Draft Environmental Assessment for Proposed Installation Development Plan Projects at Luke Air Force Base, Glendale, Maricopa County, Arizona

June 2022

Prepared for:
United States Air Force
56th Civil Engineer Squadron

PRIVACY ADVISORY

This Environmental Assessment (EA) is provided for public comment in accordance with the National Environmental Policy Act (NEPA), the President's Council on Environmental Quality (CEQ) NEPA regulations (40 CFR Parts 1500–1508), and 32 CFR Part 989, *Environmental Impact Analysis Process (EIAP)*.

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

Public commenting allows the Air Force to make better, informed decisions. Letters or other written or oral comments provided may be published in the EA. As required by law, comments provided will be addressed in the EA and made available to the public. Providing personal information is voluntary. Any personal information provided will be used only to identify your desire to make a statement during the public comment portion of any public meetings or hearings or to fulfill requests for copies of the EA or associated documents. Private addresses will be compiled to develop a mailing list for those requesting copies of the EA; however, only the names of the individuals making comments and specific comments will be disclosed. Personal home addresses and phone numbers will not be published in the EA.

COMPLIANCE

This document has been certified that it does not exceed 75 pages, not including appendices, as defined in 40 CFR § 1501.5(f). In accordance with 40 CFR § 1508.1(v), a "page" means 500 words and does not include maps, diagrams, graphs, tables, and other means of graphically displaying quantitative or geospatial information.

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Draft Environmental Assessment for Proposed Installation Development Plan Projects at Luke Air Force Base, Glendale, Maricopa County, Arizona

a. Responsible Agency: United States Air Force (Air Force)

b. Proposals and Actions:

The Air Force proposes to implement the following three short-term construction and demolition actions on Luke Air Force Base (AFB) from approximately 2023 to 2027: improvements to the existing Munitions Storage Area (MSA), reconfiguration of the Explosives Ordnance Disposal (EOD) Proficiency Training Range, and installation of pedestrian gates. The intent of these projects is to provide improvements necessary to support the mission of Luke AFB and its tenant units. The proposed projects were identified as priorities for the Installation for the improvement of the physical infrastructure and functionality of Luke AFB including current and future mission and facility requirements, development constraints and opportunities, and land use planning.

c. *For Additional Information:* Christian Black, Environmental Program Manager, 56 CES/CEIEA, 13970 W Gillespie Drive, Luke AFB AZ 85309-1629. Phone: 623-856-8488 or by email at christian.black.1@us.af.mil

d. Designation: Draft EA

e. Abstract:

This Environmental Assessment has been prepared pursuant to provisions of the *National Environmental Policy Act*, Title 42 of the *United States Code*, Section 4321 et seq., implemented by Council on Environmental Quality Regulations, Title 40 of the *Code of Federal Regulations* (CFR) Parts 1500–1508, and 32 CFR Part 989, *Environmental Impact Analysis Process (EIAP)*. Potentially affected environmental resources were identified in coordination with local, state, and federal agencies. Specific environmental resources with the potential for environmental consequences include air quality, infrastructure/utilities, biological and cultural resources, geological resources, and water resources.

The overall purpose of the Proposed Action is to support Luke AFB's future mission and training requirements associated with next-generation aircraft arrival. The Proposed Action is needed to address deficiencies in facilities at Luke AFB. Left unchecked, deficiencies in facilities and infrastructure would degrade the Base's ability to meet Air Force current and future mission requirements. The Proposed Action also is needed to provide facilities and infrastructure adequate to meet the mission requirements of the 56th Flight Wing at Luke AFB.

The purpose of the MSA improvement project is to demolish multiple, small, outdated facilities and consolidate the munitions support functions by constructing two new facilities. The MSA improvement project is needed to address the condition and capability of facilities and infrastructure allocated for munitions support functions, which are currently antiquated and discontinuous.

With respect to the EOD training range, the primary purpose of the action is to reconfigure the current range to comply with airfield operational safety criteria. The Proposed Action would also retain the current explosives safety site approval to allow for continual range operations and consolidate EOD mission support functions in one area of the Base. Reconfiguration of the EOD training range is needed to comply with airfield operational safety criteria.

Finally, the purpose of installing pedestrian gates is to aid pedestrian ingress and egress to/from the Community Support District, thereby easing traffic congestion at South Gate and helping to develop communities that are more sustainable and less vehicle dependent. Installation of new pedestrian gates is needed to provide safe and secure pedestrian access for military personnel and their dependents living on or off Base.

The analysis of the affected environmental and environmental consequences of implementing the Proposed Action concluded that by implementing standing environmental protection measures and Best Management Practices, there would be no significant adverse impacts from the Proposed Action on the resource areas analyzed. Further, significant cumulative impacts would not be anticipated from activities associated with the Proposed Action when considered with past, present, or reasonably foreseeable future actions.

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LIST OF ACRONYMS AND ABBREVIATIONS

56 CES	56th Civil Engineer Squadron
56 FW	56th Fighter Wing
56 EMS	56th Equipment Maintenance Squadron
56 EOD	56th Explosives Ordnance Disposal Unit
56 MSG	56th Mission Support Group
944 FW	944th Fighter Wing
ACAM	Air Conformity Applicability Model
ACM	asbestos-containing materials
ADEQ	Arizona Department of Environmental Quality
ADP	Area Development Plan
AETC	Air Education and Training Command
AFB	Air Force Base
AFCEC	Air Force Civil Engineer Center
AFFF	aqueous film forming foam
AFI	Air Force Instruction
AFMAN	Air Force Manual
Air Force	United States Air Force
APE	Area of Potential Effect
APZ	Accident Potential Zones
AQCR	Air Quality Control Region
AST	aboveground storage tank
AZGFD	Arizona Game and Fish Department
BGEPA	Bald and Golden Eagle Protection Act of 1940
BMP	best management practice
CATEX	Categorical Exclusion
CEQ	Council on Environmental Quality
CEMML	Center for Environmental Management of Military Lands
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CO	carbon monoxide
CO_2e	carbon dioxide equivalent
CWA	Clean Water Act
CZs	Clear Zones
dBA	A-weighted decibel
DNL	Day-Night Sound Level
DoD	United States Department of Defense
EA	Environmental Assessment
EAS	Environmental Assessment Services, LLC
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
EO	Executive Order
EOD	Explosives Ordnance Disposal
EODMAG	explosive ordnance magazine
ERP	Environmental Restoration Program
ESA	Endangered Species Act
ESQD	explosive safety quantity distance
°F	degree Fahrenheit
FEMA	Federal Emergency Management Agency
FONSI	Finding of No Significant Impact
ft^2	square foot/feet
FY	fiscal year
GBI	Green Building Initiative
GHG	greenhouse gas
HAP	hazardous air pollutant

HAZMAT	hazardous materials
IDP	Installation Development Plan
IICEP	intergovernmental coordination for environmental planning
LBP	lead-based paint
lbs	pounds
µg/m^3	micrograms per cubic meter
MBTA	Migratory Bird Treaty Act
MSA	Munitions Storage Area
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NH_3	ammonia
NHPA	National Historic Preservation Act
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NOx	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
OSHA	Occupational Safety and Health Administration
Pb	lead
PCBs	polychlorinated biphenyls
PFAS	per- and polyfluoroalkyl substances
PFOA	perfluorooctanoic acid
PFOS	perfluorooctane sulfonate
$PM_{2.5}$	particulate matter less than or equal to 2.5 microns in diameter
PM_{10}	particulate matter less than or equal to 10 microns in diameter
ppb	parts per billion
ppm	parts per million
PSD	Prevention of Significant Deterioration
Q-D	quantity-distance (arc)
RCRA	Resource Conservation and Recovery Act
ROI	Region of influence
SARA	Superfund Amendments and Reauthorization Act
SHPO	State Historic Preservation Office
SMP	Stormwater Management Plan
SO_2	sulfur dioxide
SPCC	Spill Prevention, Control, and Countermeasures
SWPPP	Storm Water Pollution Prevent Plan
TCP	Traditional Cultural Property
tpy	ton per year
TSCA	Toxic Substances Control Act
UFC	United Facilities Criteria
US	United States
USC	United States Code
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGBC	United States Green Building Council
UST	underground storage tank
UU/UE	unlimited use and unrestricted exposure
VOC	volatile organic compound

CHAPTER 1 PURPOSE AND NEED FOR THE PROPOSED ACTION

1.1 INTRODUCTION

Luke Air Force Base (AFB) is an Air Education and Training Command (AETC) training base located in Glendale, Arizona. Situated on 4,800 acres of land west of the city of Phoenix (**Figure 1-1**), the Base is home to the 56th Fighter Wing (56 FW), the largest fighter wing in the United States (US) Air Force (Air Force). In 2012, Luke AFB was selected as a beddown location for the new F-35 Lightning II, the Air Force's next-generation fighter jet.[1] The fielding of this aircraft is currently underway at the Base and will continue through approximately 2025. As one of three primary Explosive Ordnance Disposal (EOD) Air Force bases, Luke AFB is also home to the 56th EOD Unit (56 EOD) and the 944 EOD flight of the 944th Fighter Wing (944 FW), an Air Force Reserve unit. To sustain its training mission, the Air Force's 56th Civil Engineer Squadron (56 CES) proposes to implement development projects at Luke AFB over a 5-year period from fiscal year (FY) 2023 to 2027. The proposed development projects align with the Base Installation Development Plan (IDP) (Luke AFB, 2014) and would modernize the training capabilities of Luke AFB and provide the necessary functional space for future mission growth. This Environmental Assessment (EA) evaluates the potential environmental, cultural, and socioeconomic effects of the proposed development projects at Luke AFB. These projects are further described throughout this EA and collectively referred to as the "Proposed Action."

This EA is prepared in accordance with the *National Environmental Policy Act of 1969*, as amended (42 *United States Code* [USC] § 4321 et seq.) (NEPA); the Council on Environmental Quality (CEQ) NEPA regulations (40 *Code of Federal Regulations* [CFR] Parts 1500–1508); and the Air Force NEPA regulations at 32 CFR Part 989, *Environmental Impact Analysis Process (EIAP)*. Per the updated CEQ NEPA regulations, this EIAP complies with the prescriptive timeline and page limits for an EA. Other applicable provisions of 40 CFR Parts 1500–1508 are cited below. EIAP informs decision-makers, regulatory agencies, and the public about an Air Force proposed action before any decision is made on whether to implement the action. During the EIAP, if analyses in the EA determine that potential significant adverse effects would be likely to occur, the Air Force would publish a Notice of Intent (NOI) in the *Federal Register* to prepare an Environmental Impact Statement (EIS).

The CEQ NEPA regulations at 40 CFR § 1500.1(b), 40 CFR § 1506.6(b) and (c), and 40 CFR § 1507.4 provide purpose and direction for streamlining the NEPA process. CEQ memoranda (e.g., March 6, 2012) and guidance on modernizing the NEPA process (CEQ, 2003) also identify opportunities to streamline the NEPA process, including the use of technology for communications and information dissemination. This EA satisfies the requirements of NEPA in accordance with the CEQ regulations and promotes NEPA streamlining through the implementation of the Air Force EIAP. To render this document more concise, links are provided to online data sources to which the reader can refer for more information. Should the reader not have internet access, please contact the Air Force point of contact listed on the **Cover Sheet** of this EA and accommodations will be made to provide printed copies of relevant information requested.

1.2 LUKE AIR FORCE BASE

Luke AFB is the Air Force's preeminent fighter pilot training base. Approximately 75 percent of F-35 pilots globally learn to fly and prepare for combat while stationed at the Base. The host unit at Luke AFB is the 56 FW, and nearby assets, such as Gila Bend Air Force Auxiliary Field and Barry M. Goldwater Range East, provide unique training opportunities to student Airmen. The 56th Mission Support Group (56 MSG), the Wing's most diverse group, is composed of six squadrons: civil engineering (i.e., 56 CES), contracting, communications, force support, logistics readiness, and security forces. The 56 MSG is responsible for infrastructure management, emergency response, EOD, communications operations and management,

[1] The F-35 Lightning II is replacing the Air Force's aging fleet of F-16 and A-10 aircraft.

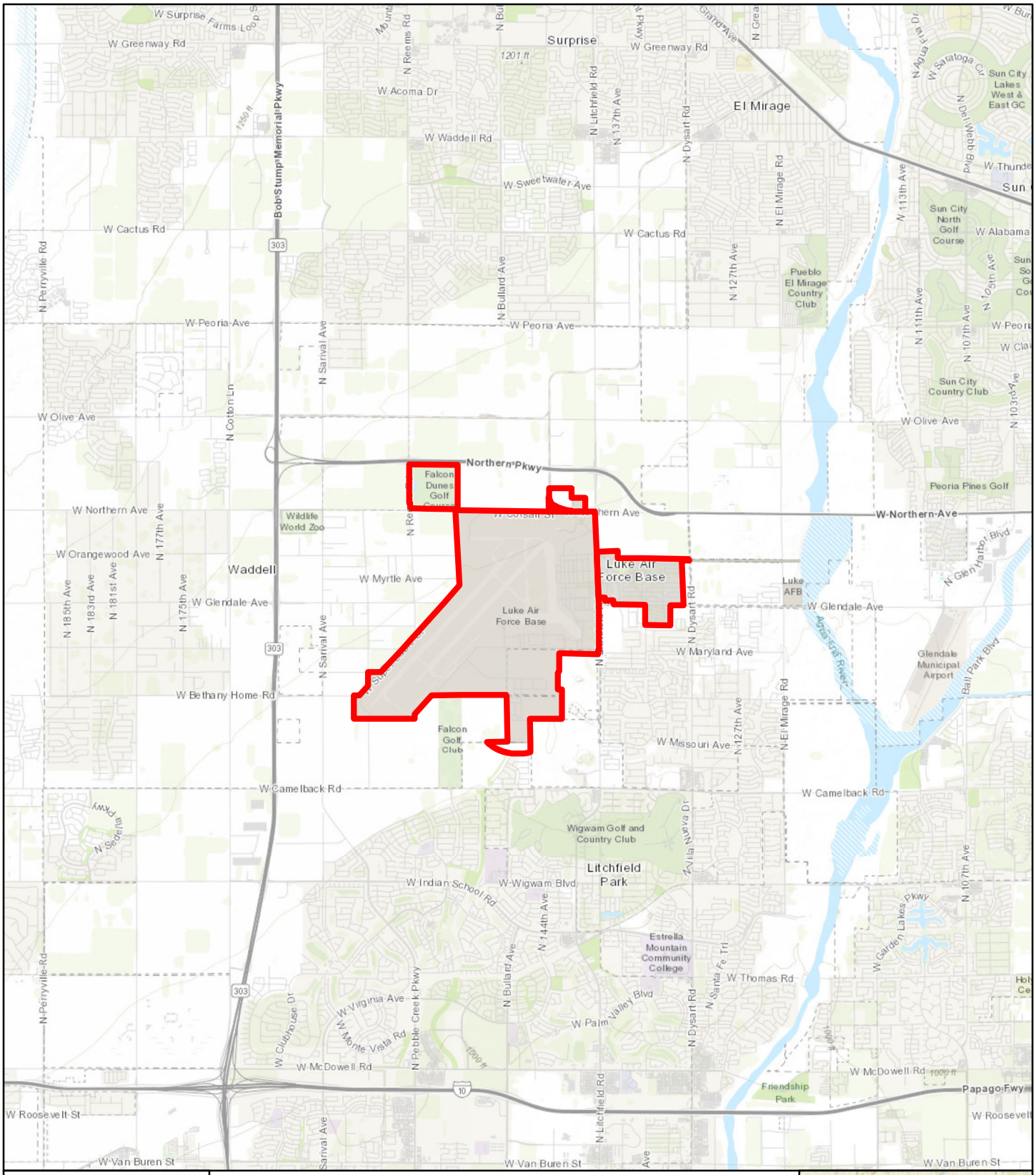


FIGURE 1-1

REGIONAL LOCATION

Luke Air Force Base

N

Imagery: ESRI 2021
Projection: WGS 1984
Zone 14N

0 0.75 1.5 Miles

and transportation, among other programs at Luke AFB. Collectively, the Base's tenant makeup, program capabilities, and real-property assets are integral to the AETC mission of Luke AFB. Training and operations at Luke AFB are centered around a large airfield with two parallel runways in the western portion of the Base. With some exception, other portions of Luke AFB are organized by mission or mission support function. These include housing; munitions management; morale, welfare, and recreation areas; and other training support functions. On average, nearly 300 fighter jet pilots graduate from training programs administered at Luke AFB annually. As more F-35s arrive at the Base over the next 3 to 5 years, the population living and/or working at Luke AFB is projected to grow approximately 30 percent by 2026.

To accommodate the increase in personnel associated with the F-35 beddown, installation development projects are planned in the Northwest Mission District, Munitions Storage District, and Community Support District (**Figure 1-2**).

1.2.1 Munitions Storage District

The Munitions Storage District at Luke AFB is in the southeastern portion of the Base. Within the Munitions Storage District is the 127-acre Munitions Storage Area (MSA), which consists of 6 munitions operating locations, 8 aboveground magazines, 2 aboveground segregated magazines, 11 earth-covered magazines, 1 trailer maintenance facility (which is also sited and can function as an operating location), and 4 administrative facilities. Approximately 210 personnel are assigned to the Munitions Storage District, which is managed by the 56th Equipment Maintenance Squadron (56 EMS). Consolidation and improvements to the MSA, which would be included under the Proposed Action, would occur in the Munitions Storage District.

1.2.2 Northwest Mission District

The 148-acre Northwest Mission District is in the northwestern portion of the Base. Bounded by the Base boundary and Northern Avenue to the north, the airfield to the south and east, and the Base boundary to the west, the Northwest Mission District is composed of industrial, maintenance, and administrative land uses. Presently, the 56th Operational Support Squadron, 56th Logistics Readiness Squadron, 56 CES, 607th Air Control Squadron, 944 FW, and civilian contractors occupy facilities located in the Northwest Mission District. A total of nine occupied buildings, nine canopy structures, seven utility structures, and several temporary trailers and training apparatus exist within the boundaries of the area. Reconfiguration of the existing EOD Range, which would be included under the Proposed Action, would occur in the Northwest Mission District.

1.2.3 Community Support District

The Community Support District is located on the far eastern side of the Base. Bounded by Lightning Street to the north and Glendale Avenue to the south, this District contains the Base's residential areas and community support facilities, such as the Child Development Center, Exchange, pharmacy, credit union, medical clinic, and youth center. Family housing on the Base is privatized; these communities are located on the eastern side of the Community Support District. Installation of pedestrian gates, which would be included under the Proposed Action, would occur in the Community Support District.

1.3 PURPOSE AND NEED FOR INSTALLATION DEVELOPMENT

The overall purpose of the Proposed Action is to support Luke AFB's future mission and training requirements associated with next-generation aircraft arrival. The construction of new facilities, renovations and repair of existing facilities, demolition of obsolete facilities, and consolidation of mission support functions would address existing deficiencies in facilities at Luke AFB. Left unchecked, deficiencies in facilities and infrastructure would degrade the Base's ability to meet Air Force current and future mission requirements. The Proposed Action is needed to provide facilities and infrastructure that are adequate to meet the mission requirements of the 56 FW at Luke AFB.

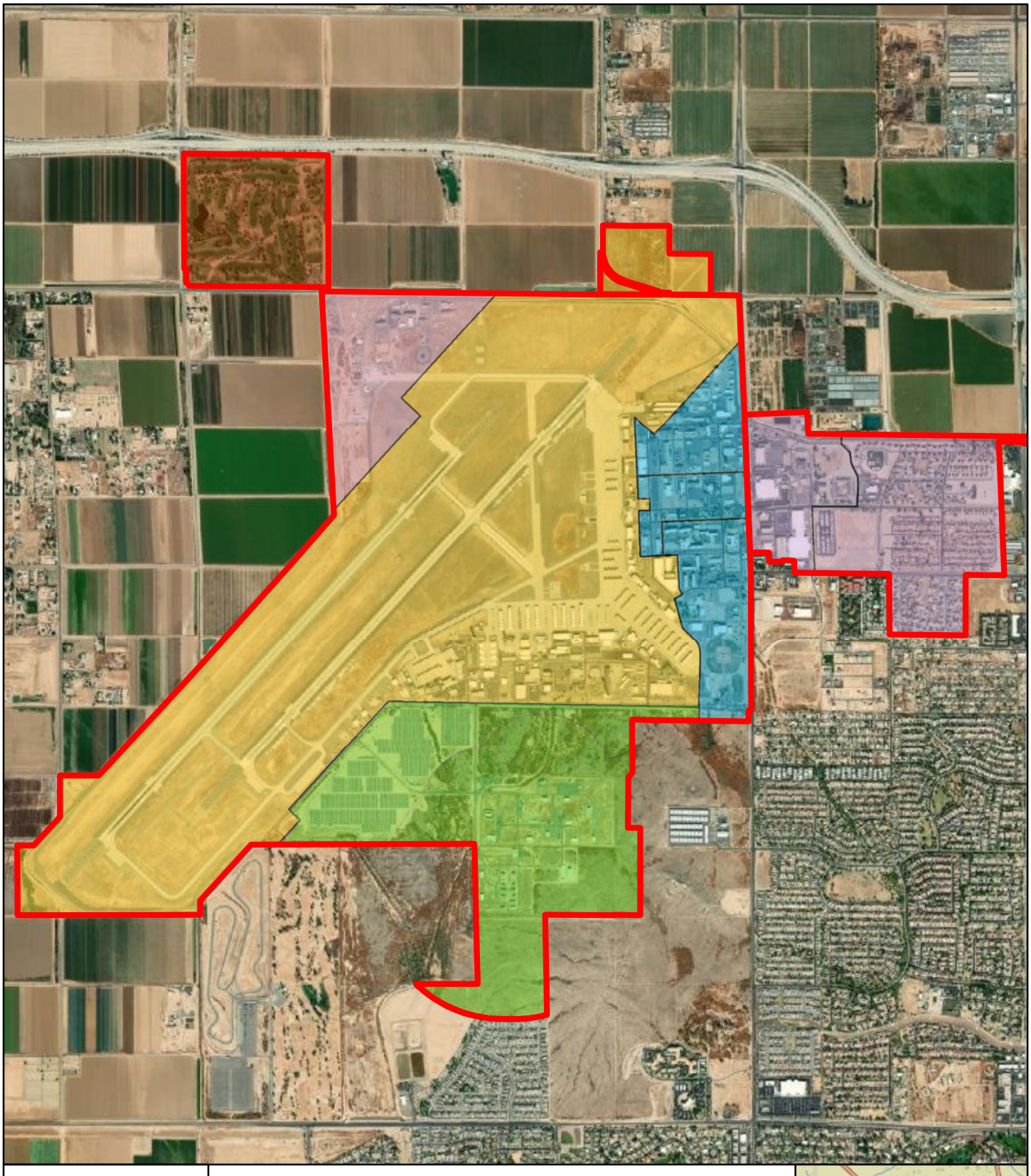


FIGURE 1-2

PLANNING DISTRICTS

1.4 PROJECTS IDENTIFIED FOR INSTALLATION DEVELOPMENT

This EA evaluates three installation development projects at Luke AFB: improvements to the existing MSA, reconfiguration of the EOD Proficiency Training Range, and installation of pedestrian gates. The individual purpose and need for each project considered in this EA is outlined in **Section 1.5.**

1.5 PURPOSE AND NEED FOR INDIVIDUAL PROJECTS

1.5.1 Munitions Storage Area

Munitions management at Luke AFB includes the storage, inventory, maintenance, and transportation of live weapons and ordnance for use in training exercises. The **purpose** of the Proposed Action in the Munitions Storage District (**Figure 1-3**) is twofold: 1) demolish multiple, small, outdated facilities and 2) consolidate their munitions support functions by constructing two new facilities. This component of the Proposed Action would seek to provide adequate space for current and anticipated levels of munitions cache and munitions support personnel in accordance with Air Force Instruction (AFI)-driven requirements based upon manning within the MSA. It would also seek to achieve more efficient land use and operations within this portion of Luke AFB. The **need** for the Proposed Action in the Munitions Storage District is to address the condition and capability of facilities and infrastructure. Currently, munitions support functions occur across multiple antiquated, discontinuous facilities. These facilities lack space and functional capability to store munitions, meet manning requirements, and provide more timely and efficient operational support. With future mission growth, these deficiencies will continue to the detriment of Airmen training at Luke AFB in preparation for combat. The Proposed Action in the Munitions Storage District would address these deficiencies consistent with US Department of Defense (DoD) policies for real property management.

1.5.2 Explosives Ordnance Disposal Proficiency Training Range

Located in the Northwest Mission District, the EOD proficiency range is a critical training asset for the EOD tenants stationed at Luke AFB. The **purpose** of the Proposed Action with respect to EOD training is to reconfigure the current range to comply with airfield operational safety criteria. Secondary objectives for this component of the Proposed Action include: 1) retain the current explosives safety site approval to allow for continual range operations and 2) consolidate EOD mission support functions in one area of the Base. The latter objective would require constructing a new administrative facility and relocating a mobile EOD storage magazine to the EOD Range (from the Mission Support District; **Figure 1-3**).

The **need** for the Proposed Action in the Northwest Mission District is to comply with airfield operational safety criteria while continuing to operate the EOD Range. Because of the explosives safety site approval process, relocating the range elsewhere on Luke AFB would not be possible without a substantial loss of training time. This component of the Proposed Action is also needed to consolidate EOD operations in one area of the Base. Currently, the administrative functions of, and the munitions employed at, the EOD Range are located elsewhere on the Base. As a result, EOD training and operations are plagued by inefficiency due to unnecessary administrative delays and the need to obtain and transport munitions from the Munitions Storage District to the EOD Range. The Proposed Action would address these deficiencies and allow for continual, more efficient EOD training and operations.

1.5.3 Pedestrian Gates

Housing for permanent and temporary residents of Luke AFB is concentrated in the Community Support District, the easternmost portion of the Base (**Figure 1-3**). This area also contains various community support facilities accessible to military personnel and their dependent family members that reside both on and off Base. The **purpose** of the Proposed Action in the Community Support District is to aid pedestrian ingress and egress to/from this area of Luke AFB by construction of two pedestrian gates. This component of the Proposed Action also seeks to ease traffic congestion at South Gate and develop communities that are more sustainable and less vehicle dependent.

