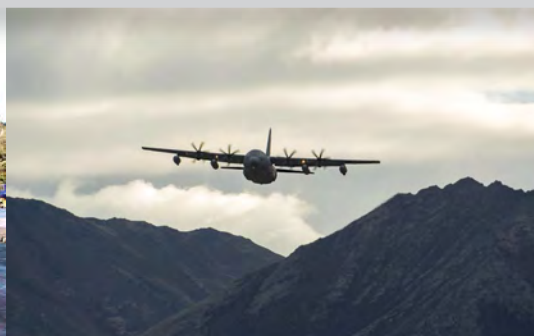
100% FINAL

JOINT BASE ELMENDORF-RICHARDSON, ALASKA

Air Installations Compatible Use Zones (AICUZ) Study

October 2019

U.S. AIR FORCE



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Air Force Civil Engineer Center
2261 Hughes Ave, Suite 155
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Lackland, TX 78236-9853

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS, JOINT BASE ELMENDORF-RICHARDSON
JOINT BASE ELMENDORF-RICHARDSON, ALASKA

MEMORANDUM FOR AREA GOVERNMENTS

FROM: Commander, Joint Base Elmendorf-Richardson
10471 20th Street, Suite 139
JBER, AK 99506-2200

SUBJECT: 2019 Air Installations Compatible Use Zones (AICUZ) Study

1. The 2019 AICUZ Study for Joint Base Elmendorf-Richardson (JBER) is an update of the 2006 and 2010 Air Force studies. This study is a reevaluation of operational noise and accident potential related to military operations. It incorporates changes to mission and base operations implemented since the 2010 merger Elmendorf Air Force Base and Fort Richardson Army Base. Updates include changes to range operations, changes to flight operations analyzed in the *Final Environmental Impact Statement (FEIS) for the Proposal to Improve F-22 Operational Efficiency at Joint Base Elmendorf-Richardson, Alaska, 2018*, and the future extension of Runway 16 to the north.

2. The AICUZ Study contains a description of the affected areas around the installation. It outlines the location of runway Clear Zones (CZs), Accident Potential Zones (APZs), and noise contours. The study provides recommendations for development that is compatible with military operations. It is my recommendation that local governments incorporate the results of this study into community plans, zoning ordinances, subdivision regulations, building codes, and other related documents.

3. This update provides noise contours based upon the Day-Night Average Sound Level (DNL) metric and utilizes a planning noise contour. Additionally, it provides noise zones associated with large caliber weapons and explosives, as well as small arms used at JBER's ranges. Long-range planning by local land use authorities involves strategies to influence present and future uses of land. The AICUZ Study provides planning contours to describe the long-term (5-10 year) noise environment for projected military operations that is more consistent with the planning horizon used by state, tribal, regional, and local planning bodies.

4. We greatly value the positive relationship JBER has with our neighbors. As a partner in the developmental planning process, we have attempted to minimize noise disturbances through such actions as quiet hours, the planned extension of Runway 16, runway utilization practices, and proactive public notification of scheduled noise-generating activities. I ask for your cooperation in implementing the recommendations and guidelines presented in this AICUZ Study update. I also hope that the updates to the AICUZ Study will aid in the development of local planning that will protect public health and safety, and preserve operational capabilities at JBER.

PATRICIA A. CSÀNK
Colonel, USAF
Commander

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Abbreviations and Acronyms

ABW	Air Base Wing
AFB	Air Force Base
AFH	Air Force Handbook
AFI	Air Force Instruction
AGL	Above Ground Level
AICUZ	Air Installations Compatible Use Zones
Air Force	United States Air Force
AKARNG	Alaska Air National Guard
APZ	Accident Potential Zone
ARNG	Army National Guard
ATC	Air Traffic Control(ler)
BASH	Bird/Wildlife Aircraft Strike Hazard
BNOISE	Blast Noise Model
BRAC	Base Realignment and Closure
CDNL	C-weighted Day-night Average Noise Level
CFR	Code of Federal Regulations
CZ	Clear Zone
dB	Decibel
dBA	A-weighted Decibel
dB PK 15 (met)	Single Event Peak Level Exceeded by 15% of Events
DNL	Day-night Average Sound Level
DoD	Department of Defense
DU/Ac	Dwelling Units per Acre
EMI	Electromagnetic Interference
EPA	United States Environmental Protection Agency
FAA	Federal Aviation Administration
FEIS	Final Environmental Impact Statement
GCA	Ground Control Approach
GIS	Geographic Information System
HAFZ	Hazards to Aircraft Flight Zone
Hz	Hertz
JBER	Joint Base Elmendorf-Richardson
JLUS	Joint Land Use Study (now called Compatible Use Program)
JPARC	Joint Pacific Alaska Range Complex
Lpk	Peak Sound Pressure Level
Mat-Su	Matanuska-Sustina
NLR	Noise Level Reduction
NORAD	North American Aerospace Defense Command
NVG	Night Vision Goggles
PA	Public Affairs
REPI	Readiness and Environmental Protection Integration

SARNAM	Small Arms Range Noise Assessment Model
SLUCM	Standard Land Use Coding Manual
T&G	Touch-and-Go
UAS	Unmanned Aircraft System
USARAK	U.S. Army Alaska
USARPAC	U.S. Army Pacific
VFR	Visual Flight Rules
WWII	World War II

1.0 Introduction

This 2019 JBER AICUZ Study updates the 2006 Elmendorf Air Force Base (AFB) Air Installations Compatible Use Zones (AICUZ) Study Update. The update presents and documents changes to the AICUZ since the previous study in 2006. It reaffirms the Air Force's policy of promoting public health, safety, and general welfare in areas surrounding an air installation while seeking development that is compatible with the defense flying mission. This study presents changes in flight operations since the previous study, incorporates ground training activities, and provides planning noise contours and recommendations for achieving development that is compatible with the defense flying and joint base mission.

1.1 AICUZ Program

Military installations attract development—people who work on the installation want to live nearby while others want to provide services to installation employees and residents. When incompatible development occurs near an installation or training area, affected parties within the community may seek relief through political channels that could restrict, degrade, or eliminate capabilities necessary to perform the defense mission. In the early 1970s, the Department of Defense (DoD) established the AICUZ Program. The goal of the program is to protect the health, safety, and welfare of those living and working near air installations while sustaining the Air Force's operational mission. The Air Force accomplishes this goal by promoting proactive, collaborative planning for compatible development to sustain mission and community objectives.

The AICUZ Program recommends that noise zones, Clear Zones (CZs), Accident Potential Zones (APZs), and flight clearance requirements associated with military airfield operations be incorporated into local community planning programs in order to maintain the airfield's operational requirements while minimizing the impact to residents in the surrounding community. Joint base activities often produce noise (e.g., small arms, large caliber weapons, or explosives), in addition to the noise produced by aircraft operations. Noise from these sources need to be integrated into the AICUZ Study and incorporated into local community planning programs. Cooperation between military airfield planners and community-based counterparts serves to increase public awareness of the importance of air installations and the need to address mission requirements and associated noise and risk factors in the public planning process. The military has the responsibility to communicate and collaborate with local governments on land use planning, zoning, and similar matters that could affect the installation's operations or missions. Likewise, the military has a responsibility to understand and communicate potential impacts that new and changing missions may have on the local community.

1.2 Scope and Authority

1.2.1 Scope

This AICUZ Study uses projected air and range operations. The Air Force provides Joint Base Elmendorf-Richardson's (JBER's) CZs, APZs, and noise zones associated with the airfield's runways and ranges to the local communities, along with recommendations for compatible land use near the installation for incorporation into comprehensive plans, zoning ordinances, subdivision regulations, building codes, and other related documents.

1.2.2 Authority

Authority for the Air Force AICUZ Program lies in two documents:

- Air Force Instruction (AFI) 32-1015, *Integrated Installation Planning,* provides guidance to installation AICUZ Program Managers.
- Air Force Handbook (AFH) 32-7084, *AICUZ Program Manager's Guide,* provides installation AICUZ Program Managers with specific guidance concerning the organizational tasks and procedures necessary to implement the AICUZ Program. It is written in a "how to" format and aligns with AFPD 32-70, *Environmental Quality*.

1.3 Previous AICUZ Efforts and Related Studies

Previous studies relevant to this AICUZ Study include:

- 1993/2000 Elmendorf AFB AICUZ Study;
- 2006 Elmendorf AFB AICUZ Study Update (Internal Working Document);
- 2010 Matanuska-Susitna Borough Joint Land Use (JLUS) Study;
- 2018 Proposal to Improve F-22 Operational Efficiency at Joint Base Elmendorf-Richardson, Alaska, Final Environmental Impact Statement (FEIS) (hereafter referred to as the 2018 F-22 Operational Efficiency FEIS); and
- 2019 Alaska Army National Guard (ARNG) Installation Compatible Use Zones Study.

1.4 Changes that Require an AICUZ Study Update

This 2019 JBER AICUZ Study updates the 2006 AICUZ Study Update. This update provides the installation's flight tracks, CZs, APZs, and noise zone information through the most accurate representation of the installation's future aircraft and range activities, as projected through 2024. As such, the AICUZ Program allows surrounding communities to consider both current and potential activities when making land use decisions.

As the DoD aircraft fleet mix and training requirements change over time, the resulting flight operations change as well. These changes can affect noise contours and necessitate an AICUZ Study update. Additionally, non-operational changes, such as noise modeling methods and a local community's land use, may require the need for an update. Per AFI 32-1015 and AFH 32-7084, the primary changes since the previous AICUZ Study that necessitate this update include:

- Updates to the base since JBER was created as a result of the Base Realignment and Closure (BRAC) 2005 decision merging Elmendorf AFB and U.S. Army Fort Richardson in 2010;
- Updates to operations as a result of the 2018 F-22 Operational Efficiency FEIS. The Record of Decision will implement FEIS Alternative F, which includes extending Runway 16/34 to the north by 2,500 feet, resulting in a 10,000-foot north-south runway that will be used for more efficient F-22 flight operations;
- JBER is adding F-22 aircraft and operations from Tyndall AFB, Florida;
- Changes in off-installation land use;
- Changes to noise contours for range and flight operations; and
- Changes in flight tracks.

More information on operations and these changes is provided in Sections 3.4 and 3.6 of this AICUZ Study.

2.0 Joint Base Elmendorf-Richardson, Alaska

2.1 Location

JBER is located in south-central Alaska, between the Cook Inlet and Chugach Mountains within the Municipality of Anchorage (Figure 2-1). The base is bordered to the north and west by the Knik Arm of Cook Inlet, and the Matanuska-Sustina (Mat-Su) Borough is located to the north. The base covers approximately 79,000 acres and is bisected by Highway 1, commonly known as Glenn Highway, and the Alaska Railroad. JBER is comprised of additional land holdings, which include separate facilities, ranges, and training areas throughout the region and state. This 2019 AICUZ Study focuses on the specific operation areas that include:

- **Elmendorf Airfield**: This airfield is located on the western side of the installation and includes two runways and various support facilities;

- **Bryant Army Airfield**: This airfield is centrally located on the installation and consists of one runway, helipads, and support facilities; and

- **JBER Ranges and Training Areas:** JBER has approximately 50,000 acres available for training, including designated ranges, drop zones, firing points, and maneuver training areas.

The airfields and ranges are described further in Sections 2.5 and 2.6, respectively.

2.2 History

JBER was created as a result of merging Elmendorf AFB and U.S. Army Fort Richardson in 2010, in accordance with the 2005 BRAC Commission's recommendations. The decision established the Air Force as the supporting agency to the entire joint base.

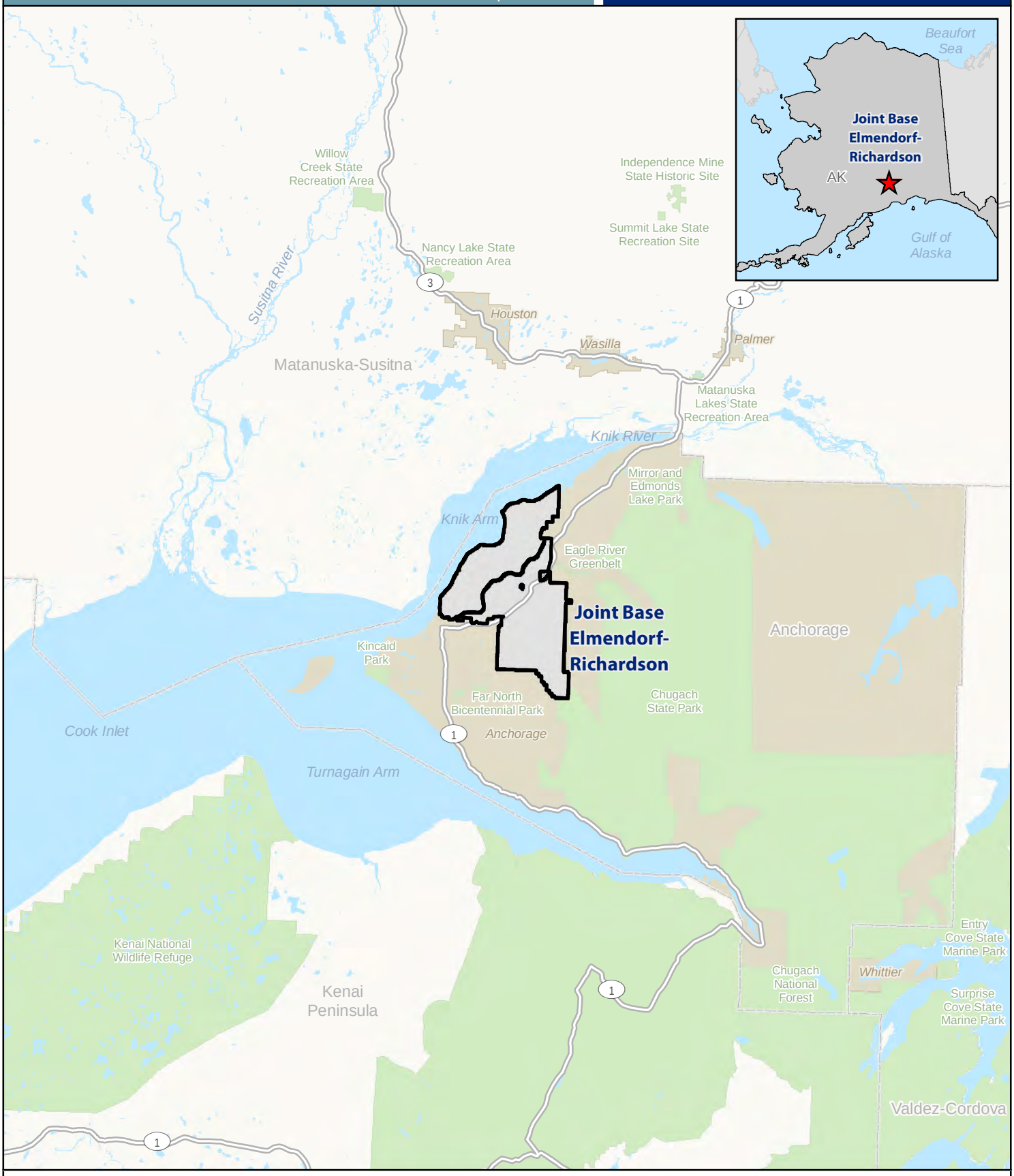
Prior to joint basing, both the Air Force and Army had a long history in the area. Fort Richardson initially was built in 1940-1941 and was named for Army Brigadier General Wilds P. Richardson, who headed the Alaska Road Commission and built garrisons and trails throughout the territory, among other accomplishments. In 1940, the War Department formally designated what had been commonly referred to as Elmendorf Field to be Fort Richardson. After World War II (WWII), the Army moved its operations to a new site, also called Fort Richardson, and the Air Force assumed control of the original Fort Richardson and renamed it Elmendorf AFB. The air facilities and field on the new post was named Elmendorf Field, after Army Air Corps Captain Hugh M. Elmendorf.

Figure 2-1

Joint Base Elmendorf-Richardson

Air Installations Compatible Use Zones

Regional Setting



Legend

- Installation Boundary
- Borough Boundary
- City
- Major Highway
- Waterbody
- Park/Recreation Area

N

0 5 10 Miles

Source: AFCEC 2018, 2019; DoD 2017; ESRI 2017; U.S. Census Bureau 2018.

2.2.1 Air Force

The 11th Air Force was re-designated as the Alaskan Air Command on December 18, 1945. The Alaskan Command, established January 1, 1947, headquartered at Elmendorf, was a unified command under the Joint Chiefs of Staff. After WWII, Elmendorf AFB took on a growing role in the defense of North America into the Cold War. During the 1940s and 1950s, there was a build-up of air defense forces in Alaska.

The Air Force built an extensive aircraft control and warning radar system, with sites located throughout Alaska's interior and coastal regions. The Alaskan North American Aerospace Defense Command (NORAD) Regional Operations Control Center at Elmendorf served as the center for all air defense operations in Alaska.

Air defense forces reached their peak in 1957, with almost 200 fighter aircraft assigned to six fighter interceptor squadrons located at Elmendorf AFB and Ladd AFB. Eighteen aircraft control and warning radar sites controlled their operations. However, following the peak and through the early 1970s, there was a gradual decline in air defense forces in Alaska due to mission changes and the demands of the Vietnam War. The Air Force inactivated five fighter squadrons and closed five radar sites. The Alaskan Command was disestablished in 1975. Elmendorf began providing more support to other Air Force commands, particularly Military Airlift Command C-5 and C-141 flights to and from the Far East. A shift occurred in 1970 with the arrival of the 43rd Tactical Fighter Squadron in June 1970 from MacDill AFB, Florida. The squadron gave Alaskan Air Command an air-to-ground capability that was further enhanced with the activation of the 18th Tactical Fighter Squadron at Elmendorf (also with F-4Es) on October 1, 1977.

