1932, contributing) would be subject to minor interior renovations for F-16 shops.
- Hangar 7 (constructed in 1932, contributing) would be used for F-16 maintenance functions.
- Two RSSs would be located to the east of Hangar 9 within the historic district and house four networked training devices plus a Unit Training Device that would require pads and power.
- Construction near but outside the district boundaries would include construction of 9 new sunshades south of an existing row of 12 sunshades and renovation of Building 158 (constructed in 1992, not eligible).

The proposed renovations of contributing historic properties are primarily limited to interior alterations that are not expected to substantially alter the exterior appearances of the resources. Based on current project planning information, the renovation projects would not alter character-defining features of Hangars 7 or 9 or Buildings 117 or 120 that make them contributing resources of the Cantonment Area Historic District. Thus, the renovation projects are expected to result in no adverse effects. In the event that Alternative 2 is selected, the DAF would engage in additional consultation with the Michigan SHPO to ensure that the renovation projects are carried out in accordance with the Secretary of the Interior's Standards for the Treatment of Historic Properties (NPS, 2017). Under consultation with the Michigan SHPO, new construction under Alternative 2 in and near the Cantonment Area Historic District would be of a scale and nature compatible with the historic and current use of the area by the Michigan ANG and, thus, would result in no adverse visual effects to the historic district.

Both the Cantonment Area Historic District and the 400-Series Housing Historic District, which in total include 96 contributing buildings, are located within the 65 dB DNL contour for Alternative 2 and would be subject to noise effects. These two properties are considered "noise

sensitive areas," as defined in paragraph 11-5b(10) of FAA Order 1050.1F. The majority of the 400-Series Housing Historic District falls between the 65 dB DNL and 70 dB DNL contours, while the majority of the Cantonment Area Historic District falls between the 70 dB DNL and 75 dB DNL contours. However, NRHP eligibility of the historic properties is based, in large part, on their association with an active ANG installation at which jet aircraft historically and routinely operate(d), thus the increased noise levels would not adversely affect the historic setting of the resources.

There is one NRHP-listed resource and two NRHP-eligible resources located in the portion of the APE extending beyond Selfridge ANG Base within the 65 dB DNL contour—the Kolping Chapel, the Weller School, and the William Tucker House. These properties are considered "noise sensitive areas," as defined by in paragraph 11 5b(10) of FAA Order 1050.1F. The three properties are located outside the 50 dB DNL contour under baseline conditions (No Action Alternative) and between the 65 dB DNL and 70 dB DNL contours for Alternative 2. The increase in noise would represent a change in the setting of each property. However, none of the resources is located in its original setting. The Kolping Chapel was listed in the NRHP in 1996 when it was located at its original location on the opposite side of Sugarbush Road in the now-closed Kolping Park (NPS, 2014; Michigan SHPO, 2022). Today the Kolping Chapel and the Weller School are located on Chesterfield Township municipal property and have been moved from their original locations. Their current setting is that of a recreated historical "village" located adjacent to a large municipal building constructed after 1983. The William Tucker House is located in a twentieth-century neighborhood in a setting that has been substantially altered since the property's period of significance in the eighteenth century. Thus, setting cannot be considered an important character-defining feature of the Kolping Chapel, the Weller School, or the William Tucker House, and the increased noise levels would not affect any of the characteristics of the buildings that qualify them for listing in the NRHP.

Scientific studies of the effects of noise and vibration on historic properties have considered potential effects on historic buildings, prehistoric structures, water tanks, archaeological cave/shelter sites, and rock art. These studies have concluded that overpressures generated by subsonic overflight were well below established damage thresholds (see Volume II, **Appendix C**, Section C.1.2.13 and Section 3.3.1.1.8, *Noise, Resource-Specific Analysis Methodology, Structural Damage*). As such, it is highly unlikely that the historic resources at Selfridge ANG Base, the Kolping Chapel, the Weller School, or the William Tucker House would experience physical effects resulting from noise or vibration, thus Alternative 2 would result in no adverse effects to historic properties in the APE for noise effects on and surrounding Selfridge ANG Base.

Traditional Resources

Selfridge ANG Base contains no known traditional resources, and Tribal consultation to date has not identified any traditional resources that may be affected by Alternative 2 (see Volume II, **Appendix A**, Section A.3, for a summary of Tribal correspondence). As such, no effects to traditional resources are anticipated for Alternative 2.

4.7.4.2 Affected Airspace

The primary source of effects to cultural resources beneath the affected airspace is through sound and vibration. The noise analysis has identified that the only substantial noise increase

associated with the use of airspace for Alternative 2 would occur in R-4201A of the Grayling Range and its MTRs (see appropriate Noise section). Noise levels would remain below 65 dB L_{dnmr} throughout the airspace except in this area, where noise would reach up to 66 dB L_{dnmr}.

The largest changes in noise levels would occur in the Grayling East MOA and its north MTRs, the Pike West MOA and its MTRs, and Steelhead Low East and its MTRs, with increases of 12.6, 12.9, and 13.1 dB L_{dnmr}, respectively; however, levels would remain below 59 dB L_{dnmr} in these areas. As previously described, scientific studies of the effects of noise and vibration on multiple types of historic properties have concluded that overpressures generated by subsonic overflight were well below established damage thresholds (see Volume II, **Appendix C**, Section C.1.2.13). No adverse effects to historic properties under the airspace are expected at these levels.

Proposed use of the airspace would be similar to ongoing training operations, although frequency would be increased under Alternative 2. Given the current use of the airspace and the nature of the proposed future use of the project area, there would be no adverse effects to NRHP-eligible or -listed archaeological resources, architectural resources, or traditional cultural properties with implementation of Alternative 2. On July 21, 2022, the Michigan SHPO concurred with a finding of no adverse effects (see Volume II, **Appendix A**, Section A.2.1.2).

4.7.5 Mitigations

Section 4.3.5, *Noise, Mitigations*, describes several potential adjustments in flight procedures the DAF is considering that can reduce noise levels to some degree. **Figure 4.7-3** depicts the 65 dB DNL noise contours based on the 5%, 50%, and 95% mitigated afterburner usage scenarios. All previously surveyed resources are also inside the 65 dB DNL noise contours for all three mitigated noise scenarios. The analysis of effects to these historic properties presented in Section 4.7.4.1, *Selfridge ANG Base and Surrounding Area*, is applicable to both the mitigated and unmitigated scenarios.

Alternative 2 would not be expected to result in adverse effects to historic properties. As a result, no mitigations are proposed to address effects to cultural resources. However, if Alternative 2 is selected, additional consultation with the Michigan SHPO would be required to ensure that renovation of historic properties in the Cantonment Area Historic District is carried out in accordance with the Secretary of the Interior's Standards for the Treatment of Historic Properties (NPS, 2017). If the proposed renovations result in unavoidable adverse effects to historic properties, appropriate mitigation would be developed through consultation with the Michigan SHPO.

Additionally, in the event of an inadvertent discovery during ground-disturbing operations, the following specific actions would occur, in accordance with Standard Operating Procedure 6.3 of the Integrated Cultural Resources Management Plan for Selfridge ANG Base (127 WG, 2021a):

- The project manager would cease work immediately, and the discovery would be reported to the 127 WG environmental manager, who would secure the location with an adequate buffer and notify the Commander and the NGB cultural resources manager.
- The environmental manager would then continue to follow ANG standard operating procedures for cultural resource inadvertent discovery.

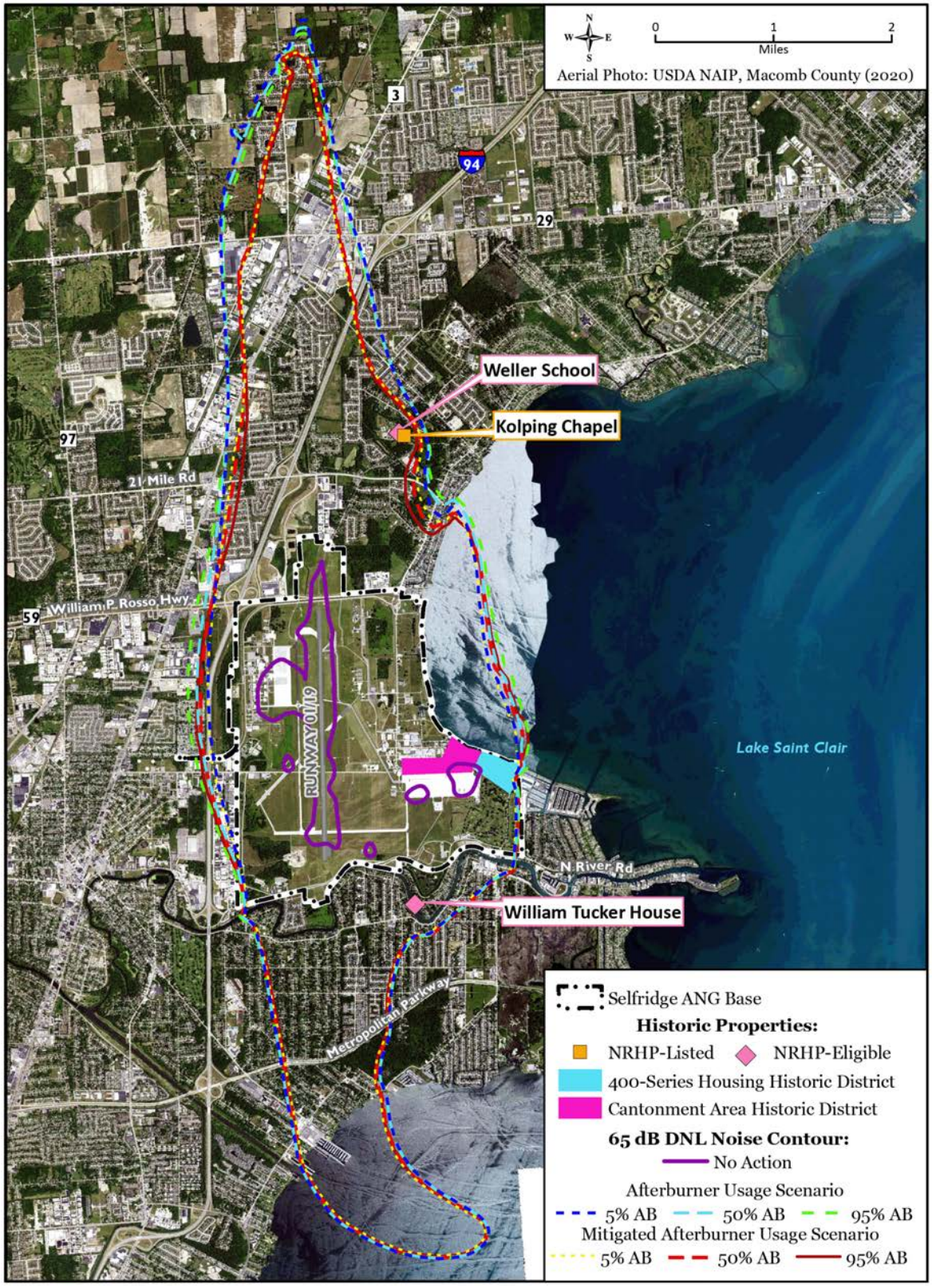

Figure 4.7-3. Map Depicting Historic Properties Within the Noise Mitigation and Proposed Action 65 dB DNL Contours APE Surrounding Selfridge ANG Base

Sources: (Selfridge ANG Base, 2021; ESRI Data & Maps, 2019a; Michigan SHPO, 2022; USDA-FSA-APFO, 2020; BRRC, 2022c; BRRC, 2022d)

4.8 BIOLOGICAL RESOURCES

The definition of the biological resources for Alternative 2 are consistent with those described for the Preferred Alternative in Section 3.8, *Biological Resources*.

4.8.1 Resource-Specific Analysis Methodology

Biological resource analysis methodology is the same as described for the Preferred Alternative (Section 3.8.1, *Biological Resources, Resource-Specific Analysis Methodology*).

4.8.2 Alternative 2 Affected Environment

4.8.2.1 Selfridge ANG Base and Surrounding Area

Biological resources at Selfridge ANG Base are managed following the Selfridge INRMP, which complies with federal, state, and local standards (ANG, 2018). Federal- and state-listed species surveys were conducted in 2016, and bat surveys were performed in 2015 (NGB, 2016a; Michigan ANG, 2015). Selfridge ANG Base operates under existing installation depredation permits, including a damage and nuisance animal control permit, a mute swan removal permit, an airport depredation permit (migratory birds), a bald eagle harassment permit, and a state threatened and endangered species permit.

4.8.2.1.1 Vegetation

Selfridge ANG Base is situated within the Eastern Broadleaf Forest Province, which is a unique assemblage of oak-hickory (*Quercus* spp., *Carya* spp.) trees with an herbaceous ground cover. The vegetation within Selfridge ANG Base consists of a maintained prairie, interspersed with fragmented wetlands and marshes consisting of mixed hardwood woodlands with the occasional scrub species (ANG, 2018). A majority of the natural vegetation has been removed from the improved and semi-improved areas to accommodate the development of runways and other facilities in support of the military mission.

In 2014, broad-scale vegetation surveys identified six natural vegetation communities (301 acres), two semi-natural vegetation communities (53 acres), and four developed vegetation (human-maintained) communities (2,016 acres). The INRMP contains additional details on these communities (ANG, 2018). Developed areas around buildings are turf lawn and maintained landscaping, as well as wetlands, drainage ditches, ponds, and semi-maintained fields (ANG, 2018). There is also some open water on Selfridge ANG Base (ANG, 2018). Aquatic resources are covered under Section 4.9, *Water Resources*.

Ongoing maintenance of forested areas is implemented to address airfield BASH concerns. A total of 145 acres have previously been deforested, and an additional 89 acres are considered high-risk BASH areas and are scheduled for deforestation (Michigan ANG, 2020).

A total of 19 invasive species were identified on Selfridge ANG Base in 2014 (ANG, 2018). The Integrated Pest Management Plan provides goals and strategies to control these species, including a prescribed burn program (ANG, 2018; Selfridge ANG Base, 2020).

4.8.2.1.2 Wildlife

The upland and wetland communities at Selfridge ANG Base provide habitat for a variety of wildlife species. Reconnaissance-level biological surveys were completed in 2004, and field

surveys for listed wildlife species were conducted in 2015 (ANG, 2018; NGB, 2016a). Refer to the Selfridge ANG Base INRMP Appendix I for a list of wildlife species known to occur and/or with potential to occur at Selfridge ANG Base (ANG, 2018). Detailed avifauna studies have not been performed at Selfridge ANG Base; however, information gathered during other studies, including American Breeding Bird Surveys, have contributed to a species list available in the installation INRMP (ANG, 2018). Common bird species observed on the installation include the great blue heron *(Ardea herodias*), Canada goose (*Branta canadensis*), mallard duck (*Anas platyrhynchos*), gulls (*Larus* spp.), hawks (*Buteo* spp. and *Accipiter* spp.), American kestrel (*Falco sparverius*), great horned owl (*Bubo virginianus*), blue jay (*Cyanocitta cristata*), American crow (*Corvus brachyrhynchos*), American robin (*Turdus migratorius*), European starling (*Sturnus vulgaris*), yellow warbler (*Setophaga petechial*), sparrows (*Ammodramus* spp. and *Melospiza* spp.), and American goldfinch (*Spinus tristis*). A regional Bird Conservation Plan has been developed by Partners in Flight that addresses research, monitoring, and outreach needs (Partners in Flight, 2017).

Common reptiles and amphibians include the northern leopard frog (*Lithobates pipiens*), common snapping turtle (*Chelydra serpentina*), painted turtle (*Chrysemys picta*), northern map turtle (*Graptemys geographica*), and eastern garter snake (*Thamnophis radix radix*). Common mammals include the eastern cottontail (*Sylvilagus floridanus*), woodchuck (*Marmota monax*), eastern gray squirrel (*Sciurus carlinensis*), fox squirrel (*Sciurus niger*), muskrat (*Ondatra zibethicus*), coyote (*Canis latrans*), red fox (*Vulpes vulpes*), striped skunk (*Mephitis mephitis*), and white-tailed deer (*Odocoileus virginianus*) (ANG, 2018).

Bat monitoring surveys conducted in 2011 and 2015 documented eight bat species on-site: (1) the eastern red bat (*Lasiurus borealis*), (2) big brown bat (*Eptesicus fuscus*), (3) hoary bat (*Lasiurus cinereus*), (4) silver-haired bat (*Lasionycteris noctivagans*), (5) evening bat (*Nycticeius humeralis*), (6) tricolored bat (*Perimyotis subflavus*), (7) little brown bat (*Myotis lucifugus*), and (8) the federally listed northern long-eared bat (*Myotis septentrionalis*) (ANG, 2018; Michigan ANG, 2015). The northern long-eared bat was not detected during the most recent (2015) surveys.

4.8.2.1.3 Special Status Species

Special status species known to occur or with the potential to occur on and near Selfridge ANG Base include species listed under the ESA, state-listed species, migratory birds, bald eagles, and golden eagles. The Information for Planning and Consultation online system was accessed to identify current USFWS trust resources (e.g., migratory birds, species proposed or listed under ESA, interjurisdictional fishes, wetlands, and USFWS National Wildlife Refuge System lands) with potential to occur within the ROI for biological resources at Selfridge ANG Base (USFWS, 2022e). The USFWS Michigan Ecological Services Field Office provided an automated Official Species List via an ESA Section 7 letter that identified six threatened or endangered species protected under the ESA, one candidate species, an experimental population of one endangered species, and no designated critical habitat (USFWS, 2022e). **Table 4.8-1** presents federally threatened, endangered, and candidate and state-listed species observed or potentially occurring in the vicinity of Selfridge ANG Base.