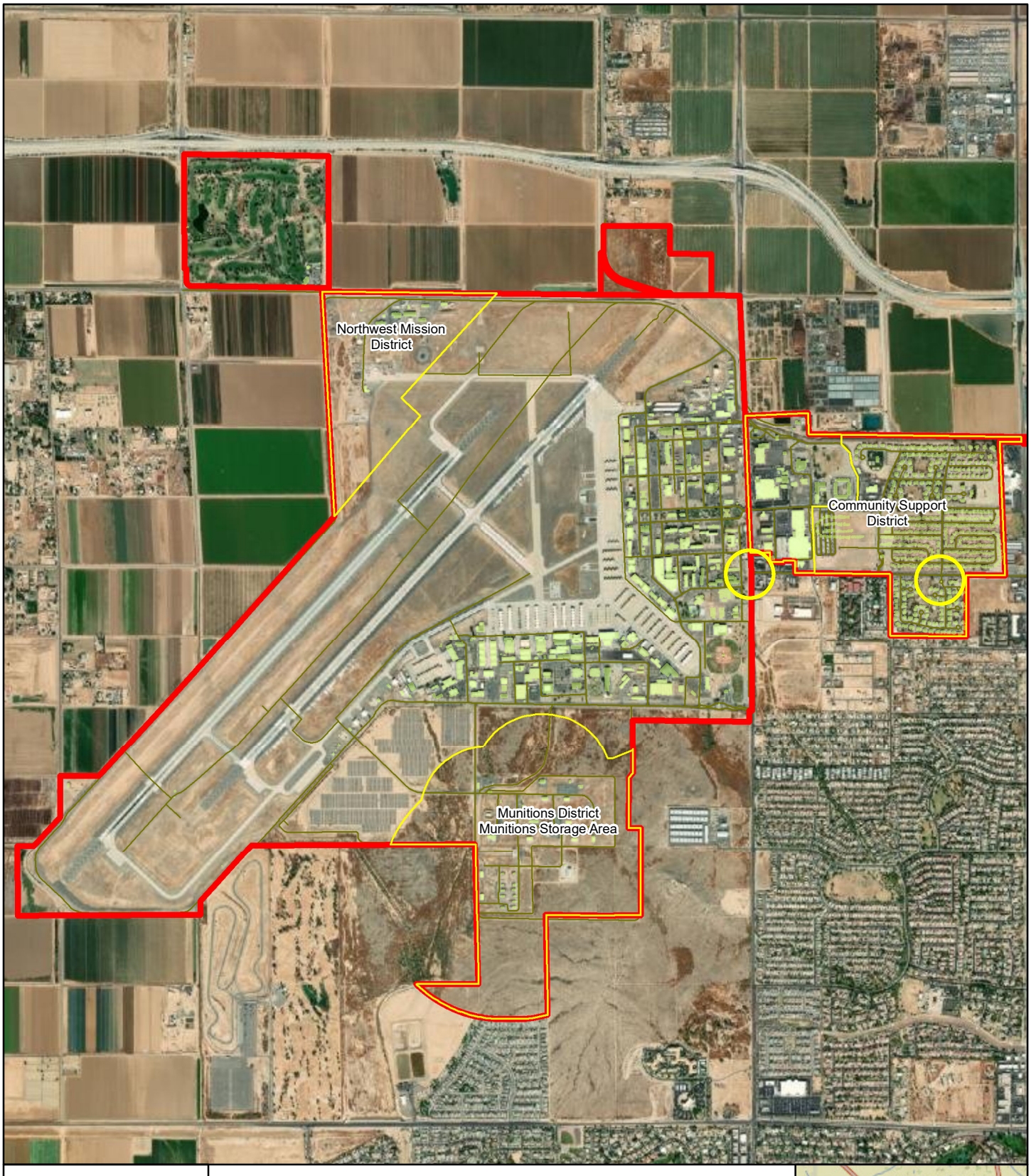


FIGURE 1-3

PROJECT AREAS

N

Imagery: ESRI 2021
Projection: WGS 1984
Zone 14N

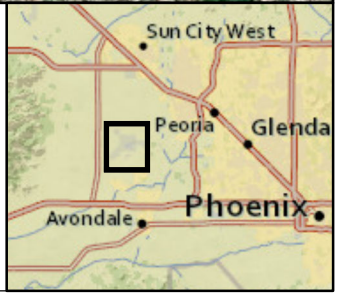
0 0.25 0.5 Miles

Road

Building

Luke Air Force Base

Project Areas



The **need** for the Proposed Action in the Community Support District is to provide safe and secure pedestrian access for military personnel and their dependents living on or off Base. On-Base residents frequently leave the Base to obtain local goods and services, whereas off-Base residents frequently seek support services within the Community Support District. Currently, these residents or visitors must travel by vehicle, enter through South Gate, and drive across the Base to access the District. The Proposed Action would improve access to a frequented on-Base destination and enhance the multi-modal transportation network for Luke AFB as a whole.

1.6 INTERAGENCY AND INTERGOVERNMENTAL COORDINATION AND CONSULTATION

1.6.1 Interagency and Intergovernmental Coordination and Consultation

The EIAP, in compliance with NEPA guidance, includes public and agency review of information pertinent to a proposed action and alternatives. Interagency and intergovernmental coordination for environmental planning (IICEP) is a federally mandated process for informing and coordinating with other governmental agencies regarding a federal proposed action. The Air Force complies with the IICEP mandate through the scoping[2] process (40 CFR § 1501.9) and public involvement (40 CFR 1506.6). Accordingly, and per Executive Order (EO) 12372, *Intergovernmental Review of Federal Programs*, the Air Force notified federal, state, and local agencies with jurisdiction that could potentially be affected by the Proposed Action and Alternatives during the development of this EA. Copies of the IICEP letters are included in **Appendix A**.

1.6.2 Government-to-Government Consultation

The *National Historic Preservation Act* (54 USC § 300101 et seq.) (NHPA) and its regulations at 36 CFR Part 800 direct federal agencies to consult with Indian tribes when the Proposed Action or Alternatives may affect tribal lands or properties of religious and cultural significance to a tribe. Consistent with the NHPA, the *Native American Graves and Protection and Repatriation Act* (25 USC § 3001 et seq.), DoD Instruction 4710.02, *DOD Interactions with Federally Recognized Tribes*, and Department of the Air Force Instruction 90-2002, *Air Force Interaction with Federally Recognized Tribes*, the Air Force has invited federally recognized tribes that are historically affiliated with lands in the vicinity of the Proposed Action and Alternatives to consult on all proposed undertakings that have a potential to affect properties of cultural, historical, or religious significance to the tribes. The tribal consultation process is distinct from NEPA consultation and IICEP and requires separate notification to all relevant tribes. The timelines for tribal consultation are also distinct from those of the other consultations. The Luke AFB point of contact for Indian tribes is the Base Commander. The point of contact for consultation with the Tribal Historic Preservation Office and the State Historic Preservation Office (SHPO) is the Luke AFB Cultural Resources Manager. Copies of government-to-government consultation letters are included in **Appendix A.**

1.6.3 Other Agency Consultations

Implementation of the Proposed Action involves coordination with several organizations and agencies. Compliance with Section 7 of the *Endangered Species Act of 1973*, as amended (16 USC § 1531 et seq.) (ESA), and implementing regulations (50 CFR Part 402) requires communication with the US Fish and Wildlife Service (USFWS) in cases where a federal action could affect listed threatened or endangered species, species proposed for listing, or candidates for listing. The primary focus of this coordination is to request a determination of whether any of these species occurs in the proposal area. If any protected species is present, a determination would be made of any potential adverse effects on the species. Should no species protected by the ESA be affected by the Proposed Action or Alternatives, no additional consultation is required. Letters will be sent to the appropriate USFWS offices as well as relevant state agencies informing them of the proposal, requesting data regarding applicable protected species, and

[2] Scoping is a process for determining the scope of issues to be addressed and analyzed in a NEPA document.

subsequently requesting concurrence if the Air Force makes a Determination of No Effect to any federally listed species.

The Air Force coordinated with the appropriate state government agencies regarding potential effects from the Proposed Action and Alternatives. Compliance with Section 106 of the NHPA and implementing regulations (36 CFR Part 800) was accomplished through the SHPO. Communication related to air quality was directed to the Arizona Department of Environmental Quality (ADEQ) and Maricopa County Air Quality Department, and for matters related to habitat and species of concern, to the Arizona Game and Fish Department. Copies of all agency correspondence are included in **Appendix A**.

1.7 Public and Agency Review

A Notice of Availability of the Draft EA and Finding of No Significant Impact (FONSI) announcing the availability of the EA to the public for review and comment was published in the *West Valley View* on 13 July 2022, and the *Glendale Star* and *Peoria Times* on 14 July 2022. The public and agency review period ended on 15 August 2022.

Copies of the Draft EA and FONSI were also made available for review at the following locations:

- Glendale Public Library, 5959 W. Brown Street, Glendale, AZ 85302
- Northwest Regional Library, 16089 N. Bullard Avenue, Surprise, AZ 85374
- Litchfield Park Library, 101 W. Wigwam Boulevard, Litchfield Park, AZ 85340
- Luke Air Force Base Library, 4724 N. Homer Drive, Luke AFB, AZ 85309

1.8 Decision to be Made

The decision to be made is whether to implement the Proposed Action. Should the Air Force choose to implement the Proposed Action, this EA will assist in determining an appropriate scope of action to minimize potential adverse environmental impacts and allow for additional, project-specific environmental review in compliance with NEPA. The decision-making framework for this EA (see also **Section 3.1**) is described as follows:

- Do not implement the Proposed Action.
- Implement the Proposed Action as documented in a FONSI for this EA and, when appropriate, via categorical exclusion (CATEX)[3] as defined in 32 CFR Part 989, Appendix B.
- Implement a reduced scope of the Proposed Action as documented in a FONSI for this EA and, when appropriate, via CATEX as defined in 32 CFR Part 989, Appendix B.
- Publish a NOI in the *Federal Register* to prepare an EIS for the Proposed Action or one or more installation development project(s).

Should the Air Force decide to implement the Proposed Action as noted above, this EA will identify any actions the Air Force will commit to undertake to minimize environmental effects and comply with NEPA.

1.9 Scope of the Environmental Assessment

The Air Force NEPA regulations at 32 CFR § 989.11 require an assessment of potential environmental impacts for Air Force projects recommended in a comprehensive plan such as an Installation Development

[3] A CATEX refers to a category of actions that do not individually or cumulatively have the potential for significant effects on the environment and, therefore, do not require further environmental analysis (32 CFR § 989.13).

Plan. In accordance with 40 CFR § 1501.3, the Air Force determined the appropriate level for this analysis is an EA. An EA is a concise public document that briefly discusses the purpose and need, alternatives, and potential environmental impacts of a proposed federal action. It aids in agency planning and decision-making, or facilitates the preparation of an EIS, as necessary (40 CFR § 1501.5).

This EA evaluates the potential environmental consequences of implementing the Proposed Action and Alternatives for installation development projects at Luke AFB. This EA has been prepared in accordance with NEPA (42 USC § 4321 et seq), CEQ regulations (40 CFR Parts 1500–1508), and the EIAP (32 CFR Part 989). NEPA is the basic national requirement for identifying environmental consequences of federal decisions. NEPA ensures that environmental information, including the anticipated environmental consequences of a proposed action, is available to the public, federal and state agencies, and the decision-maker before decisions are made and before actions are taken.

NEPA requires federal agencies to consider alternatives to the proposed action and to analyze potential impacts of alternatives. Potential impacts of the Proposed Action and Alternatives described in this document will be assessed in accordance with the Air Force EIAP (32 CFR Part 989), which requires that impacts to resources be analyzed in terms of their context, duration, and intensity. To help the public and decision-makers understand the implications of potential impacts, the impacts are described in the short and long term, cumulatively, and within context. This EA analyzes the following environmental resources: land use; geological resources; air quality; water resources, biological resources; cultural resources; infrastructure, transportation, and utilities; noise; hazardous materials and wastes; safety; socioeconomics; and environmental justice and protection of children.

The expected geographic scope of any potential consequences is defined as the Region of Influence (ROI). Luke AFB and its environs are considered in determining the ROI for each resource. The ROI boundaries vary depending on the nature of each resource. For example, the ROI for some resources, such as socioeconomics and air quality, extends over a larger jurisdiction than others, such as biological and safety.

1.10 Applicable Laws and Environmental Regulations

Implementation of the Proposed Action would involve coordination with several organizations and agencies. Adherence to the requirements of specific laws, regulations, best management practices (BMPs), and necessary permits are described in detail in each resource section in Chapter 3.

Other laws and regulations applicable to the Proposed Action include, but are not limited to:

- *Clean Water Act of 1972* (33 USC § 1251 et seq.) (CWA)
- *Resource Conservation and Recovery Act* (42 USC § 6901 et seq.) (RCRA)
- *Energy Independence and Security Act* (42 USC § 17001 et seq.)
- *Comprehensive Environmental Response, Compensation, and Liability Act* (42 USC § 9601 et seq.) (CERCLA)
- Federal *Clean Air Act* (42 USC § 7401 et seq., as amended)
- *Migratory Bird Treaty Act* (16 USC §§ 703–712.) (MBTA)
- *Toxic Substances Control Act* (15 USC § 2601 et seq.) (TSCA)
- EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (1994)
- EO 13045, Protection of Children from Environmental Health Risks and Safety Risks (1997), as amended by EO 13296 (2003)

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CHAPTER 2 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

The following sections describe the Proposed Action, alternatives screening process, and alternatives dismissed and retained for analysis in this EA.

2.1 INTRODUCTION

The installation development projects included as part of the Proposed Action were selected based on current and future needs at Luke AFB associated with the ongoing F-35 beddown. Each of the proposed projects would support the overall purpose and need for installation development as outlined in **Section 1.3** and the individual project purpose and need statements as outlined in **Section 1.5**.

2.2 DESCRIPTION OF THE PROPOSED ACTION

The Proposed Action includes a total of three short-term construction and demolition actions on Luke AFB. Overall, the Proposed Action would demolish approximately 30,686 square feet (ft^2) of existing building space and construct approximately 63,480 ft^2 of new building space. The net change in building footprint under the Proposed Action would be an increase of 32,794 ft^2.

The Proposed Action would incorporate the planning considerations addressed in Luke AFB planning documents, including the Area Development Plans (ADPs) for the Northwest Mission District and Munitions Storage District, as required by AFI 32-1015, *Integrated Installation Planning*. For example, the Proposed Action would adhere to project-specific development standards, including land use constraints for siting the new facilities, and regulate design parameters such as height, scale, and orientation. When appropriate, the standards and component plans of the ADP are discussed and referenced throughout this EA.

The planning principles set forth in AFI 32-1015 and included in the ADPs are also incorporated into the Proposed Action by design. These principles set objectives for sustainable development, including guidelines and requirements for land, water, and energy conservation. Standards and requirements common to the planning, design, construction, sustainment, restoration, and modernization of DoD-owned facilities are included in the Proposed Action, as applicable (National Institute of Building Sciences, 2021). These standards and requirements include:

- Unified Facilities Criteria (UFC) 1-200-02, *High Performance and Sustainable Building Requirements* (2016, as updated), and UFC 3-210-10, *Low Impact Development* (2015, as updated), in accordance with *Guiding Principles for Sustainable Federal Buildings and Associated Instructions* (CEQ, 2016) and implemented by AFI 32-1023, *Designing and Constructing Military Construction Projects* (2020), and the Air Force Corporate Facilities Standards.
- US Green Building Council (USGBC) or Green Building Initiative (GBI) certification for applicable projects as required by the *Air Force Sustainable Design and Development Implementing Guidance Memorandum* (Air Force Civil Engineer Center [AFCEC], 2017; Air Force, 2011). Applicable projects include:
  - new buildings larger than 5,000 ft^2 with construction costs greater than $3 million; and
  - building renovations of more than 5,000 sf^2 with construction costs greater than $3 million and an estimated 50-percent replacement cost.

Under the Proposed Action, USGBC- or GBI-certified projects would meet the federal sustainability requirements as detailed in UFC 1-200-02. Green building designs and practices would also be incorporated into all other ADP projects (i.e., below the thresholds noted above) to the extent practicable.

Components of the ADPs and Installation-wide plans, such as those for transportation, energy, and natural and cultural resources management, implement these design and development standards and

requirements at the Base level. Those measures that serve to prevent or reduce adverse environmental impacts are incorporated into the Proposed Action by design and described in this EA, where appropriate.

2.2.1 Munitions Storage Area

An appropriately sized Munitions Control, Munitions Administrative and Munitions Operations facility is necessary to accommodate the increased flying and training missions for the F-35 aircraft at Luke AFB. The increase in manning and munitions operations support requirements will escalate as the beddown continues. Combining facilities would increase mission effectiveness, safety, and communications. The proposed MSA project includes the following elements:

- Demolition of five existing buildings totaling 23,361 ft^2: Buildings 1234, 1236, 1240, 1242, and 1245 (**Figure 2-1**);
- Construction of a new 17,093-ft^2 munitions support and control facility with reinforced concrete foundation and floor slab, structural-steel frames, split-face masonry unit walls, structural sloping metal seam roof, and fire detection and protection system;
- Construction of a new 16,630-ft^2 missile and conventional munitions consolidated facility with reinforced concrete foundation and concrete floor slab, structural-steel frames, split-face masonry unit walls, structural sloping metal seam roof, and a fire detection and protection system; and
- Construction of parking lots for consolidated munitions support and control facility and missile and conventional munitions facility.

Overall, activities associated with the MSA would result in a net increase of 4,202 ft^2 of new structures. Facilities would be designed as permanent construction in accordance with the UFC 1-200-01, *General Building Requirements*, UFC 1-200-02, and UFC 4-010-01, *DOD Minimum Antiterrorism Standards for Buildings*.

2.2.2 Explosives Ordnance Disposal Proficiency Training Range

The existing EOD facilities at Luke AFB support the 56 EOD and 944 EOD units, which provide 24-hour emergency management response capability to aircraft recovery operations, explosive-related incidents, and weapons of mass destruction or other terrorist-related events. The existing EOD Proficiency Training Range is out of compliance with UFC 3-260-01, *Airfield and Heliport Planning and Design* (2019, Change 1), as the southernmost portion of the EOD Range lies within the airfield's runway lateral clearance zone, primary surface, and transitional surface, presenting an airfield safety hazard.

The Proposed Action would include consolidation of all EOD activities into the existing detonation area on Base, including temporary and permanent space for advanced EOD storage magazine, space for development of an EOD practical training area, and the construction of a permanent EOD facility.

Under the Proposed Action, the current footprint of the EOD Proficiency Training Range would be shifted approximately 5 acres to the north in compliance with airfield operational safety criteria (**Figure 2-2**). Correspondingly, approximately 5 acres of land comprising the southernmost portion of the existing Range would be vacated. The Proposed Action would demolish or repurpose an existing 7,325-ft^2 facility within the main industrial portion of the Base and construct a new, expanded 30,000-ft^2 EOD facility in the Northwest Mission District to consolidate EOD administrative and storage functions.

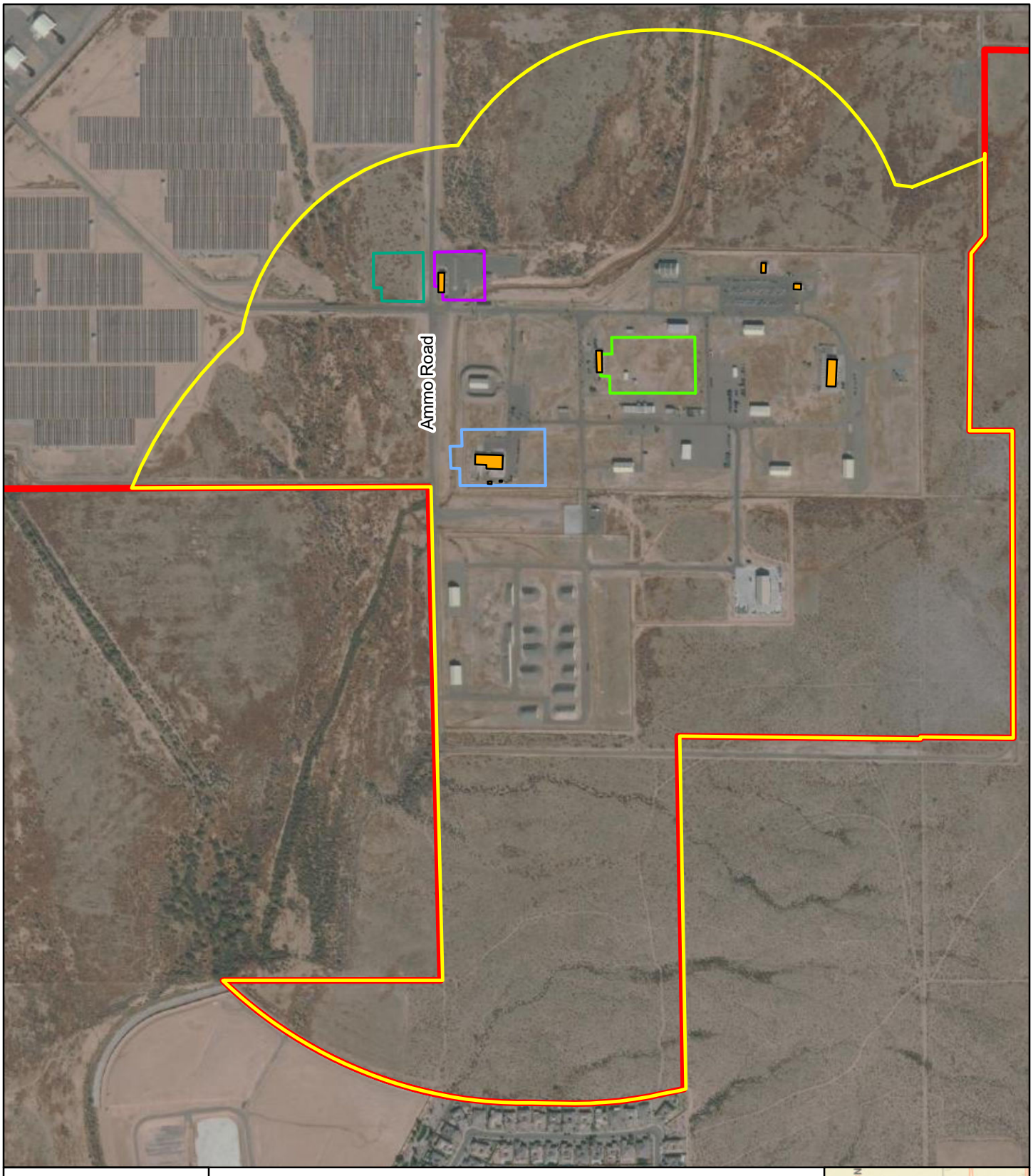


FIGURE 2-1

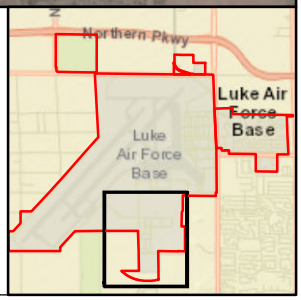
MUNITIONS STORAGE AREA PROJECT UNDER THE PROPOSED ACTION

N

Imagery: ESRI 2021
Projection: WGS 1984
Zone 12N

0 375 750 Feet

- Adminstrative Facility (Alternative 1)
- Adminstrative Facility (Alternative 2)
- Munitions Facility (Alternative 1)
- Munitions Facility (Alternative 2)
- Luke Air Force Base
- Munitions Storage District - Munitions Storage Area
- Facility Proposed for Demolition



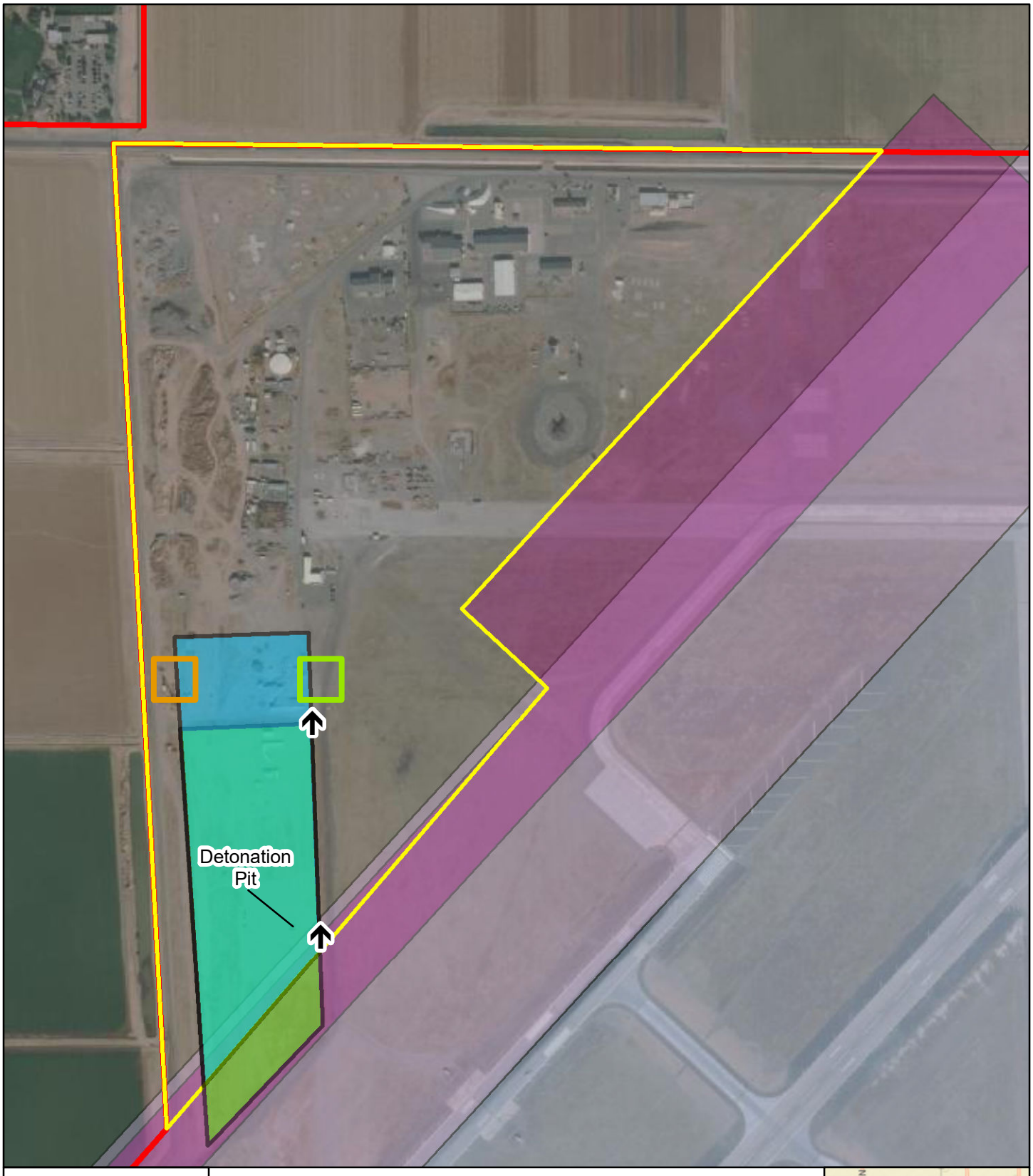


FIGURE 2-2

EOD PROFICIENCY TRAINING RANGE PROJECT UNDER THE PROPOSED ACTION

N

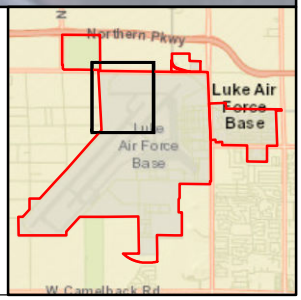
Imagery: ESRI 2021
Projection: WGS 1984
Zone 12N

0 300 600 Feet

Luke Air Force Base
Northwest Mission District
Current EOD Range
Proposed EOD Range
Alternative 1
Alternative 2

Primary Surface

Primary Surface
Lateral Clearance
Transitional Surface



The Proposed Action would also include the replacement of the boundary fence at the existing EOD Range and would site an EOD magazine (EODMAG) structure within the fenced area of existing Building 951, the administrative building for the 56 EOD. The 56 EOD acquired an EODMAG structure from another DoD EOD unit; the structure is currently vacant and located in the parking lot of Building 951. The EODMAG is a deployable explosive storage magazine that provides a minimal quantity-distance (Q-D) arc while storing explosive items found in a typical EOD deployment package. The structure itself is approximately a cube with a footprint of approximately 49 ft^2. When the EODMAG is loaded with explosives, it has a minimum Q-D arc of 10 feet. The system is made up of two storage magazines utilizing pumice-lined containers that, when loaded, properly prevent sympathetic detonation. The maximum net explosive weight per magazine would be found in the table for the specific magazine configuration. The maximum net explosive weight must be followed, and the pumice-lined containers must be used to retain the 10-foot Q-D arc. The DoD Explosives Safety Board has approved this system for the storage of approved items only; no changes to types, quantities, and placement of explosive items are permitted. The Q-D arc would be fenced and within the controlled access fence line of the EOD building. Placing the EODMAG within the boundaries of the administrative building would provide for more efficient access to munitions. Overall, activities associated with EOD Range would result in a net increase of 22,675 ft^2 of impervious surfaces.