The Alaskan Command was reestablished at Elmendorf in 1989 as sub-unified joint service command under the Pacific Command in recognition of Alaska's military importance in the Pacific region. The early 1990s carried organizational changes and an expansion of Elmendorf's importance. In 1991, the 21st Tactical Fighter Wing was reorganized as an objective wing and all the major tenant units on Elmendorf were placed under it. The 21st Tactical Fighter Wing was inactivated and the 3rd Wing was reassigned from Clark Air Base to Elmendorf Air Force Base on December 19, 1991. Today, JBER maintains its importance due to its strategic location and training facilities.

2.2.2 Army

In 1947, the new name for the headquarters for all Army personnel in Alaska became U.S. Army Alaska (USARAK). Military missions assigned to USARAK included: ground and air defense of Alaska, with priority to the Anchorage and Fairbanks areas; development of cold-weather and mountain-warfare doctrines; conducting a cold-weather and mountain school at Fort Greely; providing logistical support to Air Force and Navy elements in Alaska; conducting National Guard and U.S. Army Reserve training; supervising Reserve Officer Training Corps activities; and providing internal security, including plans for

recovery from a nuclear attack. By 1959, several Nike Hercules missile battalions were activated in the Anchorage and Fairbanks areas and operated under the last unit inactivated in 1979.

Around 1994, Army forces in Alaska reorganized under the command of USARAK, headquartered at Fort Richardson, with the 172nd Infantry Brigade as the principal combat formation, split-stationed at both Fort Richardson and Fort Wainwright. The Army underwent a major transformation in the early 2000s that witnessed a significant expansion of forces in Alaska, to include activation of two Brigade Combat Teams and numerous supporting organizations.

Today, USARAK is headquartered at JBER and is aligned as a major subordinate command U.S. Army Pacific (USARPAC). USARAK provides trained and ready forces in support of worldwide unified land operations and supports theater engagement in the Pacific/Arctic and military operations in the Alaska Joint Operations Area in order to contribute to a stable and secure operational environment.

2.3 Mission

JBER is one of 12 DoD joint bases. JBER is important to U.S. national security because of its strategic location and mix of military capabilities, including its air/ground force combined with Alaska training facilities. JBER's military capabilities include F-22 Raptors, Pacific Command's only airborne brigade, and the C-17 Globemaster IIIs, among others. The 673d Air Base Wing (ABW) is the host wing, combining installation management functions of Elmendorf AFB's 3rd Wing and U.S. Army Fort Richardson. The 673 ABW consists of four groups that operate and maintain the joint base for air sovereignty, combat training, force staging, and throughput operations in support of worldwide contingencies. The combination of JBER's air/ground force coupled with training facilities, such as the Joint Pacific Alaska Range Complex (JPARC), makes JBER a key installation within the DoD.

2.4 Host and Tenant Organizations

JBER hosts the headquarters for the Alaskan Command, 11th Air Force, USARAK, and the Alaskan NORAD Region. There are nearly 70 other organizations that call JBER home. Some of these include the 715th Air Mobility Operations Group, the 3rd Air Support Operations Squadron, the 381st Intelligence Squadron, the Air Force Reserve's 477th Fighter Group, the Canadian Forces Detachment, the U.S. Air Force Band of the Pacific, the Marine Corps Reserve Training Center, the U.S. Army Corps of Engineers, and the Armed Services YMCA of Alaska, among others. This AICUZ Study focuses on the tenants stationed at JBER, described in the sections below.

2.4.1 673d Air Base Wing

The 673 ABW is the host unit for JBER and supports and enables three Air Force total-force wings, two Army brigades, and 75 associate and tenant units. The 673 ABW is responsible for providing expeditionary combat support and the day-to-day operations of the installation, to include ensuring timely fire, medical, and emergency services, providing deployment and redeployment support for nearly 9,000 deployable Soldiers and Airmen, planning, building and sustaining a $15 billion infrastructure, and more. The 673 ABW is composed of the 673d Medical Group, the 673d Civil Engineering Group, the 673d Logistics Readiness Group, the 673d Mission Support Group, and more than a dozen Wing Staff agencies (Staff Judge Advocate, Public Affairs (PA) Office, Installation Safety Office, AFSO21, and the Sexual Assault Prevention and Response Office).

2.4.2 11th Air Force

The 11th Air Force plans, conducts, controls, and coordinates air operations in accordance with the tasks the Pacific Air Forces Commander assigns and is the force provider for Alaskan Command, the Alaskan NORAD Region, and other unified commanders. This mission is largely accomplished through the 611th Air Operations Center and 611th Air Support Group. Together, they provide a network of critical surveillance and command, control, and communications functions necessary to perform all tactical warning and attack assessment in defense of Alaska.

2.4.3 3rd Wing

The 3rd Wing provides trained and equipped tactical, all-weather strike assets, command and control platforms, and tactical airlift resources for contingency operations. The 3rd Wing provides immediate early airborne detection, warning, surveillance, and interception of hostile forces within the Alaskan NORAD Region. The 3rd Wing flies the F-22, C-17, C-12, and E-3 aircraft. The Wing consists of the 3rd Operations Group, which is supported by the 3rd Operations Support Squadron, 90th Fighter Squadron, 517th Airlift Squadron, 962nd Airborne Air Control Squadron, and the 525th Fighter Squadron. The 3rd Wing is comprised of the 3rd Maintenance Group, which is supported by the 3rd Maintenance Operations Squadron, 3rd Munitions Squadron, 3rd Maintenance Squadron, 3rd Aircraft Maintenance Squadron, and the 703rd Aircraft Maintenance Squadron.

2.4.4 U.S. Army Alaska

The USARAK Commander overseas all Army combat forces in Alaska, including major units at both JBER and Fort Wainwright. USARAK's headquarters is located at JBER. USARAK is at the forefront of protecting U.S. interests around the world. Successful combat tours by the 4th Brigade Combat Team (Airborne), 25th Infantry Division, elements of the Arctic Support Command, and many other supporting units assigned to JBER mark the Army's continued commitment to their mission at JBER.

2.4.5 Alaska National Guard

Alaska Air National Guard (AKARNG): The AKARNG has three locations across the state—Anchorage, Fairbanks, and Clear. The AKARNG performs several unique missions and is a critical player in maintaining peaceful relations with Russia. The AKARNG stands prepared with combat-ready, adaptable, Alaskan citizen Airmen to respond to the Governor of Alaska for state emergencies or the call of the President in times of crisis.

176th Wing (Air National Guard): The 176th Wing is one of the largest and most active wings in the entire Air National Guard. The 176th Wing is composed of more than 1,500 Airmen who integrate into all DoD, Active Component, Air Reserve Command, and Defense Support to Civil Authorities operations. Its missions include combat search and rescue, tactical airlift, strategic airlift, air control, and rescue coordination. In addition to being based at JBER, they have an additional detachment at Eielson AFB, Alaska.

Alaska Army National Guard: The Alaska ARNG is an essential element of the U.S. military. As direct descendants of the Alaska Territorial Guard and the "Eskimo Scouts," current members support the citizens of Alaska during times of domestic emergencies and stand ready to meet the needs of the United States of America at a moment's notice.

2.5 Airfield Environment

2.5.1 Elmendorf Airfield

Located on the western side of the installation, the airfield (Figure 2-2) includes, but is not limited to, aircraft hangars for maintenance and storage, aircraft parking ramps and taxiways, two hard surface runways, assorted office buildings, and support facilities. These facilities include hush houses for engine run maintenance and munitions storage areas. The two runways (the main runway and the cross-wind runway) are oriented to a magnetic heading. The main runway , Runway 06/24, is an east-west runway; it faces west on a heading of 060° and the opposite end faces east on a heading of 240°. The cross-wind runway (north-south runway), Runway 16/34, faces north on a heading of 016° and the opposite end faces south on a heading of 340°.

A runway is typically used in both directions and counted as two separate runways, depending on the direction of the departure. Each direction is labeled as a separate runway and numbered based on its magnetic heading, divided by 10 and rounded to a whole number. Parallel runways have the same heading and are distinguished by the suffix "L" for 'left' and "R" for 'right.'

Operational, airspace safety, and environmental constraints, as well as a variety of other factors determine runway utilization, which is discussed in Section 3.5. For example, the Air Force has to comply with Federal Aviation Administration (FAA) opposite direction operations policy that applies to the use of one runway for two-directional traffic. The policy limits the use of Runway 24 for departures. There is potential conflict with general aviation at busy nearby airfields that prevent departures from Runway 16, and noise abatement restricts departures from Runway 34 (Air Force 2018).

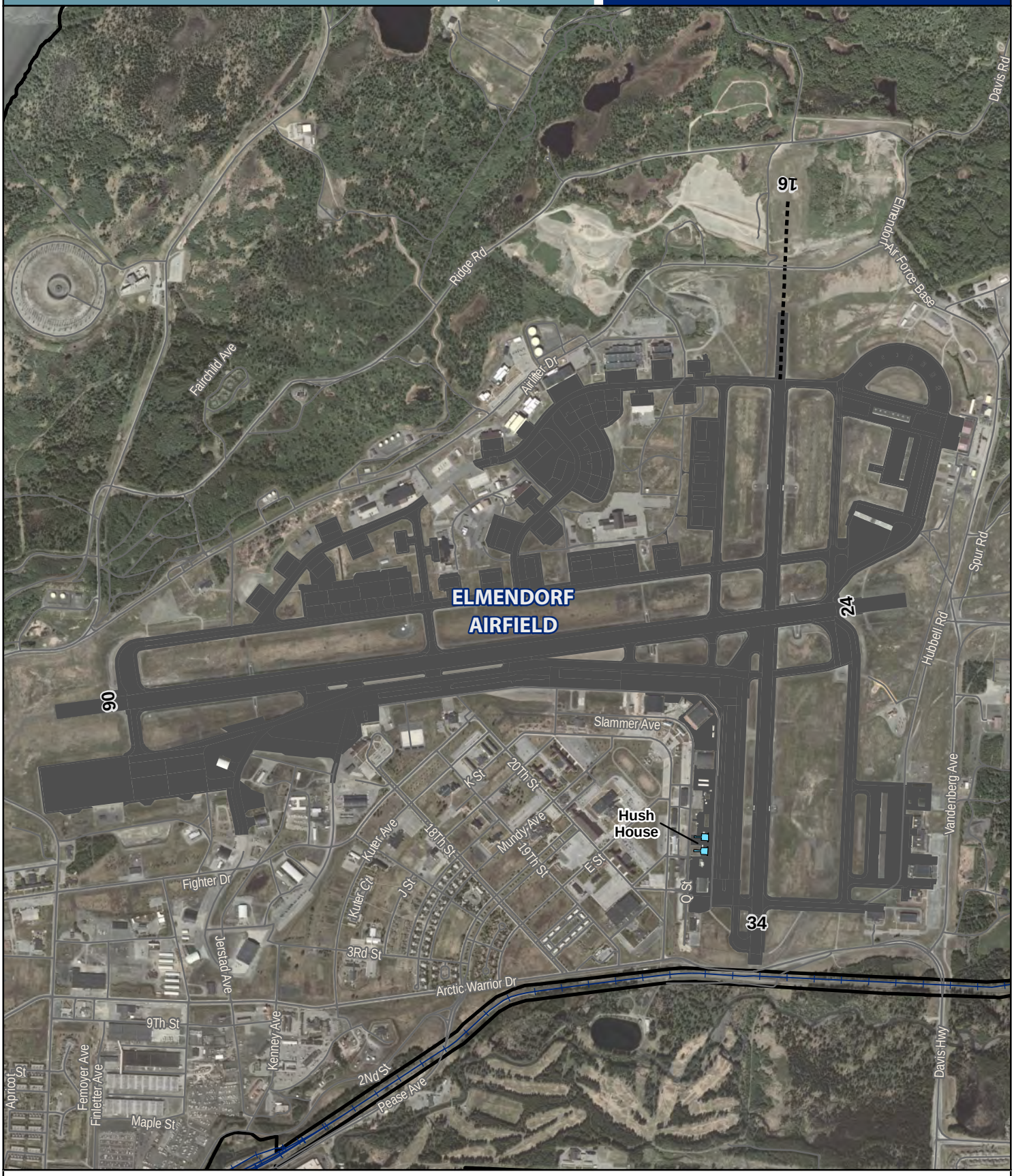
This AICUZ Study update incorporates the Runway 16/34 extension (illustrated on Figure 2-2) documented in the 2018 F-22 Operational Efficiency FEIS to support the accurate depiction of the 2024 AICUZ planning contours.

Elmendorf Airfield supports helicopter operations on both runways and life flight helicopter operations associated with the 673d Medical Group, located on JBER southeast of Elmendorf Airfield.

Figure 2-2

Joint Base Elmendorf-Richardson
Air Installations Compatible Use Zones

Elmendorf Airfield Diagram, JBER



Legend

- Hush House
- Installation Boundary
- Airfield Surface Area
- Runway 16 Extension
- Railroad
- Road

0 0.25 0.5 Miles

N

Source: AFCEC 2018; Digital Globe 2017; NGA/DHS 2015.

2.5.2 Bryant Army Airfield

Centrally located on JBER, Bryant Army Airfield (Figure 2-3) consists of one north-south runway, Runway 17/35. In one direction, the runway faces north on a heading of 017° and at the opposite end has a south heading of 350°. Bryant Army Airfield supports helicopter operations at designated helipads and on Runway 17/35. There are no facilities adjacent to the runway; however, assorted office buildings and support facilities are located along the perpendicular taxiway. The runway in use is determined by aircraft type and the mission conducted.

2.6 Range Environment

A large portion of JBER, consisting of approximately 50,000 acres, is designated for training purposes and referred to as "JBER ranges" or "ranges" in this study. JBER ranges, are part of the JPARC and provide a unique and diverse training environment with coastal lowlands, glacial features, lakes, swamps, and mountains, which are all critical to homeland defense missions and exercises that support all branches of the military. The JBER ranges span from the eastern portion of JBER from the southernmost boundary to the northern boundary along Cook Inlet and the Knik Arm encompassing a majority of the land area not associated with airfield activities or installation support services. The ranges are bordered by the Chugach Mountains and Chugach State Park to the southeast, the municipality of Anchorage to the southwest, and Eagle River and Mat-Su Valley to the northeast.

JBER ranges support a variety of training exercise and activities. There are drop and landing zones, weapons marksmanship and live fire ranges/facilities, and non-live fire facilities at JBER. Live fire training activities include small arms and large caliber weapons and explosives, all of which generate noise and, therefore, are included in this AICUZ Study update. These activities are described further in Section 3.6.

Figure 2-3

Joint Base Elmendorf-Richardson
Air Installations Compatible Use Zones

Bryant Army Airfield Diagram, JBER

Legend

- Installation Boundary
- Airfield Surface Area
- Road

0 0.25 0.5 Miles

N

Source: AFCEC 2018; Digital Globe 2017; ESRI 2017.

2.7 Local Economic Impacts

The military provides direct, indirect, and induced economic benefits to local communities through jobs and wages. Benefits include employment opportunities and increases in local business revenue, property sales, and tax revenue.

The economic impact of a military installation is based on annual payroll (jobs and salaries), annual expenditures, and the estimated annual dollar value of the jobs created. The military further contributes to the economic development of communities through increased demand for local goods and services and increased household spending by military and civilian employees.

Based on the Fiscal Year 2018 Economic Impact Analysis, JBER employs 10,228 active duty personnel, 1,815 Air Force Reserve/Air National Guard personnel, and 304 Non-extended Active-duty Reserve/Air National Guard, for a total of 12,347 personnel. In addition, JBER employs about 3,414 civilians. JBER's economic impact on the state of Alaska in Fiscal Year 2018 was approximately $1.8 billion.

Tables 2-1 to 2-5 provide summaries of personnel for JBER, the economic impact of the installation, military and civilian payroll, and construction, contracts, and expenditures for materials, equipment, and supplies based on JBER's Fiscal Year 2018 Economic Impact Analysis.

Table 2-1. Total Military Personnel and Dependents by Classification and Housing Location (Total Persons)

Classification	On-installation Residents	Off-installation Residents	Total
Active Duty (Air Force and Army)	5,836	4,392	10,228
Dependents	4,799	8,027	12,826
Air Force Reserve/Air National Guard	59	1,756	1,815
Non-Extended Active Duty Air Force Reserve/Air National Guard	19	285	304
Total	**10,713**	**14,460**	**25,173**

Source: JBER 2018

Table 2-2. Total Civilian Personnel by Appropriated and Non-appropriated Funds (Total Persons)

Appropriated Fund Civilians	Total
Air Force General Schedule	1,231
Air Force Federal Wage Board	942
Army	285
Other	78
Sub-Total	2,536
Non-appropriated Fund Contract Civilians and Private Business	**Total**
Civilian Non-appropriated Fund	598
Civilian Base Exchange	267
Contract Civilians	0
Private Business	13
Sub-Total	878
Total	**3,414**

Source: JBER 2018

Table 2-3. Annual Military Payroll by Classification and Housing Location in Fiscal Year 2018

Classification	On-installation Residents	Off-installation Residents	Total
Active Duty	$147,243,761	$654,596,689	$801,840,450
Air Force Reserve/Air National Guard	$77,692	$61,877	$139,569
Non-extended Active Duty Air Force Reserve/Air National Guard	$363,688	$5,455,311	$5,818,999
Total	**$147,685,141**	**$660,113,877**	**$807,799,018**

Source: JBER 2018

Table 2-4. Annual Civilian Payroll by Appropriated and Non-appropriated Funds in Fiscal Year 2018

Appropriated Fund Civilians	Amount
Air Force General Schedule	$103,276,625
Air Force Federal Wage Board	$69,907,390
Army	$32,321,064
Other	$5,945,381
Sub-total	$211,450,460
Non-appropriated Fund Civilians	**Amount**
Civilian Non-appropriated Fund	$17,331,008
Civilian Base Exchange	$9,600,000
Contract Civilians (not elsewhere included)	$0
Private Businesses on Base (Branch Banks/Credit Union)	$525,905
Sub-total	$27,456,913
Total	**$238,907,373**

Source: JBER 2018

Table 2-5. Summary of Construction, Contracts, and Expenditures for Materials, Equipment, and Supplies

Expense Category	Amount
Military Construction Program	$0
Non-Appropriated Fund	$0
Military Family Housing	$0
Operating and Maintenance	$39,323,770
Other	$13,761,867
Services Contracts[1]	$206,446,359
Other Services (not elsewhere included)	$1,940,164
Commissary	$45,316,247
Base Exchange	$39,500,000
Health (TriCare, Government cost only)	$20,350,244
Education (impact aid and tuition assistance)	$23,517,098
Temporary Duty	$22,216,900
Other Materials, Equipment, Supplies (not elsewhere included)[2]	$30,207,311
Total Annual Expenditure	**$442,579,960**

Source: JBER 2018

Notes:

[1] Includes total contracts to Alaska businesses of King Salmon/Wake Island/Eareckson's Base Operating Support and Alaska Radar Systems contracts.