Table 4.8-1. Special Status Species Known or With the Potential to Occur at Selfridge ANG Base

Common Name	Scientific Name [a]	Status	Potential for Occurrence on Selfridge ANG Base and Surrounding Area [b]
Mammals			
Northern long-eared bat	*Myotis septentrionalis*	FT	O
Indiana bat	*Myotis sodalis*	SE, FE	P
Birds			
Piping plover	*Charadrius melodus*	SE, FT	U
Red knot	*Calidris canutus rufa*	FT	O
Long-Eared owl	*Asio otus*	ST	P
Short-Eared owl	*Asio flammeus*	SE	O
Red-Shouldered hawk	*Buteo lineatus*	ST	P
Common loon	*Gavia immer*	ST	O
Whooping crane	*Grus americana*	EXPN	U
King rail	*Rallus elegans*	SE	P
Forster's tern	*Sterna forsteri*	ST	P
Common tern	*Sterna hirundo*	ST	P
Reptiles and Amphibians			
Eastern massasauga	*Sistrurus catenatus*	FT	P
Spotted turtle	*Clemmys guttata*	ST	P
Eastern fox snake	*Pantherophis vulpinus*	ST	P
Fish			
Lake sturgeon	*Acipenser fulvescens*	ST	P
Eastern sand darter	*Ammocrypta pellucida*	ST	P
Mooneye	*Hiodon tergisus*	ST	P
Pugnose shiner	*Notropis anogenus*	SE	P
River darter	*Percina shumardi*	SE	P
Invertebrates			
Clams			
Snuffbox mussel	*Epioblasma triquetra*	SE, FE	P
Slippershell	*Alasmidonta viridis*	ST	P
Purple wartyback	*Cyclonaias tuberculatta*	ST	P
Wavy-rayed lampmussel	*Lampsilis fasciola*	ST	P
Eastern pondmussel	*Ligumia masuta*	SE	P
Black sandshell	*Ligumia recta*	SE	P
Lilliput	*Toxolasma parvus*	SE	P
Insects			
Monarch butterfly	*Danaus plexippus*	FC	P
Plants			
Gattinger's gerardia	*Agalinis gattingeri*	SE	P
Lake cress	*Amoracia lacustris*	ST	U

Sources: (USFWS, 2022e; ANG, 2018)

Key: ANG = Air National Guard; EXPN = Experimental Population; FC = Federal Candidate; FE = Federal Endangered; FT = Federal Threatened; SE = State Endangered; ST = State Threatened; O = observed, P = potential; U = unlikely to occur; USFWS = U.S. Fish and Wildlife Service

Notes:

a. For details on species and habitat use, see the USFWS Environmental Conservation Online System (USFWS, 2022b).

b. Includes habitats within a 5-mile radius of the installation.

In 2015, focused surveys for three federally listed and five state-listed species occurred, and three state-listed species—the peregrine falcon, short-eared owl, and common loon—were documented (NGB, 2016a). The common loon was reported near the shore of and over Lake St. Clair. Both the peregrine falcon and short-eared owl were observed in several locations within the fenced airspace area, particularly on the very eastern edges and on the north and south approaches of the Selfridge ANG Base airspace (NGB, 2016a).

Only one federally listed species has been documented on Selfridge ANG Base. One acoustic detection was made for a northern long-eared bat during the 2011 focused bat surveys; no northern long-eared bats were observed during the 2015 surveys. These bats spend their winters hibernating in caves or mines, and during summers they nest by themselves or in colonies under bark, in cavities, or in the crevices of live or dead trees and may also roost in caves and mines. Northern long-eared bats breed in late summer or early fall and are opportunistic in selecting roosts and feed on insects such as moths, flies, leafhoppers, and beetles in the understory of forested hillsides at dusk. The red knot was observed in 2012 at the Lake St. Clair Metropark near Selfridge ANG Base but was not detected during the 2015 surveys. Red knots would only be present at Selfridge ANG Base during the spring and fall migration period near the shore waters of Lake St. Clair.

Migratory Birds

Selfridge ANG Base is located within the Mississippi flyway within BCR 13, Lower Great Lakes/St. Lawrence Plain (**Figure 4.8-1**). Small patches of forest, open land, and wetlands, and especially Lake St Clair, provide habitat for various migratory birds at Selfridge ANG Base. Twenty-one migratory birds that occur on the USFWS BCC list or warrant special attention have the potential to occur (**Table 4.8-2**). Migratory birds use these areas as spring and fall stopover points. Approximately 270 bird/wildlife strikes have been recorded at Selfridge ANG Base since 1993 (ANG, 2018).

Table 4.8-2. Migratory Birds With Potential to Occur at Selfridge ANG Base

Common Name	Scientific Name	Season	Potential for Occurrence on Selfridge ANG Base and Surrounding Area
American golden-plover	*Pluvialis dominica*	Spring/Summer/Fall	P
Bald eagle	*Haliaeetus leucocephalus*	Winter/Spring/Summer/Fall	O
Black tern	*Chlidonias niger*	Spring/Summer	P
Black-Billed cuckoo	*Coccyzus erythropthalmus*	Spring/Summer/Fall	U
Bobolink	*Dolichonyx oryzivorus*	Spring/Summer/Fall	P
Canada warbler	*Cardellina canadensis*	Spring/Summer/Fall	P
Cerulean warbler	*Dendroica cerulea*	Spring/Summer	P
Eastern whip-poor-will	*Antrostomus vociferus*	Spring/Summer	P
Golden eagle	*Aquila chrysaetos*	Spring/Summer/Fall	P
Golden-Winged warbler	*Vermivora chrysoptera*	Spring/Summer/Fall	P
Henslow's sparrow	*Ammodramus henslowii*	Winter	P
Lesser yellowlegs	*Tringa flavipes*	Winter	P
Long-Eared owl	*Asio otus*	Spring/Summer/Fall	P
Red-Headed woodpecker	*Melanerpes erythrocephalus*	Winter/Spring/Summer	P
Ruddy turnstone	*Arenaria interpres morinella*	Spring/Summer/Fall	P
Rusty blackbird	*Euphagus carolinus*	Winter/Spring/Summer/Fall	P
Short-Billed dowitcher	*Limnodromus griseus*	Spring/Summer	P
Wood thrush	*Hylocichla mustelina*	Spring/Summer/Fall	P

Source: (USFWS, 2022e)
Key: ANG = Air National Guard; O = observed; P = potential; U = unlikely to occur

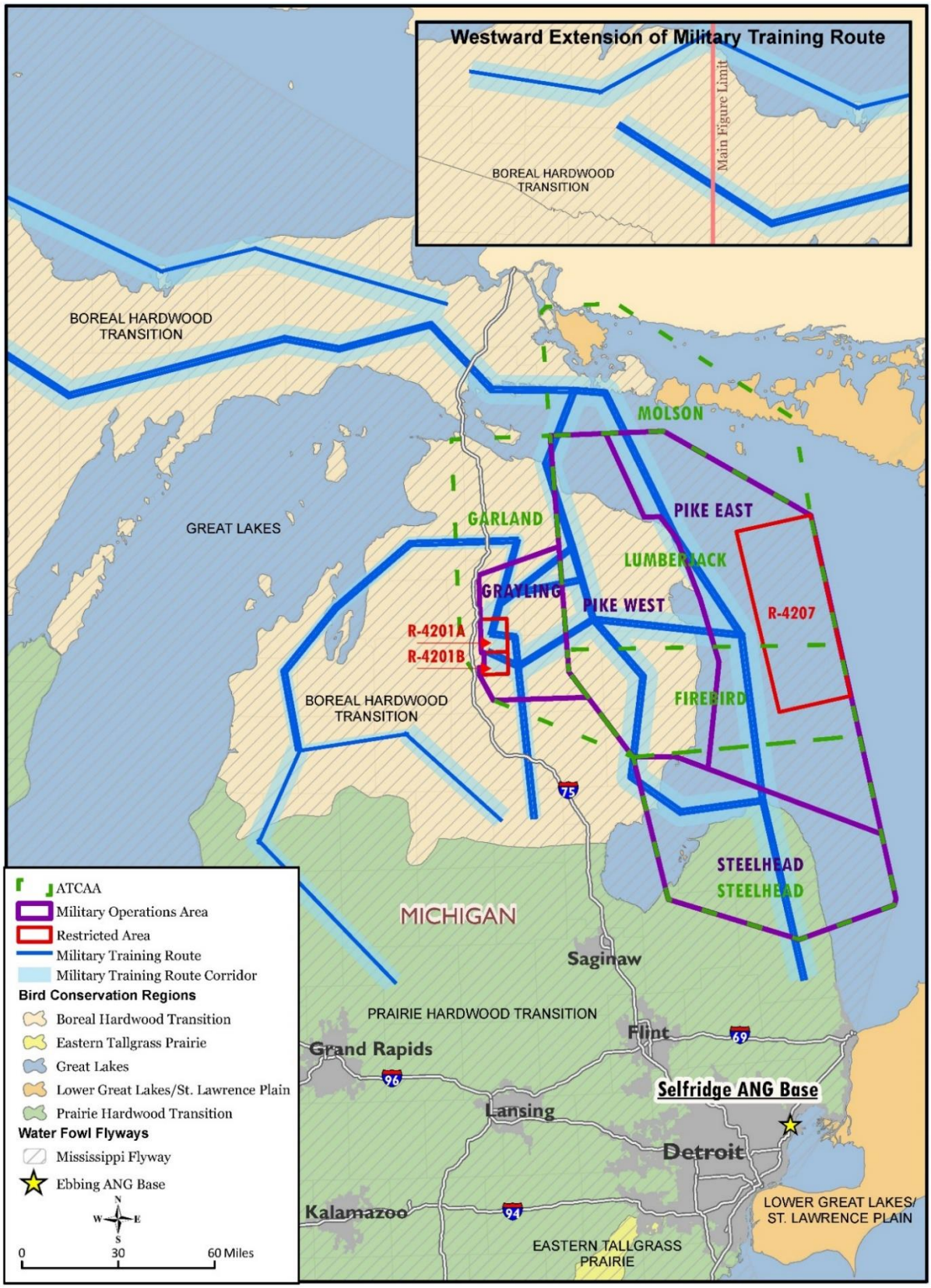

Figure 4.8-1. Selfridge ANG Base Bird Conservation Regions

Sources: (Birds Canada and NABCI, 2014; USFWS, 2015); (ESRI Data & Maps, 2019a; ESRI Data & Maps, 2019c; FAA, 2021a; FAA, 2021b; Selfridge ANG Base, 2021; USCB, 2018a)

Bald and Golden Eagles

Bald eagles are common in the state of Michigan and stay year-round where there is open water for foraging. Bald eagles will nest close to open water in a wide variety of habitats. Nests may be placed in snags or large live trees, as well as on constructed platforms or utility poles (Michigan State University, 2022). There have been several reports of bald eagle sightings on and near Selfridge ANG Base (ANG, 2018). Eagles have been observed on the eastern side of the base, along the shoreline of Lake St. Clair and near the runway (NGB, 2016a).

Golden eagles are uncommon and nonbreeding in Michigan but may occasionally migrate through the state (Cornell University, 2022). Occurrences of golden eagles at Selfridge ANG Base could include overflights during their spring and fall migrations; however, any occasional presence would be transient in nature.

4.8.2.2 Affected Airspace

4.8.2.2.1 Vegetation and Wildlife

Lands underneath the affected airspace for Alternative 2 (Selfridge ANG Base) are located within the Maumee Lake Plain ecoregion (USEPA, 2013). The region is important for many species of migratory and resident birds, particularly waterfowl, neotropical migrants, and colony nesters. The area serves as a breeding, feeding, and resting area for species such as the northern harrier, common loon, double-crested cormorant, common tern, bobolink, least bittern, and common merganser (NWF, 2021). The airspace extends over the Great Lakes, which is essential habitat to a variety of birds, fish, and other aquatic wildlife.

4.8.2.2.2 Special Status Species

Special status species with potential to occur under the affected airspace include species listed under the ESA, state-listed species, migratory birds, bald eagles, and golden eagles. Federally listed threatened and endangered species with potential to occur under the affected airspace, and with the potential to be impacted by noise or collision risks associated with aircraft operations, are presented in **Table 4.8-3**. The state status of these species is shown where applicable. The mammal and bird species listed in the table have the potential to be impacted by noise or collision risks associated with aircraft operations. Federally listed and candidate mammal, reptile, invertebrate, and plant species, as well as critical habitat for the piping plover (*Charadrius melodus*) and Hine's emerald dragonfly (*Somatochlora hineana*), also occur under the affected airspace. However, these species and critical habitats have been omitted from the analysis, as ground disturbance would not occur under the training airspace, and aircraft would fly at elevations that would not substantially impact ground or aquatic species or critical habitats. Ordnance delivery and chaff and flare use would occur in training areas that are currently approved for these activities. Existing altitude and/or quantity restrictions on flare use would continue to apply (**Figure 4.8-2**).

Numerous additional mammal, bird, fish, reptile, amphibian, invertebrate, and plant species that are listed as threatened or endangered by the State of Michigan could also occur under the affected airspace. However, as with federally listed species, only bats and birds would potentially be affected by aircraft noise and collisions. For information on state-listed species in the airspace portion of the ROI, refer to the Michigan DNR website's list of endangered and threatened species (Michigan DNR, 2009) and the installation INRMP (ANG, 2018).

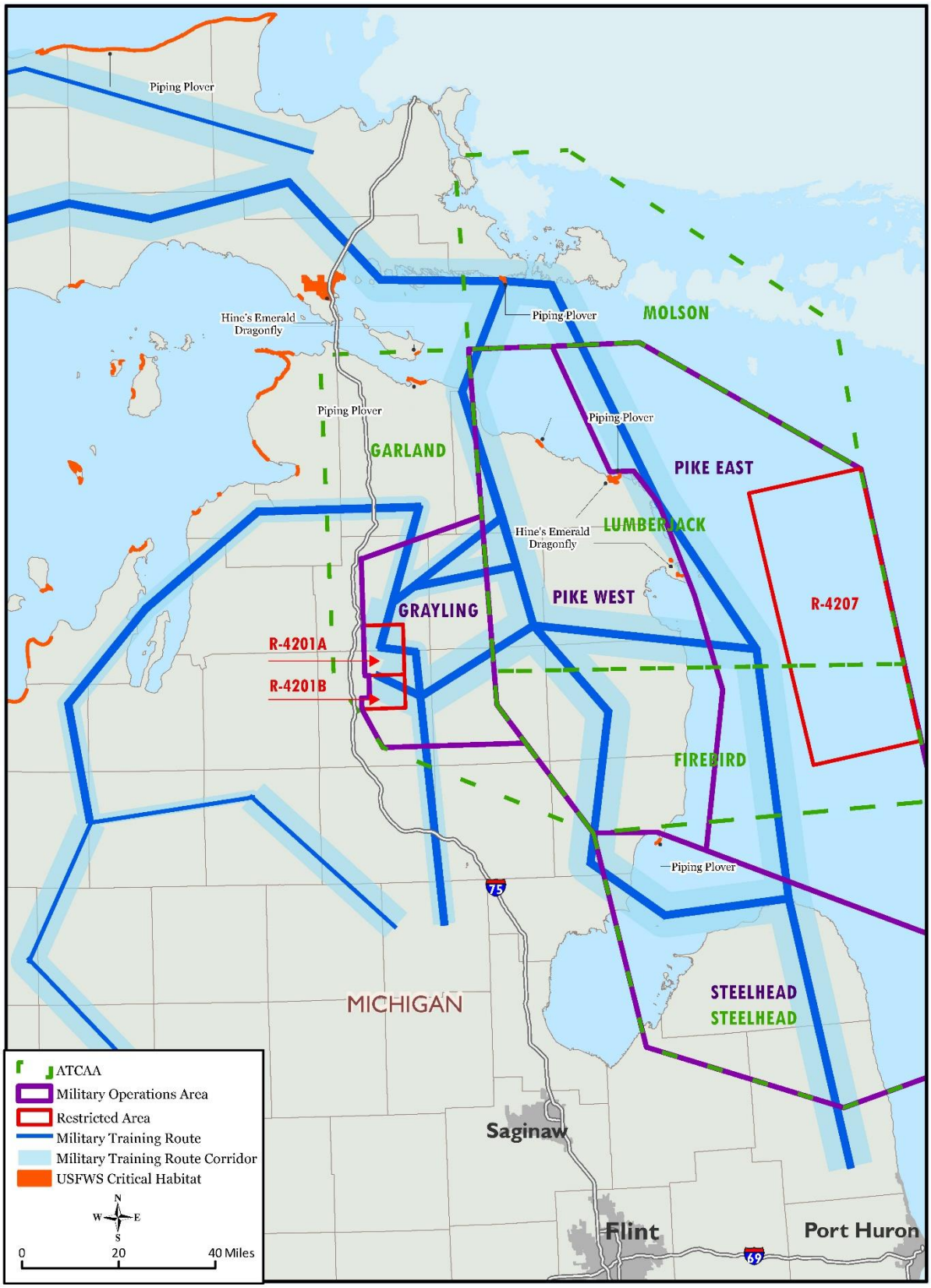

Figure 4.8-2. Selfridge ANG Base Critical Habitat Airspace

Sources: (USFWS, 2022); (ESRI Data & Maps, 2019a; ESRI Data & Maps, 2019c; FAA, 2021a; FAA, 2021b; Selfridge ANG Base, 2021; USCB, 2018a)

Table 4.8-3. Federally Listed Species Known to Occur or With the Potential to Occur Under the Airspace – Alternative 2

Common Name	Scientific Name [a]	Status	Potential For Occurrence under Selfridge ANG Base Airspace [b]
Mammals			
Northern long-eared bat	*Myotis septentrionalis*	FT	P
Indiana bat	*Myotis sodalis*	SE, FE	P
Birds			
Piping plover	*Charadrius melodus*	SE, FT	P
Red knot	*Calidris canutus rufa*	FT	P
Whooping crane	*Grus american*	EXPN	P

Source: (USFWS, 2022f)

Key: ANG = Air National Guard; EXPN = Experimental Population; FE = Federal Endangered; FT = Federal Threatened; P = potential; SE = State Endangered; ROI = region of influence; USFWS = U.S. Fish and Wildlife Service

Notes:

a. For details on species and habitat use, see the USFWS Environmental Conservation Online System (USFWS, 2022b).

b. The ROI for federally listed species under the affected airspace only applies to bird and mammal species known to occur or with the potential to occur in these areas and that have the potential to be impacted by noise or collision risks associated with aircraft operations.