2.2.3 Pedestrian Gates

The Proposed Action would construct two new pedestrian access gates and a pedestrian gatehouse. The pedestrian gatehouse would be constructed at the intersection of Litchfield Road and Glendale Avenue, allowing the Base to remotely control access of pedestrians who already have Base access (**Figure 2-3**).

The two pedestrian gates would be installed along the eastern boundary of Luke AFB. The first gate, known as the Litchfield Pedestrian Gate, would be constructed just west of North Litchfield Road near the intersection of Litchfield Road and Glendale Avenue. The second gate, known as the Kachina Pedestrian Gate, would be constructed just north of Glendale Avenue near the intersection with Lalomai Street.

Conceptual design for the new pedestrian gates indicates that the approximate footprint for each gate would be 240 ft^2. Each gate would be equipped with two 36-inch-wide doors compliant with the Americans with Disabilities Act, a 30-inch-diameter turnstile, bollards to prevent vehicular breaching of the gate, four security cameras, an integrated camera and intercom system, and a card reader to scan Base access passes.

2.3 Selection Standards for Alternative Screening

Consistent with 32 CFR § 989.8(c), selection standards were developed to establish a means for determining the reasonableness of an alternative to the Proposed Action and whether an alternative should be carried forward for further analysis in the EA. Potential alternatives to the Proposed Action were evaluated based on universal selection standards, which were applied to all alternatives. In accordance with 32 CFR § 989.8(c), the following selection standards meet the purpose of and need for the Proposed Action and were used to identify reasonable alternatives for analysis in the EA.

- Remedy facilities and infrastructure deficiencies in order to adequately support current and future strategic missions;
- Be consistent with land use requirements, anti-terrorism/force protection standards, and planning concepts as defined in the ADPs for the Munitions Storage Area and Northwest Mission District;
- Comply with security/setback requirements and operational safety standards; and
- Comply with federal and Air Force mandates for sustainable design and development.

Based on the screening criteria, several Alternatives for the components of the Proposed Action were considered on a preliminary basis. A discussion of alternatives eliminated and carried forward for further analysis are described in **Sections 2.4.4** and **2.4.5**, respectively.

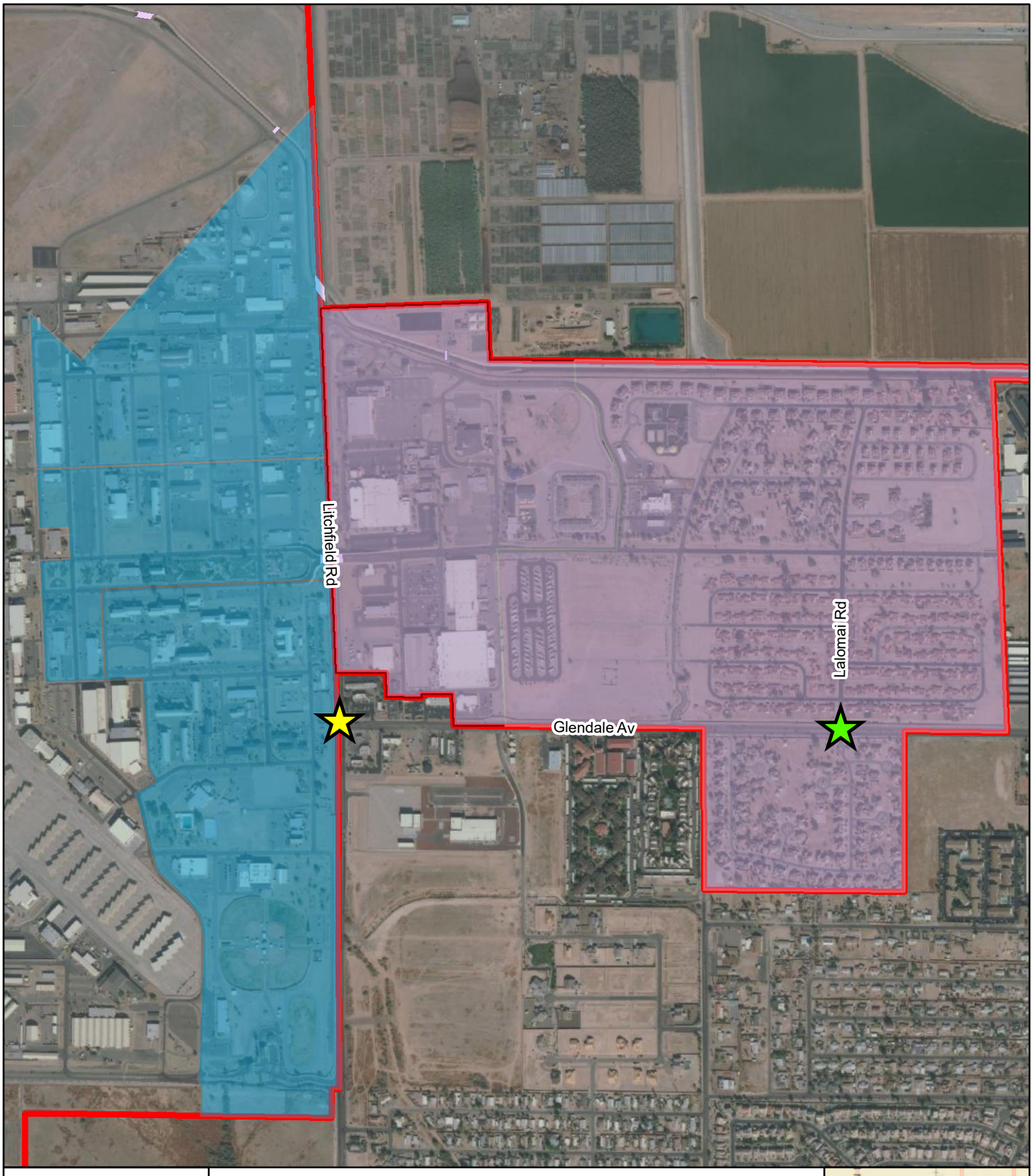


FIGURE 2-3

PEDESTRIAN GATES PROJECT UNDER THE PROPOSED ACTION

N

Imagery: ESRI 2021
Projection: WGS 1984
Zone 12N

0 500 1,000 Feet

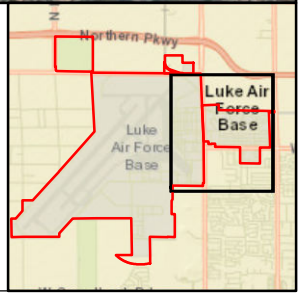
Luke Air Force Base

Mission Support District

Community Support District

Litchfield Gate

Kachina Gate



2.4 ALTERNATIVES

2.4.1 Munitions Storage Area

The two alternatives for the MSA would include the following elements, as detailed in **Section 2.2.1**:

- Demolition of five existing buildings totaling 23,361 ft^2: Buildings 1234, 1236, 1240, 1242, and 1245;
- Construction of a new 17,000-ft^2 munitions support and control facility with reinforced concrete foundation and floor slab, structural-steel frames, split-face masonry unit walls, structural sloping metal seam roof, and fire detection and protection system; and
- Construction of a new 16,000-ft^2 missile and conventional munitions consolidated facility with reinforced concrete foundation and concrete floor slab, structural-steel frames, split-face masonry unit walls, structural sloping metal seam roof, and fire detection and protection system.

2.4.1.1 Alternative 1 (Preferred Alternative)

Under Alternative 1, the new MSA facilities described in **Section 2.2.1** would be constructed east of and Ammo Road in the vicinity of the existing MSA administrative facility, which would be demolished under the Proposed Action (**Figure 2-1**). The current site would be reused for parking, and the new MSA would be located immediately to the north of the existing building.

2.4.1.2 Alternative 2

Under Alternative 2, the new MSA facilities described in **Section 2.2.1** would be constructed west of Ammo Road opposite the existing facilities, which would be demolished under the Proposed Action (**Figure 2-4**).

2.4.1.3 Application of Selection Screening Criteria

Application of the screening criteria to the alternatives is presented in **Table 2-1**.

Table 2-1.
Selection Screening Criteria – Munitions Storage Area

Alternative	Selection Standards				Meets Overall Requirements
	Deficiencies	Land Use	Security and Safety	Sustainable Design	
1	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes

2.4.2 Explosives Ordnance Disposal Proficiency Training Range

The three alternatives for the EOD Proficiency Training Range would include the following elements as detailed in **Section 2.2.2**:

- Demolition or repurposing of an existing 7,325-ft^2 facility within the main industrial portion of the Base;
- Construction of a new 30,000-ft^2 EOD facility to consolidate EOD administrative and storage functions;
- Replacement of the boundary fence at the existing EOD Range; and

- Siting of an EODMAG structure in proximity to the administrative and storage facilities proposed for construction.

2.4.2.1 Alternative 1 (Preferred Alternative)

Under Alternative 1, the existing EOD Range would be reconfigured and shifted to the north by 5 acres. The proposed EOD administrative and storage facility, measuring 30,000 ft^2 in size, would be located on the eastern side of the parcel (**Figure 2-2**).

2.4.2.2 Alternative 2

Under Alternative 2, the existing EOD Range would be reconfigured and shifted to the north by 5 acres. The proposed EOD administrative and storage facility, measuring 30,000 ft^2 in size, would be located on the western side of the parcel (**Figure 2-5**).

2.4.2.3 Alternative 3

Under Alternative 3, the existing EOD Range would be demolished, and new facilities would be constructed elsewhere on Luke AFB, outside of the Northwest Mission District.

2.4.2.4 Application of Selection Screening Criteria

Application of the screening criteria to the alternatives is presented in **Table 2-2**.

Table 2-2.
Selection Screening Criteria – Explosives Ordnance Disposal Proficiency Training Range

Alternative	Selection Standards				Meets Overall Requirements
	Deficiencies	Land Use	Security and Safety	Sustainable Design	
1	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes
3	Yes	No	This alternative does not meet the criteria for consistency with land use requirements. Therefore, no additional selection standards were evaluated.		No

2.4.3 Pedestrian Gates

The pedestrian gates would include the following elements as detailed in **Section 2.2.3**:

- Construction of two new pedestrian gates along the eastern boundary of Luke AFB, measuring approximately 240 ft^2 in size;
- Equipping the gates with two 36-inch-wide doors compliant with the Americans with Disabilities Act, a 30-inch-diameter turnstile, bollards to prevent vehicular breaching of the gate, four security cameras, an integrated camera and intercom system, and a card reader to scan Base access passes; and
- Construction of a pedestrian gatehouse allowing for remote control access to the Base.

2.4.3.1 Alternative 1

Under Alternative 1, the new pedestrian gates would be installed just west of North Litchfield Road near the intersection of Litchfield Road and Glendale Avenue and just north of Glendale Avenue near the intersection

with Lalomai Street (**Figure 2-3**). The pedestrian gatehouse would be constructed at the intersection of Litchfield Road and Glendale Avenue.

No other reasonable alternative locations for the pedestrian gates exist. A stop light is needed to allow safe crossing of Litchfield Road by pedestrians and bicyclists The stop light at the intersection of North Litchfield Road and West Glendale Avenue is the only stop light along Litchfield Road. This location also leads into the housing area on the main part of Luke AFB. On Glendale Avenue, the intersection with Lalomai Street provides the only reasonable connection for pedestrians and bicyclist between housing on the north and south sides of Glendale Avenue.

2.4.3.2 Application of Selection Screening Criteria

Application of the screening criteria to the alternatives is presented in **Table 2-3**.

Table 2-3.
Selection Screening Criteria – Pedestrian Gates

Alternative	Selection Standards				Meets Overall Requirements
	Deficiencies	Land Use	Security and Safety	Sustainable Design	
1	Yes	Yes	Yes	Yes	Yes

2.4.4 Alternatives Considered but Eliminated from Detailed Analysis

One alternative was considered and eliminated from further consideration because it would not meet the selection standards for the Proposed Action as outlined in **Section 2.3**.

Alternative 3 for the EOD Range was eliminated from detailed analysis because of the existing location of the detonation pit. DoD 6055.9-STD, *DOD Ammunition and Explosives Safety Standards* (2009, Change 2), and Defense Explosives Safety Regulation 6055.09 Air Force Manual 91-201, *Explosives Safety Standards* (2021), establish a minimum required explosive safety quantity distance (ESQD) arc around EOD facilities. Due to hazards associated with the storage and detonation of explosive ordnance, land use within the ESQD arc is highly restricted. No other locations on Luke AFB would allow for the construction of new EOD facilities and the establishment of the required ESQD arc. Therefore, this alternative has been eliminated from further consideration.

2.4.5 Alternatives Retained for Detailed Analysis

Alternatives 1 and 2 are retained for detailed analysis for each of the components of the Proposed Action, as well as the No Action Alternative.

2.4.5.1 No Action Alternative

Under the No Action Alternative, the Air Force would not implement the proposed installation development projects and Luke AFB would continue to operate under current conditions. The facility and infrastructure assets of Luke AFB would continue to degrade. In the short term, military training and operations would continue at Luke AFB in accordance with the status quo. Over time, the mission support capabilities of the Base would diminish along with its ability to support the future missions and requirements of its tenant activities.

While the No Action Alternative would not satisfy the purpose of and need for the Proposed Action, this alternative is retained to provide a comparative baseline against which to analyze the effects of the Proposed Action, as required under the CEQ regulations (40 CFR § 1502.14(d)). The No Action Alternative

reflects the status quo and serves as a benchmark against which the effects of the Proposed Action can be evaluated.

2.5 SUMMARY OF ENVIRONMENTAL CONSEQUENCES

The potential impacts under the Proposed Action and No Action Alternative are summarized in **Table 2-4**. The summary is based on information discussed in detail in **Chapter 3** of this EA and includes a concise definition of the issues addressed and the potential environmental impacts associated with each alternative. In the summary table, the term "Proposed Action Alternatives" is used to refer to both Alternatives 1 and 2 when impacts are the same for both alternatives. Where differences occur between alternatives, potential impacts are summarized by each alternative.

Table 2-4.
Summary of Environmental Consequences

Resource Area	Proposed Action		No Action Alternative
	Alternative 1	Alternative 2	
Land Use	No significant adverse effects to land use. The Proposed Action Alternatives would resolve the land use conflict between the EOD Range and the Luke AFB airfield by shifting the EOD Range to the north by 5 acres, bringing it into safety compliance.		The EOD Range would remain within the airfield lateral clearance zone and remain out of compliance.
Geological Resources	No significant effects to geological resources. Soil erosion potential would be short term and limited to construction and demolition activities.		No impacts to geological resources.
Air Quality	No significant effects to air quality. The estimated total annual emissions of the Proposed Action Alternatives would not exceed the *de minimis* or Prevention of Significant Deterioration permitting thresholds or any criteria pollutant or precursor. Carbon dioxide equivalent emissions from the Proposed Action Alternatives would be low when compared to large greenhouse gas sources.		No impacts to air quality.
Water Resources	No significant effects to water resources.	No significant effects to water resources. Alternative 2 would increase impervious surface in floodplain and flooding risk to new MSA support and control building.	No impacts to water resources, including floodplains.
Biological Resources	No significant effects to biological resources. "No Effect" determination on federally listed threatened or endangered species and other protected species. Potential minor impacts from invasive plant establishment.	No significant effects to biological resources. Minor impact to vegetation. "No Effect" determination on federally listed threatened or endangered species and other protected species. Potential minor impacts from invasive plant establishment.	No impacts to biological resources.
Cultural Resources	No significant effects to cultural resources would be expected.	No significant effects to cultural resources would be expected. Potential for subsurface archaeological artifacts at site of new MSA support and control building.	No impacts to archaeological, historical architectural properties, or Traditional Cultural Properties.

Resource Area	Proposed Action		No Action Alternative
	Alternative 1	Alternative 2	
Infrastructure, Transportation, and Utilities	No significant adverse effects to infrastructure, transportation, or utilities. Beneficial impacts would occur from pedestrian gates by improving Base access without vehicles.		No impacts to utilities. Minor impacts to Base access would occur without the pedestrian gates because access would continue to be by vehicle, contributing to traffic congestion.
Noise	No significant effects to noise-sensitive receptors or increases in operational noise levels.		No impacts to noise levels.
Hazardous Materials and Waste	No significant effects to hazardous materials and waste management. Existing plans are sufficient to manage any hazardous materials or wastes.		No impacts to hazardous materials and waste management.
Safety	No significant effects to safety. Short-term, negligible-to-minor impacts on contractor health and safety could occur during proposed construction and demolition projects. Beneficial impacts would occur from bringing the EOD Range into airfield safety standards by shifting the EOD Range north of the airfield's runway lateral CZ.		The EOD Range would remain out of compliance with airfield safety standards.
Socioeconomics	No significant adverse effects on employment, housing, or educational resources.		No impacts on employment, housing, or educational resources.
Environmental Justice and Protection of Children	No significant effects to environmental justice populations and protection of children.		No impacts to environmental justice populations and protection of children.
Cumulative Impacts	When incremental impacts of the Proposed Action Alternatives are added to other past, present, or reasonably foreseeable environmental trends and planned actions at Luke AFB, no potentially significant cumulative impacts were identified.		No cumulative impacts.

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CHAPTER 3 EXISTING CONDITIONS AND ENVIRONMENTAL CONSEQUENCES

3.1 LAND USE

3.1.1 Definition of the Resource

The term “land use” refers to real property classifications that indicate either natural conditions or the types of human activity occurring on a parcel. In many cases, land use descriptions are codified in local zoning laws; however, no nationally recognized convention or uniform terminology has been adopted for describing land use categories. As a result, the meanings of various land use descriptions, labels, and definitions vary among jurisdictions. Land use on Luke AFB is broadly classified through the identification of planning districts; that is, areas that contain common functions and types of operational activities.

3.1.2 Existing Conditions

Luke AFB occupies 4,800 acres of land in Glendale, Arizona, approximately 18 miles northwest of the Phoenix metropolitan area in Maricopa County. The area surrounding Luke AFB includes both residential suburbs and agricultural land. The Installation is bound by residential neighborhoods to the east and south, Northern Avenue to the north, Arizona State Route 303 to the west, and Camelback Road to the south. The community of Litchfield Park is southeast of the Base. Irrigated agricultural land occurs on the southwest, west, north, and northeast sides of the Base.

The land use on the Base is devoted to the mission of training F-35 and F-16 fighter pilots and EOD training (**Figure 3-1**). Luke AFB has two active runways and approximately 2,640 acres of impervious surfaces comprising runways, taxis, and parking lots and buildings (Luke AFB, 2020a). The Installation is divided into seven planning districts: District 1, Wastewater Treatment Plant; District 2, Community Support District; District 3, Mission Support District; District 4, Flightline District; District 5, Munitions Storage District, District 6, Northwest Mission District; and District 7, Golf Course District (**Figure 1-2**). The proposed projects would occur in Districts 2, 5, and 6.

District 2, the Community Support District, is located on the east side of the Base and contains two sections. The Community Center section provides support services such as the Exchange, Commissary, and medical clinic, and the Privatized Housing section contains housing for military personnel. A portion of the Proposed Action would occur in the Privatized Housing section at the intersection of Lalomai Street and Glendale Avenue. Another portion of the Proposed Action would occur just south of the Community Center section bordering the Mission Support District at the intersection of Litchfield Road and Glendale Avenue.

District 5, the Munitions Storage District, is located on the south side of Luke AFB and is divided into an Infrastructure Support Area and an MSA. The proposed projects in this district would occur in the approximately 127-acre MSA. The MSA is in the central portion of the Munitions Storage District and is bounded by the Infrastructure Support Area to the northwest, the Base boundary to the south and east, and the Flightline District to the north. The MSA contains munitions operating locations, aboveground and earth-covered magazines for munitions storage, maintenance building, and administrative facilities. Vacant, undeveloped land surrounds the MSA both within the Luke AFB boundary and on adjacent private lands that serve as ESQD clear zones (Integrated Systems Analysts [ISA], 2016).

District 6, the Northwest Mission District, is in the northwest corner of the Base and is bounded by Northern Avenue to the north, West Corsiar Street to the west, and the AFB Flightline District to the south and east (**Figure 1-2**). Several organizational units occupy facilities in the Northwest Mission District (Luke AFB, 2016a). A fenced area in the southwest corner of this District is devoted to EOD and EOD proficiency training and contains support buildings and open areas used for EOD. Currently, the southernmost portion of the EOD Range lies within the airfield’s runway lateral clearance zone, primary surface, and transitional surface, presenting an airfield safety hazard. Most of the land surface in the Northwest Mission District has

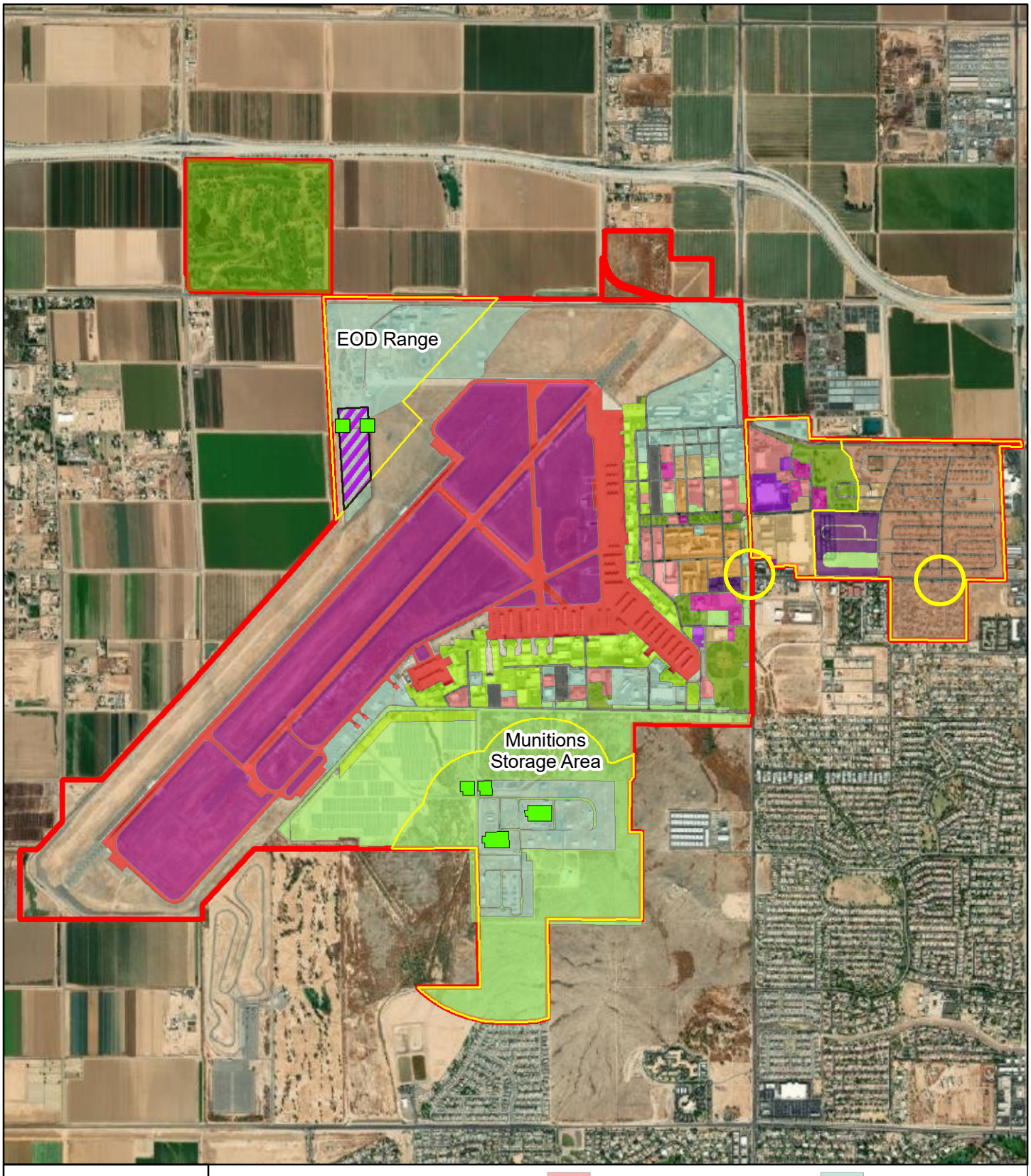

FIGURE 3-1

LAND USE

Imagery: ESRI 2021
Projection: WGS 1984
Zone 12N

0 0.25 0.5 Miles

Luke Air Force Base

Project Areas

Proposed EOD Range

Proposed Alternative

Land Use Zones

- Administrative
- Aircraft Ops & Maintenance
- Airfield
- Community Commercial
- Community Service
- Housing Accompanied
- Housing Unaccompanied
- Industrial
- Lodging
- Medical
- Open Space
- Outdoor Recreation
- Parking
- Taxiway Apron

been disturbed by past and ongoing mission activities such as fire and emergency services, heavy repair (i.e., large vehicles), readiness and emergency management, and air traffic control in addition to EOD.