[2] Total dollars spent with Alaska businesses using Government Purchase Card.

3.0 Operations

As a joint base, the primary sources of noise associated with JBER are aircraft operations and ground training activities. Aircraft operations are the primary source of noise associated with a military air installation. Air-to-ground and ground-to-ground munitions delivery are the primary sources of noise associated with military ranges. The level of aircraft-related noise exposure relates to a number of variables, including the aircraft type, engine power setting, altitude flown, direction of the aircraft, flight track, temperature, relative humidity, frequency, and time of operation (day/night). The noise exposure level associated with ground training activities or range activities relates to a number of variables, including munition type and delivery, firing points, targets, terrain, vegetation, and weather conditions.

This chapter discusses the aircraft based at or transient to JBER, the types and number of operations conducted at the airfields, and the runways and flight tracks used to conduct the operations and operations conducted on JBER ranges.

3.1 Aircraft Types

There are two primary types of aircraft operating at JBER: fixed-wing (airplanes and jets) and rotary-wing (helicopters). These aircraft are permanently based at JBER and are the most common aircraft conducting flight operations at the installation. Aircraft that are not permanently assigned to the installation but conduct operations from the installation on an occasional basis, are referred to as "transient" aircraft. Brief descriptions of assigned aircraft and the most common transient aircraft at JBER are provided below.

3.1.1 Permanently Assigned Aircraft

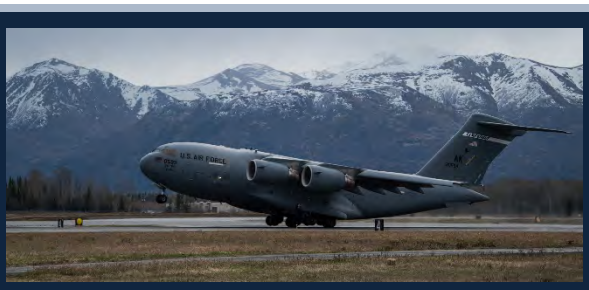
F-22 Raptor

The F-22 Raptor is a fifth-generation, single-seat, twin-engine, all-weather, stealth tactical fighter aircraft. The F-22 performs both air-to-air and air-to-ground missions and is a critical component of the Global Strike Task Force.

C-17 Globemaster III

The C-17 Globemaster III is a cargo aircraft capable of rapid, strategic delivery of troops and all types of cargo to main operating bases or directly to forward bases in the deployment area. The maximum payload capacity of the C-17 is 170,900 pounds, and it has an approximate cruise speed of 450 knots. The aircraft is operated by a crew of three: a pilot, co-pilot, and loadmaster.

F-22 Raptor



C-17 Globemaster III

C-12F Huron

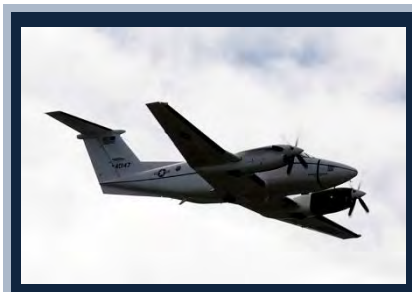
The C-12F Huron is a twin turboprop aircraft that provides operational support airlift of passengers and cargo. The C-12 has a crew of two and can carry up to eight passengers. The aircraft has a cargo capacity of 56 cubic feet. The C-12 can transport patients on medical evacuation litters.

HC-130J Combat King II

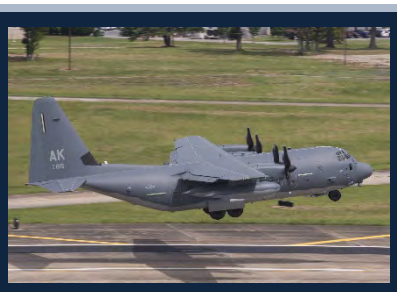
The HC-130J Combat King II is a version of the well-known C-130 Hercules tactical transport aircraft that has been specially modified and upgraded to perform combat search-and-rescue missions. The HC-130J supports missions in all-weather and geographic environments, including reaching austere locations. The HC-130J is also tasked for airdrop, helicopter air-to-air refueling, and forward-area ground refueling missions. It supports humanitarian aid operations, disaster response, security cooperation/aviation advisory, and evacuation operations.

E-3 Sentry

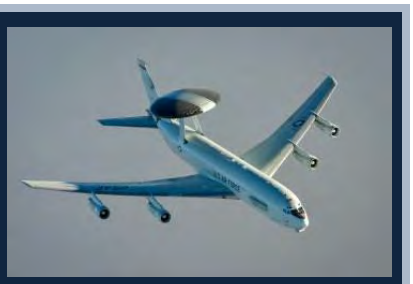
The E-3 Sentry is an airborne warning and control system, or AWACS, aircraft with an integrated command and control battle management, surveillance, target detection, and tracking platform. It is a modified Boeing 707/320 commercial airframe with a rotating radar dome.



C-12F Huron



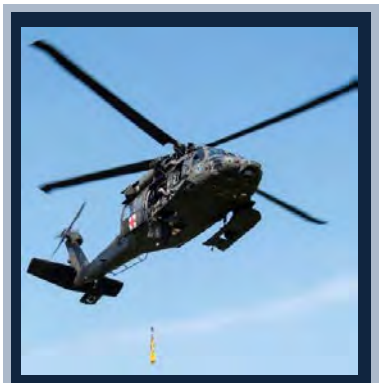
HC-130J Combat King II



E-3 Sentry

UH-60 Black Hawk/HH-60 Pave Hawk

The UH-60 Black Hawk is a twin-engine, medium-lift helicopter that provides air assault, general support, aero-medical evacuation, command and control, and special operations support to combat and stability operations. An 11-person fully-equipped infantry squad can be lifted in a single Black Hawk. The Sikorsky MH060G Pave Hawk is a twin turboshaft engine helicopter in service with the Air Force. It is a derivative of the UH-60 Black Hawk and incorporates the Air Force's PAVE electronic systems program.



UH-60 Black Hawk

HH-60 Pave Hawk

CH-47 Chinook

The CH-47 Chinook is a twin-engine, tandem rotor, heavy-lift helicopter that provides multi-mission transport of troops and supplies. The CH-47 is capable of carrying a useful load of 24,000 pounds and has a mission radius of 200 nautical miles. The CH-47 Chinook can transport 36 troops, including three crew as well as 24 litters during medical evacuation missions. This helicopter has 42 cubic meters of cargo space within the cabin that can be directly accessed by a ramp in the rear of the airframe. It has a triple hook system on the underside that provides increased stability during the transport of large external loads.

UH-72 Lakota

The UH-72 Lakota is a twin-engine, light duty helicopter with a single four-bladed main rotor and a single two-bladed tail rotor. The UH-72 Lakota can transport eight passengers, including two crew or two litters during medical evacuations. The cabin on the UH-72 Lakota can be accessed using doors mounted on each side of the aircraft as well as through large clamshell doors on the rear of the fuselage. The UH-72 Lakota has a range of 370 nautical miles.

CH-47 Chinook

UH-72 Lakota

Unmanned Aircraft Systems

JBER hosts Unmanned Aircraft Systems (UAS), including the RQ-11 Raven and RQ-7 Shadow. The RQ-11 Raven is a small (packable) UAS powered by a direct-drive electric motor and has a wingspan of 4.5 feet, a length of 3 feet, and a weight with a gimbaled payload of 4.8 pounds. The RQ-11 Raven has a cruising speed of 26 miles per hour and a range of approximately 6 miles. The Raven has a mission length of 60 to 90 minutes and can operate at 150 to 1,000 feet above the ground surface. Two trained Airmen operate the Raven and it is hand-launched. The RQ-7 Shadow is a large tactical UAS. The RQ-7Shadow has a wingspan of 20 feet and a payload capacity of 60 pounds. The RQ-7 Shadow has a mission length of over 8 hours at a distance of 31 miles. This UAS is used for reconnaissance, target acquisition, surveillance, and force protection.

3.1.2 Transient Aircraft

Some of the same aircraft that are permanently assigned to JBER are also transient aircraft. These aircraft include the C-12F, HC-130J, C-17, and the UH/HH-60. Additional common transient aircraft include fighters, bombers, transport, refueling aircraft, and other UAS. While not an exhaustive list, some of the transient aircraft present at JBER are listed below.

C-21

The C-21 is a twin turbofan-engine aircraft used for passenger and cargo airlift. The aircraft can transport one litter or five ambulatory patients for aeromedical evacuation operations. It has a crew of two and can carry eight passengers and 42 cubic feet of cargo. The C-21 is the military version of the Learjet 35A business jet.

B-737

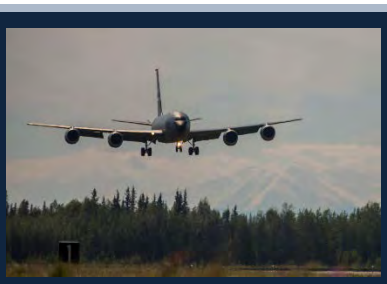
The Boeing 737 (B-737) is a short- to medium-range twin-engine jet that was developed and manufactured by Boeing Commercial Airplanes in the United States. The B-737 is a common commercial jetliner used worldwide. There have been several series of the B-737, including the original, classic, next generation, business jet, and most recently, the MAX.

KC-135 Stratotanker

The KC-135 Stratotanker is a military aerial refueling aircraft with a crew of three. It provides aerial refueling support to Air Force, Navy, Marine Corps, and allied nation aircraft. The Stratotanker is capable of transporting litter and ambulatory patients using patient support pallets during aeromedical evacuations.

C-21

B-737



KC-135 Stratotanker

3.2 Maintenance Operations

Maintenance is an integral part of any flying operation and requires a dedicated team of professionals to ensure that units can meet their flying requirements. Two key tasks in maintaining aircraft are low- and high-powered engine maintenance runs.

Aircraft maintainers may conduct engine maintenance runs at power settings ranging from idle to maximum power. Maintainers typically conduct low- to mid-range-powered engine maintenance runs on aircraft parking ramps or just outside of maintenance hangars. High-powered engine maintenance runs are typically conducted in test cells (for out-of-frame engine testing) and in acoustical enclosures, commonly referred to as "hush houses" (i.e., buildings specifically designed to muffle engine noise during in-frame testing). Elmendorf Airfield has hush houses and Bryant Army Airfield does not. Noise associated with these operations is included in the noise analysis for the JBER noise contours.

Less than 5% of engine runs are conducted between 10:00 p.m. and 7:00 a.m.; however, depending on mission necessity, maintenance engine runs could increase during nighttime hours.

3.3 Flight Operations

Flight activities, including where aircraft fly, how high they fly, how many times they fly over a given area, and the time of day they operate, must be fully evaluated to understand the relationship of flight operations and land use. This chapter discusses typical flight operations for aircraft based at or visiting at JBER.

Each time an aircraft crosses over a runway threshold (the beginning or ending of a runway's useable surface) to either takeoff, practice an approach, or land, it is counted as a single flight operation. For example, a departure counts as a single operation as does an arrival. As another example, when an aircraft conducts a pattern (a departure followed by an immediate return) it counts as two operations because the aircraft crosses both the approach and departure ends of the runway during the pattern.

This AICUZ Study considers both based and transient military aircraft operations from Elmendorf Airfield and Bryant Army Airfield. The following list highlights typical operations utilized during normal or increased flight operations. Each flight track utilized is designed to maximize flight operations and, when possible, minimize the effects of noise.

- **Takeoff**: When an aircraft is positioned on the runway, the engine power is set to facilitate movement and eventual flight.

- **Departure**: For the purpose of air traffic sequencing, separation, noise abatement, compliance with avoidance areas, and overall safety of flight, aircraft follow specific ground tracks and altitude restrictions as they depart the airfield's immediate airspace.

- **Straight-In Arrival**: An aircraft performing a straight-in arrival aligns with the runway extended centerline and begins a gradual descent for landing. This type of approach enables an aircraft to maintain a smooth, stable, and steady approach and requires no additional maneuvering.

- **Overhead Break Arrival**: An expeditious arrival using visual flight rules (VFR). The aircraft arrives over the airfield on the runway centerline at a specified point and altitude and then performs a 180-degree "break turn" away from the runway to enter the landing pattern. Once established, the pilot lowers the landing gear and flaps and then performs a second 180-degree descending turn toward the runway centerline to land.

- **Pattern Work**: Pattern work refers to traffic pattern training where the pilot performs takeoffs and landings in quick succession by taking off, flying the pattern, and then landing. A closed pattern consists of two portions, a takeoff/departure and an approach/landing; a complete closed pattern is counted as two operations because the aircraft crosses over a runway threshold twice, once on departure and once on arrival. Traffic pattern training is demanding and utilizes all of the basic flying maneuvers a pilot learns—takeoffs, climbs, turns, climbing turns, descents, descending turns, and straight and level landings.

    - **Low Approach**: A low approach is an approach to a runway that does not result in a landing, but rather a descent towards the runway (usually below 500 feet above ground level [AGL]) followed by a climb-out away from the airfield. Pilots perform low approaches for a number of reasons, including practicing to avoid potential ground obstructions (e.g., vehicles, debris, stray animals).

- **Touch-and-Go (T&G)**: A T&G landing pattern is a training maneuver that involves landing on a runway and taking off again without coming to a full stop. Usually, the pilot then circles the airfield in a defined pattern, known as a circuit, and repeats the maneuver.

- **Ground Control Approach (GCA)**: GCA is a radar or "talk down" approach directed from the ground by an air traffic controller (ATC). ATC personnel provide pilots with verbal course and glide slope information, allowing them to make an instrument approach during inclement weather. The GCA generally utilizes a "box-shaped" flight pattern with four 90-degree turns performed at a set altitude and is used to practice a variety of approach procedures at an airfield."

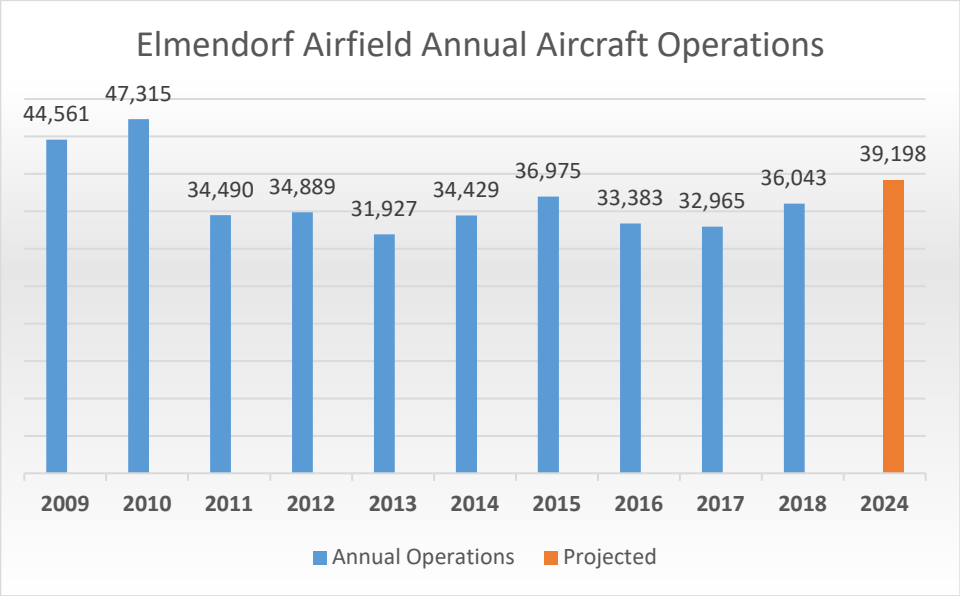
- **Radar Approach**: Radar approaches are instrument approaches performed with active assistance from ATC during poor weather conditions. ATC personnel direct the aircraft toward the runway centerline. Once established on the centerline, pilots use aircraft instruments to maintain runway alignment and adherence to altitude restrictions until the pilot is able to acquire visual sight with the runway environment. Pilots often practice this type of approach to maintain proficiency.

3.4 Annual Aircraft Operations

3.4.1 Elmendorf Airfield

This 2019 JBER AICUZ Study updates the 2006 AICUZ Study, provides context on the installation's current operations, based on the 2018 F-22 Operational Efficiency FEIS, and presents the most accurate representation of the installation's future aircraft activities, as projected to 2024. Figure 3-1 provides the number of aircraft operations that have occurred at Elmendorf Airfield over a 10-year period, including based and transient aircraft (as presented in the 2018 F-22 Operational Efficiency FEIS). Total annual operations account for each departure and arrival, including those conducted as part of a pattern operation. Annual operations over the 10-year period remained generally consistent, with a peak in operations in Calendar Year 2010.