Migratory Birds

The region is important for many species of migratory birds including neotropical migrants. The affected airspace is located within three USFWS-designated BCRs under the Central Flyway migration route: (1) BCR 13, Lower Great Lakes/St. Lawrence Plain; (2) BCR 22, Eastern Tallgrass Prairie; and (3) BCR 23, Prairie Hardwood Transition (**Figure 4.8-1**). For further details on migratory birds with the potential to occur within the Selfridge ANG Base airspace, see **Table 4.8-4** and the INRMP (ANG, 2018).

Table 4.8-4 Migratory Birds With Potential to Occur Under the Airspace – Alternative 2

Common Name	Scientific Name	Season	Potential For Occurrence under Selfridge ANG Base Airspace Area
American golden-plover	*Pluvialis dominica*	Spring/Summer/Fall	P
Bald eagle	*Haliaeetus leucocephalus*	Winter/Spring/Summer/Fall	O
Black tern	*Chlidonias niger*	Spring/Summer	P
Black-Billed cuckoo	*Coccyzus erythropthalmus*	Spring/Summer/Fall	U
Blue-Winged warbler	*Vermivora pinus*	Spring/Summer/Fall	P
Bobolink	*Dolichonyx oryzivorus*	Spring/Summer/Fall	P
Canada warbler	*Cardellina canadensis*	Spring/Summer/Fall	P
Cerulean warbler	*Dendroica cerulea*	Spring/Summer	P
Common tern	*Sterna hirundo*	Spring/Summer	P
Connecticut warbler	*Oporornis agilis*	Summer	P
Eastern whip-poor-will	*Antrostomus vociferus*	Spring/Summer	P
Evening grosbeak	*Coccothraustes vespertinus*	Spring/Summer	P
Golden eagle	*Aquila chrysaetos*	Spring/Summer/Fall	P
Golden-winged warbler	*Vermivora chrysoptera*	Spring/Summer/Fall	P
Henslow's sparrow	*Ammodramus henslowii*	Winter	P
LeConte's sparrow	*Ammodramus leconteii*	Summer	P
Lesser yellowlegs	*Tringa flavipes*	Winter	P
Long-Eared owl	*Asio otus*	Spring/Summer/Fall	P
Marbled godwit	*Limosa fedoa*	Spring/Summer	P
Olive-Sided flycatcher	*Contopus cooperi*	Spring/Summer	P

Table 4.8-4 Migratory Birds With Potential to Occur Under the Airspace – Alternative 2

Common Name	Scientific Name	Season	Potential For Occurrence under Selfridge ANG Base Airspace Area
Prairie warbler	*Dendroica discolor*	Spring/Summer	P
Red-Headed woodpecker	*Melanerpes erythrocephalus*	Winter/Spring/Summer	P
Ruddy turnstone	*Arenaria interpres morinella*	Spring/Summer/Fall	P
Rusty backbird	*Euphagus carolinus*	Winter/Spring/Summer/Fall	P
Short-Billed dowitcher	*Limnodromus griseus*	Spring/Summer	P
Wood thrush	*Hylocichla mustelina*	Spring/Summer/Fall	P
Yellow rail	*Coturnicops noveboracensis*	Spring/Summer/Fall	P

Source: (USFWS, 2022f)
Key: ANG = Air National Guard; O = observed; P = potential; U = unlikely to occur

Bald and Golden Eagles

In Michigan, bald eagles are common, and suitable breeding, feeding, and resting habitats are present under the affected airspace. Golden eagles do not live in Michigan year-round but may occur as rare migrants in small numbers.

4.8.3 No Action Alternative

The affected environment under the No Action Alternative would reflect actions that are expected to have occurred by CY 2029. These are described in Section 4.12.2.6, *Cumulative Impacts, Biological Resources*. Implementation of the No Action Alternative (i.e., no beddown of the FMS PTC at Selfridge ANG Base) would not result in any additional impacts outside those described under Cumulative Impacts.

4.8.4 Alternative 2 Environmental Consequences

Analysis of impacts to biological resources for Alternative 2 evaluates impacts in relation to the No Action Alternative (CY 2029); the affected environment at that time would be expected to be as described in Section 4.12.2.6, *Cumulative Impacts, Biological Resources*.

The types of environmental consequences (e.g., strike potential and noise effects due to construction and operations) under Alternative 2 would be the same as described for the Preferred Alternative at Ebbing ANG Base.

4.8.4.1 Selfridge ANG Base and Surrounding Area

Vegetation and Wildlife

Facility Requirements

Under Alternative 2, permanent impacts would occur within mowed lawn and maintained landscaped areas at Selfridge ANG Base (see new impervious surface information in **Table 2.3-7**, Proposed Construction and Renovation Projects at Selfridge ANG Base). There are no significant impacts to vegetation, as no unique or sensitive vegetation occurs in the disturbed areas.

Wildlife utilizing these habitats in the proposed construction areas are species commonly found in urban areas and associated with lawns and maintained landscaped habitats; these species may be permanently displaced by the development. Bats may use the trees and buildings in the developed area for day and night roosts during their active season.

Wildlife in the vicinity may be temporarily disturbed from the increase in construction-related noise and additional human activity. Noise resulting from the proposed construction and renovation activities would be localized, short-term, and only occur during daylight hours. A number of wildlife species could occur in the landscaped areas during construction; however, areas proposed for construction are in the developed portions of the installation with frequent elevated noise levels. Those species are generally tolerant of human presence and activity and would be expected to habituate or flush or flee to similar habitats that are immediately available on and in the vicinity of the base. Impacts to wildlife from construction noise would be temporary and considered not significant.

Indirect impacts to vegetation and wildlife could also occur through the introduction of invasive and noxious species where ground surfaces are disturbed, providing opportunities for invasive species to establish and move into adjacent, undisturbed native habitats. Impacts would be minimized by using existing roads and limiting parking, driving, and staging areas to previously developed areas and through implementation of the Selfridge ANG Integrated Pest Management Plan and USDA APHIS (ANG, 2018).

Aircraft Operations

Under Alternative 2, annual airfield operations at Selfridge ANG Base would increase by up to 124 percent (**Table 2.3-1**, Current, No Action Alternative, and Alternative 2 Airfield Operations at Selfridge ANG Base). An increase in airfield operations at Selfridge ANG Base and the surrounding area could result in an increased potential for bird/wildlife-aircraft strikes, especially during takeoff and landing events. Adherence to the existing Selfridge ANG Base BASH program managed by 127 WG Safety Office personnel would minimize the risk for bird/wildlife-aircraft strikes to occur; therefore, no significant impacts would occur (ANG, 2018).

Additional airfield operations would increase noise levels around the installation. Noise levels exceeding 65 dB DNL would extend approximately 5 miles north of the runway and approximately 3 miles south of the runway. Up to approximately 7,200 acres (95% afterburner scenario) in the surrounding area would be newly exposed to noise levels greater than 65 dB DNL. According to the analysis conducted in Section 4.4, *Land Use*, approximately 96 percent of this land is developed (agricultural, commercial, residential, etc.). Less than 4 percent is public/quasi-public land or recreational land that may provide additional habitat for wildlife. A comprehensive evaluation of noise impacts to animal species is included in Volume II, **Appendix C**, Section C.1.2.14. It is anticipated that wildlife at Selfridge ANG Base could be impacted by noise events associated with Alternative 2 until they disperse from the area or habituate to the elevated noise environment associated with aircraft and military operations.

Special Status Species

Special status species known to occur or with the potential to occur at Selfridge ANG Base and in the surrounding area include species protected under the ESA (northern long-eared bat, Indiana bat, piping plover, red knot, whooping crane [*Grus americana*], eastern massasauga [*Sistrurus catenatus*], and snuffbox mussel [*Epioblasma triquetra*]), state-listed species, migratory birds, bald eagles, and golden eagles. Potential impacts on state-listed species would be similar to those discussed for vegetation and wildlife in general in the preceding facility requirements and airfield operations subsections. The DAF completed Section 7 consultation

for Alternative 2 under the ESA with the USFWS on May 12, 2022. The USFWS concurred with the DAF on the following effects determinations.

Northern Long-Eared Bat

Under Alternative 2, potential impacts on the northern long-eared bat would generally be the same as those described for the Preferred Alternative (Section 3.8.4.1, *Preferred Alternative Environmental Consequences, Ebbing ANG Base and Surrounding Area*), including the potential for aircraft strikes and noise disturbance. Individuals near the airfield could be struck during aircraft operations. Although the increase in operations would increase the potential for bats to be struck, the low probability of occurrence, low number of documented bat strikes at the installation, and timing of most aircraft operations indicate that the number of individuals impacted would be small and would not affect the viability of populations. Increased noise associated with aircraft operations could potentially affect foraging bats and could deter roosting near the airfield. Affected animals would probably be able to roost and forage in other nearby suitable habitat. The potential for impacts would be reduced by the attenuation of high-frequency noise with increasing distance from the airfield and by the fact that only a small percentage of operations would occur after 10:00 p.m. In addition, individuals could potentially habituate to the aircraft noise. Overall, the number of individuals potentially impacted, and the level of impacts in the context of the health of individual bats, would be small and would not affect the viability of northern long-eared bat populations. Based on the above discussion, and consistent with the effects determination generated by the USFWS Information for Planning and Consultation online system, implementation of the Preferred Alternative would have no effect on the northern long-eared bat.

Indiana Bat

Impacts to Indiana bats would generally be the same as those described for the northern long-eared bat. Given the low probability of species occurrence, low number of documented bat strikes at Selfridge ANG Base, and the timing of most aircraft operations, the probability of an aircraft striking an Indiana bat is extremely low. Increased noise levels associated with aircraft operations could potentially deter roosting and foraging near the airfield, requiring affected individuals to seek suitable habitat elsewhere. However, at least some bat species are tolerant of anthropogenic noise and may roost in noisy environments. The number of individuals affected would be small relative to population sizes. Implementation of Alternative 2 would have no effect on the Indiana bat.

Piping Plover and Red Knot

Under Alternative 2, increased airfield operations would result in an increased potential for bird/wildlife-aircraft strikes. However, the potential for strikes involving the piping plover and red knot is low due to their unlikely occurrence on or near Selfridge ANG Base. Habitat suitable for the red knot and other shorebirds such as the piping plover is absent on the installation, and nearby potential habitat along Lake St. Clair has been altered such that protected shorebird species are unlikely to occur (NGB, 2016a). Continued adherence to measures identified in the installation's BASH Plan (Michigan ANG, 2020) would reduce the risk of collisions. These bird species would not be expected near construction areas and would, therefore, not be affected by construction noise or disturbance. Individuals present in the area and close enough to the airfield to detect aircraft noise could alter their behavior or avoid areas subject to noise exposure. However, due to the very low potential for occurrence, such effects are unlikely.

Based on these factors, activities under Alternative 2 may affect, but are not likely to adversely affect, the piping plover and red knot.

Whooping Crane

Whooping cranes are not known to have been observed on or near Selfridge ANG Base. Small areas of potential habitats such as marshes and rivers occur in the vicinity. Similar to the discussion of other listed bird species, individuals present near the installation could be struck by aircraft or disturbed by aircraft noise, but such effects are unlikely due to the low potential for occurrence. Individuals that occur outside the National Park System and National Wildlife Refuge System are considered a nonessential experimental population. Alternative 2 is not likely to jeopardize the continued existence of this population; therefore, consistent with the effects determination generated by the USFWS Information for Planning and Consultation online system, there are no further obligations under Section 7 of the ESA.

Eastern Massasauga

Eastern massasauga rattlesnakes, if present on Selfridge ANG Base, could be struck by vehicles and other equipment during construction activities. The relatively small areas of potential wetland habitat on the installation do not likely support populations of the species (NGB, 2016a). Construction personnel would avoid purposeful contact with protected species. There would be no loss of wetlands or other effects on wetland habitat. Snakes could detect noise produced during construction activities and during aircraft operations and exhibit behavioral reactions or move away from affected areas, although reptiles are apparently less sensitive to noise than some other types of animals. Based on these factors, activities under Alternative 2 may affect, but are not likely to adversely affect, the eastern massasauga.

Snuffbox Mussel

The snuffbox mussel, which occurs in the substrate of creeks, rivers, and lakes, is not known to occur on or adjacent to Selfridge ANG Base. Construction activities would not directly impact surface waters, and construction management practices would prevent effects such as erosion and siltation. Noise produced during construction and aircraft operations would not affect this species. Implementation of Alternative 2 would have no effect on the snuffbox mussel.

Migratory Birds

Impacts to migratory birds (including BCC) would be the same as those previously discussed under the wildlife section. Adherence to the existing Michigan ANG BASH Plan would help continue the minimization of the risk for bird/wildlife-aircraft strikes to occur. Therefore, impacts to migratory birds under implementation of Alternative 2 would not be significant.

Bald and Golden Eagles

Bald and golden eagles are not known to nest at Selfridge ANG Base. The potential for aircraft collisions with soaring bald eagles and golden eagles would be minimized by adherence to the existing BASH Plan.

4.8.4.2 Affected Airspace

Wildlife

Under Alternative 2, training operations would increase by 124 percent. The change in frequency of operations could result in wildlife (i.e., birds and bats) flying within the airspace to have an increased risk for bird/wildlife-aircraft strikes. The location of the airspace and

proximity to suitable habitat and a high diversity of wildlife around Lake St. Clair and the Great Lakes poses an increased risk for bird/wildlife-aircraft strikes. Pilots would train in existing airspace at altitudes of 300 to 45,000 feet MSL. However, The F-35 and F-16 aircraft would fly at higher altitudes most of the time, with the F-35 operating more than 90 percent of the time above 10,000 feet MSL. Flying at higher altitudes reduces the risk for bird/bat -aircraft strikes, which are more common below 5,000 feet AGL. Birds and bats flying at lower altitudes could be impacted during low-level training; however, such training would only occur during 10 percent of the time. In addition, the affected airspace is very large and the chance of aircraft strike in the training airspace is unlikely. Therefore, there would be no significant impacts to birds and bats.

Operations in the airspace are proposed to increase from 12,283 to 18,911, which would result in an increase in noise levels within the training airspace. In areas beneath the RAs, the average number of events exceeding 85 dB L_{max} per day would increase from approximately 1 to 6 events per day, and time-averaged sound would increase by 13.1 dB L_{dnmr} relative to the No Action Alternative. The effects of noise within the airspace can be influenced by other factors such as weather patterns; however, birds and bats exposed to daily noise levels would likely experience some disturbance (i.e., startle effects) as a result of the increased training events. The affected airspace under Alternative 2 is large, and training operations are sufficiently spread out such that intense overflight noise events at any one location are infrequent. As such, noise effects to wildlife under the affected airspace would not be considered significant.

Special Status Species

Impacts to the federally listed species presented in **Table 4.8-3**, as well as state-listed species and other special status species, would be the same as those previously discussed under the wildlife section. Given the minor potential for aircraft strikes and infrequent exposures (spread out across the training airspace, short-term, lasting only the duration of the overflight) to noise events, there would be no significant impacts to species listed under the ESA, state-listed species, migratory birds (including BCC), bald eagles, or golden eagles. As such, the DAF determines that implementation of Alternative 2 at Selfridge ANG Base may affect, but is not likely to adversely affect, federally listed species identified in **Table 4.8-3**. In addition, the USFWS regulations allow for the incidental take of migratory birds for military readiness activities.

For Selfridge ANG Base, critical habitat for piping plover (beneath the Pike East/West and Steelhead airspace areas) would not be impacted due to the typical altitudes of aircraft and the resulting noise levels near the ground within the critical habitats. Therefore, the DAF determines that implementation of Alternative 2 would have no effect to designated critical habitat.

The DAF completed Section 7 consultation under the ESA with the USFWS on May 12, 2022. The USFWS concurred with the DAF on the above effects determinations for ESA-listed species and designated critical habitat.

4.8.5 Mitigations

In the absence of any significant impacts to biological resources, no mitigations have been identified. The following general measures would minimize impacts to biological resources.

- The Selfridge ANG Base INRMP and Wildlife Fire Management Plan would be implemented to reduce and minimize impacts from invasive species.
- Measures to minimize the potential for bird/wildlife-aircraft strikes, as identified in the Michigan ANG *127th Wing Bird Aircraft Strike Hazard (BASH) Plan 91-212* (Michigan ANG, 2020), would continue to be implemented.
- Temporarily disturbed habitats will be restored as soon as possible following project implementation to prevent net loss of habitat. The use of native trees will be included for any landscaping activities. Coordination would occur with the Natural Resource Manager to determine appropriate restoration.

4.9 WATER RESOURCES

The definition of water resources for Alternative 2 is consistent with that described for the Preferred Alternative in Section 3.9, *Water Resources*.

4.9.1 Resource-Specific Analysis Methodology

The water resources analysis methodology for Alternative 2 is consistent with those described for the Preferred Alternative in Section 3.9.1 (*Water Resources, Resource-Specific Analysis Methodology*).