3.1.3 Environmental Consequences

3.1.3.1 Evaluation Criteria

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

- inconsistency or noncompliance with existing land use plans or policies,
- precluded the viability of existing land use,
- precluded continued use or occupation of an area,
- incompatibility with adjacent land use to the extent that public health or safety is threatened, or
- conflict with planning criteria established to ensure the safety and protection of human life and property.

3.1.3.2 Alternative 1

Under Alternative 1, the land use conflict between the EOD Range and the Luke AFB airfield would be resolved by shifting the existing EOD Range to the north by 5 acres, removing it from the airfield lateral clearance zone and bringing it into safety compliance. The construction and demolition projects in both the MSA and the EOD Range that would be implemented under Alternative 1 would occur entirely within the existing boundaries of Luke AFB. These projects would be implemented on lands dedicated to their existing missions and no changes to land use would occur. Under Alternative 1, the pedestrian gates would improve access to on- and off-Base destinations and enhance the multi-modal transportation network at Luke AFB. No changes to land use would occur under Alternative 1. When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at Luke AFB, no significant cumulative effects to land use would be anticipated to occur under implementation of Alternative 1.

3.1.3.3 Alternative 2

Alternative 2 differs from Alternative 1 by location of the new buildings in the MSA and EOD Range (refer to **Figures 2-1** and **2-2**). The same buildings would be demolished under Alternative 2. The EOD Range would shift north by 5 acres as described in Alternative 1, bringing the area into safety compliance with airfield land use restrictions. Because there are no reasonable alternative locations for the pedestrian gates, the locations would remain as described under Alternative 1. Buildings proposed for construction in both the MSA and EOD Range under Alternative 2 would occur in areas with similar land use. No change to land use would occur. When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at Luke AFB, no significant cumulative effects to land use would be anticipated to occur under implementation of Alternative 2.

3.1.3.4 No Action Alternative

Under the No Action Alternative, the projects included in the Proposed Action would not occur. Under the No Action Alternative, the EOD Range would remain within the airfield lateral clearance zone and remain out of compliance.

3.2 GEOLOGICAL RESOURCES

3.2.1 Definition of the Resource

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

Prime farmland is protected under the *Farmland Protection Policy Act of 1981* and is defined as land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is also available for these uses. It could be cultivated land, pastureland, forestland, or other land, but it is not urban or built-up land or water areas. In some areas not identified as having national or statewide farmland importance, land may be considered farmland of local importance to produce food, feed, fiber, forage, and oilseed crops. This farmland is identified by the appropriate local agencies. Farmland of local importance may include tracts of land that have been designated for agriculture by local ordinance.

3.2.2 Existing Conditions

3.2.2.1 Geology and Soils

Luke AFB is in an alluvial valley in the Phoenix basin within the Basin and Range physiographic province. The basin is elliptically shaped, with Luke AFB positioned in the west-central area. It is geologically bounded by the White Tank Mountains, Sierra Estrella, South Mountain, Phoenix Mountains, and the Hieroglyphic Mountains (Luke AFB, 2021a). The mountain ranges are separated by broad, alluvial valleys. The topography of Luke AFB and surrounding area is generally flat with a gentle slope from the north to south and heavily influenced by the alluvial valleys. The elevation of the Base ranges from 1,075 to 1,105 ft above mean sea level (Luke AFB, 2014). The bedrock beneath Luke AFB consists of rocks formed from the Miocene through the Pliocene (20 to 2.5 million years ago). Extensive erosional processes have deposited large amounts of sand and gravel in the basin. Soils at Luke AFB consists of loam mixtures of sand, silt, clay, and salt, which are approximately 10,000 ft thick (Hydrogeologic, Inc., 2007; Natural Resources Conservation Services, 2022) (**Figure 3-2**). Gravel-sized fragments of metamorphic gneiss and igneous granite are randomly dispersed within the soil matrix.

3.2.2.2 Prime Farmland

The land on Luke AFB is under military use and is not developable for agricultural use. No prime farmlands or farmlands of local importance occur on Luke AFB. Soils in areas surrounding Luke AFB have been identified as potential prime farmland and are used for agriculture.

3.2.3 Environmental Consequences

3.2.3.1 Evaluation Criteria

Evaluation criteria for potential impacts on geological resources are based on soil stability, land use, and mitigation measures. Adverse impacts to geological resources would occur if:

- soil erosion or sedimentation increased,
- soils were unsuitable for development, and
- soils classified as prime and unique farmland were affected.

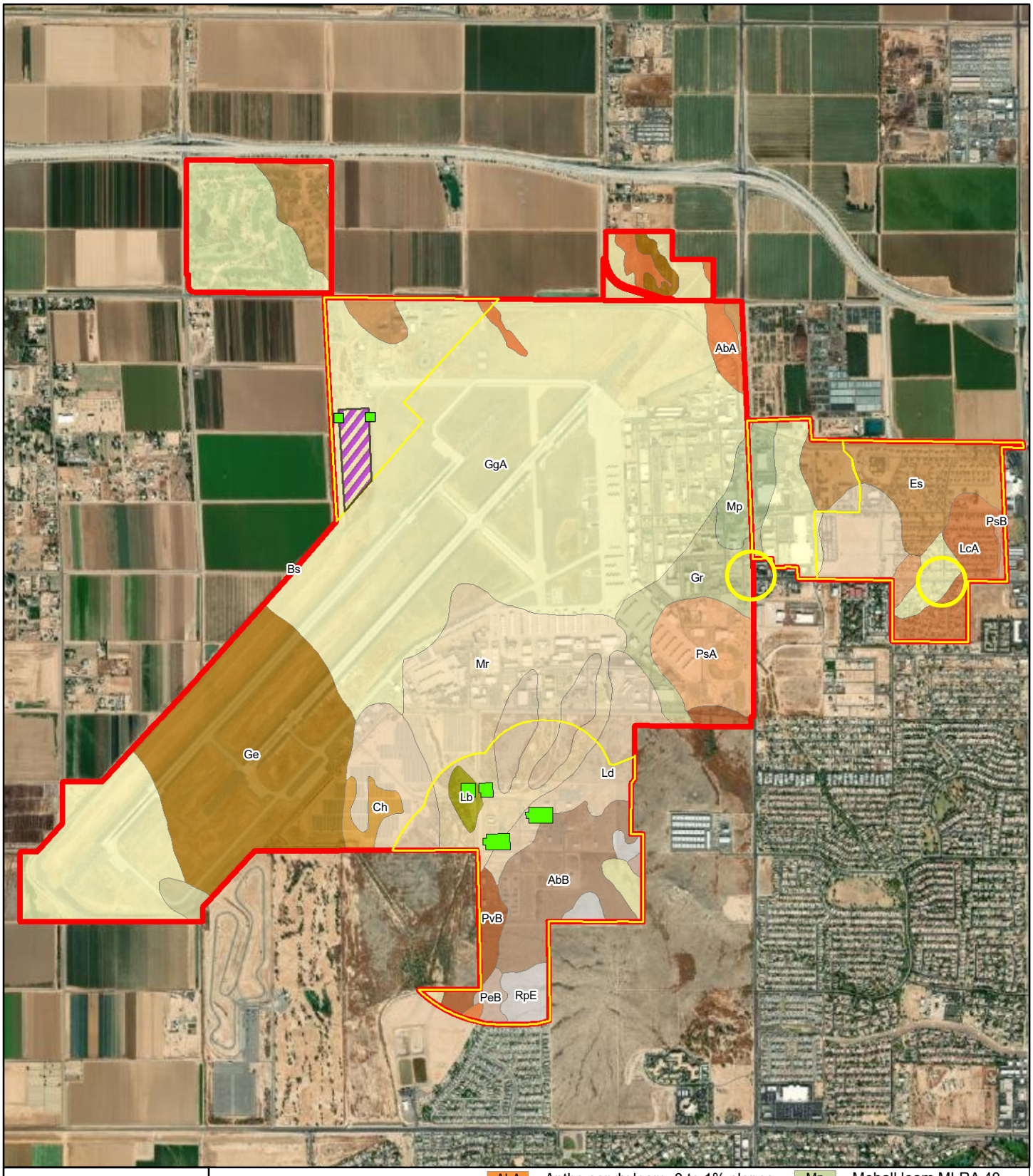

FIGURE 3-2

SOIL TYPES

N

Imagery: ESRI 2021
Projection: WGS 1984
Zone 12N

0 0.25 0.5 Miles

Luke Air Force Base

Project Areas

Proposed EOD Range

Proposed Alternative

Soil Types

AbA	Antho sandy loam, 0 to 1% slopes
BrE	Antho sandy loam, 1 to 3% slopes
Bs	Brios sandy loam
Ch	Casa Grande loam
Es	Estrella loam
Ge	Gilman fine sandy loam, 0 to 2%
GgA	Gilman loam, 0 to 1% slopes
Gr	Glenbar loam, 0 to 1% slopes
Lb	Laveen sandy loam
LcA	Laveen loam, 0 to 1% slopes
Ld	Laveen loam, 0 to 1% slopes
Mp	Mohall loam MLRA 40
Mr	Mohall clay loam
PeB	Perryville gravelly loam 1 to 3% slopes
PsA	Pinal loam, 1 to 3% slopes
PsB	Pinal loam, 1 to 3% slopes
PvB	Pinal-La Palma loams, 1 to 3% slopes
RpE	Rillito-Perryville complex, 5 to 20% slopes

3.2.3.2 Alternative 1

Soils on Luke AFB range from fine sandy loams to clay loams and are suitable for development. The demolition of buildings in the MSA may create soil disturbances if foundation materials are excavated and any surrounding impervious surfaces are removed. The construction of new buildings in both the MSA and EOD Range would disturb soils at each building site during the installation of foundations and utilities. Soil disturbance could increase the potential for soil erosion and sedimentation from stormwater runoff. Soil erosion potential would be short term and limited to construction and demolition activities, before sites are stabilized.

The Luke AFB *Storm Water Pollution Prevention Plan* (SWPPP) and the *Stormwater Management Plan* (SMP; Sections 6.0 and 7.0) contain processes and BMPs for managing and controlling construction site runoff (Luke AFB, 2020a, 2020b). Removing and reinstalling fencing around the reconfigured EOD Range would have a negligible impact on soils and soil erosion potential. The pedestrian gate projects are relatively small (less than 1,000 ft^2 total), and the potential for soil erosion and sedimentation is low. With proper project site analyses and implementation of BMPs, the potential for increased soil erosion and sedimentation would be expected to be low and could be managed with structural controls such as stormwater diversion, detention ponds, wattles, silt fences, berms, and erosion control mats. No impacts to prime farmland would occur because no prime farmland occurs within Luke AFB.

When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at Luke AFB, no significant cumulative effects to geological resources would be anticipated to occur under implementation of Alternative 1.

3.2.3.3 Alternative 2

Potential impacts to soils under Alternative 2 would be anticipated to be the same as those that would occur under Alternative 1 for the EOD Range and pedestrian gate projects. Under Alternative 2, the new MSA support and control building would be built on the west side of Ammo Road on a previously undisturbed site that is in a Federal Emergency Management Agency (FEMA)-designated floodplain. The pre-construction site analysis for stormwater management would need to evaluate existing stormwater controls (detention basins and stormwater drainage lines) in this area and any additional controls required to minimize potential soil erosion and runoff during construction.

When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at Luke AFB, no significant cumulative effects to geological resources would be anticipated to occur under implementation of Alternative 2.

3.2.3.4 No Action Alternative

Under the No Action alternative, the projects included in the Proposed Action would not occur. Under the No Action Alternative, disturbance of soils or topography would not occur. There would be no impacts to the geological resources within the project areas.

3.3 AIR QUALITY

3.3.1 Definition of the Resource

Air quality is measured by the concentration of pollutants determined to impact human health and the environment (i.e., criteria pollutants). Measurements of these “criteria pollutants” in ambient air are expressed in units of parts per million or in units of micrograms per cubic meter. Regional air quality is determined by the types and quantities of atmospheric pollutants and pollutant sources as well as the influence of surface topography and prevailing meteorological conditions.

Regional meteorology is the annual, seasonal, and monthly patterns of weather that affects the ROI and includes characteristics such as precipitation, temperature, wind, and relative humidity.

3.3.1.1 Criteria Pollutants

The US Environmental Protection Agency (USEPA) has established numerical concentration-based National Ambient Air Quality Standards (NAAQS) for pollutants that are detrimental to human health and the environment (**Table 3-1**). NAAQS are currently established for the criteria air pollutants ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, respirable particulate matter (including particles equal to or less than 10 microns in diameter and particles equal to or less than 2.5 microns in diameter), and lead. Primary NAAQS represent maximum levels of background air pollution that are considered safe, with an adequate margin of safety to protect public health. Secondary NAAQS represent the maximum pollutant concentration necessary to protect vegetation, crops, and other public resources in addition to maintaining visibility standards. Volatile organic compounds and nitrogen oxides are precursors to the formation of ozone.

Table 3-1.
National Ambient Air Quality Standards

Pollutant	Primary/ Secondary[a,b]	Averaging Time	Level[c]	Form
Carbon monoxide	primary	8 hours	9 ppm	Not to be exceeded morethan once per year
		1 hour	35 ppm	
Lead	primary and secondary	Rolling 3-month average	0.15 µg/m^3	Not to be exceeded
Nitrogen dioxide	primary	1 hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
	primary and secondary	1 year	0.053 ppm	Annual Mean
Ozone	primary and secondary	8 hours	0.070 ppm	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
Particle pollution ($PM_{2.5}$)	primary	1 year	12 µg/m^3	annual mean, averaged over 3 years
	secondary	1 year	15 µg/m^3	annual mean, averaged over 3 years
	primary and secondary	24 hours	35 µg/m^3	98th percentile, averaged over 3 years
Particle pollution (PM_{10})	primary and secondary	24 hours	150 µg/m^3	Not to be exceeded more than once per year onaverage over 3 years
Sulfur dioxide	primary	1 hour	75 ppb	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
	secondary	3 hours	0.5 ppm	Not to be exceeded more than once per year

Source: USEPA, 2016
Notes:
a. Primary Standards: the levels of air quality necessary, with an adequate margin of safety to protect the public health. Each state must attain the primary standards no later than three years after that state's implementation plan is approved by the USEPA.
b. Secondary Standards: the levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
c. Concentrations are expressed first in units in which they were promulgated.
µg/m^3 = micrograms per cubic meter; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; PM_{10} = particulate matter less than or equal to 10 microns in diameter; ppb = parts per billion; ppm = parts per million

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

When a region or area meets NAAQS for a criteria pollutant, that region or area is classified as "in attainment" for that pollutant. When a region or area fails to meet NAAQS for a criteria pollutant, that region or area is classified as "nonattainment" for that pollutant. In cases of nonattainment, the affected state, territory, or local agency must develop a state implementation plan for USEPA review and approval. The state implementation plan is an enforceable plan developed at the state level that lays out a pathway for how the state will comply with NAAQS.

3.3.1.2 Greenhouse Gases

Greenhouse gases (GHGs) are gases that trap heat in the atmosphere. These emissions are generated by both natural processes and human activities. The accumulation of GHGs in the atmosphere helps regulate the earth's temperature and contribute to global climate change. Primary GHGs include water vapor, methane, nitrogen oxides, hydrofluorocarbons, and chlorofluorocarbons. Each GHG has an estimated global warming potential, which is a function of its atmospheric lifetime and its ability to absorb and radiate infrared energy emitted from the earth's surface. The global warming potential of a particular gas provides a relative basis for calculating its carbon dioxide equivalent (CO_2e) or the amount of CO_2e to the emissions of that gas. Carbon dioxide has a global warming potential of 1 and is, therefore, the standard by which all other GHGs are measured. The GHGs are multiplied by their global warming potential, and the resulting values are added together to estimate the total CO_2e.

The USEPA regulates GHG primarily through a permitting program known as the GHG Tailoring Rule. This rule applies to GHG emissions from larger stationary sources. Additionally, the USEPA promulgated a rule for large GHG emission stationary sources, fuel and industrial gas suppliers, and carbon dioxide injection sites if they emit 25,000 metric tons or more of CO_2e per year (40 CFR § 98.2(a)(2)).

3.3.2 Existing Conditions

Under the authority of the *Clean Air Act of 1963* (42 USC § 7401 et seq.) (CAA) and subsequent amendments, the USEPA has divided the country into geographical regions known as air quality control regions to evaluate compliance with the NAAQS. Luke AFB is in Maricopa County, Arizona, which is in the Maricopa Intrastate Air Quality Control Region (AQCR) (40 CFR § 81.36) and serves as the ROI. Luke AFB is located in an area currently designated "nonattainment" for particulate matter (PM_{10}) and ozone and "maintenance" for carbon monoxide. Luke AFB is in attainment for other criteria air pollutants.

As a federal installation that is consider a "major-source" contributor for air pollution, Luke AFB maintains an ADEQ Title V Operating Permit, which requires monitoring emissions and reporting the findings (**Table 3-2**). Title V is a federal program designed to standardize air quality permits and the permitting process for major sources of emissions across the country and requires the USEPA to establish a national operating permit program. USEPA defines a major source as a facility that emits or has the potential to emit any criteria pollutant or hazardous air pollutant at levels equal to or greater than the major source thresholds. The major source threshold for criteria pollutants may vary depending on the attainment status (e.g., marginal, serious, extreme) of the geographic area and the criteria or hazardous air pollutant in which the facility is located.

Table 3-2.
Criteria Pollution Emissions at Luke AFB (tons per year)

Year	CO	NOx	PM_{10}	$PM_{2.5}$	SO_2	Total VOC's	Total HAPs
2016	2.336691	5.068322	1.303848	1.412679	0.162801	15.487184	5.290904
2017	3.358014	5.914951	5.777213	0.889960	0.215335	14.505131	0.524152
2018	3.016915	4.682149	6.173183	1.291031	0.142307	19.326951	0.337760
2019	3.286336	4.320750	1.374069	1.291934	0.108254	9.568493	1.131497

CO = carbon monoxide; HAP = hazardous air pollutant; NOx = nitrogen oxides; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; PM_{10} = particulate matter less than or equal to 10 microns in diameter; SO_2 = sulfur dioxide; VOC = volatile organic compound

3.3.2.1 Air Emission Sources at Luke AFB

There are several air emissions sources at Luke AFB that contribute to the total emissions reported at the end of each calendar year. The Luke AFB Title V Permit (Permit #P0006986) lists the following air emission sources:

- Internal combustion sources: emergency generators (diesel fuel) and general-purpose generators (diesel fuel)
- Jet engine testing: PW-220 and PW-229
- External combustion sources: sources include, but are not limited to those boilers, heaters, spray booth heaters and bake-off ovens
- Fuel storage tanks: jet fuel and diesel tanks
- Gasoline delivery vessel testing and use
- Abrasive blasting
- Aerospace manufacturing and rework: sources include, but are not limited to, aerospace paint booths
- Vehicle refinishing
- Surface and spray coating operations: sources include, but are not limited to, surface and spray coating (paint booth) operations
- Architectural coatings
- Solvent cleaning (degreasing) operations and material usage: sources include, but are not limited to, solvent cleaning equipment
- Woodworking operations: sources include, but are not limited to, dust collection operations

3.3.2.2 Regional Climate

The regional climate of the Phoenix basin is an arid desert climate with mild winters and hot summers and low precipitation. The climate at Luke AFB is characterized by warm-to-hot spring, summer, and early fall temperatures (National Oceanic and Atmospheric Administration [NOAA], 2022). The average July high temperature at nearby Litchfield Park is 106.5 degrees Fahrenheit (°F). Average temperatures in spring and fall are 86.1 °F (April) and 89.5 °F (October), respectively. Winter temperatures tend to be mild; January is the coolest month of the year, with an average daily high temperature of 66.1 °F. Daily minimum temperatures range from 81.2 °F (July) to 42.9 °F (January). On an annual average, Litchfield Park has 177 days when high temperatures reach or exceed 90 °F and 29 days per year when low temperatures drop to or fall below 32 °F.

Precipitation at Litchfield Park occurs almost entirely in the form of rain. The occurrence of snow, sleet, and hail are rare events. Winter rains occur primarily in December, January, and February with an annual

average of 0.85, 0.96 and 1.2 inches, respectively. August is normally the wettest summer month of the year at Litchfield Park, with an annual average of 1.06 inches of rain. Winter rains result from weather fronts that begin in the Pacific Ocean and move eastward across Arizona. They are generally quite widespread and characterized by gentle rainfall. Summer rains result from moisture moving into Arizona from Mexico, the Gulf of Mexico, and/or the Gulf of California. Summer rains or monsoons tend to be highly localized and result in brief, torrential downpours often accompanied by high winds and lightning. Drought conditions in the vicinity of Luke AFB are common. The weather station at Litchfield Park normally receives about 8 inches of precipitation annually, but extended periods of drought have been recorded (NOAA, 2022).

3.3.3 Environmental Consequences

3.3.3.1 Evaluation Criteria

Section 176(c), General Conformity, of the *Clean Air Act* requires federal agencies to demonstrate that their proposed activities would conform to the applicable state implementation plans for attainment of the NAAQS. General conformity applies to nonattainment and maintenance areas. If the emissions from a federal action proposed in a nonattainment area exceed annual *de minimis* thresholds identified in the rule, a formal conformity determination is required of that action. The thresholds are more restrictive as the severity of the nonattainment status of the region increases.

This section discusses the potential effects of the Proposed Action and alternatives on air quality within the ROI. The proposed project area (Maricopa Intrastate AQCR) is not in attainment for ozone in accordance with the 2015 8-hour ozone NAAQS and is considered to be in "marginal" nonattainment. The project area is also considered to be in "serious" nonattainment for PM_{10} and is considered to be in a "maintenance" area for carbon monoxide. However, the ROI is in attainment for all other NAAQS (40 CFR § 81.303).

In accordance with 40 CFR § 93.153, a conformity determination is required for each criteria pollutant or precursor where the total of direct and indirect emissions of the criteria pollutant or precursor in a nonattainment or maintenance area caused by a federal action would equal or exceed any of the rates in paragraphs (b)(1) or (2). Paragraph (b)(1) of 40 CFR § 93.153 lists *de minimis* values based on the severity of nonattainment. Because the ROI is considered to be in "marginal" nonattainment, the *de minimis* value for ozone is 100 tons per year (tpy). The ROI is classified as "serious" nonattainment for PM_{10}; as such, the *de minimis* value for PM_{10} is 70 tpy. Paragraph (b)(2) of 40 CFR § 93.153 lists *de minimis* values for maintenance areas. The ROI is also considered a maintenance area for carbon monoxide, and the correlated *de minimis* value is 100 tpy.

For attainment area criteria pollutants other than lead, the project air quality analysis used USEPA's Prevention of Significant Deterioration (PSD) permitting threshold of 250 tpy as an initial indicator of the local significance of potential impacts to air quality. Due to the toxicity of lead, the use of the PSD 250 tpy attainment area lead threshold as an indicator of potential air quality impact insignificance is not protective of human health or the environment. Therefore, the *de minimis* value of 25 tpy is used instead.

In the context of criteria pollutants, the analysis compared the annual net increase in emissions estimated for the Proposed Action to the applicable threshold(s). If the annual net increase in emissions is below 100 tpy for ozone precursors (i.e., volatile organic compounds or nitrogen oxides), 70 tpy for PM_{10}, 100 tpy for carbon monoxide, 25 tpy for lead, and 250 tpy for the remaining criteria pollutants, then the Proposed Action would not be subject to any further conformity determination, and the air quality impacts would not be considered significant.

The environmental impact methodology for air quality impacts presented in this EA is derived from Air Force Manual (AFMAN) 32-7002, *Environmental Compliance and Pollution Prevention* (February 2020). The Proposed Action is broken down into basic units. For example, a basic development project that consists of replacing a building with a new building could be broken down into demolition (ft^2), grading (ft^2), building construction (ft^2 and height), architectural coatings (ft^2), and paving (ft^2). These data are then input into the Air Force's Air Conformity Applicability Model (ACAM), which models emissions based on the inputs and

estimates air emissions for each specific criteria and precursor pollutant, as defined in the NAAQS. Assumptions of the model, methods, and detailed and summary results are provided in **Appendix B** of this EA.

3.3.3.2 Alternative 1

As presented in Section 2.2, the Proposed Action consists of the following:

- Demolition of five existing buildings (Buildings 1234, 1236, 1240, 1242, and 1245) totaling 23,361 ft^2.
- Construction of a new 17,000-ft^2 munitions support and control facility and construction of a new 16,000-ft^2 missile and conventional munitions consolidated facility.
- Demolition of an existing 7,325-ft^2 facility within the main industrial portion of the Base.
- Construction of a new 30,000-ft^2 EOD facility to consolidate EOD administrative and storage functions.
- Replacement of the boundary fence at the existing EOD Range.
- Construction of two new pedestrian gates, measuring approximately 240 ft^2 in size, along the eastern boundary of Luke AFB.

The project is in a conceptual phase and no construction schedule has been developed as of the writing of this EA. As such, the activities in the Proposed Action have been combined and entered into ACAM as one large project spanning 5 years.

As summarized in **Table 3-3**, the estimated total annual emissions would not exceed the *de minimis* or PSD permitting thresholds outlined in **Section 3.3.3.1** above for any criteria pollutant or precursor for any of the years presented. Therefore, impacts from the Proposed Action on regional air quality would be expected to be minor and no adverse impacts would be expected to occur. Based on the ACAM modeling, the net change in emissions under Alternative 1 would be anticipated to be short term. The “steady state” emissions represent anticipated long-term emissions from the proposed projects. The calculated emissions would be minimal for under Alternative 1 and would represent a conservative estimate of emissions as a byproduct of heating the buildings.