Figure 3-1. Elmendorf Airfield, Summary of Flight Operations for Calendar Years 2009 – 2018



Source: USAF 2018

Table 3-1 provides the projected annual aircraft operations for Elmendorf Airfield. This information was based on data from the Air Force and the 2018 F-22 Operational Efficiency FEIS and includes a 14% increase in F-22 operations to account for the additional aircraft operations from aircraft that were based at Tyndall AFB, Florida, prior to Hurricane Michael. F-22 Raptors and personnel with the 95th Fighter Squadron and Aircraft Maintenance Unit at Tyndall AFB have been temporarily reassigned to JBER as the base begins its long-term recovery following the severe damage it incurred from this Category 5 hurricane that made landfall in October 2018.

Table 3-1. Elmendorf Airfield, Projected Annual Aircraft Flight Operations for 2019 AICUZ Noise Contours

Aircraft	Departures	Arrivals	Closed Pattern Operations[1]	Total Operations[2]
F-22	6,510	6,510	1,952	14,972
C-17	594	594	7,484	8,672
C-12	727	727	756	2,210
C-35	68	68	96	232
E-3	204	204	1,900	2,308
C-130	715	715	2,902	4,332
H-60	440	440	366	1,246
GASEPF	879	879	316	2,074
All Transients	1,576	1,576	0	3,152
Grand Total	**11,713**	**11,713**	**15,772**	**39,198**

Notes:
[1] Each "closed pattern operation" consists of two total operations: one arrival and one departure.
[2] Planning contours for Calendar Year 2024.

The 2024 projected annual aircraft operations for Elmendorf Airfield are 39,198. These projected operations remain consistent with historic operations and have increased by 3,155 annual operations when compared to the annual operations of 36,043 noted for 2018. The projected F-22 operations account for approximately 38% of all operations.

Projected operations have been split as 95% taking place during the daytime (defined as taking place from 7:00 a.m. to 10:00 p.m.) and 5% occurring during the nighttime (defined as taking place from 10:00 p.m. to 7:00 a.m.). Arrivals account for 30% of annual operations, departures account for 30%, and 40% of annual operations are closed patterns. Almost all annual operations are conducted by based aircraft, and only 8% of all annual operations are attributed to transient aircraft.

3.4.2 Bryant Army Airfield

Bryant Army Airfield currently has 18,250 annual aircraft operations. This number is expected to remain the same for the AICUZ Study planning year of 2024. Bryant Army Airfield's projected annual aircraft operations for 2019 are presented in Table 3-2. Projected operations have been split as 95% taking place during the daytime and 5% occurring during the nighttime. Arrivals account for 11% of annual operations, departures for 11%, and 78% of annual operations are T&G operations. Approximately 5% of all annual operations are attributed to transient aircraft; all other operations are conducted by based aircraft.

Table 3-2. Bryant Army Airfield, Projected Annual Aircraft Flight Operations for 2019 AICUZ Noise Contours

	Departures	Arrivals	Touch and Go	Total Operations[1]
UH-60	1,250	1,250	11,250	13,750
C-130H	100	100	500	700
Robinson 22/44	100	100	2,300	2,500
UAS	150	150	-	300
All Transient	400	400	200	1,000
Grand Total	**2,000**	**2,000**	**14,250**	**18,250**

Notes:
[1] Planning contours for Calendar Year 2024.

3.5 Runway Utilization and Flight Tracks

3.5.1 Runway Utilization

The frequency with which aircraft utilize a runway involves a variety of factors including, but not limited to:

- Airfield environment (layout, lights, runway length);
- Direction of prevailing winds;
- Location of natural terrain features (rivers, lakes, mountains, and other features);
- Wildlife activity;
- Number of aircraft in the pattern; and/or
- Preference of a runway for the purpose of safety and noise abatement.

Installation Operations, ATC personnel, and the Supervisor of Flying establish the runway in use. Aviation planners adjust the pattern procedures accordingly to maximize air traffic flow efficiency. Table 3-3 lists aircraft use at each runway at Elmendorf Airfield (runway utilization for Bryant Army Airfield was unavailable at the time of publication.)

Table 3-3. Elmendorf Airfield Runway Usage and Departure Routing

Runway Direction	Arrival (%)	Departure (%)	Closed Patterns (%)
Runway 06 (arriving from the west and/or departing to the east)	45	42	79
Runway 24 (arriving from the east and/or departing to the west)	8	49	3
Runway 16 (arriving from the north and/or departing to the south)	45	1	13
Runway 34 (arriving from the south and/or departing to the north)	2	8	5

3.5.2 Flight Tracks

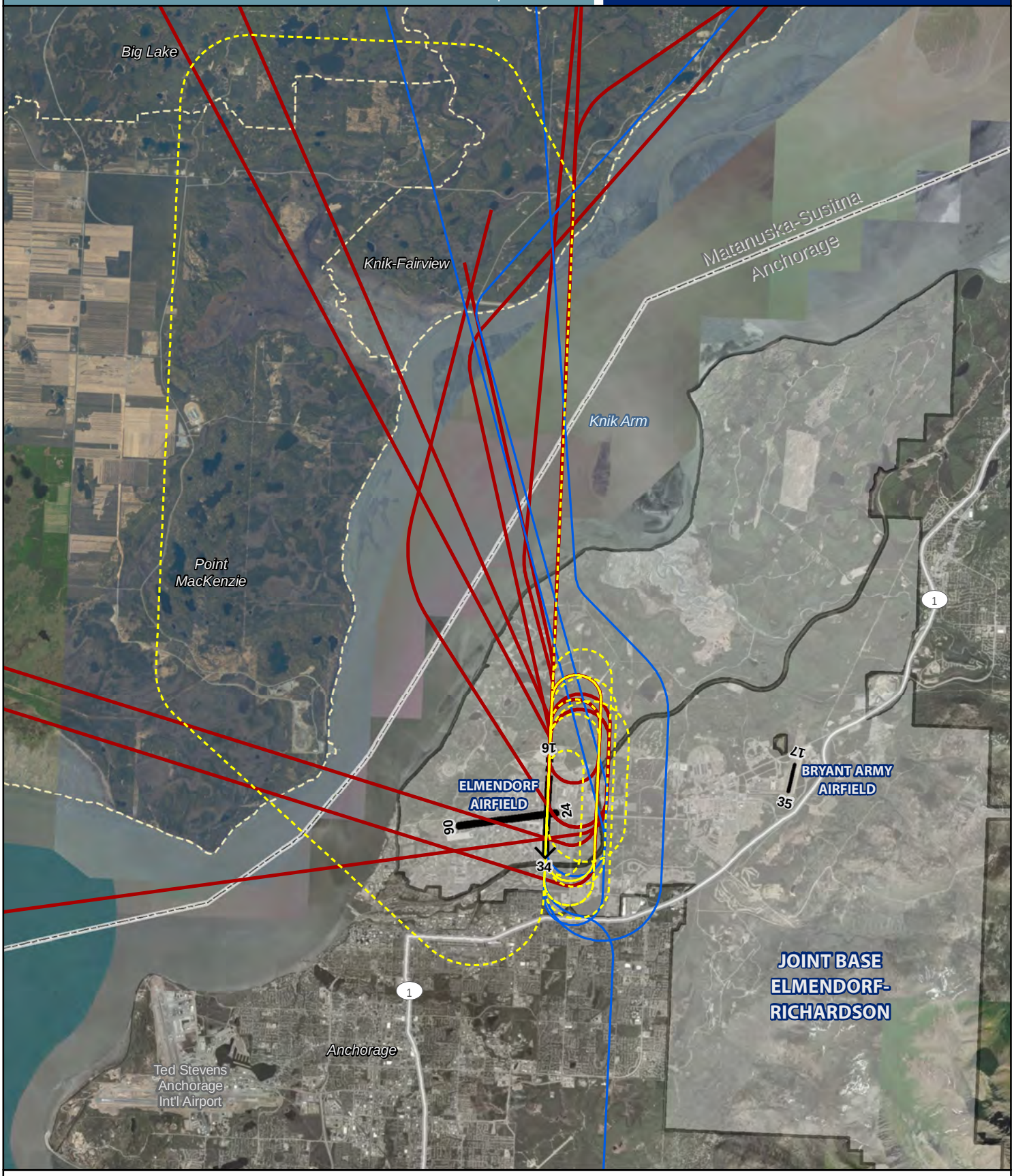
Each runway has designated flight tracks that provide for the safety, consistency, and control of an airfield. Flight tracks depict where aircraft fly in relation to an airfield. They are designed for departures, arrivals, and for pattern work procedures, and are designated for each runway to facilitate operational safety, noise abatement, air crew consistency, and the efficient flow of air traffic within the tower's controlled airspace. Aircraft flight tracks are not set "highways in the sky." While we show flight tracks as lines on the map, they are actually bands. Aircraft de-confliction, configuration, pilot technique, takeoff weight, and wind all affect the actual path taken on any given flight.

Figures 3-2 through 3-5 present the flight tracks for Elmendorf Airfield. Figures 3-6 and 3-7 present flight tracks for Bryant Army Airfield.

Figure 3-2

Joint Base Elmendorf-Richardson
Air Installations Compatible Use Zones

Flight Tracks for Runway 16, Elmendorf Airfield



Legend

- Installation Boundary
- Airfield Runway
- Runway 16 Extension
- Borough Boundary
- Municipal Boundary/ Census Designated Place
- Major Highway
- Arrival Flight Track
- Closed Pattern Flight Track
- Departure Flight Track

N

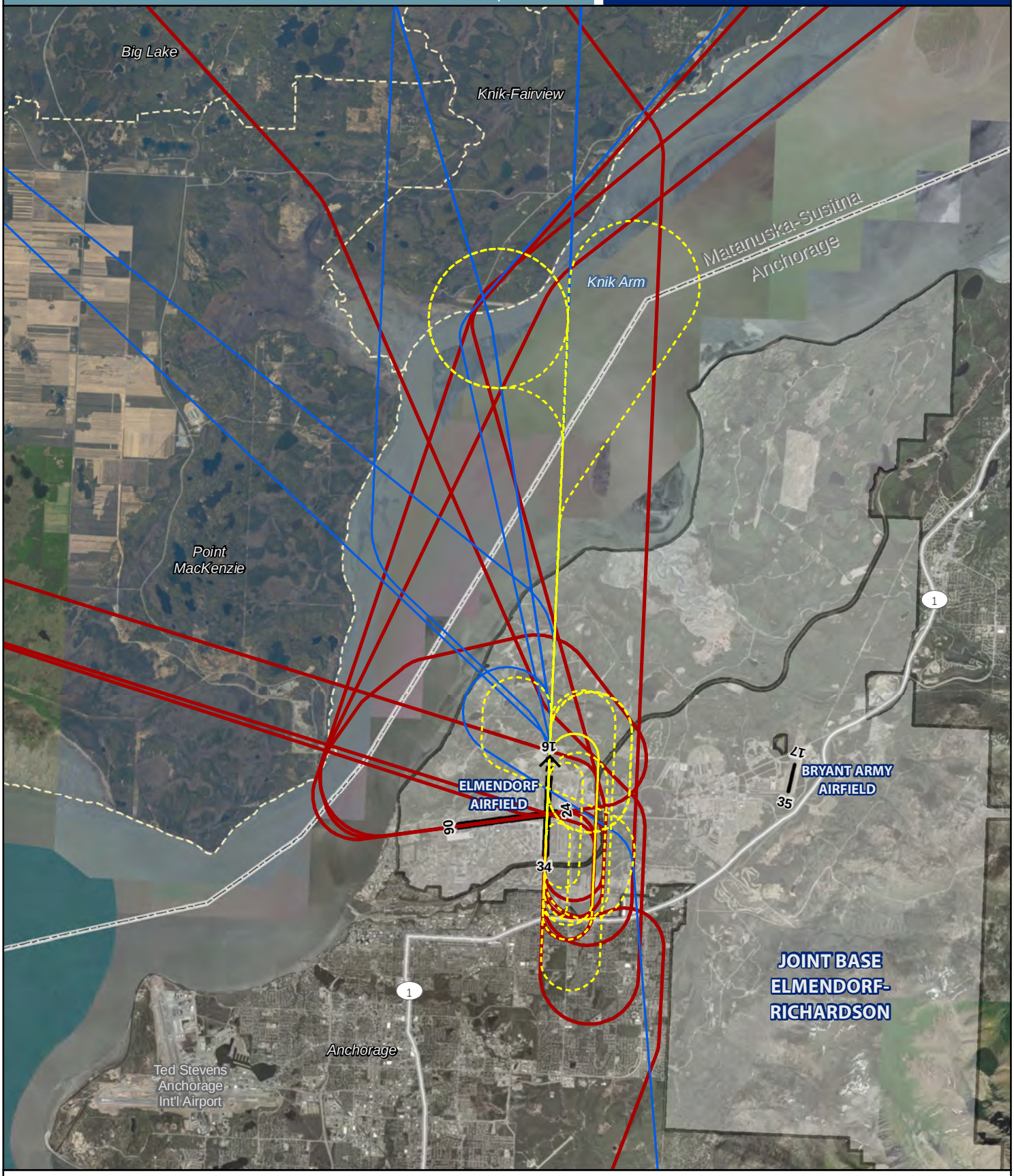
0 1 2 Miles

Source: AFCEC 2018, 2019; Digital Globe 2017; ESRI 2017; NGA/DHS 2015; U.S. Census Bureau 2018.

Figure 3-3

Joint Base Elmendorf-Richardson
Air Installations Compatible Use Zones

Flight Tracks for Runway 34, Elmendorf Airfield



Legend

- Installation Boundary
- Airfield Runway
- Runway 16 Extension
- Borough Boundary
- Municipal Boundary/ Census Designated Place
- Major Highway
- Arrival Flight Track
- Closed Pattern Flight Track
- Departure Flight Track

0 1 2 Miles

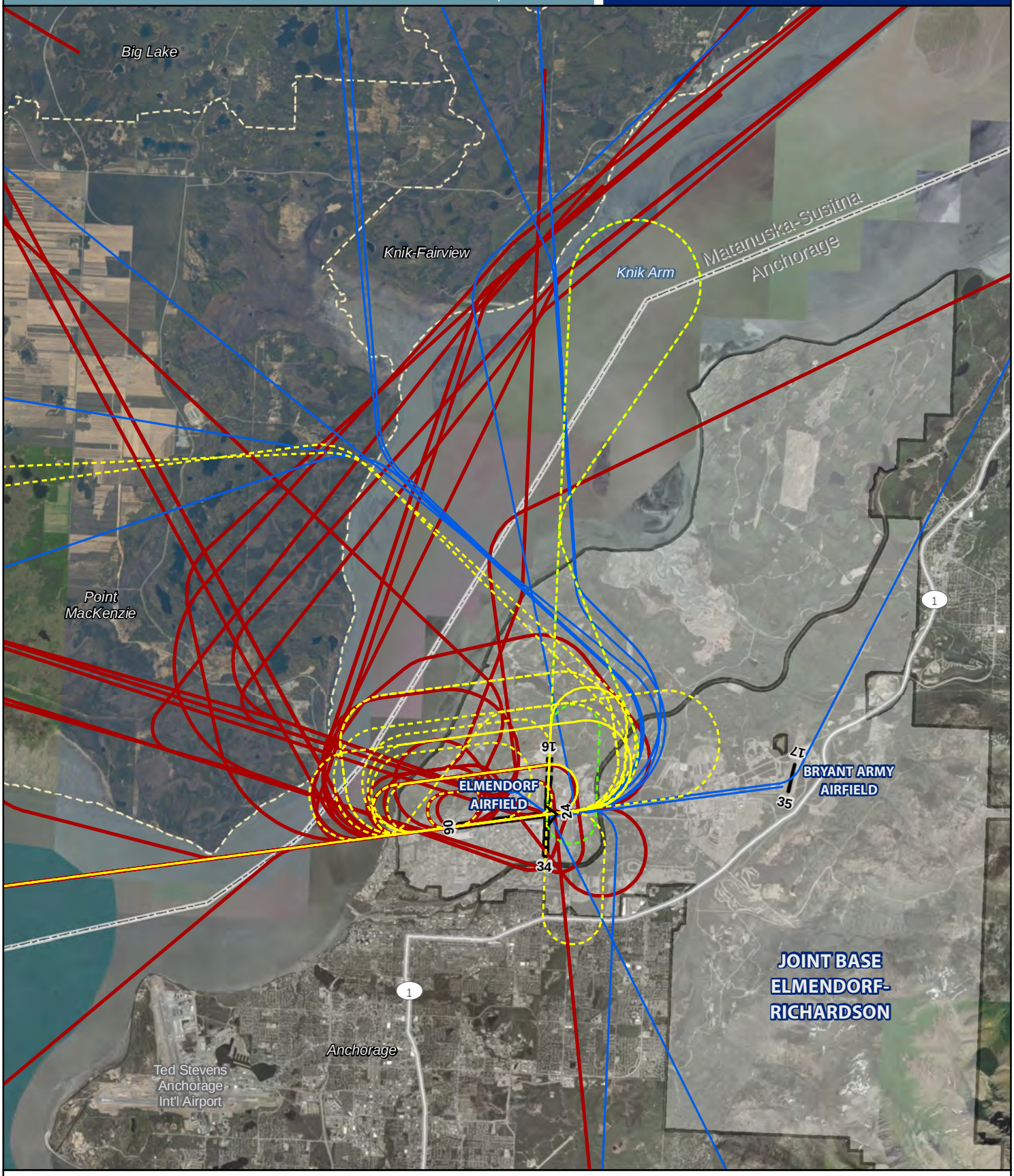
N

Source: AFCEC 2018, 2019; Digital Globe 2017; ESRI 2017; NGA/DHS 2015; U.S. Census Bureau 2018.