4.9.2 Alternative 2 Affected Environment

4.9.2.1 Selfridge ANG Base and Surrounding Area

Water resources associated with Selfridge ANG Base and the surrounding area is the same as described in the F-35A Operational Beddown EIS (USAF, 2020b), Section MI3.1.10. The main surface water features are Lake St. Clair and the Clinton River (**Figure 4.9-1**). A series of catch basins, stormwater sewers, and pump/lift stations convey flow to these waterbodies. Floodplains and wetlands are widespread at Selfridge ANG Base and are shown in **Figure 4.9-1**. Groundwater at Selfridge ANG Base generally occurs within 15 feet of the ground surface and is not considered a reliable source for domestic water use. Groundwater also occurs in the underlying Antrim Shale and Traverse Group bedrock formations. Institutional controls prohibit the installation of drinking wells at Selfridge ANG Base (USAF, 2020b). Additional details related to surface water resources are available in the F-35A Operational Beddown EIS. Selfridge ANG Base maintains a NPDES stormwater permit for industrial activities.

4.9.3 No Action Alternative

The affected environment under the No Action Alternative would reflect actions that are expected to have occurred by CY 2029. These are described in Section 4.12.2.7, *Cumulative Impacts, Water Resources*. Implementation of the No Action Alternative (i.e., no beddown of the FMS PTC at Selfridge ANG Base) would not result in any additional impacts outside those described under Cumulative Impacts.

4.9.4 Alternative 2 Environmental Consequences

Analysis of impacts to biological resources for Alternative 2 evaluates impacts in relation to the No Action Alternative (CY 2029); the affected environment at that time would be expected to be as described in Section 4.12.2.7, *Cumulative Impacts, Water Resources*.

4.9.4.1 Selfridge ANG Base and Surrounding Area

Surface Water

No construction activities would occur within surface waters at Selfridge ANG Base or the surrounding areas (**Figure 4.9-2**).

With the exception of the Building 1409 addition, the aircraft barrier arresting kits, and the F-16 simulators/F-35 simulator training complex, new construction would occur on existing impervious surfaces. Ground disturbance would be minimal, and the projects would be completed in accordance with the same procedures and processes described in Section 3.9.4.1 (*Water Resources, Preferred Alternative Environmental Consequences, Ebbing ANG Base and Surrounding Area*), which include compliance with UFC 3-210-10, *Low Impact Development* (as amended, 2016), and EISA § 438 (42 U.S.C. § 17094).

The integration of LID concepts incorporates site design and stormwater management principles to maintain the site's pre-development runoff rates and volumes to further minimize potential adverse impacts associated with increases in impervious surface area. Stormwater management would be in accordance with the requirements of the Michigan Construction Stormwater Permit, and any project greater than 1 acre or within 500 feet of surface water features would require a Soil Erosion and Sedimentation Control Permit from Macomb County. Implementation of Alternative 2 may require modification of the existing industrial NPDES stormwater permit and involve increased sampling efforts and compliance requirements.

Groundwater

Implementation of Alternative 2 would not impact any public drinking water supplies, public water supply wells, or groundwater resources.

Wetlands

Implementation of Alternative 2 would have no impacts on wetlands.

Floodplains

A number of projects would be located within the 100-year floodplain of Lake St. Clair. The majority of these projects would consist of interior renovations. The only new exterior construction would be the construction of the new sunshades and the construction of the F-16 simulators/F-35 simulator training complex. The new sunshades would occur on existing impervious surfaces. These structures are not located in an active floodway. EO 11988, *Floodplain Management*, requires that agencies evaluate the potential effects of actions within a floodplain and to avoid floodplains unless the agency determines there is no practicable alternative. Where the only practicable alternative is to site in a floodplain, a planning process is followed to ensure compliance with EO 11988. All construction in the floodplain would require compliance with AFI 32-1023, *Designing and Constructing Military Construction Projects*, which includes compliance with federal and local standards. Additionally, no structures would impede the conveyance of flood waters, decrease floodplain capacity, or increase flood elevations, frequencies, or durations. As discussed under the surface water section, pre-development hydrology would be maintained through compliance with LID and EISA, and there would be no substantial increase in stormwater runoff. Therefore, impacts to flooding that would result from implementation of Alternative 2 would not be significant.

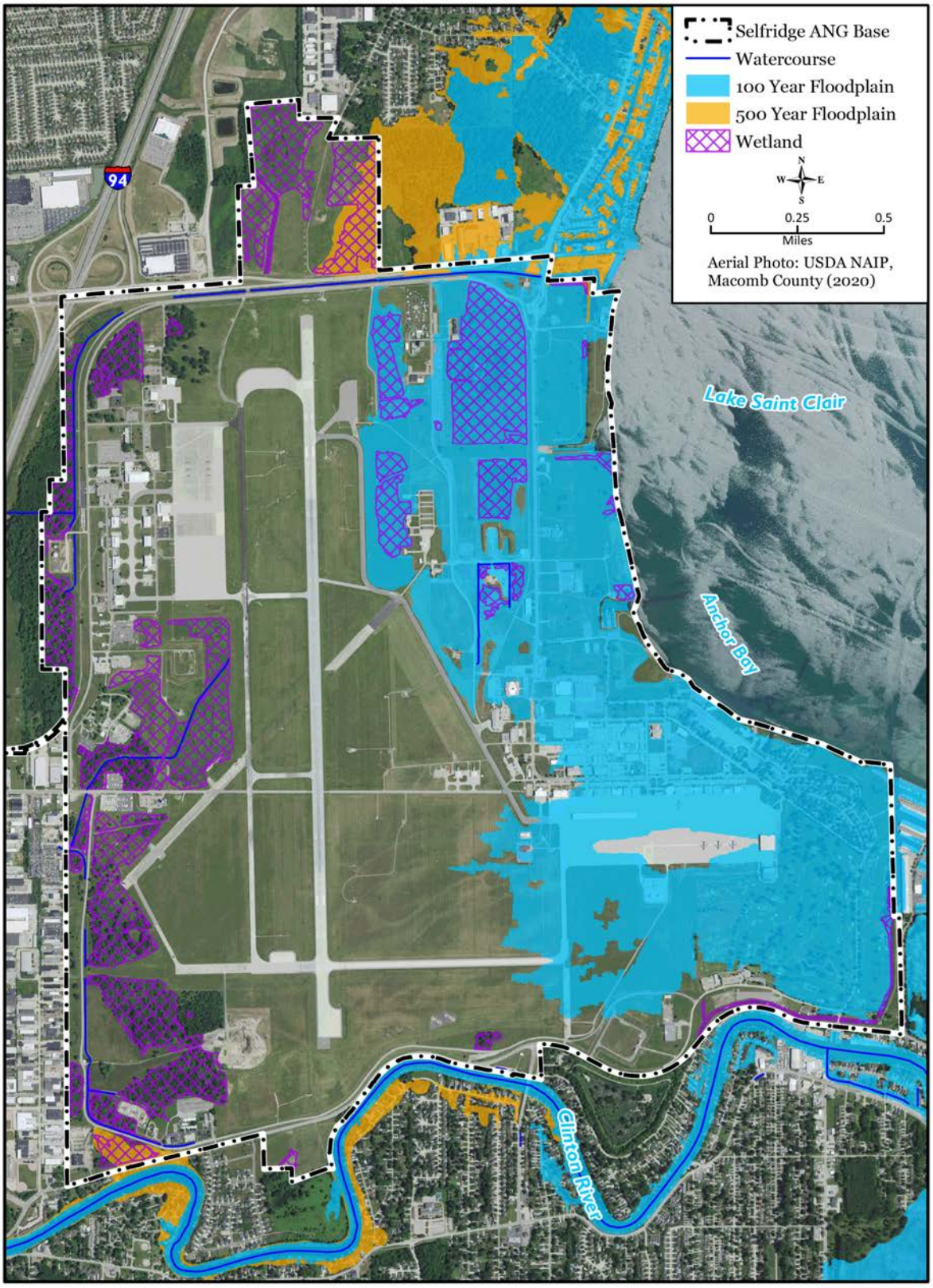

Figure 4.9-1. Surface Water Resources at Selfridge ANG Base

Sources: (Selfridge ANG Base, 2021; FEMA, 2021; USDA-FSA-APFO, 2020)

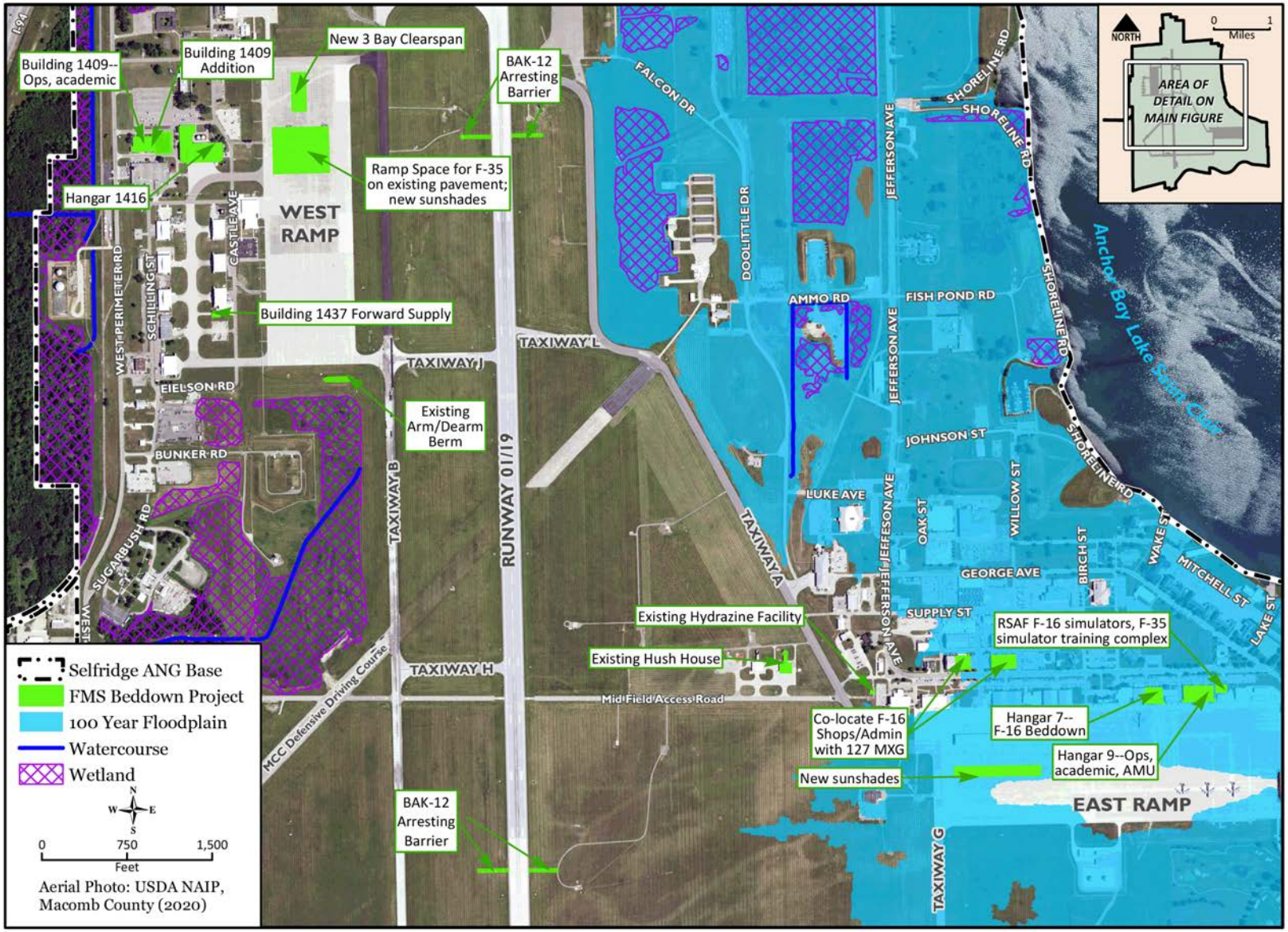

Figure 4.9-2. Selfridge ANG Base Water Projects

Sources: (Selfridge ANG Base, 2021; FEMA, 2021; USDA-FSA-APFO, 2020)

4.9.5 Mitigations

In the absence of any significant impacts to water resources, no mitigations have been identified. The following actions would be required as part of regulatory requirements, EOs, and/or the DAF and DoD policies and procedures.

- Facilities would be required to comply with UFC 3-210-10, *Low Impact Development* (as amended, 2016), and EISA § 438 (42 U.S.C. § 17094); this would serve to maintain the site's pre-development runoff rates and volumes to minimize impacts from increased impervious surface area.
- Ground-disturbance activities would require a Michigan Construction Stormwater Permit, and any project greater than 1 acre or within 500 feet of surface water features would require a Soil Erosion and Sedimentation Control Permit from Macomb County. This serves to minimize potential impacts associated with soil erosion and surface water impacts during construction.
- All construction in the floodplain would require compliance with AFI 32-1023, *Designing and Constructing Military Construction Projects*, which includes compliance with federal and local standards.

4.10 AIR QUALITY

The definition of the resource described in Section 3.10, *Air Quality*, is applicable to the Selfridge ANG Base project alternative.

4.10.1 Resource-Specific Analysis Methodology

The resource-specific analysis methodology described in Section 3.10.1 (*Air Quality, Resource-Specific Analysis Methodology*) for the Preferred Alternative is also applicable to Alternative 2. In addition, for criteria pollutants for which the project region does not attain or is in maintenance of the NAAQS, the analysis compared the net increase in annual emissions to the applicable General Conformity pollutant *de minimis* thresholds. These emission thresholds equate to 100 tons per year for VOCs, NO_x, CO, SO_2, and $PM_{2.5}$. The region surrounding Selfridge ANG Base is in attainment of the PM_{10} NAAQS (less than 85 percent of the NAAQS) (USEPA, 2022b). Therefore, the analysis used the USEPA PSD permitting threshold of 250 tons per year as an indicator of the significance of projected PM_{10} impacts within this project region. If projected emissions exceeded an indicator threshold, further analysis was conducted to determine whether impacts were significant. In such cases, if emissions (1) do not contribute to an exceedance of an ambient air quality standard or (2) conform to the approved SIP, then impacts would not be significant.

4.10.2 Alternative 2 Affected Environment

The air quality affected environment for Selfridge ANG Base includes the region surrounding the base airfield and areas underlying the proposed SUAs where project aircraft would operate within 3,000 feet AGL. These areas include the Pike East MOA, R-4201, R-4207, and connecting MTRs. The counties surrounding these areas currently attain all NAAQS. The Pike East MOA/R-4207 almost entirely overlay Lake Huron. The affected environment for greenhouse gases is the global atmosphere.

4.10.2.1 Selfridge ANG Base and Surrounding Area

Macomb County Air Emissions

In order to provide a reference for the air quality impact analysis at Selfridge ANG Base, the most recent annual air emissions for Macomb County from the 2017 National Emissions Inventory are provided in **Table 4.10-1**.

Table 4.10-1. Macomb County Annual Emissions – 2017

Emissions	Air Pollutant Emissions (tons per year)						
	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	VOC	CO_2e (MT)
Macomb County	74,007	11,584	5,503	2,895	241	21,136	5,721,915

Source: (USEPA, 2022c)

Key: CO = carbon monoxide; CO_2e = carbon dioxide equivalent; MT = metric tons; NO_x = nitrogen oxides; $PM_{2.5}$ = particulate matter with a diameter less than or equal to 2.5 microns; PM_{10} = particulate matter with a diameter less than or equal to 10 microns; SO_2 = sulfur dioxide; VOC = volatile organic compound

Emissions generated from existing operations at Selfridge ANG Base mainly occur from aircraft operations, AGE, nonroad equipment, fuel storage tanks, and natural-gas-fired space and water heaters (AECOM Technical Services, Inc, 2020). The facility maintains two Permits to Install stationary source air permits for its operations, which includes a synthetic minor permit.

4.10.2.2 Affected Airspace

Table 4.10-2 shows the specific counties that underlie the airspaces for Selfridge ANG Base and their current attainment statuses under the NAAQS. **Table 4.10-3** provides the annual emissions for these counties where proposed aircraft operations would occur below 3,000 feel AGL.

Existing operations within R-4201A/4201B generate minor amounts of emissions mainly from the use and detonation of munitions.

Table 4.10-2. Attainment Status for Counties Underlying Selfridge ANG Base Airspaces

Airspace	County	Status [(a)]
Pike East MOA	Alpena, Presque Isle – Michigan	Attainment or Unclassified for all pollutants
R-4201A	Crawford, Otsego – Michigan	Attainment or Unclassified for all pollutants
R-4201B	Crawford – Michigan	Attainment or Unclassified for all pollutants

Key: ANG = Air National Guard; MOA = Military Operations Area; R- = Restricted Area

Note:

a. Source: (USEPA, 2022d)

Table 4.10-3. Annual Emissions for Counties Underlying Selfridge ANG Base Airspaces – 2017

County	Airspace	Air Pollutant Emissions (tons per year)						
		CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC	CO_2e (MT)
Alpena	Pike East MOA	9,160	5,834	2,091	807	2,257	7,552	2,168,530
Presque Isle		4,934	1,141	1,449	310	22	6,728	134,151
Total TPY		**14,094**	**6,975**	**3,540**	**1,117**	**2,279**	**14,280**	**2,302,681**
Crawford	R-4201A	7,749	1,352	1,125	653	50	7,331	602,643
Otsego		10,237	5,274	964	340	42	9,479	1,263,631
Total TPY		**17,986**	**6,626**	**2,089**	**993**	**92**	**16,811**	**1,866,274**
Crawford	R-4201B	**7,749**	**1,352**	**1,125**	**653**	**50**	**7,331**	**602,643**

Source: (USEPA, 2022c)

Key: ANG = Air National Guard; CO = carbon monoxide; CO_2e = carbon dioxide equivalent; MOA = Military Operations Area; MT = metric tons; NO_x = nitrogen oxides; $PM_{2.5}$ = particulate matter with a diameter less than or equal to 2.5 microns; PM_{10} = particulate matter with a diameter less than or equal to 10 microns; R- = Restricted Area; SO_2 = sulfur dioxide; TPY = tons per year; VOC = volatile organic compound

Federal Class I Areas

Table 4.10-4 shows Federal Class I areas that occur within 50 miles of the Selfridge ANG Base airspaces. The Clean Air Act protects these areas from any appreciable deterioration of air quality caused by man-made air pollution.