Emissions for CO_2e do not have a regulatory threshold; however, estimated emissions for CO_2e are presented to demonstrate that CO_2e emissions also would be low when compared to GHG emissions of 25,000 metric tons or more associated with large GHG sources.

When considered with other past, present, and reasonably foreseeable environmental trends and planned actions at Luke AFB, no significant cumulative effects to air quality would be anticipated to occur under implementation of Alternative 1.

3.3.3.3 Alternative 2

Alternative 2 differs from Alternative 1 only in the location of new buildings. As such, the modeling inputs and outputs for Alternative 2 are identical to those under Alternative 1. The results of the analysis are presented in **Table 3-3**.

When considered with other past, present, and reasonably foreseeable future actions on and off Luke AFB, no significant cumulative effects to air quality would be anticipated to occur under implementation of Alternative 2.

Table 3-3.
ACAM Calculations for Alternative 1 and Alternative 2

Year	Pollutant	Action Emissions (tons/yr)	INSIGNIFICANCE INDICATOR	
			Indicator (tons/yr)	Exceedance (Yes or No)
2023	VOC	0.996	100	No
	NOx	5.796	100	No
	CO	6.495	100	No
	SO_2	0.017	250	No
	PM_{10}	13.817	70	No
	$PM_{2.5}$	0.231	250	No
	Pb	0.000	25	No
	NH_3	0.002	250	No
	CO_2e	1684.3	N/A	N/A
2024	VOC	1.234	100	No
	NOx	7.245	100	No
	CO	8.161	100	No
	SO_2	0.021	250	No
	PM_{10}	15.947	70	No
	$PM_{2.5}$	0.282	250	No
	Pb	0.000	25	No
	NH_3	0.004	250	No
	CO_2e	1988.6	N/A	N/A
2025	VOC	0.883	100	No
	NOx	3.070	100	No
	CO	3.964	100	No
	SO_2	0.009	250	No
	PM_{10}	2.753	70	No
	$PM_{2.5}$	0.119	250	No
	Pb	0.000	25	No
	NH_3	0.002	250	No
	CO_2e	881.5	N/A	N/A
2026	VOC	0.761	100	No
	NOx	2.298	100	No
	CO	3.199	100	No
	SO_2	0.007	250	No
	PM_{10}	0.098	70	No
	$PM_{2.5}$	0.098	250	No
	Pb	0.000	25	No
	NH_3	0.002	250	No
	CO_2e	733.8	N/A	N/A
2027	VOC	0.103	100	No
	NOx	0.633	100	No
	CO	0.856	100	No
	SO_2	0.002	250	No
	PM_{10}	0.034	70	No
	$PM_{2.5}$	0.034	250	No
	Pb	0.000	25	No
	NH_3	0.001	250	No
	CO_2e	253.3	N/A	N/A

Year	Pollutant	Action Emissions (tons/yr)	INSIGNIFICANCE INDICATOR	
			Indicator (tons/yr)	Exceedance (Yes or No)
2028 (steady state)	VOC	0.006	100	No
	NOx	0.103	100	No
	CO	0.086	100	No
	SO_2	0.001	250	No
	PM_{10}	0.008	70	No
	$PM_{2.5}$	0.008	250	No
	Pb	0.000	25	No
	NH_3	0.000	250	No
	CO_2e	123.9	N/A	N/A

CO = carbon monoxide; CO_2e = carbon dioxide equivalent; N/A = not applicable; NH_3 = ammonia; NOx = nitrogen oxides; Pb = lead; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; PM_{10} = particulate matter less than or equal to 10 microns in diameter; SO_2 = sulfur dioxide; VOC = volatile organic compound

3.3.3.4 No Action Alternative

Under the No Action Alternative, the projects included in the Proposed Action would not occur. There would be no impacts related to air quality within the project areas.

3.4 WATER RESOURCES

3.4.1 Definition of the Resource

Water resources includes surface water, groundwater, stormwater, and floodplains. The *Federal Water Pollution Control Act of 1948*, as amended by the CWA, was enacted to protect water resources vulnerable to contamination and quality degradation. The CWA provides the authority to establish water quality standards, control discharges into surface and subsurface waters (including groundwater), develop waste treatment management plans and practices, and issue permits for discharges. A National Pollutant Discharge Elimination System (NPDES) permit under Section 402 of the CWA is required for discharges into navigable waters. USEPA oversees the issuance of NPDES permits at federal facilities as well as water quality regulations (CWA, Section 401) for both surface- and groundwater.

3.4.1.1 Surface Water and Stormwater

The USEPA defines surface waters as waters of the US, which are primarily lakes, rivers, estuaries, coastal waters, and wetlands. Jurisdictional waters, including surface water resources, as defined in 33 CFR § 328.3, are regulated under Sections 401 and 404 of the CWA and Section 10 of the *Rivers and Harbors Act*. Manmade features not directly associated with a natural drainage, such as upland stock ponds and irrigation canals, are generally not considered jurisdictional waters.

Stormwater is surface water runoff generated from precipitation and has the potential to introduce sediments and other pollutants into surface waters. Stormwater is regulated under the CWA Section 402 NPDES program. Impervious surfaces such as buildings, roads, parking lots, and even some natural soils increase surface runoff. Stormwater management systems are designed to contain runoff on site during construction and to maintain predevelopment stormwater flow characteristics following development through either the application of infiltration or retention practices. The *Energy Independence and Security Act* (42 USC § 17094) establishes stormwater design requirements for development and redevelopment projects. Under these requirements, federal facility projects larger than 5,000 ft^2 must maintain or restore, to the maximum extent feasible, the predevelopment hydrology of the property with respect to the water temperature, rate, volume, and duration of flow.

Groundwater is water that exists in the saturated zone beneath the earth's surface in pore spaces and fractures and includes aquifers. Groundwater is recharged through percolation of water on the ground's surface (e.g., precipitation and surface water bodies) and upward movement of water in lower aquifers through capillary movement. Groundwater is an essential resource that can be used for drinking, irrigation, and industrial processes, and can be described in terms of depth from the surface, aquifer or well capacity, water quality, recharge rate, and surrounding geologic formations. Groundwater quality and quantity are regulated under several different programs. The federal underground injection control regulations, authorized under the *Safe Drinking Water Act*, require a permit for the discharge or disposal of fluids into a well. The federal sole source aquifer regulations, also authorized under the *Safe Drinking Water Act*, protect aquifers that are critical to water supply.

3.4.1.2 Floodplains

Floodplains are areas of low-level ground along rivers, stream channels, or coastal waters that provide a broad area to inundate and temporarily store floodwaters. In their natural vegetated state, floodplains slow the rate at which the incoming overland flow reaches the main water body. Floodplains are subject to periodic or infrequent inundation due to rain or melting snow. Risk of flooding is influenced by local topography, the frequency of precipitation events, and the size and characteristics of the watershed upslope of the floodplain.

FEMA evaluates and maps flood potential, which defines the 100-year (regulatory) floodplain. The 100-year floodplain is the area that has a one-percent annual chance of inundation by a floodwater. FEMA uses letter designations for flood zone classification. Zone A designates 100-year floodplains where flood depths (base flood elevations) have not been calculated and further studies are needed. Zone AE floodplains include calculated base flood elevations. Base flood elevations are minimum elevation standards for buildings. Zone X indicates the 500-year floodplain and is not part of the FEMA regulatory floodplain. Areas designated Zone X lie outside the 100-year and 500-year floodplains and indicate a low risk of flooding hazards (FEMA, 2020). Federal, state, and local regulations often limit floodplain development to passive uses, such as recreational and preservation activities, to reduce the risks to property and human health and safety.

EO 11988, *Floodplain Management*, provides guidelines that agencies should carry out as part of their decision-making process on projects that have potential impacts to or within the floodplain. This EO requires that federal agencies avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupancy and modification of flood plains and avoid direct and indirect support of floodplain development wherever there is a practicable alternative. EO 13690, *Establishing a Flood Risk Management Standard and Process for Further Soliciting and Considering Stakeholder Input*, established a Federal Flood Risk Management Standard and a process for further soliciting and considering stakeholder input; however, this EO was later revoked by Section 6 of EO 13807, *Establishing Discipline and Accountability in the Environmental Review and Permitting Process for Infrastructure*. EO 13807 did not revoke or otherwise alter EO 11988.

3.4.2 Existing Conditions

3.4.2.1 Surface Water and Stormwater

Located within the Middle Gila River Basin, Luke AFB is highly developed and natural surface waters do not exist on Base. The Base does not contain any natural perennial or intermittent streams. Surfaces waters outside of Luke AFB are limited to the surrounding Agua Fria, Gila, and Salt rivers. The nearest impaired waterway is the Gila River, which is located approximately eight miles to the south of Luke AFB. To the east, the intermittent Agua Fria River is primarily active during storm events. Luke AFB-treated effluent water supplements the flow of the Agua Fria River when not used for irrigation (Luke AFB, 2021a). Effluent discharge is regulated through the Arizona Pollutant Discharge Elimination System.

Several man-made channels border the Base, acting as stormwater and runoff drainage. The Adaman Canal follows the western and southern edge of the airfield runways, and the Dysart Drain provides drainage for the Luke AFB Falcon Dunes golf course in the northwest portion of the Base. Stormwater flows into the Dysart Drain in a sheet flow manner during significant rain events; sheet flow also outfalls south from the airfield into Bullard Wash and eventually the Gila River. Several open stormwater drainage lines have been developed to channel stormwater runoff (Luke AFB, 2020a, Figure 3-3).

Stormwater at Luke AFB is managed by the SWPPP, SMP, and any mitigation needs are managed by the Spill Prevention, Control, and Countermeasures (SPCC) Plan. Construction projects that disturb greater than one acre of land will require an NOI and a Construction General Permit per the ADEQ. For earthmoving projects over 0.1 acre, Maricopa County requires the contractor/Base to obtain an earthmoving permit (Luke AFB, 2020a).

3.4.2.2 Groundwater

Approximately 55 percent of Luke AFB is covered with impervious/developed surfaces, limiting the ability of precipitation to permeate into the groundwater (Luke AFB, 2020a). The Agua Fria Aquifer supplies water to the West Valley Region near Luke AFB via a series of wells drilled 400 to 800 feet below the earth's surface (Luke AFB, 2020c; Valley Utilities Water Company, 2022). The aquifer is served mainly via stormwater and mountain runoff beginning in the Bradshaw Mountain range and flowing through the Agua Fria River. The Bradshaw Mountain range is located approximately 40 miles north of Luke AFB.

3.4.2.3 Floodplains

Luke AFB contains Zone A and Zone X flood areas (**Figure 3-3**). Zone A floodplains surround the airfield on the west, south, and east sides. The northern and northwestern portions of Luke AFB are primarily identified as Zone X, with a small portion of Zone A bisecting the floodplain. The regional floodplain in the vicinity of Luke AFB has been modified by military, agricultural, residential, and commercial development and is positioned at the upper end of Bullard Wash, draining southward to the Gila River. Channels and diversion canals have been constructed to direct floodwaters around and from developed areas (Luke AFB, 2020b). In the Munitions Storage District, the floodplain on the Bullard Wash is west of Ammo Road outside of the MSA. A small part of the floodplain covers the northwest corner of the MSA. Parts of the floodplain have been channelized and modified from construction of the existing solar array. Approximately half of the EOD Range is mapped within a Zone A 100-year floodplain. The floodplain in the EOD Range has been modified by Air Force activities in the Northwest Mission District and agricultural development. A drainage channel runs along the west side of Northwest Mission District.

3.4.3 Environmental Consequences

3.4.3.1 Evaluation Criteria

Evaluation criteria for potential impacts on water resources are based on water availability, quality, and use; existence of floodplains; and associated regulations. Adverse impacts to water resources would occur if the Proposed Action Alternatives results in the following:

- reduced water availability or supply to existing users;
- overdraft of groundwater basins;
- excess of safe annual yield of water supply sources;
- adverse effects on water quality;
- public health issues by creating or worsening health hazard conditions;
- detrimental effects on the function of a floodplain or be affected by the floodplain; or
- violation of established laws or regulations adopted to protect sensitive water resources.

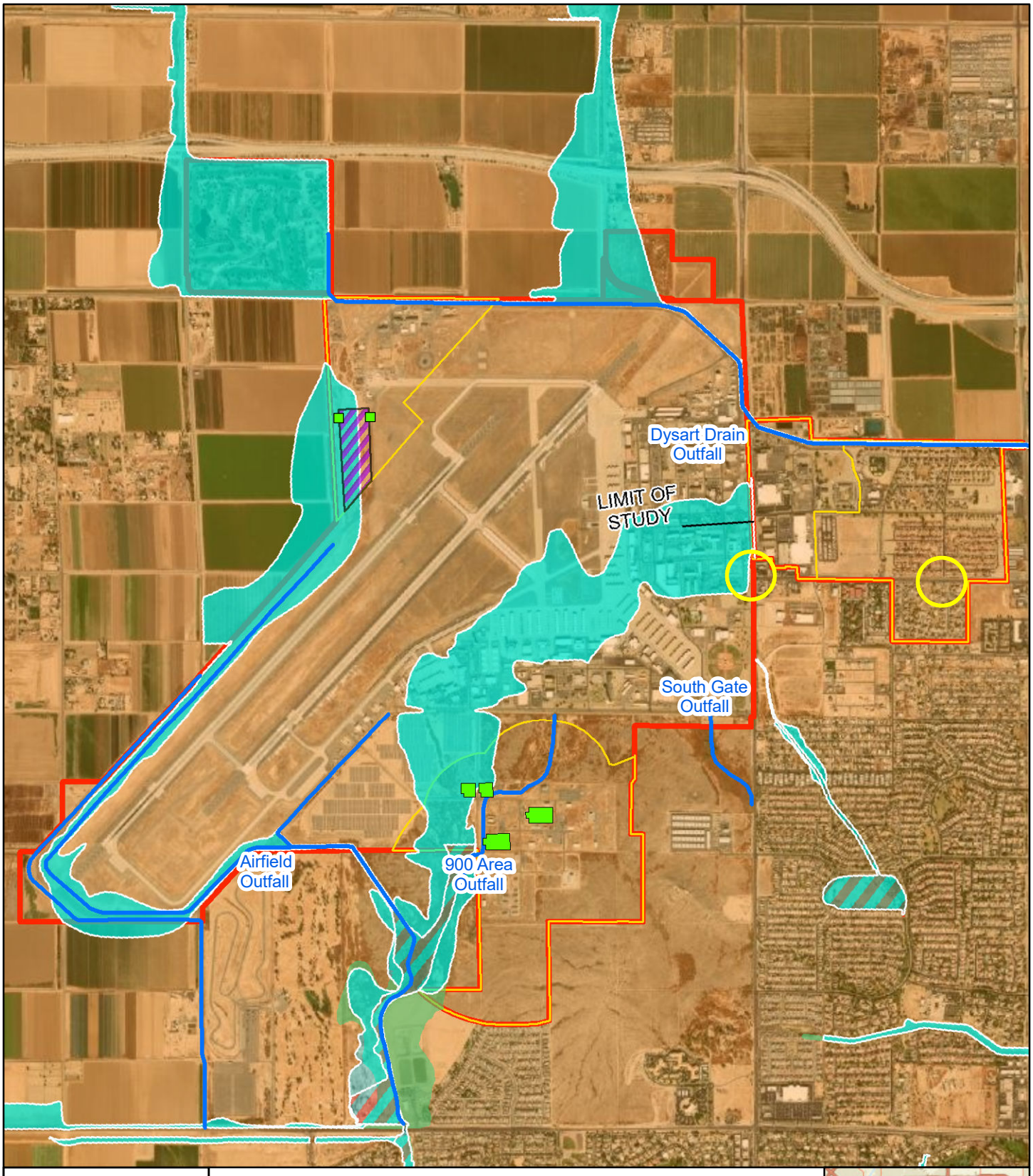

FIGURE 3-3

FLOODPLAINS

N

Imagery: ESRI 2021
Projection: WGS 1984
Zone 12N

0 0.25 0.5 Miles

Canal or Wash
Luke AFB
Project Areas
Proposed EOD Range
Proposed Alternative

500 Year Floodplain (Zone X)
100 Year Floodplain (Zone A)
Regulatory Floodway

3.4.3.2 Alternative 1

Surface Water and Stormwater

No surface waters are present on Luke AFB within the proposed project areas. Demolition and construction of buildings under Alternative 1 would require a short-term use of additional water for dust control. This would result in a negligible, short-term impact on water resources at Luke AFB. Mitigation measures to control surface runoff from construction sites would minimize sedimentation in washes and opportunities for stormwater and groundwater contamination (Luke AFB, 2020a, 2020b). When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at Luke AFB, no significant cumulative effects to surface water and stormwater would be anticipated to occur under implementation of Alternative 1.

Groundwater

Proposed demolition and construction projects under Alternative 1 would have the potential to impact groundwater if stormwater runoff from demolition and construction sites contained contaminants and eventually seeped through the soil and entered the underground aquifer. Stormwater is managed in accordance with the BMPs in the SWPPP (Luke AFB, 2020a). These controls combined with the relatively low rainfall in the region and groundwater resources that are 400 to 800 feet below the ground surface would minimize the potential for groundwater contamination. When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at Luke AFB, no significant cumulative effects to groundwater would be anticipated to occur under implementation of Alternative 1.

Floodplains

Under Alternative 1, the new MSA support and control building would be constructed on the east side of Ammo Road and north of the existing administration building, which would be demolished (**Figure 2-1**). The proposed building site would be partially located within a mapped FEMA Zone A or 100-year floodplain (**Figure 3-3**). However, this portion of the floodplain has been altered by previous development and contains parking areas. A stormwater drainage channel is located on the southeast side of the proposed project area. Existing stormwater runoff patterns would need to be evaluated during facility design in accordance with the SWPPP and SMP.

The proposed location of the new missile and conventional munitions consolidated facility would be in the west-central part of the MSA, east of Ammo Road and outside of the FEMA-designated floodplain. Project activities would not impact stormwater runoff or affect the floodplain in Bullard Wash. Buildings proposed for demolition are located outside the FEMA-designated floodplain.

The west half of the EOD Range facility is mapped within a Zone A floodplain (**Figure 3-3**). The floodplain area along the west side of the Northwest Mission District is relatively small and occurs at the upper end of the floodplain. Therefore, the floodplain is unlikely to collect a large volume of stormwater. The floodplain area in the north end of the EOD Range has been disturbed by past activities and contains stockpiles of gravel and soil. Construction actions proposed in the EOD Range under Alternative 1 would not be located within mapped floodplains.

Under Alternative 1, installation of pedestrian gates located near the intersection of Litchfield Road and lendale Avenue would not be expected to have adverse effects on water resources. This gate would be located adjacent to a mapped Zone A floodplain within Luke AFB that is completely developed. When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at Luke AFB, no significant cumulative effects to floodplains would be anticipated to occur under implementation of Alternative 1.

3.4.3.3 Alternative 2

Surface Water and Stormwater

Potential impacts to surface water and stormwater would be expected to be the same under both Alternative 1 and Alternative 2, as the location of proposed new construction is the only difference between the two alternatives. When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at Luke AFB, no significant cumulative effects to surface water and stormwater would be anticipated to occur under implementation of Alternative 2.

Groundwater

Potential impacts to groundwater would be similar to Alternative 1, as the location of the proposed new construction is the only difference between the two alternatives. When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at Luke AFB, no significant cumulative effects to groundwater would be anticipated to occur under implementation of Alternative 2.

Floodplains

Under Alternative 2, the new support and control building proposed within the MSA would be constructed on the west side of Ammo Road within a mapped Zone A floodplain (**Figure 3-3**). Construction of the building would increase the amount of impervious surface within the floodplain by approximately 40,000 ft^2 (building and parking). The floodplain upslope and west of the building area was modified during construction of the existing solar array. The potential risk of flooding exists on the proposed location. Additional evaluation of flood risk and potential mitigation measures in accordance with the SWPPP and SMP may be required for construction on this location. A finding of no practical alternative would be required for construction on this site.

Under Alternative 2, the new missile and conventional munitions consolidated facility would be located in the central part of the MSA, outside of the regulatory floodplain. Floodplain impacts associated with modifications to the EOD Range and construction of new pedestrian gates would be the same as described under Alternative 1. When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at Luke AFB, no significant cumulative effects to floodplains would be anticipated to occur under implementation of Alternative 2.

3.4.3.4 No Action Alternative

Under the No Action alternative, the projects included in the Proposed Action would not occur. There would be no impacts to water resources or floodplains.

3.5 BIOLOGICAL RESOURCES

3.5.1 Definition of the Resource

Biological resources include native or invasive plants and animals; sensitive and protected floral and faunal species; and the associated habitats, such as wetlands, forests, grasslands, cliffs, and caves in which they exist. Habitat can be defined as the resources and conditions in an area that support a defined suite of organisms. The following is a description of the primary federal statutes that form the regulatory framework for the evaluation of biological resources.

The ROI for biological resources includes the land within Luke AFB where the proposed projects would occur.

3.5.1.1 Endangered Species Act

The ESA established protection for threatened and endangered species and the ecosystems upon which they depend. Sensitive and protected biological resources include plant and animal species listed as threatened, endangered, or special status by USFWS. The ESA also allows the designation of geographic areas as critical habitat for threatened or endangered species. Under the ESA, an "endangered species" is defined as any species in danger of extinction throughout all, or a large portion, of its range. A "threatened species" is defined as any species likely to become an endangered species in the foreseeable future. USFWS maintains a list of candidate species being evaluated for possible listing as threatened or endangered under the ESA. Although candidate species receive no statutory protection under the ESA, USFWS has attempted to advise government agencies, industry, and the public that these species are at risk and may warrant protection in the future under the ESA.

3.5.1.2 Migratory Bird Treaty Act

The *Migratory Bird Treaty Act of 1918* (16 USC §§ 703–712) (MBTA) makes it unlawful for anyone to take migratory birds or their parts, nests, or eggs unless permitted to do so by regulations. Per the MBTA, "take" is defined as "pursue, hunt, shoot, wound, kill, trap, capture, or collect" (50 CFR § 10.12). Birds protected under the MBTA include nearly all species in the US except for nonnative/human-introduced species and some game birds.

EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, requires all federal agencies undertaking activities that may negatively impact migratory birds to follow a prescribed set of actions to further implement MBTA. EO 13186 directs federal agencies to develop a Memorandum of Understanding with USFWS that promotes the conservation of migratory birds.

The *National Defense Authorization Act for Fiscal Year 2003* (Public Law 107-314, 116 Stat. 2458) provided the Secretary of the Interior the authority to prescribe regulations to exempt the armed forces from the incidental take of migratory birds during authorized military readiness activities. Congress defined military readiness activities as all training and operations of the US armed forces that relate to combat and the adequate and realistic testing of military equipment, vehicles, weapons, and sensors for proper operation and suitability for combat use. Further, in October of 2012, the Authorization of Take Incidental to Military Readiness Activities was published in the Federal Register (50 CFR § 21.15), authorizing incidental take during military readiness activities unless such activities may result in significant adverse effects on a population of a migratory bird species.

In December 2017, the US Department of the Interior issued M-Opinion 37050, which concluded that the take of migratory birds from an activity is not prohibited by the MBTA when the purpose of that activity is not the take of a migratory birds, eggs, or nests. On August 11, 2020, the US District Court, Southern District of New York, vacated M-37050. Thus, incidental take of migratory birds is again prohibited. The interpretation of the MBTA remains in flux, and additional court proceedings are expected.

3.5.1.3 Bald and Golden Eagle Protection Act

The *Bald and Golden Eagle Protection Act of 1940* (16 USC §§ 668–668c) (BGEPA) prohibits actions to "take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle [or any golden eagle], alive or dead, or any part, nest, or egg thereof." Further, the BGEPA defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb," and "disturb" is defined as "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, injury to an eagle, a decrease in productivity by substantially interfering with the eagle's normal breeding, feeding or sheltering behavior, or nest abandonment by substantially interfering with the eagle's normal breeding, feeding, or sheltering behavior." The BGEPA also prohibits activities around an active or inactive nest site that could result in disturbance to returning eagles.

3.5.1.4 Wetlands

The CWA regulates discharges of pollutants in surface waters of the US. Section 404 of the CWA established a program to regulate the discharge of dredged and fill material into waters of the US, including wetlands. The US Army Corps of Engineers defines wetlands as "those areas that are inundated or saturated with ground or surface water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated soil conditions" (Environmental Laboratory, 1987). Wetlands generally include swamps, marshes, bogs, and similar areas (33 CFR Part 328). Federal protection of wetlands is also promulgated under EO 11990, *Protection of Wetlands*, the purpose of which is to reduce adverse impacts associated with the destruction or modification of wetlands. This EO directs federal agencies to provide leadership in minimizing the destruction, loss, or degradation of wetlands.

3.5.2 Existing Conditions

3.5.2.1 Vegetation

Luke AFB is located within the Sonoran Desert in the southwestern United States. Two biomes, the Sonoran Desert scrub, and the Sonoran xero-riparian scrub, have been identified at Luke AFB (Luke AFB, 2021a). A biome is a characteristically similar area of flora and fauna. These biomes are characterized by large, arid spans of open and simple vegetation on alluvial soils. Plant species in this area are highly drought resistant. Creosote bush (*Larrea tridentata*) is a dominant species, with paloverde (*Parkinsonia* spp.) and mesquite (*Prosopis* spp.) often found along washes (Luke AFB, 2021a). Vegetation within the boundaries of Luke AFB has been mostly removed or disturbed during the development of the Base. In the Munitions Storage District, vegetation has been either removed or disturbed within the 127-acre MSA. The immediate area surrounding the MSA includes lands within the safety zones for munition storage and is largely undisturbed except for the solar arrays adjacent to the airfield.

3.5.2.2 Terrestrial Wildlife

Because the land within Luke AFB is highly developed, wildlife species are restricted to those few areas where native vegetation remains or are species that have adapted to urban life. Small, nocturnal, burrowing species such as pocket mice (*Chaetodipus* spp.), kangaroo rats (*Dipodomys* spp.), bats, and the diurnal burrowing round-tailed squirrel (*Xerospermophilus tereticaudus*) are common in areas that retain some natural vegetation. Other species likely to be found include the black-tailed jackrabbit (*Lepus californicus*), desert cottontail (*Sylvilagus audubonii*), kit fox (*Vulpes macrotis*), coyote (*Canis latrans*), and Arizona cotton rat (*Sigmodon arizonae*).