Figure 3-4

Joint Base Elmendorf-Richardson
Air Installations Compatible Use Zones

Flight Tracks for Runway 06, Elmendorf Airfield



Legend

- Installation Boundary
- Airfield Runway
- Runway 16 Extension
- Borough Boundary
- Municipal Boundary/ Census Designated Place
- Major Highway
- Arrival Flight Track
- Closed Pattern Flight Track
- Departure Flight Track
- Interfacility Flight Track

0 1 2 Miles

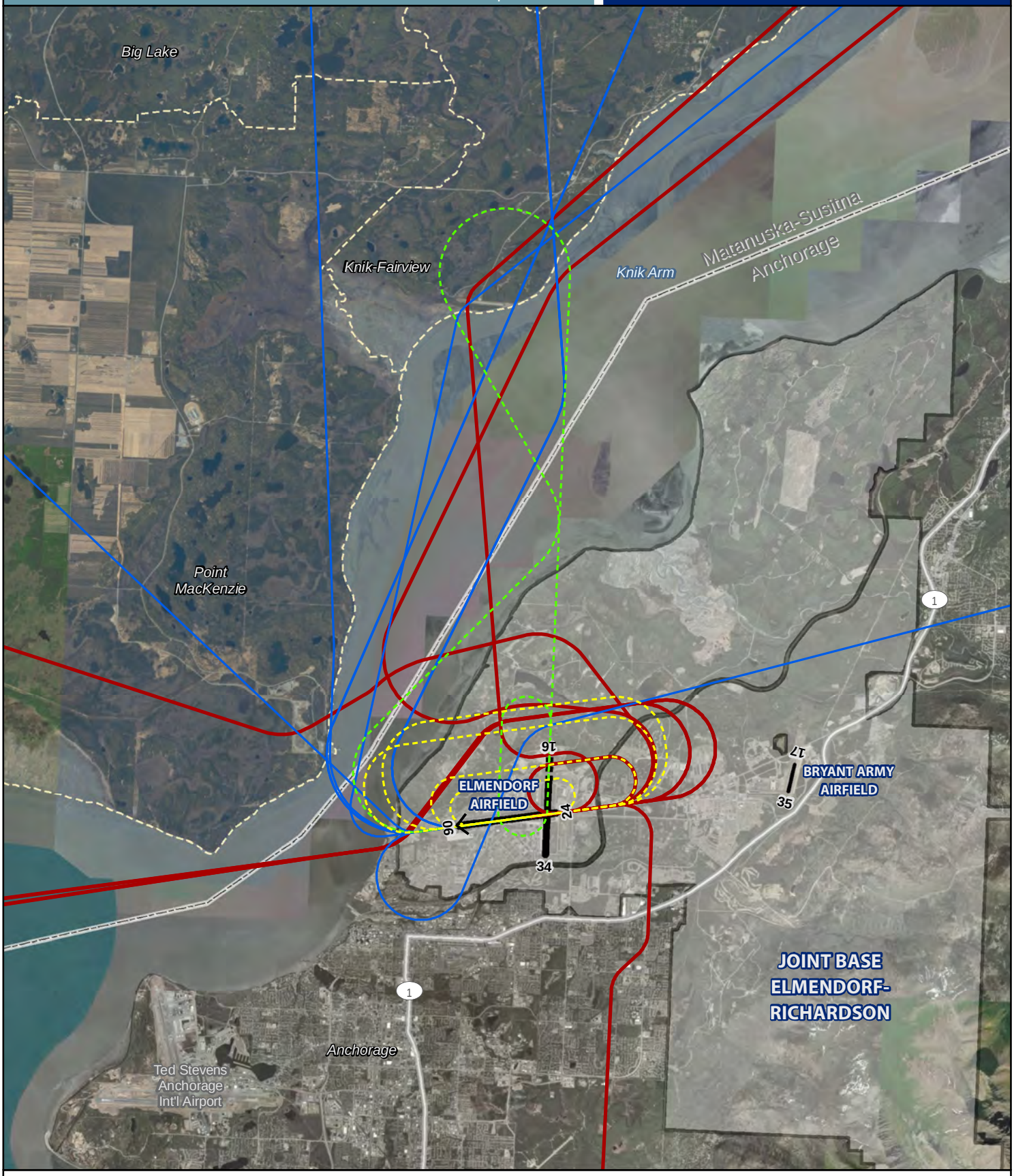
N

Source: AFCEC 2018, 2019; Digital Globe 2017; ESRI 2017; NGA/DHS 2015; U.S. Census Bureau 2018.

Figure 3-5

Joint Base Elmendorf-Richardson
Air Installations Compatible Use Zones

Flight Tracks for Runway 24, Elmendorf Airfield



Legend

- Installation Boundary
- Airfield Runway
- Runway 16 Extension
- Borough Boundary
- Municipal Boundary/ Census Designated Place
- Major Highway
- Arrival Flight Track
- Closed Pattern Flight Track
- Departure Flight Track
- Interfacility Flight Track

0 1 2 Miles

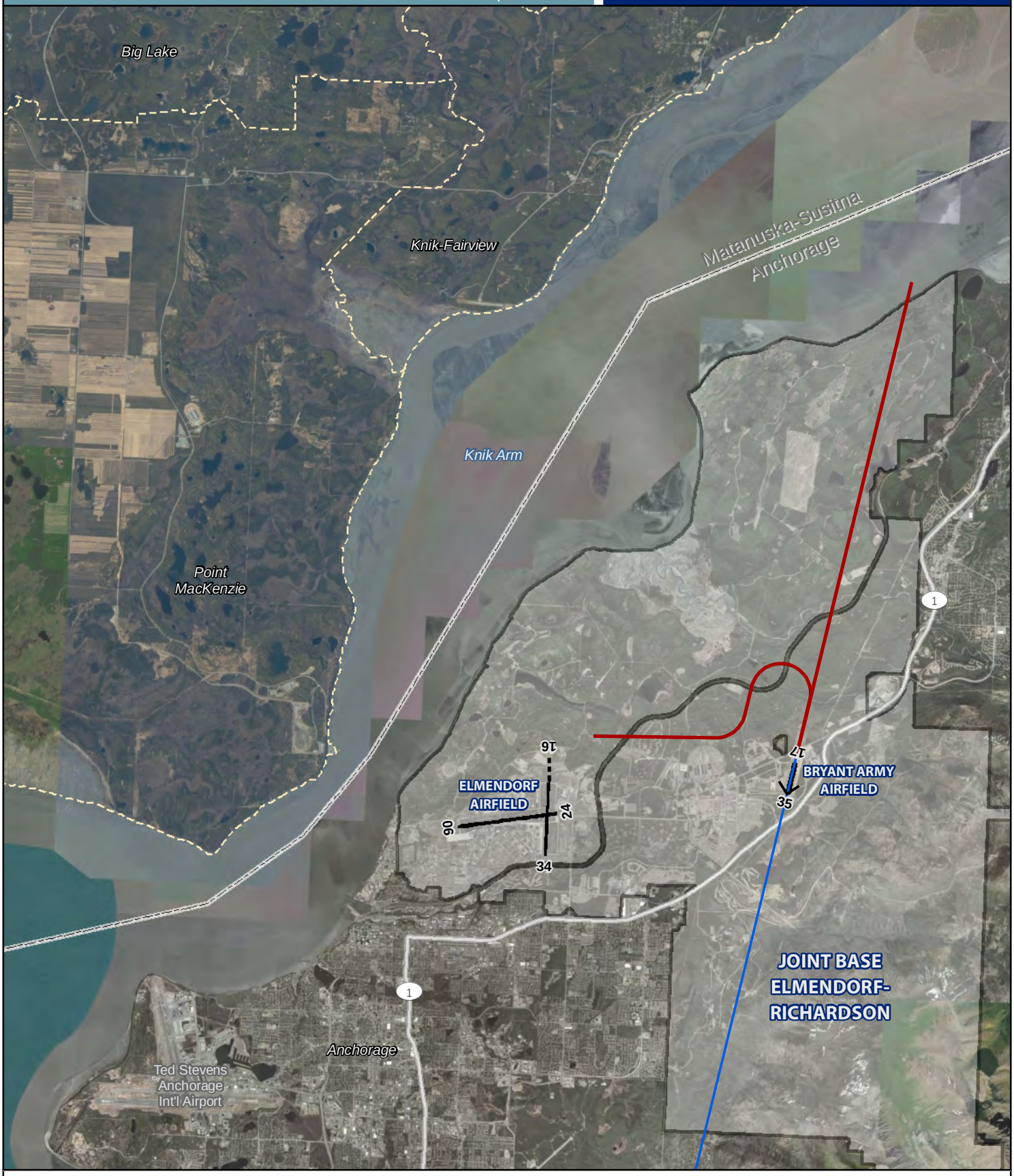
N

Source: AFCEC 2018, 2019; Digital Globe 2017; ESRI 2017; NGA/DHS 2015; U.S. Census Bureau 2018.

Figure 3-6

Joint Base Elmendorf-Richardson
Air Installations Compatible Use Zones

Flight Tracks for Runway 17, Bryant Army Airfield



Legend

- Installation Boundary
- Airfield Runway
- Runway 16 Extension
- Borough Boundary
- Municipal Boundary/ Census Designated Place
- Major Highway
- Arrival Flight Track
- Departure Flight Track

0 1 2 Miles

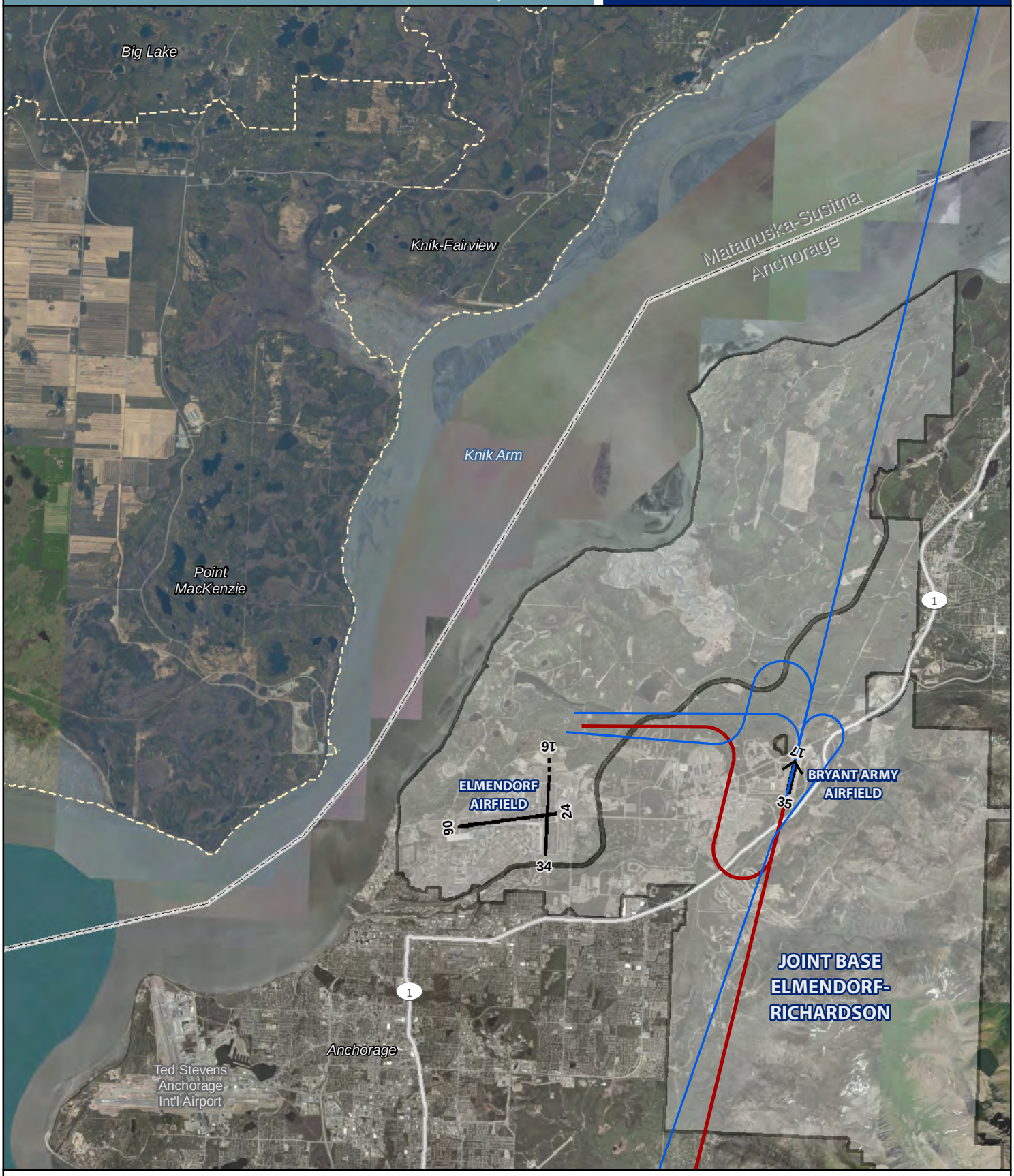
N

Source: AFCEC 2018, 2019; Digital Globe 2017; ESRI 2017; NGA/DHS 2015; U.S. Census Bureau 2018.

Figure 3-7

Joint Base Elmendorf-Richardson
Air Installations Compatible Use Zones

Flight Tracks for Runway 35, Bryant Army Airfield



Legend

- Installation Boundary
- Airfield Runway
- Runway 16 Extension
- Borough Boundary
- Municipal Boundary/ Census Designated Place
- Major Highway
- Arrival Flight Track
- Departure Flight Track

0 1 2 Miles

N

Source: AFCEC 2018, 2019; Digital Globe 2017; ESRI 2017; NGA/DHS 2015; U.S. Census Bureau 2018.

3.6 Range Operations

This 2019 JBER AICUZ Study provides context on range operations based on current year operations, and presents the most accurate representation of future range activities, as projected through 2024. Ground training activities conducted within the JBER ranges consist of munitions delivery from aircraft as well as munitions use on the ground. Training exercises are coordinated and scheduled according to training and mission requirements, with operations being conducted year-round. This section discusses typical range operations associated with noise-generating activities related to small arms, as well as large caliber weapons and explosives.

The ranges have designated training locations for both firing and maneuvering to accommodate differing training requirements, resulting in a high-quality training experience. Each training event or exercise varies according to the weapon system, ammunition type, number of rounds fired, duration of the event, and frequency of the event. Ground-to-ground operations occur throughout JBER ranges to fulfill training requirements. There is a wide variety of live fire missions, depending on the nature of the target and the nature of the operational mission. Live fire and simulated fire training include use of designated ranges and targets, convoy courses, live fire villages and assaults, direct live fire, improvised explosive device detonations, explosives (both above and below ground), and trail courses.

The live fire training at the JBER ranges considered in this analysis consists of various small arms and large caliber weapons and ammunition sizes, as well as explosives. Small arms uses include handguns, rifles, machine guns, and shotguns with standard ammunition such as 9mm, 5.56mm, 12-gauge, 7.62mm, .30 cal, .45 cal, and .50 cal. Large caliber firing operations from artillery and mortars consist of ordnance sizes from 20mm up to 120mm. Currently, seasonal restrictions at the impact area at JBER limit indirect weapons firing. Under these limitations, USARAK Soldiers are unable to meet home station training requirements for artillery and mortar weapon systems. Explosive ordnance activities include mines, grenades, and demolitions with primarily C-4.

Aircraft conduct munitions delivery and aerial gunnery throughout JBER ranges; however, these activities are predominately conducted in four main training areas. Activities associated with explosive ordnance disposal munitions use are also conducted on the ranges and included in this analysis.

3.7 Noise Abatement

The Air Force recognizes that noise from military operations may cause concern for people living near military installations.

For this reason, the Air Force and Army have established a Noise Program aimed at reducing and controlling the emission of noise and vibrations associated with the use of military aircraft, weapon systems, and munitions while maintaining operational requirements. The result is the implementation of various strategies, techniques and procedures, documented under the JBER Noise Abatement Program, aimed at protecting the installation's neighbors and structures from the harmful effects of noise and vibrations.

JBER noise abatement procedures include the following:

At Elmendorf Airfield:

- Minimizing approaches onto Runway 34;
- Planned extension of Runway 16;
- Quiet hours after 10:00 p.m. for airfield operations; and
- Run-up maintenance turns occurring on the north side of the base, away from the installation boundary and community.

Noise abatement measures are currently in place to help mitigate the effects of aircraft noise at Bryant Army Airfield, including minimum flight altitudes and procedures to avoid residential overflight. Airspace congestion and topographic features restricting operations prevent additional aircraft noise abatement procedures from being implemented at both airfields.

JBER conducts proactive and effective public outreach and media releases for scheduled activities that generate noise.

Installation leadership periodically reviews flight operations and their potential impact on surrounding communities. This requirement facilitates the planning, designation, and establishment of flight tracks over sparsely populated areas and/or waterways as often as practicable to balance operational safety and reduce noise exposure levels in surrounding communities.

3.8 Noise Complaints

At times, military operations may generate noise complaints. The Air Force evaluates all noise complaints to ensure future operations, when possible, do not generate unacceptable noise. Concerned citizens are encouraged to contact the PA Offices with any noise complaints.

One may submit noise complaints for Air Force aircraft anywhere in Alaska to:

- 11th Air Force PA Office: 800-538-6647 (1-800-JETNOIS); or
- 673 ABW PA Office in Anchorage at 907-552-5387 (907-552-JETS) or 907-552-8151.