Table 4.10-4. Federal Class I Areas in Relation to Selfridge ANG Base Airspaces

Class I Area	Entire Area (acres)	Area Underneath Airspace (acres)	Airspace Conflict	Distance to Nearest Airspace
Seney Wilderness	25,150	1,132	VR-1628; VR-1648	Overlaps

Source: (USEPA, 2015)
Key: ANG = Air National Guard; VR = Visual Route

4.10.3 No Action Alternative

The affected environment under the No Action Alternative would reflect actions that are expected to have occurred by CY 2029. These are described in Section 4.12.2.8, *Cumulative Impacts, Air Quality*. Implementation of the No Action Alternative (i.e., no beddown of the FMS PTC at Selfridge ANG Base) would not result in any additional impacts outside those described under Cumulative Impacts.

4.10.4 Alternative 2 Environmental Consequences

The analysis of impacts to air quality for the Preferred Alternative evaluates impacts in relation to the No Action Alternative (CY 2029); the affected environment at that time would be expected to be as described in Section 4.12.2.8, *Cumulative Impacts, Air Quality*.

The air quality analysis estimated the magnitude of emissions that would result from construction and operation of the proposed F-35 and F-16 missions at Selfridge ANG Base as compared to the No Action Alternative. Sections 3.10.1 and 4.10.1, *Resource-Specific Analysis Methodology,* present the air quality analysis methodology. Volume II, **Appendix D**, *Air Quality Calculations*, presents the calculations used to estimate air pollutant emissions from construction and operational sources for Alternative 2.

The air quality analysis for Alternative 2 at Selfridge ANG Base evaluates F-35 takeoff operations based on three afterburner scenarios. Activity levels and resulting emissions for all other proposed operational activities attributed to the alternative would remain the same under each afterburner scenario.

Macomb County, Michigan, which encompasses Selfridge ANG Base, is in marginal nonattainment for the ozone NAAQS and a maintenance area for CO and $PM_{2.5}$. Therefore, the analysis used the applicable General Conformity *de minimis* thresholds as indicators of the significance of projected air quality impacts for these criteria pollutants within the Selfridge ANG Base project region. These emission thresholds equate to 100 tons per year for VOC, NO_x, CO, SO_2, and $PM_{2.5}$. The region surrounding Selfridge ANG Base is in attainment of the PM_{10} NAAQS (less than 85 percent of the NAAQS). Therefore, the analysis used the USEPA PSD permitting threshold of 250 tons per year as an indicator of the significance of projected PM_{10} impacts within this project region. If projected emissions exceed an indicator threshold, further analysis was conducted to determine whether impacts were significant. In such cases, if emissions (1) do not contribute to an exceedance of an ambient air quality standard or (2) conform to the approved SIP, then impacts would not be significant.

4.10.4.1 Selfridge ANG Base and Surrounding Area

Base Facilities Construction

Alternative 2 at Selfridge ANG Base would require renovations of existing facilities and construction of new airfield facilities (e.g., training and maintenance facilities, hangars, and arresting barriers). Air quality impacts associated with proposed construction activities would result from (1) combustive emissions generated by fossil fuel-powered equipment and (2) fugitive dust emissions ($PM_{10}/PM_{2.5}$) from operation of equipment on exposed soil. The air quality analysis conservatively assumed that Alternative 2 would complete all construction activities in the year 2023.

Inclusion of BMPs into proposed construction activities would reduce fugitive dust emissions generated from the use of construction equipment on exposed soil by 50 percent from uncontrolled levels (Countess Environmental, 2006).

Table 4.10-5 presents estimates of annual emissions that would occur from the infrastructure improvements for the proposed F-35 and F-16 missions at Selfridge ANG Base. These data show that even if all construction activities occurred in 1 year, the total construction emissions would be well below the annual significance indicators. Therefore, construction emissions associated with Alternative 2 would not result in significant air quality impacts.

Proposed construction equipment would emit HAPs that potentially could impact public health. The main health risk from HAPs would occur in the form of particulates from the combustion of diesel fuel. Proposed construction over 1 year would emit 1.22 tons of diesel particulate matter that would occur from on-site equipment and trucks and the transport of materials by truck within the regional roadways. The intermittent release of these emissions over a large project area would result in very low ambient concentrations of HAPs in a localized area and, therefore, would produce minimal impacts to public health.

Table 4.10-5. Annual Alternative 2 Construction Emissions at Selfridge ANG Base

Construction Year	Air Pollutant Emissions (tons per year)							
	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	VOC	Pb	CO_2e (MT)
2023	**6.04**	**4.75**	**0.01**	**2.35**	**0.19**	**1.74**	**<0.00**	**1,184**
Significance indicator threshold	250	250	250	250	250	250	25	NA

Source: ACAM modeling results (see Volume II, Appendix D, *Air Quality Calculations*)
Key: ANG = Air National Guard; CO = carbon monoxide; CO_2e = carbon dioxide equivalent; MT = metric tons; NA = not applicable; NO_x = nitrogen oxides; $PM_{2.5}$ = particulate matter with a diameter less than or equal to 2.5 microns; PM_{10} = particulate matter with a diameter less than or equal to 10 microns; SO_2 = sulfur dioxide; VOC = volatile organic compound; Pb = lead
Note:
a. ACAM emissions for lead are 0.0 tons/year (Casteneda, 2022)

Aircraft Operations

Operation of Alternative 2 would generate air emissions from (1) F-35 and F-16 aircraft operations, (2) F-35 and F-16 engine maintenance and testing, (3) AGE, (4) space and water heaters, (5) testing of diesel-powered electric generators, and (6) personnel commuting activities. The analysis employed the ACAM to estimate emissions from these activities. The air quality analysis assumed that the action would reach full operations and resulting emissions in CY 2029.

Table 4.10-6 summarizes the maximum annual operations emissions that would result from implementation of the maximum afterburner scenario of 95% at Selfridge ANG Base. Emissions would be slightly lower for scenarios with lower afterburner usages. For example, emissions from the 5% afterburner scenario would be no more than 6 percent lower for any air pollutant compared to emissions from the afterburner scenario of 95%. The data in **Table 4.10-6** show that emissions from Alternative 2 would remain below the significance indicator threshold of 100 tons per year for CO, SO_2, PM_{10}, $PM_{2.5}$, and VOCs. Therefore, these pollutants would not result in any significant air quality impacts. In addition, NO_x emissions from Alternative 2 would exceed the conformity thresholds of 100 tons per year and, therefore, are potentially significant. The NO_x emission increase would trigger the requirement for a positive General Conformity determination before any final decision could be made to implement Alternative 2 at Selfridge ANG Base, which would ensure that the alternative would conform to the applicable SIP and would not result in significant air quality impacts.

Table 4.10-6. Maximum Annual Operations Emissions for Alternative 2 at Selfridge ANG Base, Calendar Year 2029

Source	Air Pollutant Emissions (tons per year)							
	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	VOC	Pb [(b)]	CO_2e (MT)
Aircraft flight operations/engine trim tests	51.56	108.15	9.00	14.11	12.69	2.47	<0.00	26,203
Aircraft engine test cells	0.57	2.57	0.17	0.23	0.20	0.04	<0.00	514
Aerospace ground equipment	20.63	33.83	2.37	3.49	3.38	11.76	<0.00	1,781
Space and water heating	1.33	1.59	0.01	0.12	0.12	0.09	<0.00	1,911
Test electric generators	0.05	0.07	0.01	0.02	0.02	0.02	<0.00	8
Personnel commuting activities	10.18	0.78	0.01	0.02	0.02	0.89	<0.00	844
Total Alternative 2 emissions [(a)]	**84.33**	**146.99**	**11.56**	**17.99**	**16.43**	**15.26**	**<0.00**	**31,260**
Significance indicator threshold	100	100	100	100	100	100	25	NA

Source: ACAM modeling results (see Volume II, Appendix D, *Air Quality Calculations*)

Key: ANG = Air National Guard; CO = carbon monoxide; CO_2e = carbon dioxide equivalent; MT = metric tons; NA = not applicable; NO_x = nitrogen oxides; $PM_{2.5}$ = particulate matter with a diameter less than or equal to 2.5 microns; PM_{10} = particulate matter with a diameter less than or equal to 10 microns; SO_2 = sulfur dioxide; VOC = volatile organic compound

Notes:

a. As a result of rounding, the data in each column might not add up exactly to its "Totals" row.

b. Jet fuels used in military and civilian aircraft (e.g., JP-8 and Jet-A) are complex mixtures of aliphatic and aromatic hydrocarbons made by blending various distillate stocks of petroleum with additives that do not contain any lead. Therefore, the emission factor for lead is 0.00 lb/1,000 lb fuel (Casteneda, 2022).

4.10.4.2 Affected Airspace

To quantify the air quality effects of Alternative 2 within Selfridge ANG Base airspaces and training areas, the analysis focused on F-35 and F-16 aircraft operations within the lowest 3,000 feet of the atmosphere. The airspaces or training areas where proposed aircraft operations would occur below 3,000 feet AGL include the Pike East MOA, R-4201A/B, R-4207, and MTRs.

Table 4.10-7 presents the annual emissions that would result from the operation of aircraft within airspaces and training areas under Alternative 2. These data show that the proposed aircraft operations within these areas would result in air pollutant emissions within 3,000 feet AGL that would remain below the significance indicator of 250 tons per year for all criteria pollutants. Therefore, Alternative 2 would not result in significant air quality impacts within any airspace or training area.

At full implementation, Alternative 2 would add 21 F-16 sorties per year to MTRs VR-1628 and VR-1648. These MTRs overlap about 1.8 square miles of the Seney Wilderness Area Class I area. Proposed aircraft operations within the MTRs would occur from about 100 to 500 feet AGL. However, air emissions from these intermittent, minimal amounts of proposed aircraft operations would not produce significant contributions to visibility within the Seney Wilderness Area.

Table 4.10-7. Annual Operations Emissions for Alternative 2 Within Selfridge ANG Base Airspaces and Training Areas

Source	Air Pollutant Emissions (tons per year)							
	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	VOC	Pb	CO_2e (MT)
Aircraft operations	**0.53**	**30.90**	**1.44**	**1.60**	**1.44**	**0.05**	**<0.00**	**3,960**
Significance indicator threshold	250	250	250	250	250	250	25	NA

Source: ACAM modeling results (see Volume II, Appendix D, *Air Quality Calculations*)
Key: ANG = Air National Guard; CO = carbon monoxide; CO_2e = carbon dioxide equivalent; MT = metric tons; NA = not applicable; NO_x = nitrogen oxides; $PM_{2.5}$ = particulate matter with a diameter less than or equal to 2.5 microns; PM_{10} = particulate matter with a diameter less than or equal to 10 microns; SO_2 = sulfur dioxide; VOC = volatile organic compound; Pb = lead
Note: The emission factor for lead is 0.00 lb/1,000 lb fuel (Casteneda, 2022).

4.10.5 Mitigations

Although construction activities would not have any significant impacts to air quality, BMPs (such as dust suppression techniques) are available and would be incorporated into proposed construction activities to reduce fugitive dust emissions generated from the use of construction equipment on exposed soil. USEPA recommends in their scoping comments that the DAF considers implementing applicable aspects of the USEPA Construction Emission Control Checklist to reduce diesel and fugitive dust emissions from construction activities.

The DAF evaluated mitigation measures to reduce noise impacts that would also affect air pollutant emissions due to altering flight patterns (see Section 4.3.5, *Noise, Mitigations*). As a result, ACAM was used to calculate the annual emissions from operating under the mitigated flight scenarios. **Table 4.10-8** provides a comparison of the total annual emissions in the end-state under the mitigated flight scenarios as compared to the unmitigated Alternative 2 emissions.

Table 4.10-8. Comparison of Annual Operations Emissions for the Mitigated Flight Scenario at Selfridge ANG Base, Calendar Year 2029

Source	Air Pollutant Emissions (tons per year)							
	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	VOC	Pb [b]	CO_2e (MT)
Total Alternative 2 Unmitigated Emissions [a]	**84.33**	**146.99**	**11.56**	**17.99**	**16.43**	**15.26**	**<0.00**	**31,260**
Total Mitigated Flight Scenario Emissions	**83.05**	**150.69**	**12.03**	**19.70**	**17.08**	**15.27**	**<0.00**	**32,936**
Net Change in Emissions	-1.28	3.70	0.47	1.71	0.65	0.01	<0.00	1,676
Significance Indicator Threshold	100	100	100	100	100	100	25	NA

Source: ACAM modeling results (see Volume II, Appendix D, *Air Quality Calculations*)
Key: ANG = Air National Guard; CO = carbon monoxide; CO_2e = carbon dioxide equivalent; MT = metric tons; NA = not applicable; NO_x = nitrogen oxides; Pb = lead; $PM_{2.5}$ = particulate matter with a diameter less than or equal to 2.5 microns; PM_{10} = particulate matter with a diameter less than or equal to 10 microns; SO_2 = sulfur dioxide; VOC = volatile organic compound
Notes:
a. As a result of rounding, the data in each column might not add up exactly to its "Total" row.
b. Jet fuels used in military and civilian aircraft (e.g., JP-8 and Jet-A) are complex mixtures of aliphatic and aromatic hydrocarbons made by blending various distillate stocks of petroleum with additives that do not contain any lead. Therefore, the emission factor for lead is 0.00 lb/1,000 lb fuel (Casteneda, 2022).

While emissions would decrease slightly for CO, there would be a slight increase in annual emissions in the ROI for all other criteria pollutants versus the unmitigated scenarios. The significance indicator threshold for NO_x would continue to be exceeded. Therefore, a positive

General Conformity determination would be required to determine that the alternative would conform to the applicable SIP and would not result in significant air quality impacts.

However, because the NO_x emissions exceed the indicator threshold by around 50 percent, significant reductions in annual flight operations may be required to ensure conformity with the Michigan SIP. In a general sense, a total of 6,240 annual flying hours (3,240 for the F-35 and 3,000 for the F-16) equates to between 147 and 151 tons per year of NO_x, or about 0.02 tons per hour. Using this general analysis, the number of flight hours may need to be reduced by approximately 1,240 hours annually to ensure conformity.

4.11 ALTERNATIVE 2 IMPACT AND MITIGATION SUMMARY

This section provides an impact summary of the analyses presented for Alternative 2. The significance of impacts was determined by evaluating Alternative 2's anticipated effect on individual resources relative to context and intensity of the impact. Impacts summarized in **Table 4.11-1** are described as "significant," "not significant," "neutral," or "no effect" per the definitions outlined in Section 2.6, *Environmental Comparison of Alternatives*.

Table 4.11-1. Summary of Alternative 2 and No Action Impacts

Resource Area	Alternative 2		No Action	
	Installation	Airspace	Installation	Airspace
Noise	Significant [Section 4.3.4]	Not Significant [Section 4.3.4]	Neutral [Section 4.3.3	Neutral [Section 4.3.3]
Land Use	Significant [Section 4.4.4]	Not Significant [Section 4.4.4]	Neutral [Section 4.4.3]	Neutral [Section 4.4.3]
Socioeconomics	Not Significant [Section 4.5.4]	No Effect [Section 4.2]	Neutral [Section 4.5.3]	Neutral [Section 4.5.3]
Environmental Justice	Significant [Section 4.6.4]	Not Significant [Section 4.2]	Neutral [Section 4.6.3]	Neutral [Section 4.6.3]
Cultural Resources	Not Significant [Section 4.7.4]	No Effect [Section 4.7.4]	Neutral [Section 4.7.3]	Neutral [Section 4.7.3]
Biological Resources	Not Significant [Section 4.8.4]	Not Significant [Section 4.8.4]	Neutral [Section 4.8.3]	Neutral [Section 4.8.3]
Water Resources	Not Significant [Section 4.9.4]	No Effect [Section 4.2]	Neutral [Section 4.9.3]	Neutral [Section 4.9.3]
Air Quality	Significant [Section 4.10.4]	Not Significant [Section 4.10.4]	Neutral [Section 4.10.3]	Neutral [Section 4.10.3]
Safety	Not Significant [Section 4.2]	Not Significant [Section 4.2]	Neutral [Section 4.2]	Neutral [Section 4.2]
Soils and Geology	Not Significant [Section 4.2]	No Effect [Section 4.2]	Neutral [Section 4.2]	Neutral [Section 4.2]
Hazardous Materials and Waste/Solid Waste	Not Significant [Section 4.2]	Not Significant [Section 4.2]	Neutral [Section 4.2]	Neutral [Section 4.2]
Infrastructure/ Transportation	Not Significant [Section 4.2]	No Effect [Section 4.2]	Neutral [Section 4.2]	Neutral [Section 4.2]
Airspace	Neutral [Section 4.2]			

Notes:
Red = significant impacts
Yellow = impacts considered to not be significant
Green = neutral or no effects

Overall, the DAF has identified potential significant adverse impacts related to noise, and relative noise effects to land use and socioeconomics, around Selfridge ANG Base. Other impacts identified for Selfridge ANG Base and the surrounding area are generally not significant in nature, and impacts to resources within and under the training airspace would generally be neutral or have no effect.