Bird species common in the vicinity of Luke AFB include raptors, such as red-tailed hawks (*Buteo jamaicensis*), American kestrels (*Falco sparverius*), Coopers hawk (*Accipiter cooperii*), northern harrier (*Circus cyaneus*), peregrine falcon (*Falco peregrinus*), prairie falcon (*Falco mexicanus*), and western burrowing owls (*Athene cunicularia*). Species found infrequently but known to hunt on Base include vultures (*Cathartes aura*) and common ravens (*Corvus corax*).

In the 1990s, the US Army Corps of Engineers surveyed Luke AFB to determine the most common bird species in landscaped and native habitats (Luke AFB, 2021a). The survey found that the mourning dove (*Zenaida macroura*), common starling (*Sturnus vulgaris*), great-tailed grackle (*Quiscalus mexicanus*), and house finch (*Haemorhous mexicanus*) were the species most commonly found to coexist with human habitation in landscaped areas. The mourning dove is also associated with native habitats on the Base. The horned lark (*Eremophila alpestris*) is most commonly found in the open fields on the Base.

Several species of reptiles and amphibians are known to occur on Luke AFB. The side-blotched lizard (*Uta stansburiana*), western whiptail lizard (*Cnemidophorus tigris*), gopher snake (*Pituophis catenifer*), Great Plains toad (*Anaxyrus cognatus*), and Couch's spadefoot toad (*Scaphiopus couchii*) are likely to be observed in natural areas, occasionally occurring in more developed areas.

Undeveloped areas surrounding the MSA that serve as safe zones for stored munitions are more likely to contain native wildlife species than the developed and disturbed areas of Luke AFB including the EOD Range and the proposed pedestrian gate locations.

3.5.2.3 Wetlands and Aquatic Resources

No wetlands have been identified on the Base. Dysart Drain on the northern boundary of the Base may support hydrophytic vegetation and wetland hydrology in some locations, but it is a cement-lined stormwater channel that drains the Luke AFB Falcon Dunes golf course and other areas north of Luke AFB and does not contain hydric soils (Luke AFB, 2021a). All three indicators—hydrophytic vegetation, wetland hydrology, and hydric soils—must be present to be classified as a wetland.

3.5.2.4 Threatened or Endangered Species and Other Protected Species

Surveys for protected and endangered species were last conducted at Luke AFB in the 1990s. During those surveys, no federal- or state-listed species were found. Two threatened or endangered species, the yellow-billed cuckoo *(Coccyzus americanus)* and the California least tern *(Sterna antillarum browni)*, and one candidate species, the Monarch butterfly *(Danaus plexippus)*, have the potential to occur in the area (see **Appendix A**).

The yellow-billed cuckoo is listed as threatened. In the western US, the yellow-billed cuckoo is a bird that uses dense thickets and wooded cover, typically willows (*Salix* spp.) and cottonwoods (*Populus* spp.), along rivers and streams (USFWS, 2022). The California least tern, a subspecies of the least tern (*Sternula antillarum*), is listed as endangered. The California least tern is a species that primarily occurs along the coastal and near-inland areas of California, where it feeds on small fishes in estuaries, embayments, and other shallow, nearshore waters and nests on open sand areas. In 2009, two pairs, thought to be the California subspecies, nested in Glendale, Arizona, immediately east of Luke AFB (USFWS, 2020). None has been observed in Arizona since. Habitat for the yellow-billed cuckoo and the California least tern does not occur on Luke AFB; however, these species could occur on Luke AFB during migration or as transients.

The Monarch butterfly is a candidate species being considered for protection under the ESA. Monarch butterflies feed on nectar from many flower species but breed only where there are milkweeds (*Asclepias* spp.). Vegetation in the MSA, EOD Range, and pedestrian gate project areas has been mostly disturbed or removed by past activities and is unlikely to provide habitat to Monarch butterflies. Undisturbed areas may provide flowering plants for migrating individuals if winter rains are sufficient to produce spring flowers.

Habitat for bald or golden eagles does not exist in the project areas although both species occur within Arizona. Bald eagles typically are found in riparian areas along rivers such as the Salt or Verde rivers or large water reservoirs (Arizona Game and Fish Department [AZGFD], 2022). Golden eagles prefer open areas that include cliffs or mountains for nesting (McCarty et al., 2020). Open areas of desert scrub provide preferred prey such as rabbits and other diurnal wildlife species. The area around Luke AFB has been largely developed and contains little native vegetation suitable for either bald or golden eagles.

Migratory bird species, protected under the MBTA, likely occur in the undeveloped areas surrounding the MSA. However, the region surrounding Luke AFB has been either developed or fragmented into small habitat patches, decreasing the quality of habitat available to migratory birds. The western burrowing owl, a migratory species, a state special status species, and a federal Bird of Conservation Concern, has been documented at Luke AFB. Burrowing owls are tolerant to human disturbance and can be found in areas undergoing urbanization and other human activities (AZGFD, 2009). They do not dig their own burrows but will nest in human modified landscapes; therefore, any open area without dense tree cover and containing natural or artificial burrows can be considered adequate nesting, wintering, or migratory habitat.

3.5.2.5 Invasive Species

Invasive species are nonnative species whose introduction causes or is likely to cause economic or environmental harm, or harm to human, animal, or plant health. EO 13751, *Safeguarding the Nation From the Impacts of Invasive Species*, requires federal agencies to identify actions that may affect invasive species; use relevant programs to prevent introductions of invasive species; detect, respond, and control such species; monitor invasive species populations; and provide for restoration of native species. Luke AFB manages invasive species under its *Integrated Pest Management Plan* (Luke AFB, 2020d). Recent surveys conducted at Luke AFB identified two highly invasive plants: Sahara mustard (*Brassica tournefortii*) and stinknet (*Oncosiphon pilulifer*) (Center for Environmental Management of Military Lands [CEMML], 2021; Luke AFB, 2021a). Luke AFB has documented several infestations of stinknet, also known as globe chamomile, in parking lots, roadsides, and the EOD Range (CEMML, 2021). Stinknet is now considered common in the Phoenix area and Maricopa County. Invasive species damage native habitat and impede management by outcompeting native species, changing fire regimes, and, in the case of stinknet, causing contact dermatitis and respiratory illness in humans.

3.5.3 Environmental Consequences

3.5.3.1 Evaluation Criteria

The level of impact on biological resources is based on the following:

- importance (i.e., legal, commercial, recreational, ecological, or scientific) of the resource;
- proportion of the resource that would be affected relative to its occurrence in the region;
- sensitivity of the resource to the proposed activities; and
- duration of potential ecological impact.

Adverse impacts on biological resources would occur if the Proposed Action or Alternatives negatively affect species or habitats of high concern over relatively large areas or if estimated disturbances cause reductions in population size or distribution of a species of high concern.

As a requirement under the ESA, federal agencies must provide documentation that ensures that the agency's proposed actions would not adversely affect the existence of any threatened or endangered species. The ESA requires that all federal agencies avoid "taking" federally threatened or endangered species (which includes jeopardizing threatened or endangered species habitat). Section 7 of the ESA establishes a consultation process with USFWS that ends with either a no effect determination by the federal agency or a biological opinion from the USFWS that the Proposed Action either would not or would jeopardize the continual existence of a species.

3.5.3.2 Alternative 1

Vegetation

The areas designated for proposed project activities under Alternative 1 are highly disturbed or developed. Due to the lack of intact native vegetation in the areas proposed for development under Alternative 1 and the minimal vegetation clearing associated with construction and demolition activities that would occur under Alternative 1, no significant impacts to vegetation would be anticipated to occur. When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at Luke AFB, no significant cumulative effects to vegetation would be anticipated to occur under implementation of Alternative 1.

Terrestrial Wildlife

There is limited suitable habitat for wildlife in the areas on Luke AFB within the proposed project locations under Alternative 1. The developed portion of Luke AFB, in which the projects proposed under Alternative

1 would be located, supports relatively common wildlife species such as small mammals and migratory birds. It is possible that birds may nest or bats may roost on some of the buildings scheduled for demolition. Buildings would be checked for nests unless work is conducted outside the primary nesting season, generally 1 April through 1 July in Arizona. Buildings also would be checked for roosting bats prior to demolition. The bat maternity season is generally from early May through mid- to late-August. Wildlife, especially avian species, utilizing small, undeveloped areas between buildings for foraging and breeding would normally be sensitive to increased noise impacts from military aircraft. However, operations have been ongoing at Luke AFB for decades and are now part of the natural noise environment. The noise and movement temporarily caused by construction and demolition activities would have negligible short-term impacts on wildlife. When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at Luke AFB, no significant cumulative effects to wildlife would be anticipated to occur under implementation of Alternative 1.

Wetlands and Aquatic Resources

No wetlands are present on Luke AFB; therefore, no impacts to wetlands and aquatic resources would be anticipated to occur under Alternative 1.

Threatened or Endangered Species and Other Protected Species

Luke AFB does not contain habitat for either the threatened yellow-billed cuckoo or the endangered California least tern. The Air Force has determined that the proposed projects under Alternative 1 would have “No Effect” on federally listed threatened or endangered species. In addition, no impacts to bald or golden eagles are expected because suitable habitat for these species does not exist on Luke AFB. Migratory birds would have the potential to nest in buildings proposed for demolition; however, all project areas would be checked for nesting birds prior to construction and demolition activities.

Invasive Species

Many cool-season invasive plant species such as stinknet and Sahara mustard are particularly adapted to disturbed areas where seeds can become established during the cooler, wetter winter months. Soil disturbance associated with either demolition or new construction could create seed beds conducive to the establishment of invasive plant species. Stinknet is known to occur in the EOD Range, and Luke AFB has initiated studies on effective control methods (CEMML, 2021). Project areas that are disturbed would be monitored for invasive plants after project completion. If invasive plants do become established, the site would be managed under the *Integrated Pest Management Plan*. Potential control methods for stinknet include mechanical treatments such as scraping the soil or pulling the plants to remove plants prior to flowering. Pre- and post-emergent chemical herbicides also are used to control plants prior to producing seeds (Chamberland, 2020). The Proposed Action and Alternatives would potentially impact invasive species by enhancing established beds in disturbed areas. BMPs such as checking construction sites for presence of invasive plants would be employed. If invasive plants are present, mechanically or chemically treating the plants, avoiding areas of invasive plants, and washing vehicle tires and undersides and worker’s boots prior to leaving the area would minimize potential transport of seeds to other areas.

When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at Luke AFB, no significant cumulative effects to biological resources would be anticipated to occur under implementation of Alternative 1.

3.5.3.3 Alternative 2

Vegetation

Under Alternative 2, the new MSA support and control building would be constructed west of the existing MSA administration building in an area just west of Ammo Road. This area is undeveloped and contains native vegetation and likely populations of native burrowing rodents that are common throughout the Sonoran Desert. The site contains no habitat for any threatened or endangered species. Construction on

this site could disturb up to 1.5 acres of previously undisturbed land and would have a minor, but long-term impact to biological resources.

Terrestrial Wildlife

Impacts to wildlife species under Alternative 2 would be similar to Alternative 1, except approximately 1.5 acres of habitat would be disturbed for the construction of the proposed new MSA support and control building west of the existing MSA administration building in an area just west of Ammo Road. This project would primarily affect small desert rodent and reptile species that are relatively common and abundant in the Sonoran Desert.

Wetlands and Aquatic Resources

No wetlands are present on Luke AFB; therefore, no impacts to wetlands and aquatic resources would be anticipated to occur under Alternative 2.

Threatened or Endangered Species and Other Protected Species

The Air Force has determined that the proposed projects under Alternative 2 would have "No Effect" on federally listed threatened or endangered species. In addition, no impacts to bald or golden eagles are expected because suitable habitat for these species does not exist on Luke AFB. Migratory birds would have the potential to nest in buildings proposed for demolition; however, all project areas would be checked for nesting birds prior to construction and demolition activities.

Invasive Species

Potential establishment of invasive species under Alternative 2 would be similar to Alternative 1. Under Alternative 2, approximately 1.5 acres of previously undisturbed land would be used for the new MSA support and control building west of Ammo Road. However, most of the construction area would be occupied by the new building and associated parking areas, limiting the potential for establishment of invasive plant species.

When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at Luke AFB, no significant cumulative effects to biological resources would be anticipated to occur under implementation of Alternative 2.

3.5.3.4 No Action Alternative

Under the No Action alternative, the projects included in the Proposed Action would not occur. Under the No Action Alternative, the biological resources at Luke AFB would remain in their current state, and no adverse effects would be expected.

3.6 CULTURAL RESOURCES

3.6.1 Definition of the Resource

Cultural resources are any prehistoric or historic district, site, building, structure, or object considered important to a culture or community for scientific, traditional, religious, or other purposes. These resources are protected and identified under several federal laws and EOs including the *Archaeological and Historic Preservation Act of 1960*, as amended (54 USC § 300101 et seq.), the *American Indian Religious Freedom Act of 1978* (42 USC § 1996), the *Archaeological Resources Protection Act of 1979*, as amended (16 USC §§ 470aa–470mm), the *Native American Graves Protection and Repatriation Act of 1990* (25 USC §§ 3001–3013), the NHPA, as amended through 2016, and associated regulations (36 CFR Part 800). The NHPA requires federal agencies to consider effects of federal undertakings on historic properties prior to deciding or taking an action and integrate historic preservation values into their decision-making process. Federal agencies fulfill this requirement by completing the NHPA Section 106 consultation process, as set forth in 36 CFR Part 800. NHPA Section 106 also requires agencies to consult with federally recognized American

Indian tribes with a vested interest in the undertaking. NHPA Section 106 requires all federal agencies to seek to avoid, minimize, or mitigate adverse effects to historic properties (36 CFR § 800.1(a)).

Cultural resources include the following subcategories:

- Archaeological (i.e., prehistoric or historic sites where human activity has left physical evidence of that activity, but no structures remain standing);
- Architectural (i.e., buildings, structures, groups of structures, or designed landscapes that are of historic or aesthetic significance); and
- Traditional Cultural Properties (TCPs) (resources of traditional, religious, or cultural significance to American Indian tribes).

Significant cultural resources are those listed on the National Register of Historic Places (NRHP) or determined to be eligible for listing. To be eligible for the NRHP, properties must be 50 years old and have national, state, or local significance in American history, architecture, archaeology, engineering, or culture. They must possess sufficient integrity of location, design, setting, materials, workmanship, feeling, and association to convey their historical significance and meet at least one of four criteria for evaluation:

1. Associated with events that have made a significant contribution to the broad patterns of our history (Criterion A);

2. Associated with the lives of persons significant in our past (Criterion B);

3. Embody distinctive characteristics of a type, period, or method of construction, or represent the work of a master, or possess high artistic values, or represent a significant and distinguishable entity whose components may lack individual distinction (Criterion C); and/or

4. Have yielded or be likely to yield information important in prehistory or history (Criterion D).

Properties that are less than 50 years old can be considered eligible for the NRHP under criteria consideration G if they possess exceptional historical importance. Those properties must also retain historic integrity and meet at least one of the four NRHP criteria (Criteria A, B, C, or D). The term “historic property” refers to National Historic Landmarks, NRHP-listed, and NRHP-eligible cultural resources.

3.6.2 Existing Conditions

Central and southern Arizona have historically played important roles in archaeological reconstructions of culture histories and past lifeways in the ancient US Southwest. The prehistoric and historic cultural periods are described in the Luke AFB *Integrated Cultural Resources Management Plan* (Luke AFB, 2021b).

3.6.2.1 Archaeological Sites

Approximately 25 archaeological studies have been completed within Luke AFB, immediately adjacent to the Base, or within the several perpetual easements that abut the Base. These projects included intensive pedestrian surveys, testing, and data recovery projects. Of most significance to the Proposed Action is an archaeological data recovery at five sites in 2013 located at the solar array, which is west of and adjacent to the MSA. These sites are now combined into one site called the Falcon Landing site (Luke AFB, 2021b). Two of the sites have been mitigated. The area surrounding the Falcon Landing site is considered an area of concern for archaeological resources.

A Class III cultural resources survey was conducted 28–29 September 2021 on 60 acres in the Munitions Storage District and included five areas of undeveloped areas outside the MSA and developed or partially developed areas within the MSA (Environmental Assessment Services LLC [EAS], 2021, Figure 4). The Area of Potential Effect (APE) includes all areas where potential project ground disturbances may occur.

Area 1 in the APE was adjacent to the previously identified Falcon Landing site. The survey identified no cultural resources or archaeological sites with the APE. Sixteen isolated occurrences (IOs) were recorded. An IO is an artifact or feature that does not qualify as an archaeological site and generally consists of a single artifact, an individual feature, or widely dispersed artifact scatters of extremely low density. All except two IOs occurred in Area 1 of the APE (EAS, 2021, Figure 8). The other two IOs occurred in Area 4 of the APE.

A Class III cultural resources survey was conducted 17 December 2020 within a 24.3-acre APE (19.2-acre existing EOD Range plus the proposed 5.1-acre expansion to the north) (Uzzle and Howell, 2020). This survey found that the APE is completely disturbed by previous and ongoing activities. Two IOs were found during the survey. Much of the fill in the area has been imported, and the depositional context of these IOs is unknown.

3.6.2.2 Historic Architectural Properties

Over the years, Luke AFB has evaluated the on-Base structures 50 years or older for eligibility for listing on the NRHP. In 2021, the last 38 structures on the Base were evaluated (Luke AFB 2021b, Section 28b; Arizona SHPO, 2020). Only buildings 1150 and 1158, both located in the Community Support Planning District, were determined to be eligible for listing. No building in the Munition Storage District or the EOD Range is eligible for listing.

3.6.2.3 Traditional Cultural Properties

TCPs may include traditionally used plants and animals, trails, and certain geographic areas. Types of resources that have been specifically identified in recent studies include, but are not limited to, rock art sites; “power” rocks and locations; medicine areas; and landscape features such as specific peaks or ranges, hot springs, meadows, valleys, and caves. No TCPs, sacred sites, human remains, associated grave goods, unassociated grave goods, sacred objects, or objects of cultural patrimony have been identified or recovered at Luke AFB (Luke AFB, 2021b).

3.6.3 Environmental Consequences

3.6.3.1 Evaluation Criteria

Adverse impacts on cultural resources would occur if the Proposed Action or Alternatives results in the following:

- physically altering, damaging, or destroying all or part of a resource;
- altering characteristics of the surrounding environment that contribute to the resource’s significance;
- introducing visual or audible elements that are out of character with the property or alter its setting;
- neglecting the resource to the extent that it deteriorates or is destroyed; or
- the sale, transfer, or lease of the property out of agency ownership (or control) without adequate enforceable restrictions or conditions to ensure preservation of the property’s historic significance.

For the purposes of this EA, an impact is considered significant if it alters the integrity of a NRHP-listed, eligible, or potentially eligible resource or potentially impacts TCPs.

3.6.3.2 Alternative 1

Archaeological Sites

Under Alternative 1, the new MSA support and control building would be constructed east of Ammo Road in the vicinity of the existing MSA administrative facility. The new missile and conventional munitions consolidated facility would be constructed east of Ammo Road on the south end of Westbrook Lane. Both building sites were surveyed for cultural resources; neither site contains any archaeological sites or IOs. The EOD Range is completely disturbed from past and ongoing mission activities, including the 5 acres north of the range that would be integrated into the new footprint of the EOD facility. No archaeological sites were located during the 2020 cultural resources surveys (Uzzle and Howell, 2020). Two IOs were found during the surveys, but the depositional context of the two IOs is unknown because much of the fill in the EOD Range has been imported.

Historic Architectural Properties

The demolition of Buildings 1234, 1236, 1240, 1242, and 1245 in the MSA would have no impact on cultural resources. These buildings were previously surveyed and determined ineligible for inclusion in the NRHP. All the buildings are in previously disturbed ground areas and an archaeological survey found no sites or IOs in the vicinity of these building (EAS, 2021, Figure 8). Under Alternative 1, DoD would also either demolish or repurpose a 7,325-ft^2 EOD facility within the main industrial portion of the Base. This action would not affect any cultural resources, as it is in a previously developed area and not eligible for the NRHP.

Traditional Cultural Properties

No TCPs, sacred sites, human remains, associated grave goods, unassociated grave goods, sacred objects, or objects of cultural patrimony have been identified or recovered on Luke AFB. The Alternative 1 would result in no impacts on archaeological sites, historic properties, or TCPs.

When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at Luke AFB, no significant cumulative effects to cultural resources would be anticipated to occur under implementation of Alternative 1.

3.6.3.3 Alternative 2

Archaeological Sites

Impacts to archaeological sites would be the same as Alternative 1 except for the proposed MSA support and control building. Under Alternative 2, the new MSA support and control building would be constructed west of Ammo Road, across from the existing MSA administrative facility (**Figure 2-1**). This proposed site would be in the southeast corner of Area 1 of the APE that was surveyed in 2021 for cultural resources. The land surface is presently undisturbed. Fourteen IOs were found in survey Area 1 including one IO within the footprint of the proposed facility. No archaeological sites were recorded in the area. Although no archaeological sites or historic sites eligible for inclusion in the NRHP would be affected by construction on this site, a recommendation was made in the cultural resources survey report to avoid the area because the site is near the Falcon Landing archaeological site and the potential for subsurface archaeological artifacts is high (EAS, 2021).

Historic Architectural Properties

Impacts to historic architectural properties would be the same as under Alternative 1. No impacts to historic architectural resources would be anticipated.

Traditional Cultural Properties

Impacts to TCPs would be the same as under Alternative 1. No impacts to TCPs would be anticipated.

When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at Luke AFB, no significant cumulative effects to cultural resources would be anticipated to occur under implementation of Alternative 2.

3.6.3.4 No Action Alternative

Under the No Action alternative, the projects included in the Proposed Action would not occur. No cultural resources would be impacted.

3.7 INFRASTRUCTURE, TRANSPORTATION, AND UTILITIES

3.7.1 Definition of the Resource

Infrastructure consists of systems and structures that enable a population in a specified area to function. Infrastructure is wholly man-made, with a high correlation between the type and extent of infrastructure and the degree to which an area is characterized as developed. The availability of infrastructure and its capacity to support more users, including residential and commercial expansion, are generally regarded as essential to the economic growth of an area.

Infrastructure includes utilities, solid waste management, sanitary and storm sewers, and transportation. Utilities include electrical, natural gas, potable water supply, sanitary sewage/wastewater, and communications systems. Sanitary and storm sewers (also considered utilities) include systems that collect, move, treat, and discharge liquid waste and stormwater. Transportation is the system of roadways, highways, and transit services in the vicinity of the Installation that potentially could be affected by a proposed action.

The ROI for this resource is Luke AFB and areas adjacent to the Base. The components of this resource area are discussed below.

3.7.2 Existing Conditions

3.7.2.1 Transportation

Luke AFB is located approximately 20 miles west of the city of Phoenix, within a region that is well-served by a system of highways connecting them to the greater Phoenix region and Interstate highway system (Maricopa Association of Governments, 2020). North Litchfield Road bounds the east side of the Community Support District and carries traffic through the Base.

Traffic is concentrated primarily within the Community Support District in the eastern part of the Base. This district contains the Base's residential areas and community support facilities. Currently, on-Base residents frequently leave the Base for goods and services, and off-Base residents often access the Base to use support services in the Community Support District. These trips are made by vehicle, and residents must drive across the Base to access the District.

There is no public transportation available on the Installation, but one public bus route from Valley Metro serves Luke AFB and terminates at the Base's Lightning Gate. Bicycle lanes and multi-use pathways are also available throughout the Installation but are concentrated off-Base to the south/southeast in the communities of Litchfield Park, Goodyear, and Avondale. Luke AFB and the City of Glendale have a collaborative relationship and work together to address transportation infrastructure needs (Maricopa Association of Governments, 2020).

3.7.2.2 Electricity and Natural Gas

Electricity at Luke AFB is provided by Arizona Public Service via a two-line, 69-kilovolt feed. The Base distribution system has eight feeder circuits serving more than 440 individual facility connections. Luke AFB

is also home to a solar array, producing 10 megawatts of renewable energy per year (Luke AFB, 2015). The primary electrical system is adequate to meet current and planned mission needs, but secondary system upgrades would be needed to support increased mission requirements and future facility renovations.

Natural gas is provided to Luke AFB by Southwest Gas Corporation via two regulator stations. There are three aboveground storage tanks in the Northwest Mission District (Luke AFB, 2016).

3.7.2.3 Potable Water Supply

Potable water at Luke AFB is received from Valley Utilities Water Company, which draws from the Agua Fria aquifer. The Agua Fria aquifer is recharged primarily by mountain runoff and stormwater infiltration. Water is pumped from seven wells, treated, pumped to storage tanks, and finally pumped through distribution mains (Valley Utilities Water Company, 2022). The Installation also has connections with EPCOR Utilities Inc. and Liberty Utilities. There are also two water supply wells on Base.

Water usage on Luke AFB is governed by an agreement with the Arizona Department of Water Resources, which classifies the Base as an institutional provider. As such, Luke AFB limits on-Base resident consumption and turf-related usage. The water supply and distribution system is adequate to meet duration, flow, and pressure requirements for industrial, domestic, and fire protection usages (Luke AFB, 2016).

3.7.2.4 Solid Waste

Solid waste removal at Luke AFB is contracted by the City of Glendale (Luke AFB, 2021c). The City of Glendale owns the City of Glendale Municipal Landfill where Luke AFB solid waste is disposed. The landfill has intergovernmental agreements in place with multiple cities in the surrounding area.

3.7.3 Environmental Consequences

3.7.3.1 Evaluation Criteria

Impacts to infrastructure from the Proposed Action or Alternatives are evaluated for their potential to disrupt or improve existing levels of service, increase energy or water consumption, and exceed the capacity of sanitary sewer and solid waste management systems.

Adverse transportation impacts would occur if the Proposed Action or Alternatives creates a substantial increase in traffic that would cause a decrease in the level of service, a substantial increase in the use of the street systems or mass transit, or if on-Base parking needs could not be met. Adverse impacts to utilities/services would occur if the Proposed Action or Alternatives creates a demand that exceeds the existing supply capacity or required services in conflict with adopted plans and policies for the area.

3.7.3.2 Alternative 1

Construction and demolition projects under Alternative 1 would occur entirely within the boundaries of Luke AFB.

Transportation

The proposed construction and demolition projects in the MSA and in the EOD Range would not affect Base transportation systems. Proposed parking areas associated with the new buildings would provide necessary parking.