One may submit range noise complaints to:

- USARAK PA Officer at 907-384-1373 or Community Relations Chief: 907-384-2019.

When a person files a noise complaint with the base, base staff complete a Noise Complaint Worksheet for review and noise tracking purposes. This worksheet includes the caller's information, a description of the event and the aircraft involved, and comments from on-base reviewers, including the PA Office and flying units. This worksheet is used for both aircraft noise and range-related noise.

JBER posts information on the installation website, including alerts about upcoming aircraft and range operations that are able to be shared publicly:

- JBER Website (https://www.jber.jb.mil/);
- USARAK Website (https://www.army.mil/usarak);
- JBER Facebook (https://www.facebook.com/JBERAK/); and
- USARAK Facebook (https://www.facebook.com/USArmyAlaska/).

4.0 Military Operational Noise

Terrain features, weather phenomena, man-made structures, and daily life activity contribute to noise exposure.

How an installation manages operational noise can play a key role in shaping its relationship with neighboring communities. Ideally, aircraft noise and range noise and their management should be key factors in local land use planning. Because military operational noise may affect areas around the installation, the Air Force has defined noise zones using the guidance provided in the AICUZ Instruction (AFI 32-1015).

While the level of noise produced by aircraft and range training activities may have a direct effect on communities in proximity to military air installations, additional factors may influence the noise impact. An airfield's layout (its buildings, parking ramps, and runways), type of aircraft, natural terrain features, weather phenomena, and daily activities all influence the levels of noise that the community experiences.

4.1 What is Sound/Noise?

Sound becomes noise when it interferes with normal activities.

Sound consists of vibrations in the air. A multitude of sources can generate these vibrations, including roadway traffic, barking dogs, radios—or military operations. These vibrations are called compression waves. Just as a pebble dropped into a pond generates ripples, the compression waves—formed of air molecules pressed together—radiate out, decreasing with distance. If these vibrations reach your eardrum at a certain rate and intensity, you perceive it as sound. When the sound is unwanted, we refer to it as noise. Generally, sound becomes noise to a listener when it interferes with normal activities. Sound has three components: intensity, frequency and duration.

- **Intensity** or loudness relates to sound pressure change. As the vibrations oscillate back and forth, they create a change in pressure on the eardrum. The greater the sound pressure change, the louder it seems.

- **Frequency** determines how we perceive the pitch of the sound. Low-frequency sounds are characterized as rumbles or roars, while high-frequency sounds are typified by sirens or screeches. Sound frequency is measured in terms of cycles per second or hertz (Hz). While the range of human hearing goes from 20 to 20,000 Hz, we hear best in the range of 1,000 to 4,000 Hz. For environmental noise, we use A-weighting, which focuses on this range, to best represent human hearing. While we may refer to A-weighted decibels as "dBA", if it is the only weighting being discussed, the "A" is generally dropped.

- **Duration** is the length of time one can detect the sound.

4.2 How Sound is Perceived

The loudest sounds that the human ear can comfortably hear are a million times higher in intensity than those of sounds we barely hear. Because such large numbers become awkward to use, we measure noise in decibels (dB), which uses a logarithmic scale.

Figure 4-1 is a chart of A-weighted sound levels from common sources. A sound level of 0 dB is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. Normal speech has a sound level of approximately 60 dB. Sound levels above 120 dB can cause discomfort inside the ear, while sound levels between 130 and 140 dB are felt as pain.

Figure 4-1. Typical A-weighted Sound Levels of Common Sounds

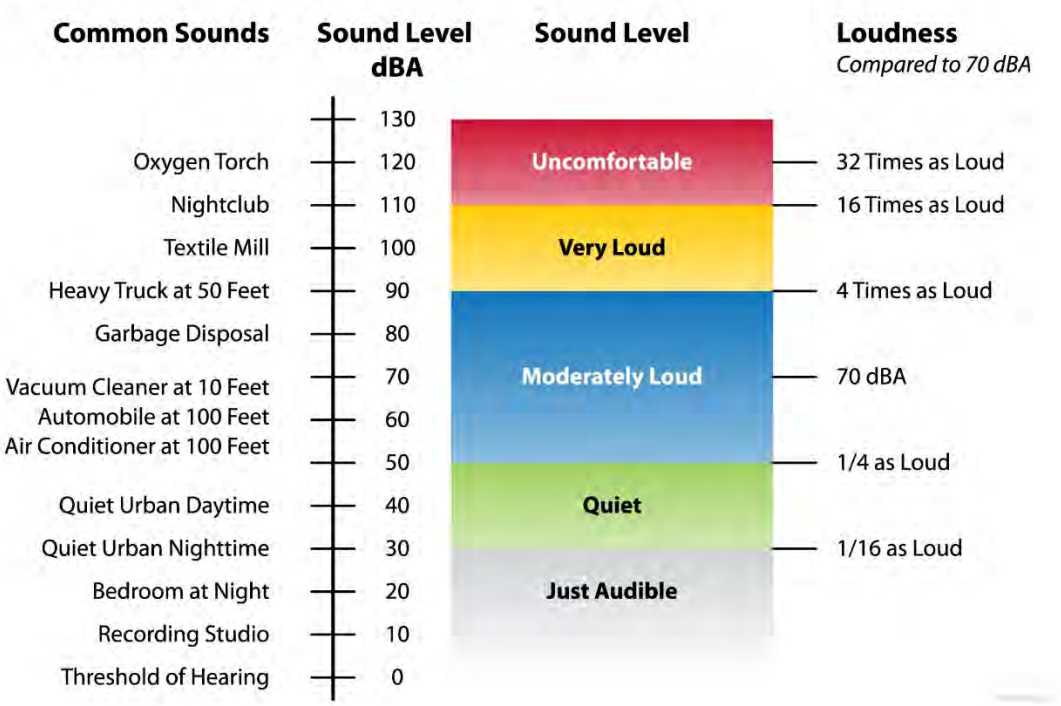


Table 4-1 shows the subjective responses with change in (single-event) sound level. While noise energy doubles or halves with every 3-dB change, we do not perceive all this noise energy. It takes a 10 dB increase or decrease for our ears to perceive a doubling or halving of loudness.

Table 4-1. Subjective Response to Changes in Sound Level

Change in Sound Level	Change in Loudness
20 dB	Striking 4-fold Change
10 dB	Dramatic 2-fold or Twice as Loud
5 dB	Quite Noticeable
3 dB	Barely Perceptible
1 dB	No Noticeable Change

4.3 The Day-night Average Sound Level

When people hear an aircraft fly overhead, the question may be asked, "How loud was that?" While we may often find ourselves concerned over the loudness of a sound, there are other dimensions to the sound event that draw our interest. For instance, does one overflight draw the same interest as two separate overflights—or 20? Also, does the 30-second run-up of engines prior to takeoff draw the same interest as a 30-minute maintenance run? Additionally, is an overflight more noticeable at 2:00 p.m. or at 2:00 a.m., when the ambient noise is low and most people are sleeping?

The length and number of events—the total noise energy—combined with the time of day that a noise event takes place play key roles in our perception of noise. To reflect these concerns, the Air Force uses a metric called the "Day-night Average Sound Level" (DNL). DNL was created by the United States Environmental Protection Agency (EPA) and is used throughout the United States.

DNL, when used as a metric for aircraft noise, represents the accumulation of noise energy from all aircraft noise events in a 24-hour period. Additionally, for all operations between 10:00 p.m. and 7:00 a.m., DNL adds a 10-dB penalty to each event to account for the intrusiveness of nighttime operations. As is implied in its name, the DNL represents the noise energy present in a daily period. However, because aircraft operations at military airfields fluctuate from day to day, the Air Force typically bases DNL on a year's worth of operations and represents the annual average daily aircraft events.

DNL is not a level heard at any given time, but represents long-term exposure. Scientific studies, including the Schultz curve, have found good correlation between the percentages of groups of people highly annoyed by sounds and the level of average noise exposure measured in DNL. The Shultz curve shows a relationship that quantifies what percentage of respondents were highly annoyed as a function of the DNL of transportation noise. It has formed a primary basis for federal policy about transportation noise and, specifically, aircraft noise.

The C-weighted Day-night Average Noise Level (CDNL) is the metric used to describe the noise environment for ground training ranges involving the live fire of large caliber munitions and detonation of explosives. Contours developed using the Blast Noise Model

(BNOISE), are averaged over 250 days for joint bases with ground activities. CDNL noise contours of 57, 62, and 70 are plotted for purposes of land use compatibility.

4.4 Peak Sound Pressure Level

The Peak Sound Pressure Level (Lpk) refers to the highest instantaneous pressure level measured during an individual event. The DoD uses Lpk to describe sounds that are impulsive, such as those that occur for impacts, explosions, gunfire, or sonic booms. The metric PK 15 (met) accounts for statistical variation in the received single-event peak noise level that is due to weather. It is the calculated peak noise level, without frequency weighting, expected to be exceeded by 15% of all events that might occur. If multiple weapon types are fired from one location or multiple firing locations, the single-event level is the loudest level that occurs at each receiver location. The PK 15 (met) metric does not communicate any information about how often the loudest munitions type is detonated. No frequency weighting is applied to peak noise levels because low-frequency noise energy, which is prevalent in munitions detonation noise, may cause vibrations and other effects, even if it may not be heard well by the human ear.

Noise generated by activities within the training ranges is impulsive and intermittent; therefore, this noise is perceived as being more disruptive than aircraft noise. Even though this is not how large weapon noise is evaluated, the impulsiveness and intermittency of these sounds is what people generally to react to.

4.5 Noise Contours

The DoD develops noise contours, as needed, to assess the compatibility of aircraft and range operations with surrounding land uses. Noise contours connect points of equal value, just as contours on topographic maps connect points of equal elevation. This AICUZ Study presents the future year planning noise contours. The Air Force utilizes NOISEMAP, the DoD standard model for assessing noise exposure from military aircraft operations at air installations, as well as Small Arms Range Noise Assessment Model (SARNAM) for small arms ranges and BNOISE for large caliber weapons and explosives ranges. Aircraft DNL noise contours of 65, 70, 75, 80, and 85 dB are plotted and used to analyze land use compatibility in this AICUZ Study. The effects of atmospheric conditions and terrain were taken into account in the noise modeling. Local weather conditions (e.g., temperature, relative humidity, and air pressure) influence how quickly sound is absorbed by the atmosphere as it travels outward from its source. The effects of terrain on noise include terrain elevation (e.g., hills, valleys) and surface impedance (i.e., the amount of sound energy absorbed by the surface). Because the noise zones for small arms are based on the loudest weapon and not the number of annual operations conducted at the range, if there are multiple weapon types being fired at one or multiple firing points, the peak contours reflect the loudest level that occurs at each receiver location. The Air Force plots two noise zones for use when analyzing land use compatibility for small arms ranges: 87

to 104 dB PK 15 (met) and >104 dB PK 15 (met). The Air Force plots CDNL noise contours of 57, 62, and 70 dB for large caliber weapons and explosives operations. Non-munitions noise sources, such as aircraft and ground vehicles, are not covered in the range noise analysis. Noise contours, when overlaid on local land use maps, can help to identify areas of incompatible land use and assist communities in planning for future development around an air installation. Noise contours for Bryant Army Airfield do not exceed 65 dB DNL and do not extend off-installation; therefore, per AFI 32-1015, these noise contours are not analyzed in this AICUZ Study.

4.5.1 Planning Contours

This AICUZ Study provides future year planning noise contours. Long-range planning by local land use authorities involves strategies that influence present and future uses of land. Due to the long-range nature of this planning, the Air Force provides planning contours—noise contours based on reasonable projections of future missions and operations. AICUZ studies using planning contours provide a description of the long-term (5- to 10-year) aircraft noise environment for projected aircraft and range operations that is more consistent with the planning horizon used by state, tribal, regional, and local planning bodies. The 2019 JBER AICUZ noise contours are based on projected operations for Calendar Year 2024.

The Air Force develops planning contours on the best available, realistic, long-range projections of unclassified estimates of future mission requirements. This includes reasonable projections of future operations based on trends in operational tempo, retirement of legacy aircraft, new aircraft entering the inventory, and other factors.

These long-range projections are not commitments of future operations. Inclusion of planning contours in the AICUZ Study does not eliminate the need to conduct appropriate environmental analysis if an assumption used in the development of the planning contours becomes a proposed Air Force or Army action.

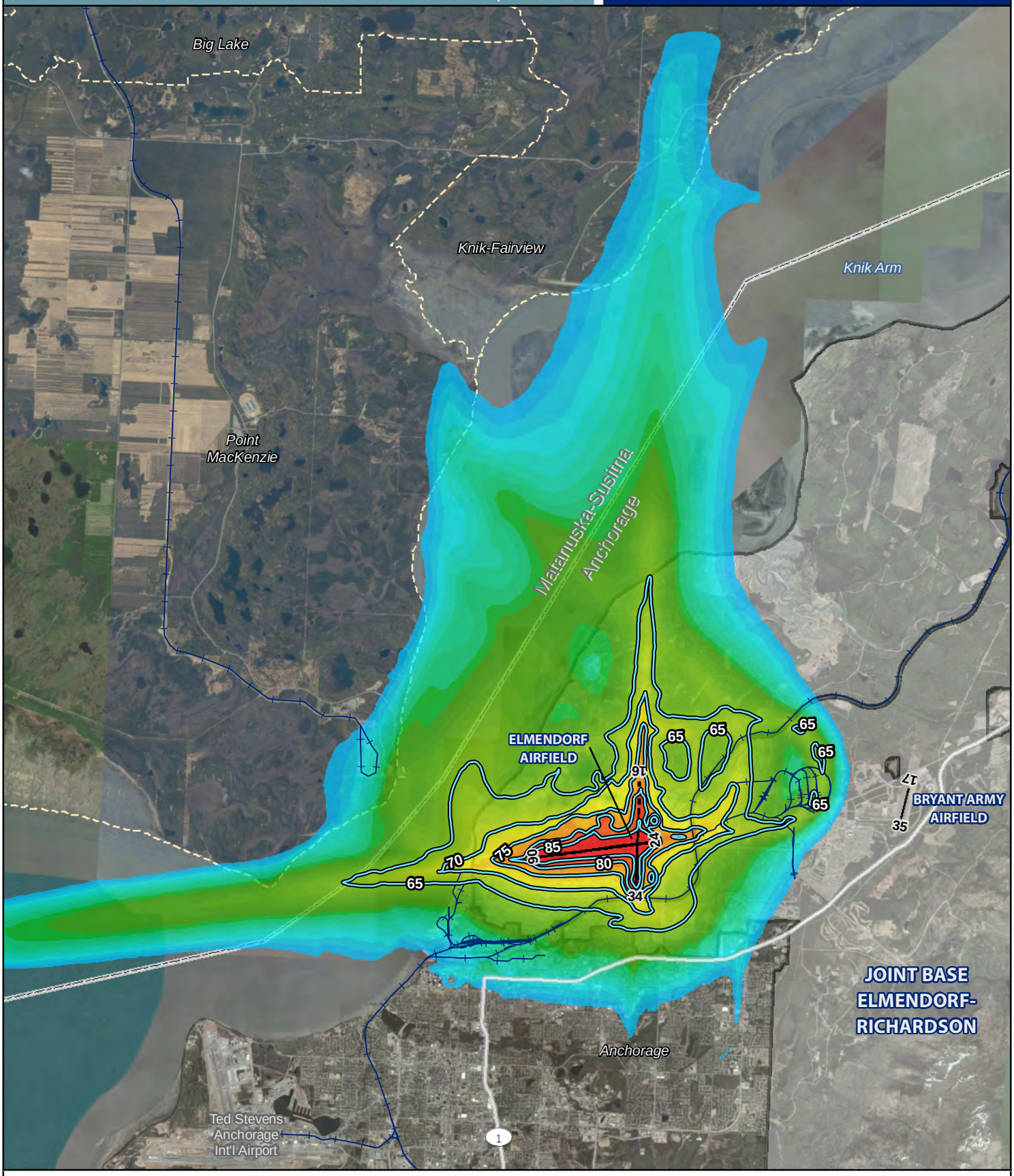
4.5.2 Elmendorf Airfield Noise Contours

The 2019 JBER AICUZ noise contours for Elmendorf Airfield are based on projected operations (Table 3-1) for the year 2024 (Figure 4-2). The 65 dB DNL noise contour extends to the northern boundary of the installation and to the east it remains completely within the installation boundary. To the west, the 65 dB DNL contour extents over a portion of the Port of Alaska and approximately 2.1 miles over the Knik Arm of the Cook Inlet. To the south, the 65 dB DNL contours extends 0.04 mile (from installation boundary), overlaying the Mountain View area of the Municipality of Anchorage. The 75 dB DNL contour remains within the installation boundary. The F-22 is a main contributor to the 2019 AICUZ contours.