Within the context of analysis in this document and as presented in **Table 4.11-1,** "installation" refers to Selfridge ANG Base and the area immediately surrounding the base and airfield (to include land areas underneath airspace surrounding the airfield), and "airspace" refers to SUA, which includes Restricted Areas, MTRs, MOAs, and ATCAAs and associated land areas underneath.

Within the context of the discussion below, mitigations are those actions identified by the DAF, either through consultation with regulatory agencies or independently, that are specific to implementation of Alternative 2 that would serve to avoid, minimize, rectify, reduce or eliminate, or compensate for significant impacts. Actions associated with permits required to implement Alternative 2 (such as NPDES permits requiring a SWPPP) are not considered mitigations within this context.

The following sections summarize significant impacts and impacts considered to not be significant for each resource area, identified with red and yellow shading, respectively in **Table 4.11-1**. Resources experiencing neutral or no effects identified as "green" are not discussed in this summary.

4.11.1 Noise

Potential impacts associated with noise under Alternative 2 relative to airspace would not be significant, as time-averaged noise levels would remain below 65 dB.

Impacts under Alternative 2 would be significant relative to the installation, as up to an additional 7,171 acres of land would be affected by 65 dB DNL or greater, and up to an additional 18,799 people would be affected by 65 dB DNL or greater. In addition, Alternative 2 would result in an increase in the number of speech-interference events, noise-interference events in schools, and sleep-disturbance events in the region surrounding Selfridge ANG base.

Mitigations

Mitigations proposed for noise under Alternative 2 would be the same as those described for the Preferred Alternative in Section 3.11.1, *Noise*.

The potential mitigation scenarios being considered would reduce DNL relative to the unmitigated operational scenarios in some areas while other areas would see a minor increase. The total off-base/airport land area exposed to noise levels exceeding 65 dB DNL would be reduced by 11%, 14%, and 16% relative to the original (unmitigated) 5%, 50%, and 95% afterburner scenarios, respectively. The estimated number of residents exposed to noise levels greater than 65 dB DNL would be reduced by 9%, 13%, and 16% relative to the unmitigated 5%, 50%, and 95% afterburner scenarios, respectively.

4.11.2 Land Use

Potential impacts associated with land use under Alternative 2 relative to airspace would not be significant. In quiet areas, noise increases may have minor-to-moderate impacts on uses that benefit from quiet surroundings. Projected noise levels in the areas under the restricted

airspace associated with CGJMTC would increase by 5 to 9 dBA L_{dnmr}/DNL to levels up to 66 L_{dnmr}/65 dB DNL. Levels greater than 65 dBA L_{dnmr}/DNL are not compatible with noise-sensitive uses. Moderate-to-high adverse impacts on some wilderness users and their experience of primitive recreation would occur.

Potential impacts associated with land use under Alternative 2 relative to the installation would be significant. Total off-base land exposed to noise levels of 65 dB DNL and greater would increase to 7,170 acres. Residential land exposure would increase by 2,177 acres. Of this, noise levels greater than or equal to 65 dB DNL (but below 70 dB DNL) would affect 1,309 acres, and noise levels greater than or equal to 70 dB DNL (but below 75 dB DNL) would affect 743 acres. Residential land is considered incompatible with these noise levels and discouraged; however, community needs for housing may warrant use of NLR measures to reduce interior sound levels (see **Appendix B**, *Land Use Supporting Information*, Table 1, Footnote 1 (Residential)). For 125 acres of residential land exposed to projected noise of greater than or equal to 75 dB DNL, residential land use and related structures are not compatible under DoDI 4165.70, *Real Property Management*, guidelines. One acre of commercial land would experience noise of 80 dB DNL or greater, where only large-scale wholesale warehouse uses are compatible. Three acres of public/quasi-public land would be exposed to noise levels of greater than or equal to 75 dB DNL, which is considered incompatible. Overall, projected noise impacts on land use compatibility are significant due to the substantial increase in residential land exposed to incompatible noise levels.

Mitigations

Mitigations applicable for Alternative 2 to reduce impacts on land use compatibility are the same as those described in Section 4.3.5, *Noise, Mitigations*.

The total off-base/airport residential land area (acres) exposed to noise levels exceeding 65 dB DNL would be reduced by between 3% and 9% depending on afterburner usage relative to the same unmitigated scenarios; residential acres exposed to noise levels exceeding 70 dB DNL would be reduced by between 21% and 26% depending on afterburner usage relative to the same unmitigated scenarios; residential acres exposed to noise levels exceeding 75 dB DNL would be reduced by between 11% and 34% depending on afterburner usage relative to the same unmitigated scenarios; residential land area exposed to more than 80 dB DNL would be reduced from 1 acre to 0 acre under all mitigated afterburner scenarios.

4.11.3 Socioeconomics

The estimated number of people within the 65 dB DNL or greater noise contours for the 5%, 50%, and 95% afterburner scenarios under Alternative 2 increase over the No Action from 0 to between 18,098 and 18,799 while housing units affected increase over the No Action from 0 to between 5,855 and 6,099.

Potential impacts associated with socioeconomics under Alternative 2 related to the installation would not be significant. The action would result in a less than 0.13-percent increase in local population. Some beneficial impacts due to the additional population would occur, and increases in noise could potentially decrease property values by 0.2 to 2.0 percent per dB increase.

Mitigations

Noise mitigations under consideration by the DAF detailed in Section 4.3.5, *Noise, Mitigations*, would decrease the number of residents and housing units exposed to noise levels of 65 dB DNL or greater and minimize adverse noise impacts to residential areas newly exposed to noise levels of 65 dB DNL or greater. Depending on the mitigation scenario, the total affected population could be reduced by between nine percent and 16% and total affected housing units by between 10% and 16% versus unmitigated noise.

4.11.4 Environmental Justice and Children

Potential impacts associated with environmental justice under Alternative 2 related to airspace would not be significant. Time-averaged noise for populations under airspace would remain under impact thresholds.

Potential impacts associated with environmental justice and children under Alternative 2 related to the installation would be significant. Impacts are based on the percentages of populations within the greater than 65 dB DNL noise zones, which would result in disproportionately high and adverse human health or environmental effects on minority populations. Alternative 2 would also result in noise impacts that may disproportionately affect children. In addition, the elderly could be significantly impacted.

Mitigations

Noise mitigations under consideration by the DAF as described in Section 4.3.5, *Noise, Mitigations*, would result in approximately 12% to 18% less minority population affected and between 13% and 22% low-income population affected by 65 dB DNL depending on afterburner scenario as compared to unmitigated noise. Similarly, potential noise mitigations would result in an estimated reduction of between 10% and 18% children and between 9% and 15% elderly potentially affected depending on afterburner scenario as compared to unmitigated noise.

Other additional mitigations would be the same as those described under Section 4.6.5, *Environmental Justice and Children*, *Mitigations*.

4.11.5 Cultural Resources

No significant impacts have been identified to historic properties under the airspace. No effect is anticipated to cultural resources under Alternative 2 related to airspace, as no effects to archaeological resources, architectural resources, or traditional cultural properties are anticipated. Potential adjustments in flight procedures the DAF is considering that can reduce noise levels would have no effect on identified cultural resources. Consultation with Native American Tribes and the Michigan SHPO is underway to confirm the finding of no effect.

Potential impacts associated with cultural resources under Alternative 2 related to the installation would not be significant, as no impacts to archaeological or traditional cultural properties are anticipated, and no adverse effects to architectural resources would occur. Consultation with Native American Tribes is still in process. On July 21, 2022, the Michigan SHPO concurred with a finding of no adverse effects.

Mitigations

Alternative 2 would not be expected to result in adverse effects to historic properties. As a result, no mitigations are proposed to address impacts to cultural resources. However, if Alternative 2 is selected, additional consultation with the Michigan SHPO would be required to

ensure that renovation of historic properties in the Cantonment Area Historic District is carried out in accordance with the Secretary of the Interior's Standards for the Treatment of Historic Properties (NPS, 2017). If the proposed renovations result in unavoidable adverse effects to historic properties, appropriate mitigations would be developed through consultation with the Michigan SHPO.

Additionally, in the event of an inadvertent discovery during ground-disturbing operations, the following specific actions would occur.

- The project manager would cease work immediately, and the discovery would be reported to the 127 WG environmental manager, who would secure the location with an adequate buffer and notify the Commander and the NGB cultural resources manager.
- The environmental manager would then continue to follow ANG standard operating procedures for inadvertent discovery of cultural resources.

4.11.6 Biological Resources

Potential impacts associated with biological resources under Alternative 2 would not be significant. Impacts to vegetation and wildlife would not be considered significant. Alternative 2 may affect, but is not likely to adversely affect, federally listed species.

Mitigations

In the absence of any significant impacts to biological resources, no mitigations have been identified. The following general measures would minimize impacts to biological resources.

- The Selfridge ANG Base INRMP and Wildlife Fire Management Plan would be implemented to reduce and minimize impacts from invasive species.
- Measures to minimize the potential for bird/wildlife-aircraft strikes, as identified in the Michigan ANG *127th Wing Bird Aircraft Strike Hazard (BASH) Plan 91-212* (Michigan ANG, 2020), would continue to be implemented.
- Temporarily disturbed habitats would be restored as soon as possible following project implementation to prevent net loss of habitat. The use of native trees would be included for any landscaping activities. Coordination would occur with the Natural Resource Manager to determine appropriate restoration.

The DAF completed Section 7 consultation for Alternative 2 under the ESA with the USFWS on May 12, 2022. The USFWS concurred with the DAF effects determinations as described in Section 4.8.4, *Alternative 2 Environmental Consequences*.

4.11.7 Water Resources

Potential impacts associated with water resources under Alternative 2 would not be significant, as any impacts to surface water, groundwater, and wetlands would be minimized through required design elements, permit-related BMPs, and installation management practices. Development activities would occur within the 100-year floodplain. Compliance with federal and local standards and design features to avoid impedance of floodwater conveyance, decrease of floodplain capacity, or increase of flood elevations would serve to avoid or minimize potential impacts. No impacts to wetlands would occur.

Mitigations

In the absence of any significant impacts to water resources, no mitigations have been identified. The following actions would be required as part of regulatory requirements, EOs, and/or the DAF and DoD policies and procedures.

- Facilities would be required to comply with UFC 3-210-10, *Low Impact Development* (as amended, 2016) and EISA § 438 (42 U.S.C. § 17094); this would serve to maintain the site's pre-development runoff rates and volumes to minimize impacts from increased impervious surface area.
- Ground-disturbance activities would require a Michigan Construction Stormwater Permit, and any project greater than 1 acre or within 500 feet of surface water features would require a Soil Erosion and Sedimentation Control permit from Macomb County. This serves to minimize potential impacts associated with soil erosion and surface water impacts during construction.
- All construction in the floodplain would require compliance with AFI 32-1023, *Designing and Constructing Military Construction Projects*, which includes compliance with federal and local standards.

4.11.8 Air Quality

Potential impacts associated with air quality under Alternative 2 related to airspace may potentially be significant. Analysis of the air quality data showed that the proposed aircraft operations within the areas under the airspace would result in air pollutant emissions within 3,000 feet AGL that would not exceed any first-level annual indicator threshold emissions from Alternative 2.

Potential impacts associated with air quality under Alternative 2 related to the installation may potentially be significant. NO_x emissions from Alternative 2 would exceed the conformity thresholds of 100 tons per year. The NO_x emissions increase would trigger the requirement for a positive General Conformity determination before any final decision could be made to implement Alternative 2 at Selfridge ANG Base, which would ensure that the alternative would conform to the applicable SIP and would result in less than significant air quality impacts.

Mitigations

In the absence of any significant impacts to air quality from construction activities, no mitigations are identified that would reduce or avoid significant impacts from Alternative 2. However, BMPs (such as dust suppression techniques) are available and would be incorporated into proposed construction activities to reduce fugitive dust emissions generated from the use of construction equipment on exposed soil. USEPA recommends in their scoping comments that the DAF consider implementing applicable aspects of the USEPA Construction Emission Control Checklist to reduce diesel and fugitive dust emissions from construction activities.

Implementation of noise mitigations, which include altering flight profiles, would decrease emissions slightly for CO; however, there would be a slight increase in annual emissions in the ROI for all other criteria pollutants versus the unmitigated scenarios. The significance indicator threshold for NO_x would continue to be exceeded. Because the NO_x emissions would exceed the indicator threshold by around 50 percent, significant reductions in annual flight operations may be required to ensure conformity with the Michigan SIP.

4.12 CUMULATIVE IMPACTS

CEQ regulations implementing NEPA require that the cumulative impacts of a Proposed Action and Alternatives be assessed (40 CFR §§ 1500–1508). A cumulative impact is defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." (40 CFR § 1508.7).

4.12.1 Foreseeable Actions and Trends

This discussion identifies foreseeable actions and trends in the areas that are considered as part of resource analysis. These actions and trends inform the anticipated condition of the affected environment for the No Action Alternative (CY 2029) and establish the baseline against which Alternative 2 is evaluated. **Table 4.12-1** summarizes this information.

Predictable environmental trends considered in this EIS are trends generally agreed upon by the greater scientific community and/or those that could result from foreseeable actions. A future action is considered a foreseeable action for this EIS if it is (1) included in a federal, state, or local planning document; (2) likely to occur based on the recommendations of federal, state, or local planning agencies; (3) an existing permit application; or (4) a fiscal appropriation that is likely (or reasonably certain) to occur. For purposes of this analysis, foreseeable actions were considered if they could result in potential impacts that could have temporal or geographic overlap with potential effects of the Preferred Alternative or Alternative 2.

Table 4.12-1. Alternative 2 – Reasonably Foreseeable Future Actions and Environmental Trends

Aspect	Description	Timeframe	Resources Potentially Affected
Reasonably Foreseeable Future Actions			
127 WG construction and demolition projects (NGB, 2019)	Proposal is to undertake 19 infrastructure improvement projects, including the demolition of three facilities. Projects include Main Gate/Entry Control; Campground; Southern Road and Base Boundary; Solar PV Array Farm; Shoreline Protection Perimeter Fencing; Various Internal and External Renovations and Demolitions; and Utility and Pavement Repairs.	2020 – 2025+	Air quality, noise, safety, earth, water, biological and cultural resources, infrastructure, land use, and socioeconomics
Selfridge ANG Base, Michigan (USAF, 2020b)	Three REPI projects are being evaluated for purchase for conservation easements to avoid incompatible development. These include two areas north of the installation and one area south of the installation.	Not Available	Potentially beneficial effects to airspace, air quality, noise, safety, earth, water, biological and cultural resources, infrastructure, land use, socioeconomics, and environmental justice
Air National Guard/Alpena CRTC modification of the Alpena SUA (ANG 2022)	The proposal includes creation of new airspace and modifications to the existing Alpena SUA Complex (Grayling West, Grayling East, Steelhead Low MOA, R-4201B) as needed to support the training requirements of fifth-generation fighters and meet current and emerging training	2023	Airspace, air quality, noise, safety, earth, water, biological and cultural resources, infrastructure, land use, socioeconomics, and environmental justice

Table 4.12-1. Alternative 2 – Reasonably Foreseeable Future Actions and Environmental Trends

Aspect	Description	Timeframe	Resources Potentially Affected
	needs and maximize efficient use of the airspace structure. New airspace would be used to expand existing MOAs and Restricted Areas, and existing MOAs would be realigned and/or floors lowered as needed to create new MOAs.		
Chesterfield Town Center (USAF, 2020b)	Portion of Chesterfield Town Center property rezoned in Dec 2018 within APZ I to C-3 Commercial III (General Commercial) from light manufacturing under Planned Unit Development. Proposal includes construction of remaining shopping complex northeast of Interstate 94.	Not Available	Air quality, noise, safety, earth, water, biological and cultural resources, infrastructure, land use, and socioeconomics
Developer (USAF, 2020b)	This proposal includes a 30-acre parcel south of the base that is planned for a single-family development of approximately 60 homes within the next 5 years.	Not Available	Air quality, noise, safety, earth, water, biological and cultural resources, infrastructure, land use, and socioeconomics
Developer (USAF, 2020b)	Proposal includes multi-family single-story development of 50–70 units planned north of the base; this project is currently in the development phase and is expected to be completed within the next few years.	Not Available	Air quality, noise, safety, earth, water, biological and cultural resources, infrastructure, land use, and socioeconomics
Predictable Environmental Trends			
Climate change	The U.S. Global Change Research Program estimates in the Fourth National Climate Assessment that annual average temperatures in Michigan by late in the century (2071 to 2100) will increase from 4 to 8 degrees Fahrenheit compared to conditions from 1986 to 2015, based on lower and higher emission scenarios (U.S. Global Change Research Program, 2018). Predictions of long-term environmental impacts in the Midwest region that encompasses Michigan include an increase in extreme high temperature events, an increase in humidity during the warm season, an increase in days with heavy precipitation and flooding, an increase in ambient ozone concentrations, and a decrease in lake ice cover. In addition to temperature changes and increased extreme weather events, Selfridge ANG Base is located on Anchor Bay, a portion of Lake St. Clair. Lake St. Clair is located in between Lake Huron and Lake Erie. Over the last few decades, water levels have declined slightly for most of the Great Lakes. The past few years, however, have shown notable increases toward the top of the historical range. Furthermore, since 1995, average surface water temperatures have increased slightly for each of the Great Lakes. The annual average temperatures for Lake Erie and Lake Huron have increased by about 2.07 and 1.87 degrees Fahrenheit, respectively. Water level and water temperature are two important and interrelated indicators of weather and climate change in the Great Lakes (USEPA, 2021b).		All resources

Table 4.12-1. Alternative 2 – Reasonably Foreseeable Future Actions and Environmental Trends

Aspect	Description	Timeframe	Resources Potentially Affected
Population/demographic trends	Aspect includes changes in population and demographics within the affected environment. Trends are detailed within Section 4.5, *Socioeconomics*, and Section 4.6, *Environmental Justice*. These may be the direct result of other reasonably foreseeable future actions identified (such as roadway improvements and housing construction).		Socioeconomics and environmental justice
Trends in property values	Aspect includes changes in property values within the affected environment. Trends are detailed in Section 4.5, *Socioeconomics*.		Socioeconomics
Community development trends	Notwithstanding the reasonably foreseeable future actions identified above, this aspect accounts for the overall trend of community development as represented by a combination of identified projects and those that may occur in the future that are not captured in this document (e.g., projects that may arise over time).		Natural resources, socioeconomics, air quality
Air emissions trends	Aspect includes changes in air emissions that could result in increase or reduction in criteria pollutant emissions within the affected environment. Trends are detailed in Section 4.10, *Air Quality*.		Air quality

Key: 127 WG = 127th Wing; ANG = Air National Guard; CRTC = Combat Readiness Training Center; MOA =Military Operations Area; PV = photovoltaic; R- = Restricted Area; REPI = Readiness and Environmental Protection Integration; SUA = Special Use Airspace; U.S. = United States

4.12.2 Cumulative Impacts Analysis

Because Alternative 2 would not be fully realized until CY 2029, analysis of Alternative 2's environmental consequences already includes the potential impacts associated with a combination of foreseeable actions and trends. Therefore, analysis of Alternative 2 is a de-facto cumulative impacts analysis. Analysis of Alternative 2 assesses the effect of the Proposed Action on the affected environment inclusive of foreseeable actions and trends identified previously. This is, in effect, a cumulative impact analysis, because analysis of Alternative 2 already includes foreseeable actions in the baseline condition against which Alternative 2 is analyzed.