The construction of two pedestrian gates along the eastern boundary of the Installation would improve pedestrian access for military personnel and their dependents to Luke AFB, ease congestion at South Gate, and develop more sustainable communities that are less dependent on vehicle transportation while

enhancing the multi-modal transportation network for Luke AFB. When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at Luke AFB, minor, beneficial cumulative effects on transportation would be anticipated to occur under Alternative 1.

Electricity and Natural Gas

No long-term impacts to either the electrical or natural gas supply systems are expected from the projects under Alternative 1. Both utility systems have the capacity to meet new demands from increases in building square footage. Energy efficient construction of new buildings may decrease energy consumption consistent with EO 13693, *Planning for Federal Sustainability in the Next Decade*, and demolition of outdated and inefficient buildings would decrease demand. Therefore, net changes in long-term electrical or natural gas demand are anticipated to be minimal.

Any potential short-term disruptions to electrical or natural gas service within the project areas during construction and demolition activities would be mitigated during project planning. Disruptions could occur from temporary service interruptions during disconnections for demolition, rerouting of above- or belowground service lines, or installing connections to new buildings.

When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at Luke AFB, no significant, cumulative effects on electrical or natural gas distribution systems would be anticipated to occur under Alternative 1.

Potable Water Supply

Change in demand for potable water from implementation of Alternative 1 would be expected to be minimal. The existing potable water supply system has the capacity to meet any demands from implementation of the Proposed Action. Short-term, negligible impacts on the potable water supply system could occur during construction and demolition when existing lines are disconnected from old buildings and new lines are constructed to serve new buildings. There would be a short-term increase in water use for dust control during demolition and construction. When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at Luke AFB, no significant cumulative effects on potable water supply would occur under Alternative 1.

Solid Waste

Under Alternative 1, construction and demolition of buildings, fences, and walls in the MSA, EOD Range, and for the pedestrian gates would generate solid waste. Construction projects generate approximately 4.39 pounds (lbs.)/ft^2 of construction activity and approximately 158 lbs./ft^2 from demolition projects (buildings and impervious surfaces) (USEPA, 2009). The Proposed Action under Alternative 1 would result in an additional 63,240 ft^2 of construction and 30,686 ft^2 of demolition. Construction and demolition projects would generate approximately 277,624 and 4,848,388 lbs. of solid waste, respectively. In accordance with AFMAN 37-7002, *Environmental Compliance and Pollution Prevention*, generated solid waste would be collected and transported off Base for disposal or recycling. Contractors would comply with federal, state, and local regulations for the collection and disposal of solid waste from the proposed projects.

No long-term impacts on solid waste management would be expected to occur under Alternative 1 because the projects would not appreciably increase the amount of solid waste generated on the Base, and the total amount of waste would be less than one percent of the annual waste received at the City of Glendale Municipal Landfill (City of Glendale, 2022). When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at Luke AFB, no significant cumulative effects on solid waste management would be anticipated to occur under Alternative 1.

3.7.3.3 Alternative 2

Alternative 2 differs from Alternative 1 by location of the new buildings in the MSA, EOD Range, and pedestrian gates. No additional construction or demolition is proposed under Alternative 2. Impacts to infrastructure, transportation, and utilities under Alternative 2 would be the same as those described for

Alternative 1. When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at Luke AFB, no significant cumulative effects on infrastructure, transportation, or utilities would be anticipated to occur under Alternative 2.

3.7.3.4 No Action Alternative

Under the No Action Alternative, the projects included in the Proposed Action would not occur. Under the No Action Alternative, the EOD Range would remain in the airfield lateral clearance zone and remain out of compliance. Without the pedestrian gates, minor impacts to Base access would occur because access would continue to be by vehicle, contributing to traffic congestion.

3.8 NOISE

3.8.1 Definition of the Resource

Noise is undesirable or unwanted sound that interferes with verbal communication and hearing. Sound pressure level, described in decibels, is used to quantify sound intensity. Sound level measurements used to characterize sound levels sensed by the human ear are designated “A-weighted” decibels (dBA).

The *Noise Control Act of 1972* (Public Law 92-574) directs federal agencies to comply with applicable federal, state, and local noise control regulations. In 1974, the USEPA provided information suggesting continuous and long-term noise levels greater than 65 dBA are normally unacceptable for noise-sensitive receptors such as residences, schools, churches, and hospitals.

3.8.2 Existing Conditions

As is normal for military installations with a flying mission, the primary driver of noise at Luke AFB is aircraft operations. Base military aircraft such as the F-35 airframes make up most flight operations at Luke AFB. Luke AFB conducts over 16,000 operations or over flights in its local airspace annually, with flight operations typically from 7 a.m. to 11:30 p.m. Monday through Friday (Luke AFB, 2016b). An operation is defined as a single takeoff or landing. Closed patterns consist of two operations—one departure and one arrival (e.g., two closed pattern circuits consist of four total operations).

Typical ambient sound levels on the Base have been modeled previously for a noise effects assessment as part of the F-35 Training Basing EIS (Air Force, 2012). Modeling results for this assessment indicate that existing Day-Night Sound Levels (DNLs) range from 65 dBA DNL to 85 dBA across Luke AFB. Ambient noise levels from aircraft operations at the proposed project locations are in the range of 65 to 85 dBA.

In addition to aviation noise, other noise is generated from the day-to-day activities from operations, maintenance, and the industrial functions associated with airfield operations. These noise sources include ground-support equipment and vehicular transportation. Noise from aircraft operations remains the dominant noise source.

Sensitive noise receptors that could potentially be exposed to noise from Installation activities are proximate to the southeastern and eastern portions of the Installation. Several schools are located on or near the eastern portion of the Base. All Luke AFB housing and community functions are located along the east side of the Base, and several residential neighborhoods in the city of Glendale are situated to the southeast of the Installation.

3.8.3 Environmental Consequences

3.8.3.1 Evaluation Criteria

When evaluating noise effects, several aspects are examined:

- the degree to which noise levels generated by training and operations, as well as construction, demolition, and renovation activities, would be higher than the ambient noise levels;
- the degree to which there would be hearing loss and/or annoyance; and
- the proximity of noise-sensitive receptors (e.g., residences, schools, hospitals, parks) to the noise source.

An environmental analysis of noise includes the potential effects on the local population and estimates the extent and magnitude of the noise generated by the Proposed Action and Alternatives.

3.8.3.2 Alternative 1

Proposed projects under Alternative 1 would include construction and demolition activities that would occur entirely within the boundaries of Luke AFB. The affected environment for noise effects from the Proposed Action and Alternatives and ongoing operations is focused within 0.5 mile to 1 mile of the proposed projects.

Noise modeling results indicate that existing DNLs range from 65 dBA DNL to 85 dBA across Luke AFB and within the vicinities of the proposed projects (Air Force, 2012). Noise associated with the operation of construction equipment is generally short term, intermittent, and localized, with the loudest machinery typically producing peak sound pressure levels ranging from 86 to 95 dBA at a 50-foot distance from the source (**Table 3-4**).

Table 3-4.
Peak Sound Pressure Level of Construction Equipment from 50 Feet

Equipment	Sound Pressure Level (dBA)
Bulldozer	95
Scraper	94
Front Loader	94
Backhoe	92
Grader	91
Crane	86

Source: Reagan and Grant, 1977
dBA = A-weighted decibel

However, construction noise does not typically generate a predicted noise exposure of 65 dBA DNL or greater even at extremely high rates of operation because the equipment itself does not generate noise that would produce a 65-dBA DNL when averaged over a year. Additionally, adherence to standard Air Force Occupational Safety and Health regulations that require hearing protection along with other personnel protective equipment and safety training would minimize the risk of hearing loss to construction workers. Therefore, noise associated with construction and demolition projects proposed under Alternative 1 would not cause any significant direct or indirect impacts on noise-sensitive receptors. When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at Luke AFB, no significant cumulative effects to the noise environment would be anticipated to occur under implementation of Alternative 1.

There would be no operational increases in noise resulting from implementation of Alternative 1.

3.8.3.3 Alternative 2

Proposed projects under Alternative 2 would include construction and demolition activities that would occur entirely within the boundaries of Luke AFB. As for Alternative 1, noise associated with construction and demolition projects proposed under Alternative 2 would not be expected to cause any significant direct or indirect impacts on noise-sensitive receptors. When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at Luke AFB, no significant cumulative effects to the noise environment would be anticipated to occur under implementation of Alternative 2.

3.8.3.4 No Action Alternative

Under the No Action alternative, the projects included in the Proposed Action would not occur. Noise on Luke AFB would not change from current conditions, and no significant impacts on noise-sensitive receptors would occur.

3.9 HAZARDOUS MATERIALS AND WASTES

3.9.1 Definition of the Resource

The *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (42 USC § 9601) (CERCLA), as amended by the *Superfund Amendments and Reauthorization Act* (SARA) and the *Toxic Substances Control Act* (15 USC § 2601 et seq., as implemented by 40 CFR Part 761) (TSCA), defines hazardous materials (HAZMAT) as any substance with physical properties of ignitability, corrosivity, reactivity, or toxicity that might cause an increase in mortality, serious irreversible illness, and incapacitating reversible illness, or that might pose a substantial threat to human health or the environment. The Occupational Safety and Health Administration (OSHA) is responsible for the enforcement and implementation of federal laws and regulations pertaining to worker health and safety under 29 CFR Part 1910. OSHA also includes the regulation of HAZMAT in the workplace and ensures appropriate training in their handling.

The *Solid Waste Disposal Act*, as amended by the *Resource Conservation and Recovery Act* (42 USC § 6901) (RCRA), which was further amended by the *Hazardous and Solid Waste Amendments of 1984* (Public Law 98-616), defines hazardous wastes as any solid, liquid, contained gaseous, or semi-solid waste, or any combination of wastes, that pose a substantial present or potential hazard to human health or the environment. In general, both HAZMAT and hazardous wastes include substances that, because of their quantity, concentration, physical, chemical, or infectious characteristics, might present substantial danger to public health and welfare or the environment when released or otherwise improperly managed.

Air Force Policy Directive 32-70, *Environmental Considerations in Air Force Programs and Activities*, establishes the policy that the Air Force is committed to performing the following actions:

- cleaning up environmental damage resulting from its past activities,
- meeting all environmental standards applicable to its present operations,
- planning its future activities to minimize environmental impacts,
- responsibly managing the irreplaceable natural and cultural resources it holds in public trust, and
- eliminating pollution from its activities wherever possible.

AFMAN 32-1067, *Water and Fuel Systems*, identifies compliance requirements for underground storage tanks (USTs) and aboveground storage tanks (ASTs), and associated piping, that store petroleum products and hazardous substances. Evaluation of HAZMAT and hazardous wastes focuses on USTs and ASTs as well as the storage, transport, and use of pesticides, fuels, oils, and lubricants. Evaluation might also extend to generation, storage, transportation, and disposal of hazardous wastes when such activity occurs at or near the project site of a Proposed Action. In addition to being a threat to humans, the improper release of

HAZMAT and hazardous wastes can threaten the health and wellbeing of wildlife species, botanical habitats, soil systems, and water resources. In the event of HAZMAT or hazardous waste release, the extent of contamination will vary based on the type of soil, topography, weather conditions, and water resources that occur in the vicinity of the event.

AFMAN 32-7002, *Environmental Compliance and Pollution Prevention*, establishes procedures and standards that govern management of HAZMAT throughout the Air Force. This manual applies to all Air Force personnel who authorize, procure, issue, use, or dispose of HAZMAT, and to those who manage, monitor, or track any associated activities.

Through the Environmental Restoration Program (ERP) initiated in 1980, a subcomponent of the Defense ERP that became law under SARA (formerly the Installation Restoration Program), each DoD installation is required to identify, investigate, and clean up hazardous waste disposal or release sites. Remedial activities for ERP sites follow the Hazardous and Solid Waste Amendments under the RCRA Corrective Action Program. The ERP provides a uniform, thorough methodology to evaluate past disposal sites, control the migration of contaminants, minimize potential hazards to human health and the environment, and clean up contamination through a series of stages until it is decided that no further remedial action is warranted.

Description of ERP activities provides a useful gauge of the condition of soils, water resources, and other resources that might be affected by contaminants. It also aids in the identification of properties and their usefulness for given purposes (e.g., activities dependent on groundwater usage might be foreclosed where a groundwater contaminant plume remains to complete remediation).

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

The ROI for potential HAZMAT and hazardous wastes impacts is Luke AFB.

3.9.2 Existing Conditions

Luke AFB was added to the USEPA National Priorities List in 1990 and was removed from the list in 2002 (AECOM, 2021). The National Priorities List is a prioritized list of Superfund sites that are eligible for remediation under CERCLA. In addition, a Federal Facilities Agreement was signed by the USEPA, ADEQ, Arizona Department of Water Resources, and the Air Force in 1990. This Federal Facilities Agreement established the procedural framework for environmental investigations at Luke AFB. Under this agreement, 33 potential sources of contamination were divided into two operable units (OU-1 and OU-2), where two and eight sites were determined to require further action, respectively.

Luke AFB is classified and permitted as a large-quantity hazardous waste generator under RCRA (Luke AFB, 2021d).

3.9.2.1 Hazardous Materials and Wastes

The RCRA program establishes the mandatory procedures and requirements for federal facilities that use, accumulate, transport, treat, store, or dispose of hazardous wastes or substances. Under these requirements, USEPA can grant authority to the state to establish and enforce its own hazardous waste management program, provided the state's requirements are not less stringent than those of the USEPA (USEPA, 2021b). In Arizona, ADEQ implements the RCRA program.

Activities at Luke AFB require the use and storage of a variety of HAZMAT that includes flammable and combustible liquids, acids, corrosives, caustics, compressed gases, solvents, paints, paint thinners, and pesticides. Hazardous and toxic substances disposal procedures are identified in the Luke AFB *Hazardous Waste Management Plan* (Luke AFB, 2021d) and all wastes are disposed of in compliance with all federal, state, and local regulations. Primary sources of HAZMAT and hazardous wastes generated at Luke AFB include over 100 industrial shops within the Installation and facilities supporting aircraft maintenance and operation (Luke AFB, 2019).

Section 311 of the CWA, as amended by the *Oil Pollution Act* (Public Law 101-380), establishes requirements to prevent, prepare for, and respond to oil discharges at specific types of facilities, including military bases. Luke AFB maintains an SPCC Plan to minimize hazardous discharges to waters of the US (Luke AFB, 2019). Should an accidental spill occur at the Base, the SPCC Plan also formalizes and guides response and cleanup activities. The goal of the *Oil Pollution Act* is to prevent oil from reaching navigable waters and adjoining shorelines, and to contain discharges of oil. The Act requires these facilities to develop and implement SPCC Plans and establishes procedures, methods, and equipment requirements. Additionally, the SPCC Plan details specific procedures and responsibilities for responding to HAZMAT and petroleum product spills. The 56 FW maintains the SPCC Plan, manages hazardous waste personnel, and coordinates spill responders/ contractors (Luke AFB, 2019).

Past and current activities requiring the use of HAZMAT and petroleum products at Luke AFB include:

- aircraft operation and maintenance,
- vehicle operation and maintenance (general and tactical),
- infrastructure and equipment maintenance,
- chemical treatments (pesticides and herbicides),
- demolition and construction of buildings, and
- EOD activities.

Hazardous waste is created by these activities.

3.9.2.2 Asbestos and Lead-Based Paint

A significant number of buildings on Luke AFB date from the 1940s through the 1980s, during which time ACM were commonly used in construction. Nonfriable asbestos is not considered HAZMAT until it is removed or disturbed. The Luke AFB *Asbestos Management Plan* identifies the need for asbestos management, abatement, and removal, where applicable, when funding is available, or where damage or exposure warrants the need. The *Asbestos Management Plan* focuses on in-place management of asbestos, meaning, where applicable, ACM can be left in place until there is a need for removal (i.e., due to conditions, renovation, demolition) (Luke AFB, 2020e). Conversely, buildings constructed prior to 1970 are likely to contain friable asbestos in building materials. Disruption of these materials causes asbestos to become airborne, producing a risk of inhalation. The Air Force manages asbestos in accordance with AFI 32-1001, *Civil Engineer Operations*, and applicable USEPA regulations (USEPA, 2022a).

OSHA and USEPA have determined that human exposure to lead is an adverse health risk. Sources of exposure to lead are dust, soils, and LBP. In 1973, the Consumer Product Safety Commission established a maximum lead content in paint of 0.5 percent by weight in a dry film of newly applied paint. In 1978, under the *Consumer Product Safety Act* (15 USC §§ 2051–2089), the Commission lowered the allowable lead level in paint to 0.06 percent (600 parts per million). The Act also restricted the use of LBP in nonindustrial facilities. The DoD implemented a ban on LBP use in 1978; therefore, it is possible that facilities constructed prior to or during 1978 may contain LBP.

3.9.2.3 Radon

The US Surgeon General defines radon as an invisible, odorless, and tasteless gas, with no immediate health symptoms, which comes from the breakdown of naturally occurring uranium inside the earth. Radon that is present in soil can enter a building through small spaces and openings, accumulating in enclosed areas such as basements. USEPA and the US Surgeon General have evaluated the radon potential in the US to organize and assist building code officials in deciding whether radon-resistant features are applicable in new construction. Radon zones evaluate the average indoor radon screening level and can range from 1 (high) to 3 (low). Each zone designation reflects the average short-term radon measurement that can be expected in a building without the implementation of radon control methods.

Maricopa County is located within Radon Zone 2. This zone has predicted average indoor radon screening levels between 2 and 4 picocuries per liter (USEPA, 2022b). Due to the low probability of radon levels exceeding the USEPA's guidance level of 4 picocuries per liter, radon is not further evaluated.

3.9.2.4 Polychlorinated Biphenyls

PCBs are a group of chemical mixtures used as insulators in electrical equipment, such as transformers and fluorescent light ballasts. Chemicals classified as PCBs were widely manufactured and used in the US until they were banned in 1979. The Air Force manages PCBs in accordance with AFMAN 32-7002, *Environmental Compliance and Pollution Prevention*, as well as under USEPA regulations. The Air Force defines PCBs as any PCB-containing equipment or material, as defined in 40 CFR Part 761, with a concentration more than 50 parts per million. Buildings constructed prior to 1979, with a dependence on previous uses, potentially contain PCBs in various machinery and wiring. However, Luke AFB is generally considered PCB-free outside of these components (Luke AFB, 2021d).

3.9.2.5 Perfluoroalkyl Substances and Aqueous Film Forming Foam

PFAS are a group of man-made chemicals that are employed in a wide variety of residential, commercial, and industrial uses, and can be found in everyday items such as nonstick cookware, stain-resistant fabric and carpet, certain types of food packaging, and firefighting foam (AFCEC, n.d.). In 2016, the USEPA announced advisory levels for two types of PFAS in drinking water, perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA).

The USEPA has not yet enacted specific regulatory standards for PFAS. However, continued research shows that there are potential human health risks associated with these substances, and regulatory standards are being considered (AFCEC, n.d.). Aqueous film forming foam (AFFF), which the Air Force began to use in the 1970s to extinguish petroleum-based fires, contains both PFOS and PFOA. In August of 2016, the Air Force began phasing out PFOS-based AFFF and other AFFF products and introduced newer, more environmentally friendly formulas. In August of 2017, the Air Force finished the phase-out and completed the new foam delivery (AFCEC, n.d.). All Air Force investigation and mitigation work relating to PFOS and PFOA is performed in accordance with CERCLA, applicable state laws, and the USEPA's lifetime drinking water health advisory of 70 parts per trillion (AFCEC, n.d.).

Luke AFB conducted a site inspection of 12 AFFF release areas in 2016 to determine the extent and level of contamination in soil and groundwater (Amec Foster Wheeler, 2019). Sites were either classified as "no further remedial action planned" or "requiring further study in a remedial investigation" (**Figure 3-4**). One site, the North Fire Training Area (FT007), was specifically noted due to the likely previous use of PFAS for training activities (Luke AFB, 2021d).

3.9.2.6 Environmental Restoration Program Sites

The Luke AFB ERP implements cleanup actions for contaminated sites on the Base. Under CERCLA, ERP sites are subject to a detailed site investigation and risk assessment, the results of which are used to identify cleanup options. There were 33 ERP sites investigated between the early 1980s through the late 1990s,

and the Base was ultimately removed from the National Priorities List in 2002 (AECOM, 2021). Because the selected remedies at 12 sites left contaminants above levels that permit unlimited use and unrestricted exposure (UU/UE), the Air Force performed additional investigations from 2013 to 2020 to achieve UU/UE. Of these 12 sites, 7 have achieved UU/UE via site closure, and 6 will remain unchanged (**Figure 3-4**).

There are no Military Munitions Response Program sites at Luke AFB.

3.9.3 Environmental Consequences

3.9.3.1 Evaluation Criteria

Impacts on HAZMAT management would be considered adverse if the Proposed Action resulted in noncompliance with applicable federal and state regulations or increased the amounts generated or procured beyond current Luke AFB waste management procedures and capacities. Impacts on the ERP would be considered adverse if the Proposed Action disturbed (or created) contaminated sites resulting in negative effects on human health or the environment.

3.9.3.2 Alternative 1

Hazardous Materials and Wastes

Under the Proposed Action, the limited use of certain hazardous materials would be required during construction and demolition. Associated HAZMAT might include paints, welding gases, solvents, preservatives, sealants, and pesticides. Additionally, hydraulic fluids and petroleum products, such as diesel and gasoline, would be used in construction and demolition equipment and vehicles. As such, the Proposed Action would create the potential for the accidental discharge or spill of HAZMAT that could contaminate the environment or result in exposure of persons to such contaminants.

Construction could unearth contaminants in environmental media not yet known or identified for management action. Even without a major release or discovery event, multiple minor releases of HAZMAT under Alternative 1 could potentially affect the environment or persons in the vicinity.

If encountered, HAZMAT used or generated during construction or demolition would be handled, stored, and disposed of in accordance with federal, state, and local laws and regulations. All applicable permits for handling and disposal of HAZMAT would be obtained prior to starting construction or demolition activities. Construction and demolition work under Alternative 1 would be subject to the procedural requirements of the Luke AFB *Hazardous Waste Management Plan*, SPCC Plan, and other applicable management plans to prevent and minimize risks associated with contaminant release or transport in the environment. During construction or demolition, if HAZMAT is discovered, work in that location would stop until the potential contamination has been properly evaluated and addressed.

Asbestos, Lead Based Paint, and Polychlorinated Biphenyls

Additional risk under the Alternative 1 would be associated with improper handling of construction and building materials. Improper handling of these materials has the potential to adversely affect the state of HAZMAT at Luke AFB. Concerns of ACM, LBP, and PCB are also associated with the age of a building. Only Building 1236, which is proposed for demolition under Alternative 1, has the potential to contain LBP or PCB (**Table 3-5**). No facilities proposed for demolition under the Alternative 1 has the potential to contain ACM.

Perfluoroalkyl Substances and Aqueous Film Forming Foam

PFAS may be present in soil and/or groundwater at AFFF release sites FT007E and FT007W because of past fire-fighting training activities. The sites are located approximately 0.5 mile northeast of the proposed EOD Range but lie outside the Northwest Mission District (see **Figure 3-4**). Under the 2020 site investigation, these sites were recommended for remedial investigation. The Oil/Water Separator Canal and Surface Impoundment Wash (**Figure 3-4**) are directly west of the proposed facilities in the MSA and

were also recommended for remedial investigation. There are no AFFF release areas in the vicinity of the proposed pedestrian gates. Significant impacts to the projects from PFAS and AFFF would not be anticipated under the Proposed Action.

Table 3-5.
Potential Presence of Hazardous Materials by Year Built

Building Number	Project	Year Built	ACM Potential (prior 1970)	LBP Potential (prior 1978)	PCB Potential (prior 1978)
1234	MSA	1984	No	No	No
1236	MSA	1975	No	Yes	Yes
1240	MSA	1987	No	No	No
1242	MSA	1983	No	No	No
1245	MSA	1995	No	No	No

ACM = asbestos-containing materials; LBP = lead-based paint; MSA = Munitions Storage Area; PCB = polychlorinated biphenyls

Environmental Restoration Program Sites

There are no currently active ERP sites at Luke AFB, but there are several former sites that require monitoring. Construction activities under Alternative 1 would take place near the following ERP sites. However, because these ERP sites are inactive, impacts to the project sites would not be anticipated under the Alternative 1.

- DP013 (Drainage Ditch Disposal Area)
- FT007E (Eastern Portion of North Fire Training Area)
- SD020 (Oil/Water Separator at Auto Body Shop)

Several projects under Alternative 1 would be implemented in the vicinity of existing on-Base ASTs (see **Figure 3-4**). **Table 3-6** lists ASTs located within approximately 150 meters of a proposed project. Although some projects would be located within proximity of an existing AST, work under Alternative 1 would not be expected to result in impacts to ASTs. Base contractors would be responsible for avoiding the ASTs during construction.