Figure 4-2

Joint Base Elmendorf-Richardson
Air Installations Compatible Use Zones

2019 AICUZ Aircraft Noise Contours with Gradient Shading, Elmendorf Airfield



Legend

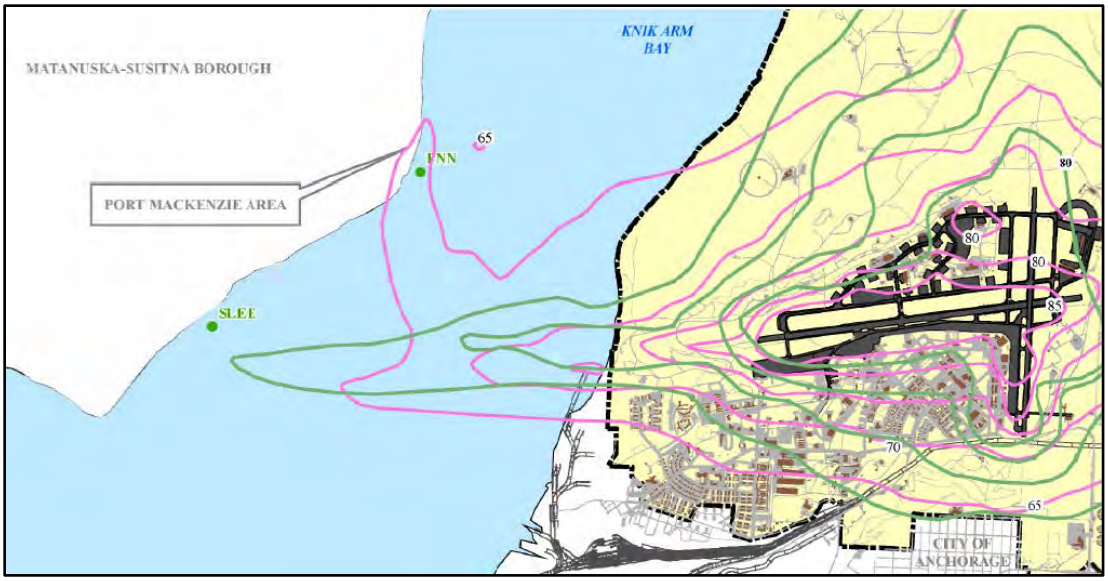
- Installation Boundary
- Airfield Runway
- Runway 16 Extension
- Borough Boundary
- Municipal Boundary/ Census Designated Place
- Major Highway
- Railroad
- Noise Gradient (dB): 50 – 85
- Aircraft Noise Contour, dB DNL (2019 AICUZ)

0 1 2 Miles

N

Source: AFCEC 2018, 2019; Digital Globe 2017; ESRI 2017; NGA/DHS 2015; U.S. Census Bureau 2018.

In general, the 2024 planning contours are similar to the 2006 AICUZ noise contours. The graphical representation provided below illustrates the 2006 AICUZ noise contours (shown in pink) and the 1993 AICUZ noise contours (shown in green). The 2006 AICUZ noise contours extended farther west, slightly overlaying the Port Mackenzie area of Mat-Su Borough, whereas the 2024 planning contours do not. This slight difference is, in part, due to changes in runway usage based on F-22 runway optimization and changes in flight tracks and based aircraft since 2006.



2006 AICUZ Noise Contours (shown in pink) and 1993 Noise Contours (shown in green) over Port Mackenzie Area

Table 4-2 presents the off-installation land acreage and estimated population within the 2024 planning contours. The Air Force generates population estimates on 2017 Census block-level data, using a geometric proportion method to determine the estimated population within the contour bands. This method assigns population based on the portion of a census block that is located within the contour. The population across census blocks is assumed to be evenly distributed.

According to the 2017 U.S. Census data, approximately 144 acres and 153 people would be exposed to a minimum of 65 dB DNL and all would be located within the 65-69 dB DNL noise zone. While the 70+ dB DNL noise zones are contained within the installation boundary, they overlay portions of the railroad, which is classified as off-installation because the railroad owns the land; therefore, Table 4-2 is showing off-installation acres and estimated populations within those areas.

Table 4-2. Off-installation Land Area and Estimated Population within Noise Zones for the 2019 AICUZ Noise Contours, Elmendorf Airfield

Noise Zone (dB DNL)	Acres	Estimated Population
65-69	144.16	153
70-74	48.15	34
75-79	5.34	2
80-84	0	0
85+	0	0
Total (65+)	**197.65**	**189**

Source: United States Census Bureau 2017
Note:
Population is estimated using a geometric proportion method within the contour bands. This method assigns population based on the portion of a census block that is located within the contour. The population across census blocks is assumed to be evenly distributed.

4.5.3 Range Noise Contours

The 2019 JBER AICUZ noise contours for large caliber weapons and explosives (Figure 4-3) and small arms (Figure 4-4) at the JBER ranges are based on current operations, which are projected to remain the same for the AICUZ Study planning year 2024.

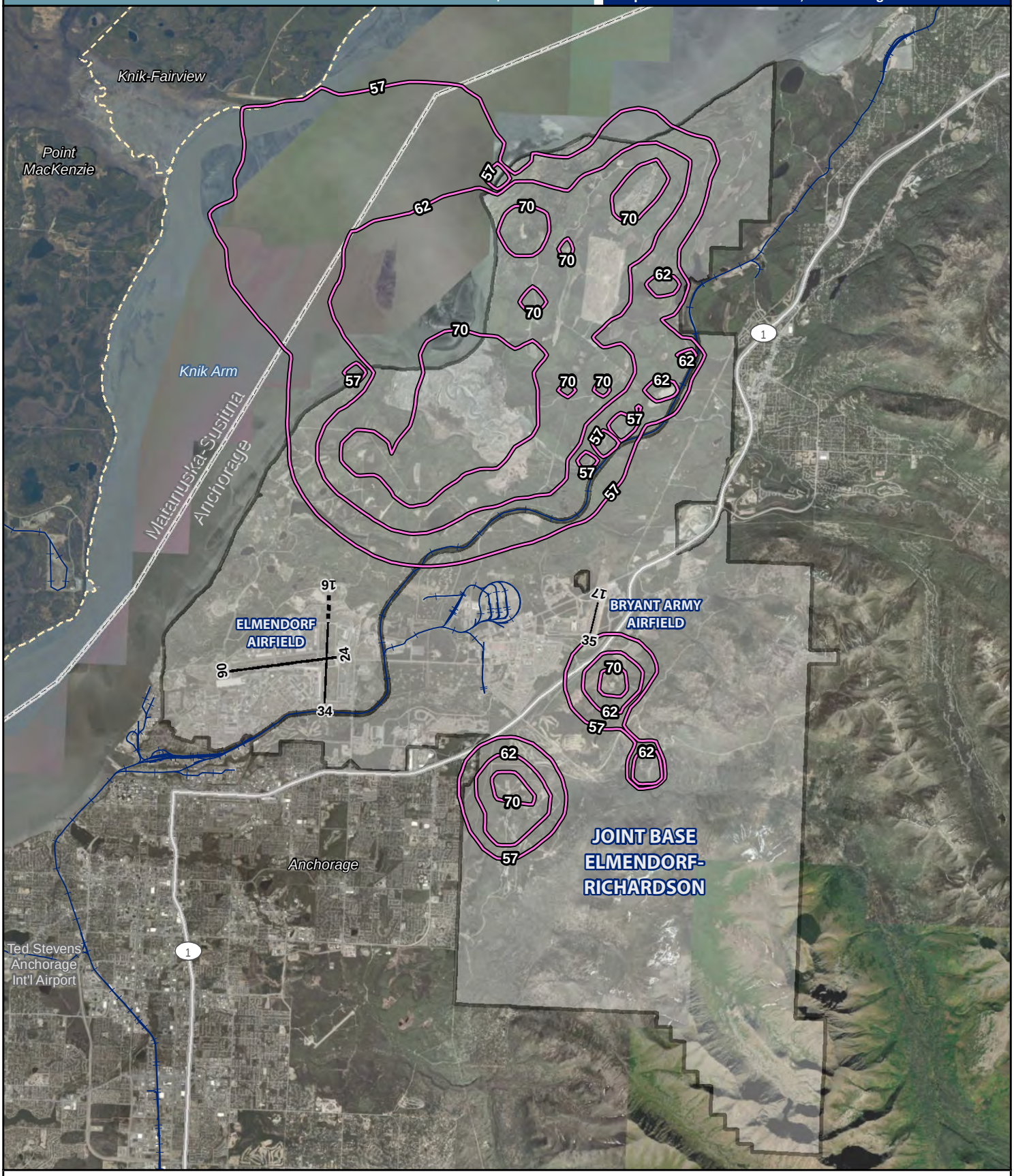
The 2019 large caliber weapons and explosives noise contours are largely contained within the installation boundary in accordance with the computer-generated models. To the north, the 57 and 62 dB CDNL noise contours and some of the 70 dB CDNL noise contour overlay the Knik Arm of Cook Inlet. To the south, portions of the 57 dB CDNL noise contour extend off base over the Municipality of Anchorage.

The 104 dB PK 15 (met) small arms noise contours are almost fully contained within the installation boundary, in accordance with the computer-generated models, except for an area that overlays Glenn Highway on the western edge of the base boundary. The 87 dB PK 15 (met) small arms noise contours extend off the installation boundary and overlay the Knik Arm of Cook Inlet to the north, Mat-Su Valley to the northeast, Chugach State Park to the east, and the Municipality of Anchorage to the south and southwest.

Figure 4-3

Joint Base Elmendorf-Richardson
Air Installations Compatible Use Zones

2019 AICUZ Large Caliber Weapons and Explosives CDNL Contours, JBER Ranges



Legend

- Installation Boundary
- Airfield Runway
- Runway 16 Extension
- Borough Boundary
- Municipal Boundary/ Census Designated Place
- Major Highway
- Railroad
- Large Caliber Weapons and Explosives Noise Contour, CDNL

0 1 2 Miles

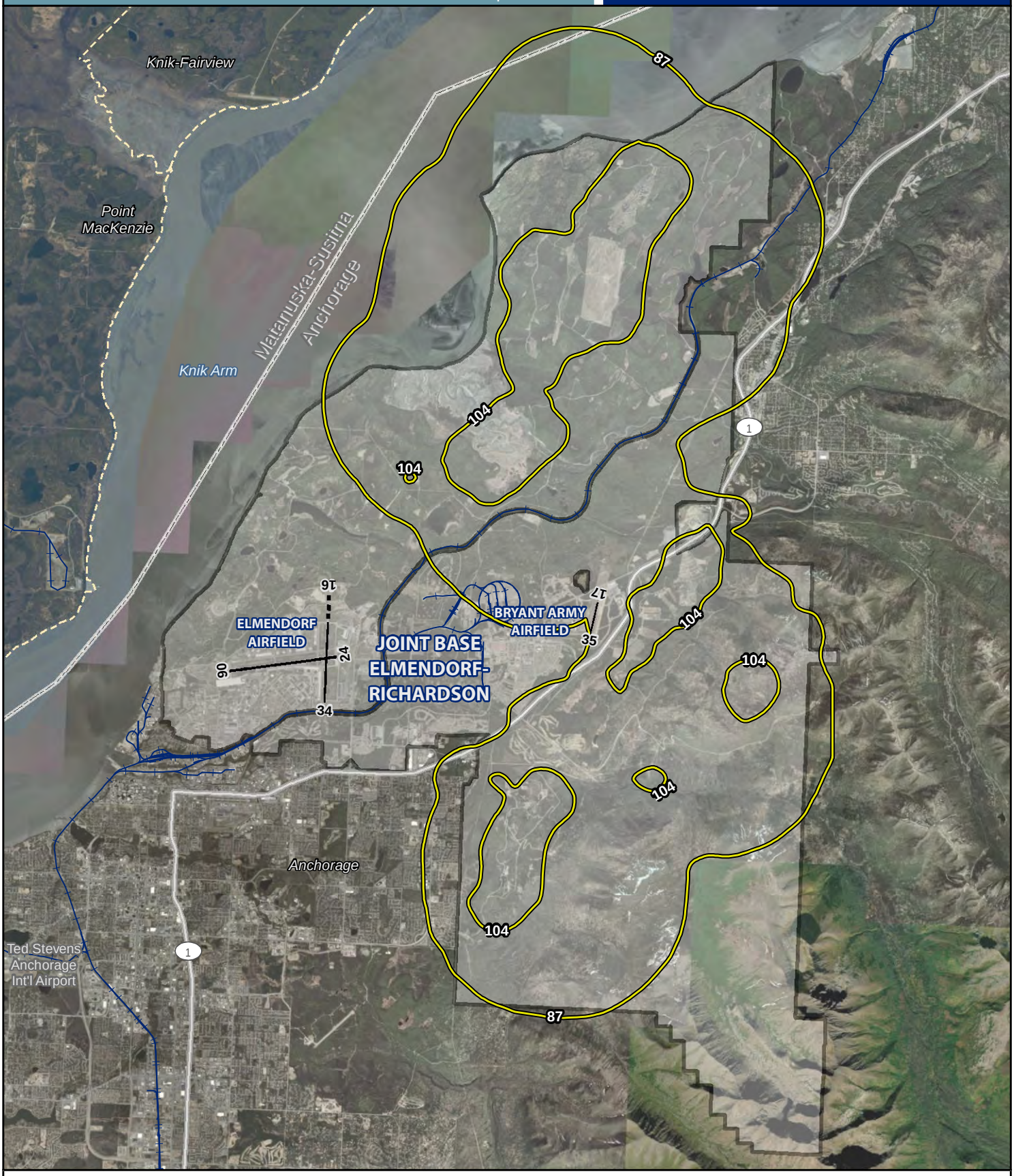
N

Source: AFCEC 2018, 2019; Digital Globe 2017; ESRI 2017; NGA/DHS 2015; U.S. Census Bureau 2018.

Figure 4-4

Joint Base Elmendorf-Richardson
Air Installations Compatible Use Zones

2019 AICUZ Small Arms Peak Noise Level, JBER Ranges



Legend

- Installation Boundary
- Airfield Runway
- Runway 16 Extension
- Borough Boundary
- Municipal Boundary/ Census Designated Place
- Major Highway
- Railroad
- Small Arms Peak Noise Contour, dB PK15 (met)

N

0 1 2 Miles

Source: AFCEC 2018, 2019; Digital Globe 2017; ESRI 2017; NGA/DHS 2015; U.S. Census Bureau 2018.

Tables 4-3 and 4-4 present the off-installation land acreage and estimated population within the 2024 Large Caliber Weapons and Explosives and Small Arms planning contours. The Air Force generates population estimates on 2017 Census block-level data, using a geometric proportion method to determine the estimated population within the contour bands. This method assigns population based on the portion of a census block that is located within the contour. The population across census blocks is assumed to be evenly distributed.

Approximately 256 acres and 402 people are located within the 57-62 dB CDNL noise zone. It is estimated that no people will be exposed to 62-70 CDNL noise zone or the 70+ dB CDNL noise zone. Approximately 6,274 acres and 18,113 people are exposed to a minimum of 87 dB PK 15 (met) small arms noise contours, and all are located within the 87-104 dB PK 15 (met) noise zone. The population exposure to >104 dB PK 15 (met) noise contours is estimated to be 7 people.

Table 4-3. Off-installation Land Area and Estimated Population within Large Caliber Weapons and Explosives CDNL Noise Zones for the 2019 AICUZ Noise Contours, JBER Ranges

Noise Zone (CDNL)	Acres	Estimated Population
57-62	256.28	402
62-70	0.21	0
70+	0	0
Total	**256.49**	**402**

Source: Source: United States Census Bureau 2017
Note:
Population is estimated using a geometric proportion method within the contour bands. This method assigns population based on the portion of a census block that is located within the contour. The population across census blocks is assumed to be evenly distributed.

Table 4-4. Off-installation Land Area and Estimated Population within Small Arms Peak Noise Zones for the 2019 AICUZ Noise Contours, JBER Ranges

Noise Zone (dB PK 15 (met))	Acres	Estimated Population
87-104	6,274.36	18,113
>104	82.28	7
Total	**6,356.63**	**18,120**

Source: United States Census Bureau 2017
Notes:
Discrepancies in totals are a result of rounding.
Population is estimated using a geometric proportion method within the contour bands. This method assigns population based on the portion of a census block that is located within the contour. The population across census blocks is assumed to be evenly distributed.

5.0 Community and Aircraft Safety

Community and aircraft safety is paramount to the Air Force, and this safety is a shared responsibility between the Air Force and the surrounding communities, with each playing a vital role in its success. Cooperation between the Air Force and the community results in strategic and effective land use planning and development. As such, the Air Force has established a flight safety program and has designated areas of accident potential around its air installations to assist in preserving the health, safety, and welfare of residents living near its airfield. This AICUZ Study provides the information needed, in part, to reach this shared safety goal.

Identifying safety issues assists the community in developing land uses compatible with airfield operations. As part of the AICUZ Program, the Air Force defines areas of accident potential, imaginary surfaces, and hazards to aircraft flight. Safety areas associated with range activities are contained within the installation boundary and not included as part of this AICUZ Study.

5.1 Clear Zones and Accident Potential Zones

In the 1970s and 1980s, the military conducted studies of historical accident and operations data throughout the military. The studies showed that most aircraft mishaps occur on or near the runway, diminishing in likelihood with distance from the runway. Based on these studies, the DoD identified CZs and APZs as areas where an aircraft accident is most likely to occur if an accident were to take place; however, it should be noted that CZs and APZs are not predictors of accidents. The studies identified three areas that, because of accident potential, planners should consider for density and land use restrictions: the CZ, APZ I, and APZ II.

The dimensions for CZs and APZs are based on the runway classification. Runway classifications are based on the type of aircraft that use them and are categorized as Class A or Class B. Class A runways are designated to be used by smaller and lighter aircraft, such as propeller driven aircraft, some of the of the smaller training jet aircraft, gliders, and some remotely piloted vehicles. Class B runways are used by large aircraft, such as refueling and airlift as well as high-speed tactical aircraft. Runways at Bryant Army Airfield are classified as Class A. Runways at Elmendorf Airfield are classified as Class B.

Runways at Bryant Army Airfield are classified as Class A. Runways at Elmendorf Airfield are classified as Class B.

While the APZs extend outward from the ends of the runway along the extended runway centerline, the installation may add a curved APZ when over 80% of the operations follow a curved departure.

Within the CZ, most uses are incompatible with military aircraft operations. For this reason, it is the Air Force's policy, where possible, to acquire real property interests in land within the CZ to ensure incompatible development does not occur. Within APZ I and APZ II, a variety of land uses are compatible; however, higher density uses (e.g., schools, apartments, churches) should be restricted because of the greater safety risk in these areas. Chapter 6 discusses land use and recommendations for addressing incompatibility issues within APZs for Elmendorf Airfield and Bryant Army Airfield.