4.12.2.1 Noise

Selfridge ANG Base and Surrounding Area

Foreseeable future actions at Selfridge ANG Base include multiple construction, demolition, renovation, and repair projects. Construction activity associated with these projects generates locally elevated noise levels while the projects are in progress. Selfridge ANG Base is an active military installation supporting frequent aircraft operations as well as other noise-generating activities. In this context, noise generated by temporary and localized construction activity has minimal effects. No changes to the Selfridge ANG Base flying mission are proposed at this time, and aircraft noise levels are not expected to change relative to current conditions.

Proposed development of off-installation lands near Selfridge ANG Base would further urbanize areas that are already heavily developed for human use. Off-installation developments would generally not result in substantive changes to ambient (non-aircraft) noise levels, except within the parcel being developed. Proposed purchases of off-installation conservation easements would not result in any change to the acoustic environment.

Affected Airspace

The NGB has proposed several modifications and additions of airspace at the Alpena SUA Complex, which are expected to be in effect prior to CY 2029 (i.e., the No Action Alternative). These airspace modifications are expected to occur regardless of the Preferred Alternative or Alternative 2. An EA is being prepared pursuant to NEPA, which will provide a detailed accounting of environmental impacts associated with the proposed modifications including impacts to the acoustic environment. Proposed airspace modifications include the following.

- Discontinuation of annual requests for the Grayling temporary MOA
- Establishment of the Grayling West MOA and Grayling East MOA with floor altitudes at 500 feet AGL and 10,000 feet MSL, respectively
    - The combined horizontal extent of these proposed MOAs matches the extent of the existing Grayling temporary MOA.
- Modifications of the Steelhead, Pike East, and Pike West MOA boundaries internal to the Alpena SUA Complex
    - Because the proposed boundary changes are internal within the SUA complex, the combined footprint of the three MOAs would not change.
- Establishment of the Steelhead Low South, Steelhead Low North, and Steelhead Low East MOAs with floor altitude at 4,000 feet above MSL, 500 feet AGL, and 500 feet AGL, respectively
    - The combined horizontal extent of these proposed MOAs does not exceed the extent of the existing overall Alpena SUA Complex.

Noise levels were calculated for areas that are below SUA (e.g., MOA and/or Ras), areas that are below MTR corridors, and areas in which multiple SUAs and MTR corridors overlap. Based on proposed airspace modifications and expected changes in operations tempo, noise levels would increase relative to current conditions but remain below 65 dB L_{dnmr} in all areas (**Figure 4.3-2**). Overflight noise would exceed 85 dB L_{max} about once per day on average in the busiest airspace unit (R-4201A). In other areas, the number of events exceeding 85 dB L_{max} would be 0.6 per average day (i.e., about one event every other day) or less. Event frequencies listed as zero indicate that events exceeding 85 dB L_{max} are rare, such that the number rounds to zero.

Supersonic operations over land at altitudes above 30,000 feet MSL in ATCAAs overlying the Pike East, Pike West, and Steelhead MOAs generate sonic booms that occasionally reach the ground, but result in noise levels below 45 dB CDNL. Although sonic booms are sometimes heard, their effects are minimal. Sonic booms generated at altitudes above 10,000 feet MSL in portions of the Pike East MOA more than 15 miles from the shore and in R-4207 are more intense and frequent than sonic booms experienced in land areas. These booms have limited potential to disturb, as the affected area is entirely open water.

CGJMTC facilitates training with a wide variety of air-to-ground and ground-to-ground munitions. As described in the *Michigan Army National Guard Installation Compatible Use Zone Study*, air-to-ground munitions expended in R-4201A include approximately 600 rockets, 66,000 cannon rounds, and 96 Mark 82 high-explosive bombs per year (APHC, 2021). Ongoing A-10 aircraft air-to-ground gunnery at CGJMTC generates peak noise levels of between 115 and 130 dBP, which are associated with a moderate risk of complaints, at locations up to 1.25 miles from the western boundary of CGJMTC. Employment of Mark 82 high-explosive bombs at

CGJMTC generates noise levels exceeding 115 dBP at up to 5.5 miles from the target under unfavorable weather conditions.

4.12.2.2 Land Use

Selfridge ANG Base and Surrounding Area

The base would continue to maintain its airfield infrastructure and mission support facilities with renovation, improvements, and some new construction. These projects are planned in accordance with the DAF's directives and orders to achieve safety and security standards. Any major project that substantially changes the activities and uses of a particular location adjacent to off-base areas would require further evaluation prior to implementation.

The DAF has no plans to acquire land with incompatible development in CZs and APZs. Selfridge ANG Base is currently focusing on partnering with owners and local communities to obtain easements for undeveloped property located in APZ I and APZ II that have incompatible zoning. Using this method to control the type of future use of these areas would prevent further incompatible development.

Affected Airspace

Section 3.12.1, *Foreseeable Actions and Trends*, describes actions and trends that may affect land management and uses in the Preferred Alternative training airspace ROI for the Preferred Alternative. Similar conditions are expected for the Alternative 2 (Selfridge ANG Base) training airspace ROI. Small rural and lakeside communities may experience growth and expansion as people move from urban areas and participate in outdoor activities in higher numbers.

4.12.2.3 Socioeconomics

Selfridge ANG Base and Surrounding Area

Population

As previously shown on **Table 4.5-1**, between the years 2000 and 2019, overall population in the state of Michigan, Macomb County, and Harrison Township have increased at average annual growth rates of 0.01 percent, 0.52 percent, and 0.11 percent, respectively. **Table 4.12-2** shows population projections for these areas in CY 2029 based on the assumption that populations in each area would continue to grow at the same average annual growth rate.

Population projections shown in the table above are less than population projections reported by the Michigan DTMB, which provides population projections for the state and counties at 5-year increments (Michigan DTMB, 2022). According to the Michigan DTMB, population in Macomb County would grow at an average annual rate of 0.56 percent based on forecasted estimates of 883,019.9 people in 2020 to 933,965.1 people in 2030 (Michigan DTMB, 2022). According to the Michigan DTMB, population in the state of Michigan would grow at an average annual rate of 0.39 percent based on forecasted estimates of 10,023,423 people in 2020 to 10,424,510 people in 2030 (Michigan DTMB, 2022).

Table 4.12-2. Population Projections, Selfridge ANG Base ROI

Area	Census 2020	CY 2029	Average Annual Growth Rate (Census 2020–CY 2029)
Michigan	10,077,331	10,090,204	0.01%
Macomb County	881,217	923,605	0.52%
Harrison Township	24,314	24,557	0.11%

Sources: (State of Michigan, 2022; Macomb County, 2022a; USCB, 2019a; USCB, 2021b)
Key: % = percent; ANG = Air National Guard; CY = calendar year; ROI = region of influence

Employment and Income

Median household income in the state of Michigan, Macomb County, and Harrison Township increased by 1.85 percent, 1.70 percent, and 2.10 percent between 2010 and 2019 (USCB, 2010a; USCB, 2019c). Per capita income also increased by 2.62 percent, 2.19 percent, and 2.14 percent in the state, county, and township during the same time period (USCB, 2010a; USCB, 2019c). Between 2010 and 2019, the unemployment rate decreased annually from a high of 13.4 percent in 2010 to 4.3 percent in 2019 (BLS, 2021a; BLS, 2021d). Between 2019 and 2020, the unemployment rate jumped up to 12 percent in the county (BLS, 2021b). Unemployment rates are expected to return to 2019 levels and remain within a similar range as what was experienced the last several years.

Between 2010 and 2019, the total full-time and part-time employment in the county reported by the Bureau of Economic Analysis increased at an average annual rate of approximately 2.13 percent (BEA, 2021b). Between 2010 and 2019, the construction industry increased at an average annual rate of 3.68 percent and comprised approximately 5.35 percent to 6.23 percent of total employment in the county. Based on the assumption that employment trends would continue in the county, the total employment may increase to 502,964 jobs in CY 2029. Construction employment would be expected to increase to around 35,878 jobs, or 7.1 percent of total employment. Continued annual employment growth in the industry would be necessary to support ongoing and reasonably foreseeable future construction activities, such as those identified in **Table 4.12-1**.

The 127 WG would continue to be an important contributor to the local and regional economy. Total fiscal year 2020 expenditures associated with the 127 WG of the Michigan ANG have been estimated at over $159 million (127 WG, 2020). Current personnel and expenditures associated with the 127 WG would be anticipated to continue at similar levels to support the active installation and existing mission.

Housing

According to the U.S. Census Bureau, the median value of owner-occupied units in Macomb County has increased from $157,000 in 2010 to $166,800 in 2019 (USCB, 2010b; USCB, 2019c). This represents an overall increase in the median value of owner-occupied homes of approximately 6.24 percent between 2010 and 2019, at an average annual rate of approximately 0.68 percent (USCB, 2010b; USCB, 2019c). During the same time period, the number of housing units has increased overall, with an average of 1,165 additional total housing units per year in the county (USCB, 2010b; USCB, 2019c).

As of January 2022, the median listing price in Macomb County was $379,992, trending up 11.8 percent from the previous year (Realtor.com, 2022b). Between January 2020 and January 2021, the median listing price increased by 4.71 percent year-over-year (Realtor.com, 2022b). The median house price in the county has risen considerably over the last several years due to strong demand, low mortgage rates, and lack of inventory from labor and material shortages as well as general supply chain challenges. Construction of two planned developments within the next 5 years, including the development of 60 single-family homes south of the base and development of multi-family single-story housing with 50 to 70 units north of the base, would contribute to the available housing supply (USAF, 2020b).

Education

Student enrollment in the Macomb ISD and in the state have been trending downward since over a decade. Total student enrollment in Macomb ISD has declined from a reported 140,151 students during the 2011–2012 school year to a reported 128,664 students during the 2018–2019 school year, representing an average annual change of -1.21 percent (Michigan School Data, 2022). Total student enrollment during the 2020–2021 school year was 120,464, representing a decline of 3.56 percent over the previous year (Michigan School Data, 2022). Several reasons for the decade-long trend include the "proliferation of charter schools, schools-of-choice programs, and a historically low-birth rate" (Macomb Daily, 2021). More recently, declines in employment may also have resulted in families enrolling students outside of the ISD. State funding, which is directly tied to enrollment, has also been affected with subsequent cuts in the number of district staff, reductions in payroll and benefits, building closures, and streamlined programs (Macomb Daily, 2021).

4.12.2.4 Environmental Justice and Children

Selfridge ANG Base and Surrounding Area

This discussion focuses on the foreseeable actions and trends through CY 2029 that would potentially affect minority, low-income, children, and elderly populations. Section 4.12.1, *Foreseeable Actions and Trends*, describes these future actions and trends in more detail. Trends are presented below.

Population growth in Macomb County is estimated to be 0.52 percent per year based on U.S. Census Bureau trends described in Section 4.5.2.1, *Socioeconomics, Alternative 2 Affected Environment, Selfridge ANG Base and Surrounding Area*. Children showed a slight decline of 1.4 percent (USCB, 2021c). Comparison of trends for minority and low-income populations from the 2010 to 2020 census data is not recommended by the U.S. Census Bureau because they changed the questions for measuring race and ethnicity in the latest census. Overall, race alone or in combination groups experienced increases in population (USCB, 2021c). Therefore, population growth could result in a greater percentage of minority and low-income populations located within the greater than 65 dBA DNL noise zones. Based on the trends, the number of children may decrease over time.

According to the Macomb County Planning and Economic Development website, the defense industry jobs since 2010 have increased by 125 percent in 2019, providing 25,106 jobs with above-average earnings (Macomb County, n.d.). These trends are expected to continue and could be beneficial to minority and low-income populations.

4.12.2.5 Cultural Resources

Selfridge ANG Base and Surrounding Area

The 127 WG has planned several construction and demolition projects at Selfridge ANG Base, which were subject to an environmental assessment in 2019. The *Environmental Assessment for Construction and Demolition Projects at the 127th Wing, Selfridge ANGB, Michigan* identified no anticipated effects to archaeological resources and outlined steps to be taken in the event of unanticipated discoveries (NGB, 2019). None of the buildings proposed for demolition are historic properties. However, the project includes interior renovations to Buildings 117, 120, and 903 and Hangar 5; interior and exterior renovations to Buildings 126 and 140; exterior repairs to Hangars 36 and 859; interior renovations and additions to Hangar 3;

and an addition to Building 154. Buildings 117, 120, 126, and 140 and Hangars 3 and 5 are all contributing resources to the Cantonment Area Historic District. Many of the improvements to these buildings were the types of actions addressed by the 2002 *Programmatic Agreement Among the National Guard, the Advisory Council on Historic Preservation, and the Michigan State Historic Preservation Officer Regarding the Operation and Maintenance of the Selfridge ANG Base*, which expired in December 2020. A May 2019 submission to the Michigan SHPO presented a preliminary finding of no adverse effects but acknowledged that additional consultation would be needed as the details of the projects were developed and that appropriate treatments would be developed to mitigate any adverse effects, if necessary (NGB, 2019).

One additional foreseeable future action at Selfridge ANG Base involves three Readiness and Environmental Protection Integration (REPI) projects for conservation easements to avoid incompatible development. Management of these properties under the REPI program is unlikely to affect cultural resources.

Section 4.12.1, *Foreseeable Actions and Trends*, identifies one commercial development (Chesterfield Town Center) and two large residential developments in the area surrounding Selfridge ANG Base. These projects are outside the APE for Alternative 2, but they represent large-scale construction projects involving significant ground disturbance with the potential to directly affect historic properties and alter the landscape of the region. As such, they are indicative of regional development trends that could affect the overall inventory of historic properties near the APE.

Affected Airspace

Section 4.12.1, *Foreseeable Actions and Trends*, identifies the proposed creation of new airspace and modifications to the existing Alpena SUA Complex, including the potential lowering of floors as needed to create new MOAs. This foreseeable action has the potential to introduce noise and visual effects to historic properties below the existing and proposed new airspaces. However, the alteration of airspace would not be expected to result in any direct effects to archaeological resources, and it is unlikely to result in any direct adverse effects (noise/vibration) to aboveground historic properties. The environmental analysis for this action would require NHPA Section 106 consultation with the appropriate SHPOs and Tribes to fully assess potential effects to historic properties.

4.12.2.6 Biological Resources

Selfridge ANG Base and Surrounding Area

There are no known foreseeable future actions that would have significant impacts on biological resources at Selfridge ANG Base or within the surrounding area. Even though the Great Lakes may be more resilient to climate change, Michigan could have shifts in water quality, which could alter natural trends and habitat for a variety of wildlife species. Climate change may cause wildlife to change distribution patterns in search of food and suitable habitats. Any associated shift in species historical range and distribution may increase the potential presence of federally and/or state-listed, threatened, endangered, or candidate species. Any such future actions/trends would be managed as required by the INRMP (e.g., management guidelines for threatened and endangered species and BASH). New projects would require additional subsequent analyses under NEPA and coordination with the appropriate state

and federal agencies. Selfridge ANG Base would continue to operate under existing installation permits.

Affected Airspace

Reasonably foreseeable future actions (Section 4.12.1, *Foreseeable Actions and Trends*) through CY 2029 at Selfridge ANG Base include creating new MOA airspace and/or realigning and/or lowering the existing MOAs and R-4201B, as needed, to better support fifth-generation fighter training requirements. Climatic change trends are also described above in Section 4.12.1. New projects would require additional subsequent analyses under NEPA and coordination with the appropriate state and federal agencies.

4.12.2.7 Water Resources

Selfridge ANG Base and Surrounding Area

Foreseeable actions and trends that could impact water resources at Selfridge ANG Base would include additional development within the watershed leading to increases in surface water runoff and changes in precipitation due to climate change. Known development in the watershed includes additional construction, demolition, and infrastructure projects as described in Section 4.12.1, *Foreseeable Actions and Trends*. These projects include the 127 WG construction and demolition projects, construction of the Chesterfield Town Center, and various housing developments.