Table 3-6.
Aboveground Storage Tanks Within 150 Meters of Proposed Projects

Project	Storage Tank Type	Storage Tank Number	Tank Status	Description
MSA	AST	Tank 1219	Active	Generator diesel tank for Building 1219, next to proposed administrative facility
MSA	AST	Tank 1233-2	Inactive	Former diesel tank, inactive since 2013
MSA	AST	Tank 1233	Active	Diesel convault tank in ammo storage area
Pedestrian Gates	AST	Tank 8226	Active	Generator diesel tank at the Lalomai Gate
EOD Range	AST	Tank 1040	Active	Diesel convault tank 110 m north of the proposed EOD Range

AST = aboveground storage tank; EOD = Explosive Ordnance Disposal; MSA = Munitions Storage Area

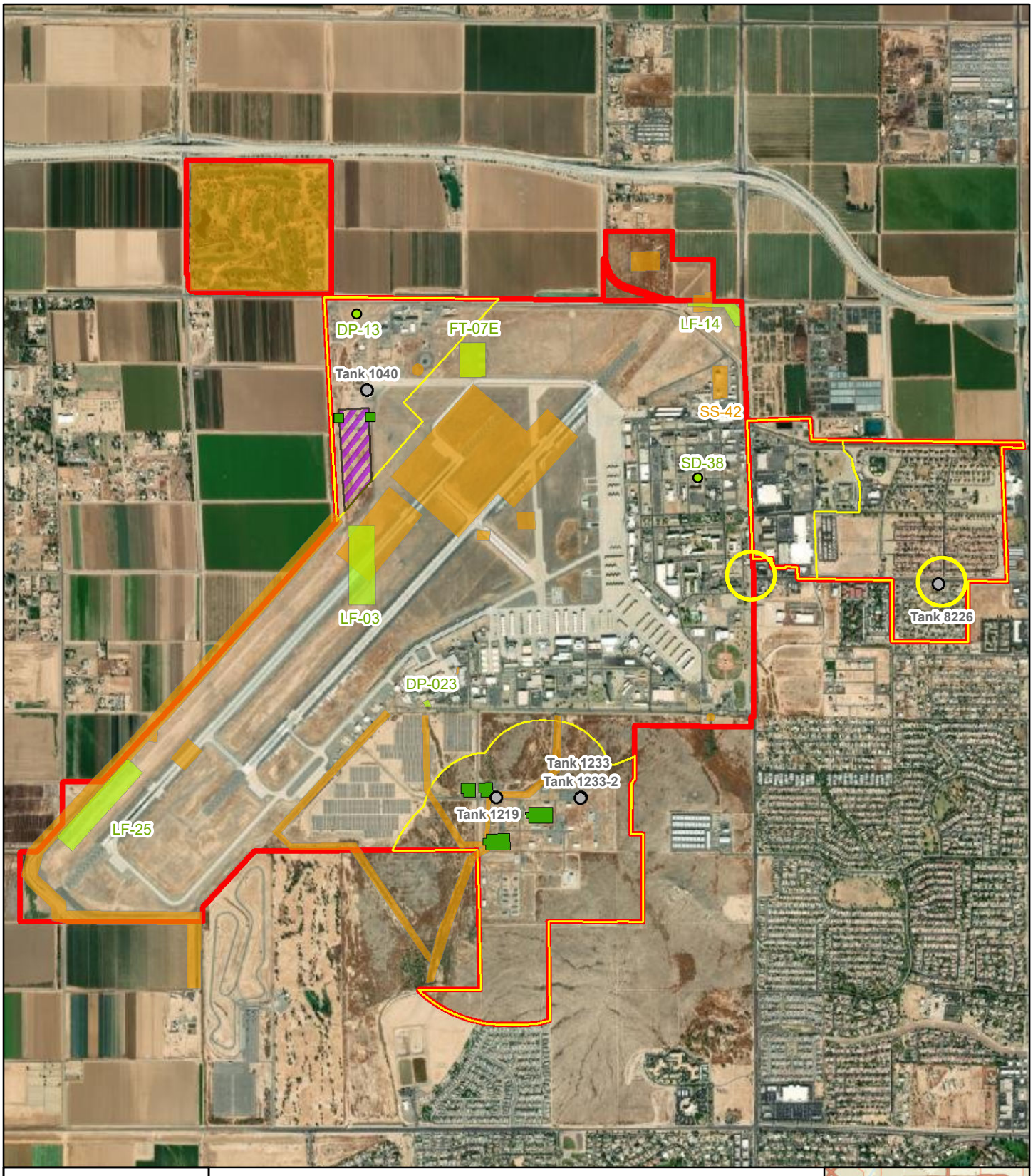

FIGURE 3-4
HAZMAT

Imagery: ESRI 2021
Projection: WGS 1984
Zone 12N

0 0.25 0.5 Miles

Storage Tank
Luke AFB
Project Areas
AFFF Release Area
IRP Site
Proposed EOD Range
Proposed Alternative

With the applicable requirements and management plans in place and no contaminants at concentration levels that would pose a risk to construction workers, potential construction-related HAZMAT impacts would short term and minor. No potential impacts from Alternative 1 would be expected to occur. When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at Luke AFB, no significant cumulative effects to HAZMAT would be anticipated under Alternative 1.

3.9.3.3 Alternative 2

Alternative 2 differs from Alternative 1 only in the location of new buildings. However, construction and demolition activities would still occur; therefore, impacts related to HAZMAT anticipated to occur under Alternative 2 would be the same as those described for Alternative 1.

3.9.3.4 No Action Alternative

Under the No Action alternative, the projects included in the Proposed Action would not occur. Under the No Action Alternative, Luke AFB would continue to operate as a large-quantity generator of hazardous waste under RCRA. Management associated with the use, handling, storage, transport, treatment, or disposal of HAZMAT at the Base would continue in accordance with relevant plans. Luke AFB would maintain compliance with applicable HAZMAT laws and regulations.

3.10 SAFETY

3.10.1 Definition of the Resource

This section discusses safety concerns associated with ground, explosives, and flight activities. Ground safety considers issues associated with ground operations and maintenance activities that support unit operations including arresting gear capability, jet blast/maintenance testing, and safety danger. Aircraft maintenance testing occurs in designated safety zones. Ground safety also considers the safety of personnel and facilities from flight operations in the vicinity of the airfield and in the airspace. Clear Zones (CZs) and Accident Potential Zones (APZs) around the airfield restrict the public's exposure to areas with a higher accident potential. Although ground and flight safety are addressed separately, in the immediate vicinity of the runway, risks associated with safety-of-flight issues are interrelated with ground safety concerns.

Explosives safety relates to the management and safe use of ordnance and munitions. Flight safety considers aircraft flight risks such as midair collision, bird/wildlife-aircraft strike hazard, and in-flight emergency. The Air Force has safety procedures and aircraft-specific emergency procedures produced by the original equipment manufacturer of the aircraft. Basic airmanship procedures also exist for handling any deviations to air traffic control procedures due to an in-flight emergency; these procedures are defined in Volume 3 of AFI 11-202, *General Flight Rules*, and established aircraft flight manuals. The Flight Crew Information File is a safety resource for aircrew day-to-day operations and contains air and ground operation rules and procedures.

The ROI includes Luke AFB and areas immediately adjacent to the Base where ground and explosives safety concerns exist, as well as the airfield and airspace.

3.10.2 Existing Conditions

Under 40 CFR § 989.27, the EIAP for an action must assess direct and indirect impacts of the Proposed Action and Alternatives on the safety and health of Air Force employees and others at a work site. Air Force Policy Directive 91-2, *Safety Programs,* is implemented by AFI 91-202, *The U.S. Air Force Mishap Prevention Program*, which manages risks to protect Air Force personnel from occupational deaths, injuries, or illnesses and minimize loss of Air Force resources. These standards apply to all Air Force activities and adherence to the Air Force's Mishap Prevention Program ensures Air Force workplaces meet federal safety and health requirements.

Day-to-day operation and maintenance activities at Luke AFB are performed in accordance with applicable Air Force safety regulations, published Air Force Technical Orders, and standards prescribed by Air Force occupational and environmental safety, fire protection, and health program requirements. These are intended to reduce occupational risks to government personnel and contractors and to protect other individuals that reside on or visit or are near the Base.

The following sections describe existing ground, explosives, and flight safety conditions at Luke AFB.

3.10.2.1 Ground Safety

Ground safety concerns include ground and industrial operations, operational activities, and motor vehicle use. Accidents can occur from equipment operation, use of materials, and building and equipment maintenance.

Air Force safety programs for industrial activities, motor vehicle and equipment operation, and everyday operations are continuously refined as new activities and new information becomes available. All Airmen receive regular safety training in order to keep the chances of mishaps as low as possible.

All construction contractors at Luke AFB must follow ground safety regulations and worker's compensation programs to avoid posing any risks to workers or personnel on or off Base. Construction contractors are responsible for reviewing potentially hazardous workplace operations, monitoring exposure to workplace chemicals (e.g., lead, ACM, HAZMAT); physical hazards (e.g., noise propagation, slips, trips, falls); and biological agents (e.g., infectious waste, wildlife, poisonous plants). Construction contractors are required to recommend and evaluate controls (e.g., preventative, administrative, engineering) to ensure personnel are properly protected and to implement a medical surveillance program to perform occupational health physicals for those workers subject to any accidental chemical exposures.

3.10.2.2 Explosives Safety

Defense Explosives Safety Regulation 6055.09, AFMAN 91-201, *Explosives Safety Standards*, defines the guidance and procedures for munition storage and handling. During typical training operations, aircraft are not loaded with high-explosive ordnance. Munitions for training operations may include captive ordnance, defensive countermeasure chaff and flares, and gun ammunition with inert projectiles. All munitions are stored and maintained in the MSA within facilities designed for the allowable types and amounts of explosives. All storage and handling of munitions is carried out by trained and qualified munitions flight personnel and in accordance with Air Force-approved Technical Orders.

Defined distances are maintained between the 127-acre MSA and the other facilities on and off Base and civilian facilities/residences (ISA, 2016). These distances, referred to as Q-D arcs, are determined by the type and quantity of stored explosives. Each explosives material storage or handling facility has Q-D arcs extending outward from its sides and corners for a prescribed distance. Within these Q-D arcs, development is either restricted or prohibited to ensure personnel safety and to minimize potential damage to other facilities in the event of an accident. The land adjacent to the MSA within these arcs but outside the Installation is managed under a lease/easement arrangement with private landowners.

These existing procedures ensure that maintenance and flight activities involving any type of ordnance are conducted as safely as possible.

3.10.2.3 Flight Safety

The safety of the public with respect to aircraft operations at Luke AFB is a primary concern for the Air Force. The areas surrounding the Base have established Air Installation Compatible Use Zones guidelines to define those areas with the highest potential for aircraft accidents and aircraft noise impacts, and to establish flight rules and flight patterns that will have the least impacts on the civilian population with regard to safety and noise effects. For potential aircraft accidents, CZs and APZs have been established to identify

areas with the greatest risk for aircraft accidents and to guide or minimize off-Base development in these higher-risk areas (**Figure 3-5**).

The potential for aircraft mishaps during flight is a public concern with regard to flight safety. Mishaps may occur as a result of midair collisions, collisions with man-made structures or terrain, mechanical failure, weather-related accidents, pilot error, bird/wildlife-aircraft strike hazard, or strikes from defensive countermeasures used during training.

The Air Force has established a Flight Safety Program and designated areas of accident potential around air installations to protect people and property on the ground. These areas include CZs and APZs, which restrict incompatible land use and thereby reduce exposure to hazards within and adjacent to the runway. The existing EOD Range is out of compliance because the southernmost portion of the EOD Range lies within the airfield's runway lateral CZ, primary surface, and transitional surface, presenting an airfield safety hazard (**Figure 2-2**).

3.10.3 Environmental Consequences

3.10.3.1 Evaluation Criteria

Safety-related impacts from a proposed activity are assessed according to the potential to increase or decrease safety risks to personnel, the public, property, or the environment. Adverse impacts related to safety would occur if the Proposed Action or Alternatives resulted in Air Force OSHA criteria being exceeded or the improper implementation of established or proposed safety measures, creating unacceptable safety risk to personnel. Adverse impacts would occur if the activities

- substantially increase risks associated with the safety of construction personnel, contractors, military personnel, or the local community;
- substantially hinder the ability to respond to an emergency; or
- introduce a new health or safety risk for which the Base is not prepared or does not have adequate management and response plans in place.

3.10.3.2 Alternative 1

Under Alternative 1 the proposed projects would not change existing flight safety CZs, APZs, or ESQD arcs; therefore, no negative impacts to flight safety or ESQD arcs would occur. Beneficial impacts would include bringing the EOD Range into compliance and addressing current airfield safety hazards by shifting the EOD Range north of the airfield's runway lateral CZ.

Construction and demolition activities can potentially expose personnel to health and safety hazards from heavy-equipment operation, HAZMAT and chemical use, and working in confined, poorly ventilated, and noisy environments. Therefore, short-term, negligible-to-minor impacts on contractor health and safety could occur during proposed construction and demolition projects under Alternative 1. To minimize health and safety risks, contractors would be required to use appropriate personal protective equipment and establish and maintain site-specific health and safety programs for their employees and follow all applicable OSHA regulations. Additionally, construction contractors at Luke AFB are required to follow ground safety regulations and worker's compensation programs to avoid risks to workers or personnel on or off Base.

3.10.3.3 Alternative 2

Alternative 2 differs from Alternative 1 only in the location of new buildings. However, construction and demolition activities would still occur; therefore, impacts expected to occur under Alternative 2 would be the same or less as those described for Alternative 1.

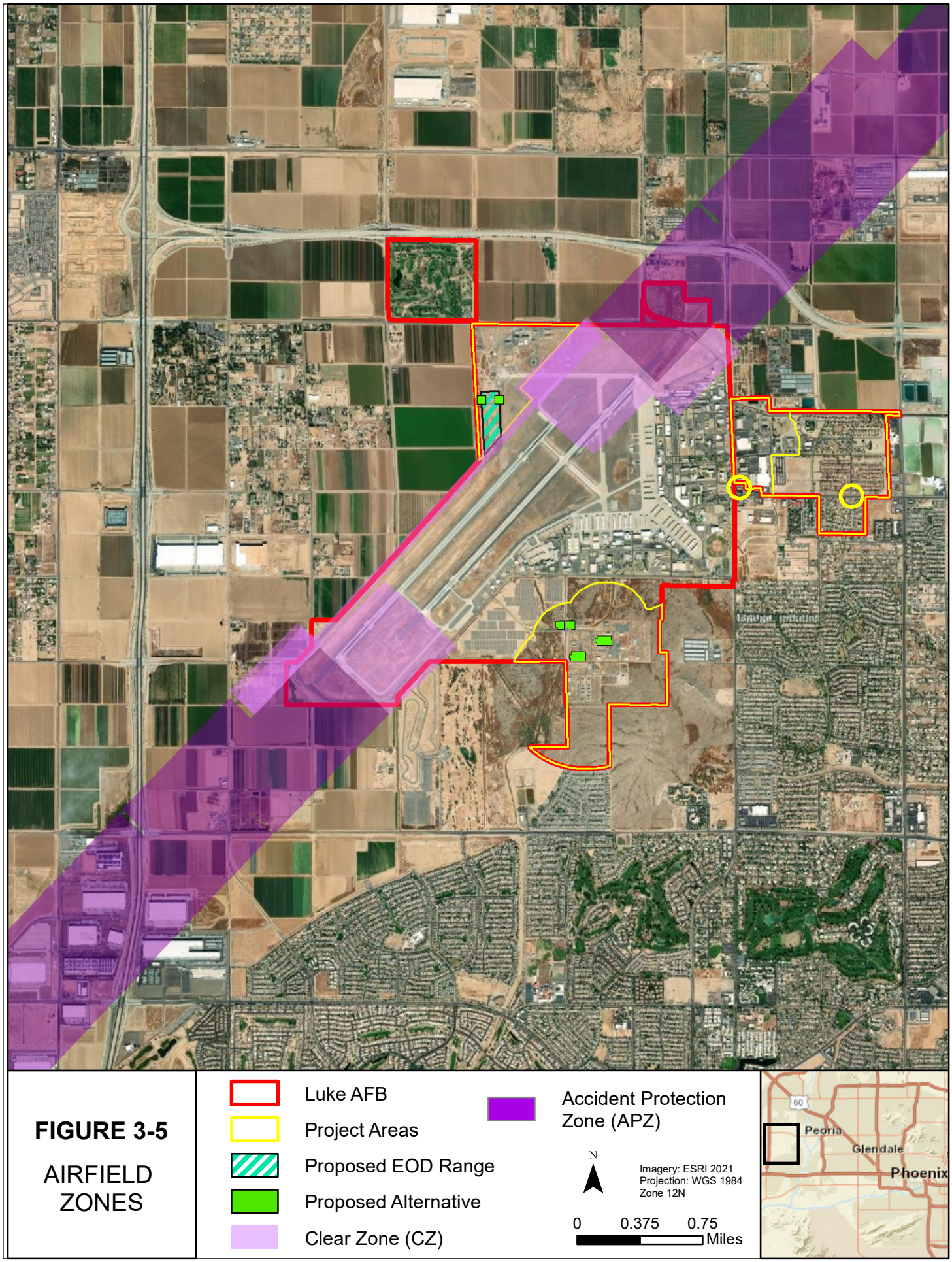

FIGURE 3-5

AIRFIELD ZONES

3.10.3.4 No Action Alternative

Under the No Action alternative, the projects included in the Proposed Action would not occur. Safety on Luke AFB would remain unchanged, but operations within the EOD Range and MSA would continue in substandard facilities that require constant maintenance and repair and have limited space. The EOD Range would remain within the airfield's runway lateral CZ, primary surface, and transitional surface, presenting a continuing airfield safety hazard. There would be no change to ground, explosives, or flight safety at Luke AFB. Without the pedestrian gate, access to Base housing areas would continue to be limited to vehicle access through the main gates. This promotes unsafe fence jumping by pedestrians to avoid long access routes.

3.11 SOCIOECONOMICS

3.11.1 Definition of the Resource

Socioeconomics is the relationship between economics and social elements, such as population levels and economic activity. Several factors can be used as indicators of economic conditions for a geographic area, such as demographics, median household income, unemployment rates, percentage of families living below the poverty level, employment, and housing data. Employment data identify gross numbers of employees, employment by industry or trade, and unemployment trends. Data on industrial, commercial, and other sectors of the economy provide baseline information about the economic health of a region. Socioeconomic data are typically presented at county, state, and national levels to characterize baseline socioeconomic conditions in the context of regional, state, and national trends.

The ROI for socioeconomics includes Luke AFB, surrounding communities, and Maricopa County.

3.11.2 Existing Conditions

3.11.2.1 Population

The population in Maricopa County was approximately 4.5 million people in 2020, an increase of 1.6 percent since 2010. Luke AFB is surrounded by five communities: Litchfield Park, Surprise, Glendale, Goodyear, and Buckeye, totaling approximately 585,000 people (**Table 3-7**). Of these communities, the city of Buckeye has been the fastest growing, with a population increase of 8 percent since 2010.

Table 3-7.
Community and County Population Estimates and Growth near Luke AFB.

Geographic Area	2010	2020	Average Annual Growth Rate 2010–2020 (percent)
Litchfield Park	5,476	6,847	2.5
Surprise	117,517	143,148	2.2
Glendale	226,721	248,325	1.0
Goodyear	65,275	95,294	4.6
Buckeye	50,876	91,502	8.0
Maricopa County	3,817,117	4,420,568	1.6

3.11.2.2 Employment

Total employment in Maricopa County in 2019 was estimated to be approximately 1.8 million people (US Census Bureau [USCB], 2022). Luke AFB is the largest employer in the West Valley region of the Phoenix metropolitan area; direct employment associated with Luke AFB is approximately 7,000 military and civilian

personnel (Maguire, 2017). An additional 4,400 indirect jobs are also attributed to Luke AFB. These include jobs created off-Base for providing supplies and materials and independent contractors. The estimated induced labor force created by Luke AFB was approximately 3,750 persons. Induced jobs are those created through the economic impact of Luke AFB in such industries as financial, education, food and service, recreational, and real estate. The estimated total job creation from Luke AFB is approximately 15,100 jobs. The total economic output or total value of goods and services produced by Luke AFB was estimated as $2.4 billion.

3.11.2.3 Housing

Approximately 83 percent of the military personnel stationed at Luke AFB live off Base (Maricopa Association of Governments, 2020). The surrounding communities of Surprise (17 percent), Glendale (13 percent), Goodyear (8 percent), and Buckeye (8 percent) are home to approximately 46 percent of military personnel living off Base. The Maricopa Association of Governments report, *Luke Air Force Base Targeted Growth Management Plan*, concluded that sufficient affordable housing inventory exists in the West Valley region to support Luke AFB. Of the estimated community housing demand in the West Valley region, approximately 10 percent or less is projected to be attributable to demand from the military community (Maricopa Association of Governments, 2020, Table H-1).

3.11.2.4 Schools

The West Valley region, where most of the military and civilian personnel stationed at Luke AFB live, encompasses all or part of 15 regular public school districts: seven elementary school districts, four high school districts, two unified school districts, and two “unorganized” districts (Maricopa Association of Governments, 2020). There are 112 public schools in the ROI, including standard public schools, magnet schools, and charter schools that offer diverse programming at all grade levels. Out of the 112 public schools, 36 are charter schools. The region has a strong public school system; private schools offer additional quality choices. On Base, the Child Development Center is near capacity, with some children already wait-listed because the capacity for their age group has been met. There is continuing need for childcare services to support the needs of military families.

3.11.3 Environmental Consequences

3.11.3.1 Evaluation Criteria

Consequences to socioeconomic resources were assessed in terms of the potential impacts on the local economy from implementation of the Proposed Action and Alternatives. The level of impacts from expenditures associated with the Proposed Action and Alternatives was assessed in terms of direct impacts on the local economy and indirect impacts on other socioeconomic resources (e.g., housing, employment). The magnitude of potential impacts can vary greatly depending on the location of an action. For example, implementation of an action that creates 10 employment positions might be unnoticed in an urban area but might have significant impacts in a rural region. In addition, if potential socioeconomic changes from a Proposed Action result in substantial shifts in population trends or in adverse effects on regional spending and earning patterns, such changes may be considered adverse.

3.11.3.2 Alternative 1

The proposed projects that would occur under Alternative 1 would not involve the addition of permanent military, contract, or civilian personnel or their families. Therefore, no impacts to the local or regional population would occur under implementation of Alternative 1.

Under Alternative 1, construction of new facilities and demolition of existing facilities would result in a temporary increase of 20 to 50 construction personnel, depending on the number of projects occurring at one time; this temporary increase would have a negligible beneficial impact on the socioeconomic condition on the region. Because there would be no permanent increase in military, contract, or civilian personnel,

there would be no need for additional housing. Therefore, no adverse impacts on employment, housing, or educational resources would occur under Alternative 1. When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at Luke AFB, no significant cumulative effects to employment, housing, or educational resources would be anticipated to occur under Alternative 1.

3.11.3.3 Alternative 2

Alternative 2 differs from Alternative 1 only in the location of new buildings. Therefore, potential socioeconomic impacts under Alternative 2 would be the same as those of Alternative 1. When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at Luke AFB, no significant cumulative effects to employment, housing, or educational resources would occur under Alternative 2.

3.11.3.4 No Action Alternative

Under the No Action alternative, the projects included in the Proposed Action would not occur. Therefore, any incremental increase in economic benefit from construction jobs would not occur.

3.12 ENVIRONMENTAL JUSTICE AND PROTECTION OF CHILDREN

3.12.1 Definition of the Resource

EOs direct federal agencies to address disproportionate environmental and human health effects in minority and low-income populations and to identify and assess environmental health and safety risks to children.

EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, pertains to environmental justice issues and relates to various socioeconomic groups and disproportionate impacts that could be imposed on them. This EO requires that federal agencies' actions substantially affecting human health or the environment do not exclude persons, deny persons' benefits, or subject persons to discrimination because of their race, color, or national origin. EO 12898 was enacted to ensure 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. Consideration of environmental justice concerns includes race, ethnicity, and the poverty status of populations in the vicinity of a proposed action.

EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, states that each federal agency "(a) shall make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children; and (b) shall ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks."

For the purposes of this analysis, minority populations are defined as Alaska Natives and American Indians, Asians, Blacks or African Americans, Native Hawaiians, and Pacific Islanders or persons of Hispanic origin (of any race); low-income populations include persons living below the poverty threshold as determined by the USCB; and youth populations are children under the age of 18 years.

Minority, low-income, and youth populations that could be disproportionately impacted by the project are addressed for the county and cities in the ROI (Luke AFB airfield and environs) and are compared with those populations in Arizona and the US.

3.12.2 Existing Conditions

In 2021, approximately 45 percent of the population of Maricopa County was part of minority ethnic groups (**Table 3-8**). This percentage is slightly higher than the national average of minorities and nearly the same

as the percentage of minority groups in Arizona. However, minority groups comprise less than 21.1 percent of the population in Litchfield Park, the community adjacent to and southeast of Luke AFB (**Figure 1-1**). In the communities surrounding Luke AFB, the communities of Glendale and Buckeye have the highest proportion of minority groups at 51 and 53.8 percent, respectively.

Approximately 11.6 percent of the population in Maricopa County lives below the poverty line. This percentage is similar to the poverty levels in Arizona and nationally (**Table 3-8**). The poverty level in the surrounding communities is highest in Glendale, at 18.2 percent. The poverty level in the other communities is lower than the county-wide average of 11.6 percent. The percent of youth (under age 18) in the local communities ranges from 20.9 in Litchfield Park to 29.4 percent in Buckeye.

Table 3-8.
Total Population and Populations of Concern by Community and Geographic Region

Community/ Geographic Area	Total Population	Percent Total Minority	Percent Hispanic or Latino[a]	Percent Below Poverty	Percent Youth[a]
Litchfield Park, AZ	6,847	21.1	13.8	8.8	20.9
Surprise, AZ	143,148	29.2	19.6	7.3	24.4
Glendale, AZ	248,325	51.0	38.2	18.2	25.5
Goodyear, AZ	95,294	42.1	28.0	8.0	24.5
Buckeye, AZ	91,502	53.8	43.5	9.1	29.4
Maricopa County	4,420,568	45.5	31.4	11.6	23.5
State of Arizona	7,151,502	46.2	31.7	12.8	22.5
United States	331,449,281	39.3	18.5	11.4	22.3

Note:
a. Hispanic and Latino denote a place of origin and percent youth are all persons under the age of 18.Environmental Consequences

3.12.2.1 Evaluation Criteria

Environmental justice analysis evaluates disproportionate and adverse effects on minority, low-income, and youth populations. Environmental justice issues could occur if an adverse environmental or socioeconomic consequence to the human population fell disproportionately upon minority, low-income, or youth populations. Ethnicity and poverty status was compared among local, county, state, and national data to determine if these populations could be disproportionately affected by the Proposed Action or Alternatives.

3.12.2.2 Alternative 1

Access to Luke AFB is restricted to military personnel, civilian employees, and assigned contract workers. Under Alternative 1, demolishing existing buildings and constructing new facilities in the MSA and the EOD Range would be restricted to those areas. Impacts to persons outside Luke AFB would not occur because the proposed activities are wholly contained within the Base. Therefore, there would be no disproportionate impacts to minority, low-income, or youth populations. The two pedestrian gates would be constructed on the perimeter of Luke AFB. Impacts to military personnel and members of the public would be short term and limited to restricted traffic lanes and speed limits in construction zones. These impacts would not result in disproportionate impacts to minority, low-income, or youth populations. When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at Luke AFB, no significant cumulative effects to environmental justice populations would occur under Alternative 1.

3.12.2.3 Alternative 2

Alternative 2 differs from Alternative 1 only in the location of new buildings. Therefore, potential impacts to minority, low-income or youth populations under Alternative 2 would be the same as those of Alternative 1. When considered in conjunction with other past, present, and reasonably foreseeable environmental trends

and planned actions at Luke AFB, no significant cumulative effects to environmental justice populations would occur under Alternative 1.

3.12.2.4 No Action Alternative

Under the No Action alternative, the projects included in the Proposed Action would not occur. Therefore, impacts to minority, low-income, and youth populations would not occur.

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