The NOAA National Centers for Environmental Information predicts that the frequency and intensity of extreme precipitation will increase in the State of Michigan due to factors associated with climate change. Increases in overall precipitation are also projected and are most likely to occur during the winter and spring. Both of these predictions could potentially increase the frequency and intensity of floods (NOAA, 2022b). Changes are predicted to occur in the next 30 years. As a result, in the short term (6 to 7 years), any changes to surface water resources at Selfridge ANG Base as a result of climate change are anticipated to be minor. Given the proximity of Lake St. Clair to Selfridge ANG Base and the anticipated increase in flood frequency and intensity, future development and planning may require additional considerations in the placement and construction of facilities in the floodplain.

4.12.2.8 Air Quality

Selfridge ANG Base and Surrounding Area

Air monitoring data for the last several years show that, with the exception of ozone, Macomb County attains all NAAQS (EGLE, 2022). It is expected that with the implementation of existing and future air regulations and greenhouse gas initiatives, Macomb County would continue to attain these NAAQS through CY 2029. Air monitoring data for the 2019–2021 period showed that Macomb County attained the ozone NAAQS, and USEPA proposes to redesignate the region as in attainment of this standard (USEPA, 2022f). Since monitoring data show that ozone levels are just below the level of attainment, it is conservatively assumed that the county will remain in marginal nonattainment of the NAAQS for ozone. Therefore, use of the attainment/marginal nonattainment area emission indicator thresholds of 100 tons per year (and 250 tons per year for PM_{10}) for the analysis of proposed emissions would be applicable for conditions in CY 2029.

Table 4.12-3 shows the general downward trend in emissions of most pollutants for Macomb County from years 2011 to 2017. The ozone attainment plan for Southeast Michigan predicts

that NO_x and VOC emissions will continue to decrease between 2019 and 2035 (data not presented, as they are in terms of tons per day for the entire seven-county planning region during the ozone season). Therefore, **Table 4.12-3** presents conservative estimates of CY 2029 emissions for Macomb County, based on the application of the county population growth factor (6.3 percent increase from 2017 to 2029; see Section 4.5, *Socioeconomics*) to the 2017 county emissions. Use of linear trends to estimate county emissions in 2029 would result in unrealistically low predictions of emissions.

Table 4.12-3. Potential Macomb County Projected Emissions for 2029

Emissions	Year	Air Pollutant Emissions (tons per year)						
		CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	VOC	CO_2e (MT)
Macomb County	2011	106,532	20,833	350	6,746	2,570	22,631	3,939,967
Macomb County	2014	98,671	16,444	834	5,780	2,694	24,221	3,679,164
Macomb County	2017	74,008	11,584	245	5,506	2,897	21,136	5,721,915
Macomb County Forecast – Population Increase	**2029**	**78,671**	**12,314**	**260**	**5,853**	**3,080**	**22,468**	**6,082,396**

Source: (USEPA, 2022e)

Key: CO = carbon monoxide; CO_2e = carbon dioxide equivalent; MT = metric tons; NO_x = nitrogen oxides; $PM_{2.5}$ = particulate matter with a diameter less than or equal to 2.5 microns; PM_{10} = particulate matter with a diameter less than or equal to 10 microns; SO_2 = sulfur dioxide; VOC = volatile organic compound

The U.S. Global Change Research Program estimates in the *Fourth National Climate Assessment* that annual average temperatures in Michigan by late century (2071 to 2100) will increase from 4 to 8 degrees Fahrenheit compared to conditions from 1986 to 2015, based on lower and higher emission scenarios (U.S. Global Change Research Program, 2018). Predictions of long-term environmental impacts in the Midwest region that encompasses Michigan include an increase in extreme high-temperature events, an increase in humidity during the warm season, an increase in days with heavy precipitation and flooding, an increase in ambient ozone concentrations, and a decrease in lake ice cover.

In addition to temperature changes and increased extreme weather events, Selfridge ANG Base is located on Anchor Bay, a portion of Lake St. Clair. Lake St. Clair is located in between Lake Huron and Lake Erie. Over the last few decades, water levels have declined slightly for most of the Great Lakes. The past few years, however, have shown notable increases toward the top of the historical range. Furthermore, since 1995, average surface water temperatures have increased slightly for each of the Great Lakes. The annual average temperatures for Lake Erie and Lake Huron have increased by about 2.07 and 1.87 degrees Fahrenheit, respectively. Water level and water temperature are two important and interrelated indicators of weather and climate change in the Great Lakes (USEPA, 2021b).

While Selfridge ANG Base has adapted its operations to manage recent climatic changes, exacerbation of climate conditions in the future could increase the cost of proposed operations and could impede operations during extreme events. Additional measures could be needed to mitigate such impacts over the operational life expectancy of the project alternative.

Affected Airspace

It is expected that, with the implementation of existing and future air regulations and greenhouse gas initiatives, counties that underlie the project airspaces would continue to attain the NAAQS through CY 2029. Therefore, use of the attainment area emission indicator thresholds of 100/250 tons per year for the analysis of proposed emissions would be applicable for conditions in CY 2029.

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5. SUBMITTED ALTERNATIVES, INFORMATION, AND ANALYSES

5.1 PUBLIC INVOLVEMENT SUMMARY

- **Notice of Intent (NOI)** – A notice that announced the DAF's intent to prepare an EIS was published in the Federal Register on January 14, 2022. The NOI formally initiated the public scoping process. The NOI included descriptions of the alternatives and the scoping process, and the dates, times, and locations of the scoping meetings. The NOI also invited affected federal, state, and local agencies; affected Native American Tribe(s); and interested persons (e.g., public) to participate in the scoping process.
- **Scoping** – CEQ regulations at 40 CFR § 1501.9 requires a process called "scoping" to involve the public early in the assessment process. The scoping process is designed to solicit input from the public and interested agencies on the nature and extent of issues and impacts to be addressed and the methods by which potential impacts are evaluated. The DAF published advertisements in local newspapers near Ebbing ANG Base and Selfridge ANG Base and under the airspace proposed for use a week prior to the scoping meetings. Each advertisement provided scoping meeting dates and locations applicable to that area. The 30-day scoping comment period began on January 14, 2022, and officially ended on February 14, 2022. The DAF held two virtual public scoping meetings to inform the public and solicit comments and concerns about the proposal.

Comments and stakeholder input received within the scoping comment period were considered during the development of the alternatives and the analysis presented in the Draft EIS. Comments received after the official end of the scoping comment period were also considered in determining the range of actions, alternatives, and environmental analysis of significant issues in the Draft EIS, to the maximum extent practicable, prior to its publication.

5.2 SUBMITTED ALTERNATIVES

No additional alternatives were submitted by tribal entities, the public or agencies via the scoping process.

5.3 INFORMATION AND ANALYSES

Table 5.3-1 provides a summary of the substantive comments (information) received during scoping and how the DAF addressed those comments in this EIS (analyses).

This table provides a summary of the substantive comments and not individual comments verbatim. Some comments were provided by multiple commenters. The substantive comments in the table have been organized into broad categories. Substantive comments generally include, but are not limited to, comments that identify potential environmental impacts for analysis, identify reasonable alternatives for analysis, identify feasible mitigations for consideration, or otherwise recommend relevant information that should be considered in the development of the Draft EIS. Non-substantive comments generally include, but are not limited to, comments that express a conclusion, an opinion, or a vote for or against the proposal itself, or some aspect of it; that state a position for or against a particular alternative; or that

otherwise state a personal preference or opinion. All comments received on this proposal will be included in the Administrative Record regardless of when they were received and regardless of their substantive or non-substantive nature.

Table 5.3-1. Summary of Scoping Comments and the Department of the Air Force Responses

Comment	Addressed in EIS	If Yes, Location in EIS If No, Rationale
Purpose and Need, Alternatives		
Several comments questioned the alternative selection process and how it was determined that Ebbing ANG Base and Selfridge ANG Base were identified as potential beddown locations.	Yes	See Section 2.4, *Alternative Selection Process*.
Comments questioned whether the proposed expansion of the FSRA was a part of this action.	No	The FSRA runway expansion is a separate, unrelated FAA action covered under FAA NEPA. This project is included as a reasonably foreseeable future action for purposes of impact analysis.
Comments requested that the EIS describe and fully analyze a reasonable range of alternatives and that each alternative should describe and assess all components, including, but not limited to, staging areas, parking areas, access roads, and storage/maintenance yards, as appropriate. Furthermore, it was requested that the EIS should describe any alternatives that were considered but dismissed prior to the EIS, with a clear discussion of the rationale for the elimination of any alternatives that are not evaluated in detail.	Yes	See Chapter 2, *Description of Proposed Action and Alternatives*.
Comments requested that the environmental impacts of the proposal and alternatives be presented in comparative form and that the potential environmental impacts of each alternative be quantified to the greatest extent possible (e.g., acres of wetlands impacted, tons per year of emissions produced).	Yes	See Section 2.6, *Environmental Comparison of Alternatives*, and throughout the document.
Noise		
Many comments raised concerns about the potential noise impacts around both Ebbing ANG Base (and FSRA) and Selfridge ANG Base from aircraft operations and requested specific analysis and calculations on the noise impacts for overflights.	Yes	See Sections 3.3, *Preferred Alternative – Noise*, and 4.3, *Alternative 2 – Noise*.
Several comments raised concerns about the potential for impacts to recreation and tourism along the Lake Huron shoreline from an increase in noise under the airspace.	Yes	Section 4.4, *Alternative 2 – Land Use*, addresses land use and recreation under Michigan airspace.
Comments requested the EIS include a detailed Speech Interference Level (SIL) table and a "Shout Zone" table that details, at typical AGLs, how far on each side of the flight path and how long people 3 feet apart will have to shout at each other to be understood until the dBA level drops below 87 dBA.	No	See Sections 3.3, *Preferred Alternative – Noise*, and 4.3, *Alternative 2 – Noise*. In accordance with applicable federal agency guidelines, day-night average sound level (DNL) is used in the EIS as the primary metric for assessing overall noise impacts. The EIS also includes supplemental noise metrics to give a more complete description of noise impacts than is provided by DNL alone. In the base vicinity, where flight operations generally follow predictable paths, the estimated frequency of events with potential to interfere with speech are stated for each operational scenario at several representative locations. The estimation method uses a

Table 5.3-1. Summary of Scoping Comments and the Department of the Air Force Responses

Comment	Addressed in EIS	If Yes, Location in EIS If No, Rationale
		metric like the SIL. Individual overflight noise levels are also provided for various aircraft types and distances for flights in and en route to training airspace.
Commenters requested analysis for noise effects on quality of life, recreation activities, quietude, churches, and other community gathering environments.	Yes	See Sections 3.3, *Preferred Alternative – Noise,* and 3.4, *Preferred Alternative – Land Use*, and Sections 4.3, *Alternative 2 – Noise,* and 4.4, *Alternative 2 – Land Use*.
Socioeconomics, Property Values		
Commenters were concerned about the impact of noise on property values surrounding Ebbing ANG Base (and FSRA).	Yes	See Section 3.5, *Preferred Alternative – Socioeconomics*.
Climate Change		
Comments requested that the description of the affected environment include an analysis of projected future climate changes, including future climate scenarios, that may affect the proposed action.	Yes	Identified as an environmental trend throughout the EIS analysis.
Biological Resources and Wildlife		
Commenters requested that the EIS identify all state and Federally petitioned and listed threatened and endangered species, as well as any critical habitat that might occur within the project areas; identification of which species or critical habitat might be directly, indirectly, or cumulatively affected by each alternative and describe possible mitigation for each of the species; consult with the U.S. Fish and Wildlife Service (USFWS) under Section 7 of ESA; and the DAF should coordinate with the appropriate State Wildlife and Fisheries programs to ensure that current and consistent surveying, monitoring, and reporting protocols are applied in protection and mitigation efforts	Yes	See Sections 3.8, *Preferred Alternative* – Biological Resources, and 4.8, *Alternative 2 – Biological Resources*, and Volume II, **Appendix A**, Section A.2.2, *Agency Consultations – Endangered Species Act*.
Invasive/Native Species		
Comments recommended the EIS identify alternative management practices that limit herbicide use (as a last resort), focusing instead on other methods to limit invasive species vegetation and decrease fire risk. If the project should entail new landscaping, the EIS should describe how the project will meet the requirements of Executive Order 13112, Invasive Species (February 3, 1999).	Yes	See Sections 3.8, *Preferred Alternative – Biological Resources*, and 4.8, *Alternative 2 – Biological Resources*.
Hazardous Materials and Waste/Solid Waste		
Comments suggested that the EIS should address potential direct, indirect, and cumulative impacts of hazardous materials, hazardous waste, and solid waste from construction and operation of the proposed project.	Yes	See Sections 3.2, *Preferred Alternative – Hazardous Materials and Waste/Solid Waste,* and 4.2, *Alternative 2 – Hazardous Materials and Waste/Solid Waste*.
Commenters raised questions regarding the DAF's current PFAS contamination and remediation efforts.	No	Ongoing PFAS investigation and remediation efforts are outside the scope of this EIS. Potential impacts of the Preferred Alternative/Alternative 2 to existing contaminated sites and remedial actions are addressed in Sections 3.2, *Preferred Alternative – Hazardous Materials and Waste/Solid Waste*, and 4.2, *Alternative 2 – Hazardous Materials and Waste/Solid Waste*.

Table 5.3-1. Summary of Scoping Comments and the Department of the Air Force Responses

Comment	Addressed in EIS	If Yes, Location in EIS If No, Rationale
Cumulative Impacts		
Comments suggested the EIS should identify how resources, ecosystems, and communities in the vicinity of the project have already been, or will be, affected by past, present, or future activities in the project area.	Yes	This is addressed through analysis of reasonably foreseeable future actions and environmental trends throughout the document.
Cultural and Tribal Resources		
Commenters submitted concerns regarding potential impacts of construction and noise to Native American, cultural, and archaeological resources.	Yes	See Sections 3.3, *Preferred Alternative – Noise*, and 3.7, *Preferred Alternative – Cultural Resources*, and Sections 4.3, *Alternative 2 – Noise*, and 4.7, *Alternative 2 – Cultural Resources*, and Volume II, **Appendix A**, Section A.3, *Native American Tribal Coordination*.
Comments requested details associated with compliance with the National Historic Preservation Act (Section 106) and Executive Order 13175, *Consultation and Coordination with Indian Tribal Governments*.	Yes	See Sections 3.7, *Preferred Alternative – Cultural Resources*, and 4.7, *Alternative 2 – Cultural Resources*, and Volume II, **Appendix A**, Section A.3, *Native American Tribal Coordination*.
Air Quality Concerns		
Comments identified concern regarding the impact to local air quality from construction activity and aircraft operations.	Yes	See Sections 3.10, *Preferred Alternative – Air Quality*, and 4.10, *Alternative 2 – Air Quality*.
Surface Water and Groundwater		
Commenters indicated that the EIS should fully discuss potential direct, indirect, and cumulative impacts from the proposed project to surface and groundwater quality.	Yes	See Sections 3.9, *Preferred Alternative – Water Resources*, and 4.9, *Alternative 2 – Water Resources*.
Stormwater Management		
Comments suggested that the EIS should address stormwater management and whether any components of the proposed project are within a 50- or 100-year floodplain.	Yes	See Sections 3.9, *Preferred Alternative – Water Resources*, and 4.9, *Alternative 2 – Water Resources*. The DAF policy does not address the 50-year floodplain.
Waters of the United States/Clean Water Act Section 404 Compliance		
Comments recommended that the EIS include a thorough evaluation that demonstrates planning efforts to avoid, minimize, and compensate for stream and wetland losses associated with the construction, operation, and maintenance of the proposed project and that impacts to aquatic resources and wetlands should include direct, indirect (i.e., secondary), and cumulative effects reasonably associated with the proposed project.	Yes	See Sections 3.9, *Preferred Alternative – Water Resources*, and 4.9, *Alternative 2 – Water Resources*.
Environmental Justice		
Comments requested details of adherence to Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, and inclusion of a brief detailed discussion of all environmental impacts that the proposed project will have on minority and/or low-income populations, schools, religious establishments, senior homes, and businesses and the mitigation measures to be undertaken.	Yes	See Sections 0, *Preferred Alternative – Environmental Justice and Children*, and 4.6 *Alternative 2 – Environmental Justice and Children*.

Table 5.3-1. Summary of Scoping Comments and the Department of the Air Force Responses

Comment	Addressed in EIS	If Yes, Location in EIS If No, Rationale
Children's Health		
Comments requested details of adherence to Executive Order 13045, Protection of Children From Environmental Health Risks and Safety Risks, and discussion of disproportionate effect on children, schools, or elderly.	Yes	See Sections 0, *Preferred Alternative – Environmental Justice and Children*, and 4.6, *Alternative 2 – Environmental Justice and Children*.
Energy Efficiency		
Commenters suggested that the EIS discuss how the proposed project will adhere to the Energy Independence and Security Act.	Yes	See Sections 3.2, 3.9.4, 0, and 3.11.7 for the Preferred Alternative and Sections 4.2, 4.9.4, 4.9.5, and 4.11.7 for Alternative 2.

Key: AGL = above ground level; ANG = Air National Guard; DAF = Department of the Air Force; dBA = A-weighted decibels; DNL = day-night average sound level; EIS = Environmental Impact Statement; FAA = Federal Aviation Administration; NEPA = National Environmental Policy Act; PFAS= perfluoroalkyl and polyfluoroalkyl substances; SIL = Speech Interference Level

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