5.1.1 Elmendorf Airfield

The runways at Elmendorf Airfield are classified as Class B. The CZs and APZs for Class B runways are described in the bullets below and are shown on Figure 5-1.

- **Clear Zone**: At the end of all active Air Force runways is an area known as the "Clear Zone." The CZ is an area 3,000 feet square centered on the end of the runway. A CZ is required for all active runways and should remain undeveloped.

- **APZ I**: Beyond the CZ is APZ I. APZ I is 3,000 feet in width and 5,000 feet in length along the extended runway centerline.

- **APZ II**: APZ II is the rectangular area beyond APZ I. APZ II is 3,000 feet in width by 7,000 feet in length along the extended runway centerline.

Figure 5-1. Class B Runway Clear Zones and Accident Potential Zones

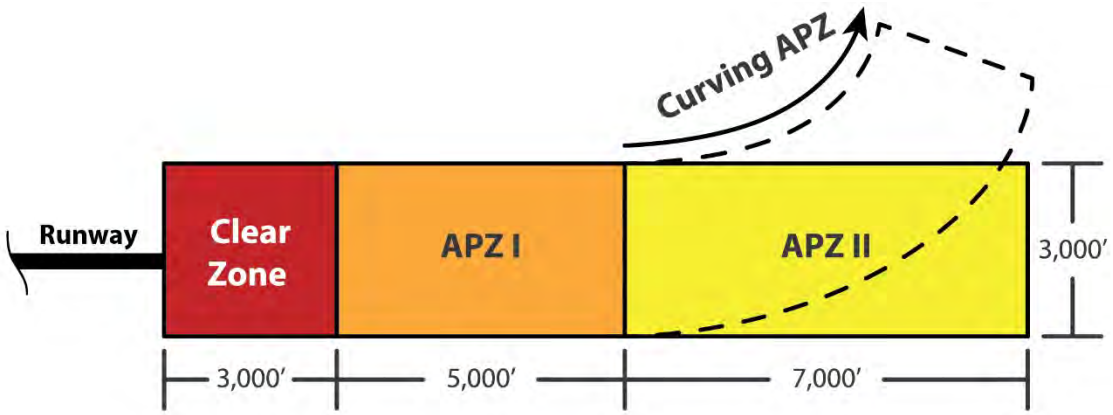


Figure 5-2 depicts the CZs and APZs for Runways 16/34 and 06/24 for Elmendorf Airfield. The CZ and APZs that extend straight out to the north associated with Runway 16, adjusted to account for the runway extension, remain within the installation boundary overlaying portions of the range. Runway 24's CZ and APZs, adjusted to follow the expedited route aircraft fly to training areas and to deconflict with Bryant Army Airfield, turn northeast starting at APZ I. The CZ and APZs are within the installation boundary and overlay portions of the railroad, both in APZ I and APZ II. Runway 34's CZ is within the installation boundary; however, portions of APZ I extend off-base over the Mountain View and Russian Jack Park communities and APZ II extends off-base over the Northeast community. The Runway 06 CZ is within the installation boundary; however, portions of APZ I overlay a small area of the Government Hill community, and APZ II extends 1.3 miles over the water in the Knik Arm.

Table 5-1 tabulates the off-installation land acreage and estimated population within the Elmendorf Airfield CZs and APZs. While the CZs are contained within the installation boundary, they overlay portions of railroad owned land, which is classified as off-installation; therefore, Table 5-1 is showing off-installation acres and the estimated population within those acres. Similarly, portions of APZ I and APZ II overlay the railroad, and, therefore, are reflected in the acreage and population estimates in Table 5-1. Both APZ I and APZ II extend off-installation and overlay communities and populations, as shown in Table 5-1. The entirety of APZ II from Runway 06 is over water and, therefore, is not included in Table 5-1. Chapter 6 discusses land use and recommendations for addressing incompatibility issues within CZs and APZs for an airfield.

Table 5-1. Off-installation Land Area and Estimated Population within the Clear Zones and Accident Potential Zones, Elmendorf Airfield

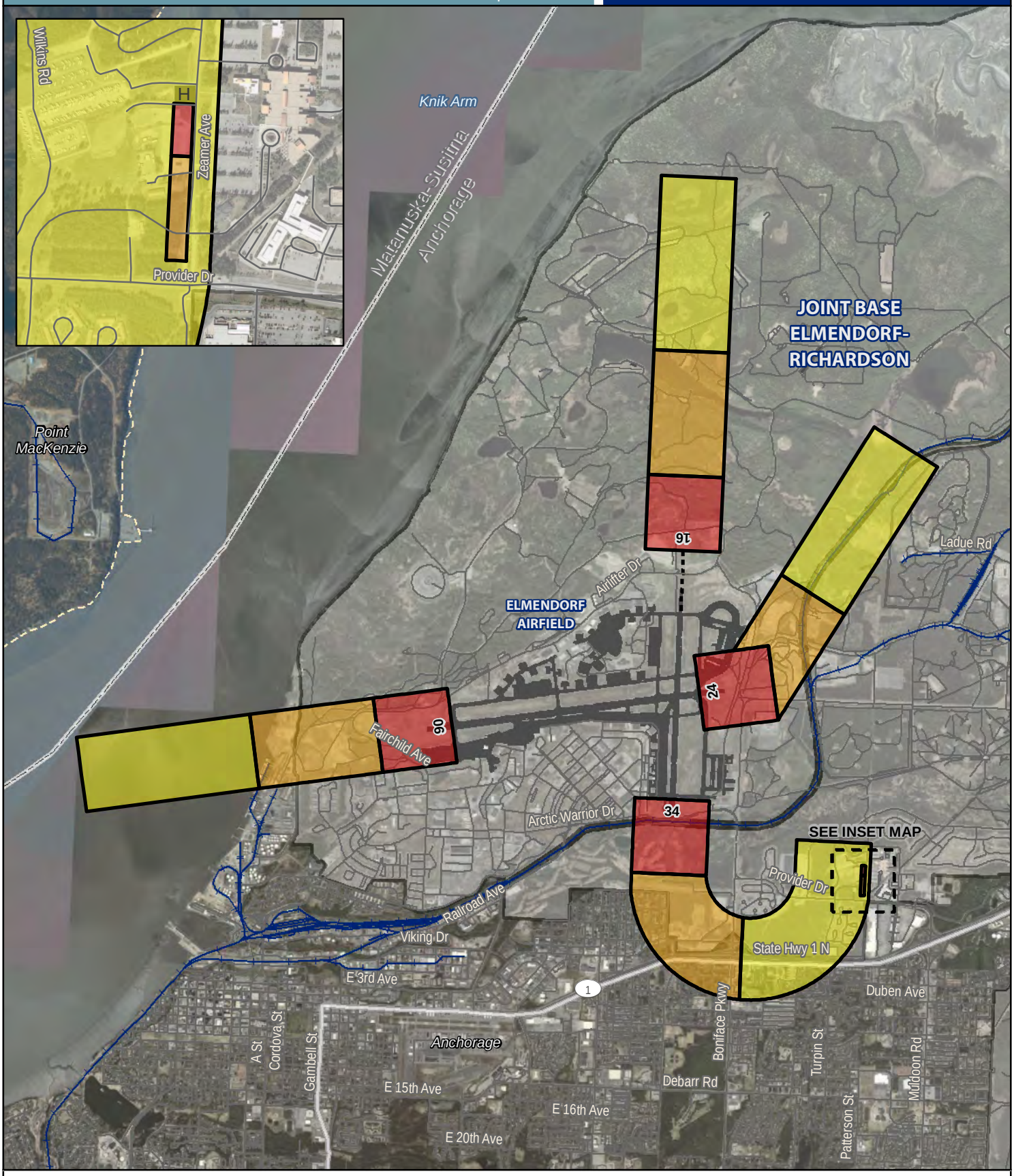
Zone	Acres	Population
CZ	14.04	6
APZ I	275.39	2,486
APZ II	155.23	888
Total	**444.66**	**3,379**

Source: United States Census Bureau 2017
Notes:
Discrepancies in totals are a result of rounding.
Population is estimated using a geometric proportion method within the safety zones. This method assigns population based on the portion of a census block that is located within the contour. The population across census blocks is assumed to be evenly distributed.

Figure 5-2

Joint Base Elmendorf-Richardson
Air Installations Compatible Use Zones

2019 AICUZ Clear Zones and Accident Potential Zones, Elmendorf Airfield



Legend

- Installation Boundary
- Airfield Surface Area
- Runway 16 Extension
- H Helipad
- Borough Boundary
- Municipal Boundary/ Census Designated Place
- Major Highway
- Railroad
- Clear Zone
- Accident Potential Zone I
- Accident Potential Zone II

0 0.5 1 Miles

N

Source: AFCEC 2018, 2019; Digital Globe 2017; ESRI 2017; NGA/DHS 2015; U.S. Census Bureau 2018.

5.1.2 Bryant Army Airfield

The Bryant Army Airfield runway is classified as Class A VFR runway. The CZs and APZs for Class A runways are described in the bullets below and are shown on Figure 5-3.

- **Clear Zone**: At the end of all active DoD runways is an area known as the "Clear Zone." The CZ is an area 1,000 feet in width and 3,000 feet in length along the runway centerline. A CZ is required for all active runways and should remain undeveloped.

- **APZ I**: Beyond the CZ is APZ I. APZ I is 1,000 feet in width and 2,500 feet in length along the extended runway centerline.

- **APZ II**: APZ II is the rectangular area beyond APZ I. APZ II is 1,000 feet in width by 2,500 feet in length along the extended runway centerline.

Figure 5-3. Class A Runway Clear Zones and Accident Potential Zones

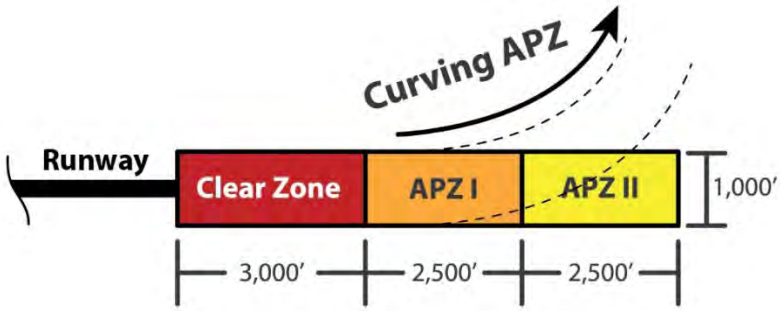
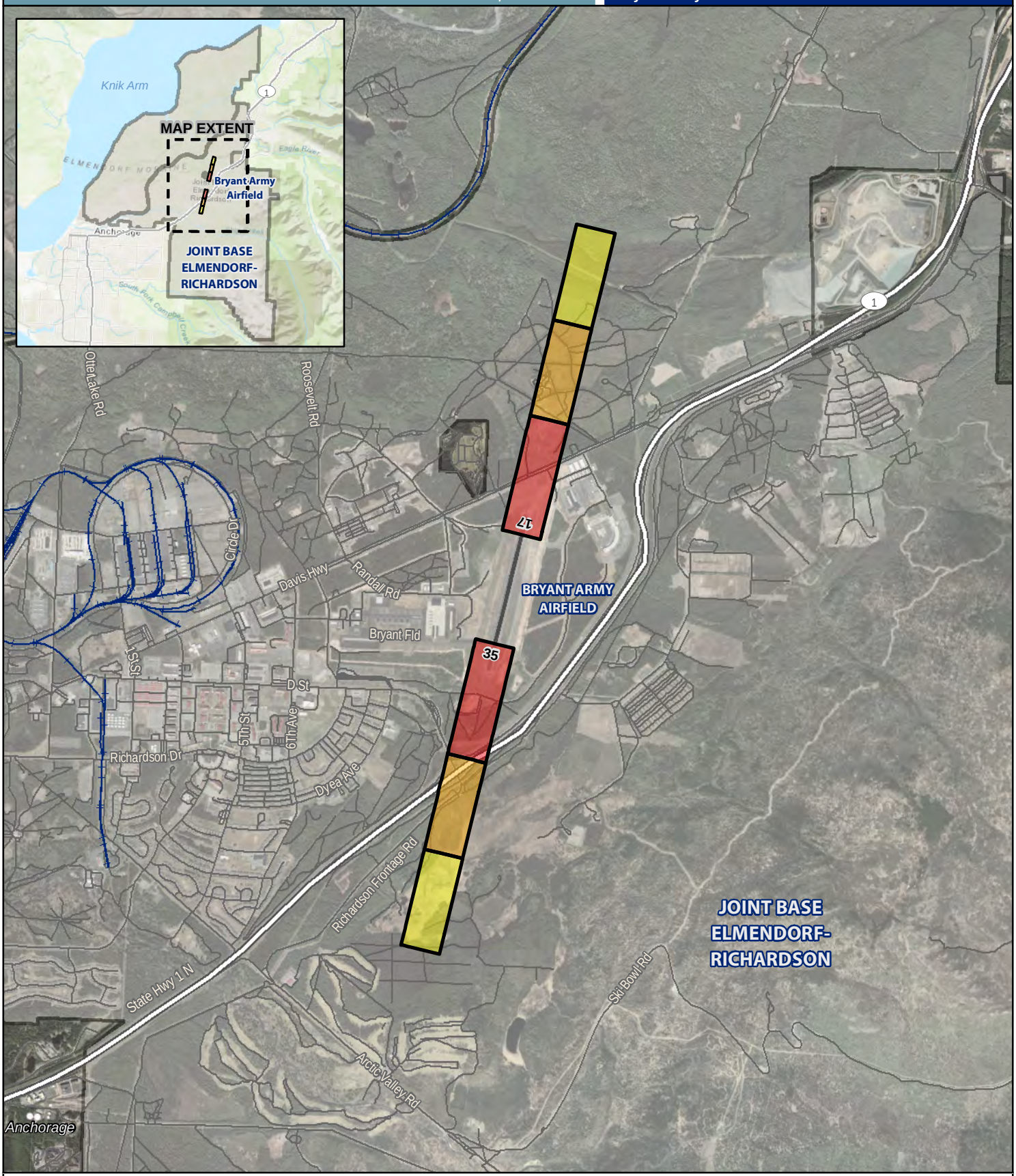


Figure 5-4 depicts the CZs and APZs for Runway 17/35 for Bryant Army Airfield. The APZs for each runway end follow DoD guidance and are contained within the installation boundary, with small portions of the CZ and APZ I overlaying Glenn Highway. APZs for Bryant Army Airfield do not curve.

Figure 5-4

Joint Base Elmendorf-Richardson
Air Installations Compatible Use Zones

2019 AICUZ Clear Zones and Accident Potential Zones, Bryant Army Airfield



Legend

- Installation Boundary
- Airfield Surface Area
- Major Highway
- Railroad
- Clear Zone
- Accident Potential Zone I
- Accident Potential Zone II

0 0.5 1 Miles

N

Source: AFCEC 2018, 2019; Digital Globe 2017; ESRI 2017; NGA/DHS 2015; U.S. Census Bureau 2018.

5.2 Imaginary Surfaces

The DoD and FAA identify a complex series of imaginary planes and transition surfaces that together define the airspace needed to remain free of obstructions around an airfield. Obstruction-free imaginary surfaces form a complex bowl around the airfield to ensure safe flight approaches, departures, and pattern operations. Obstructions include natural terrain and man-made features such as buildings, towers, poles, wind turbines, cell towers, and other vertical obstructions to airspace navigation.

There are different imaginary surfaces for Class B and Class A runways. Illustrations of the imaginary surfaces for these runways are shown in the following sections.

5.2.1 Elmendorf Airfield

Attributes of a Class B fixed-wing runway, like those at Elmendorf Airfield, are depicted on Figure 5-5. Table 5-2 provides brief descriptions for each of these surfaces. Figure 5-6 depicts the actual runway airspace imaginary surfaces specific to Elmendorf Airfield's Class B runways. In general, the Air Force does not permit above-ground structures in the primary surface (located on base), and height restrictions apply to transitional surfaces and approach and departure surfaces. Height restrictions are more stringent for areas closer to the runway and flight paths.

Figure 5-5. Imaginary Surfaces and Transition Planes for Class B Fixed-Wing Runways

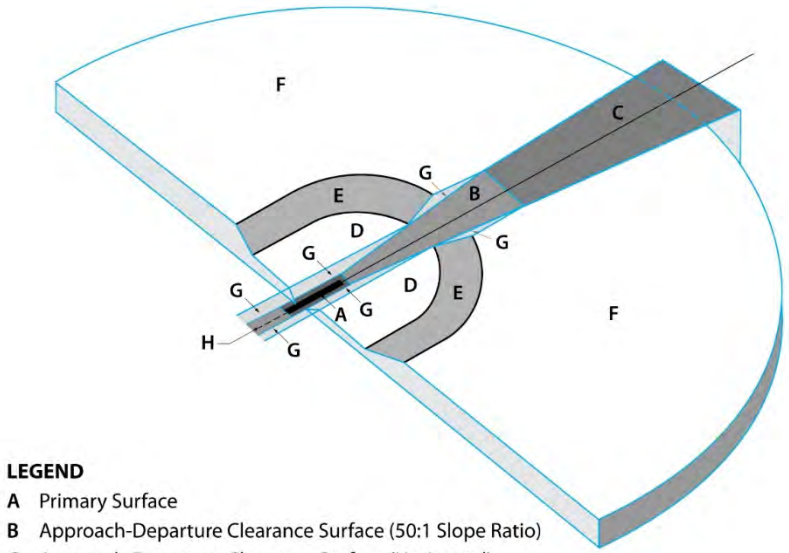


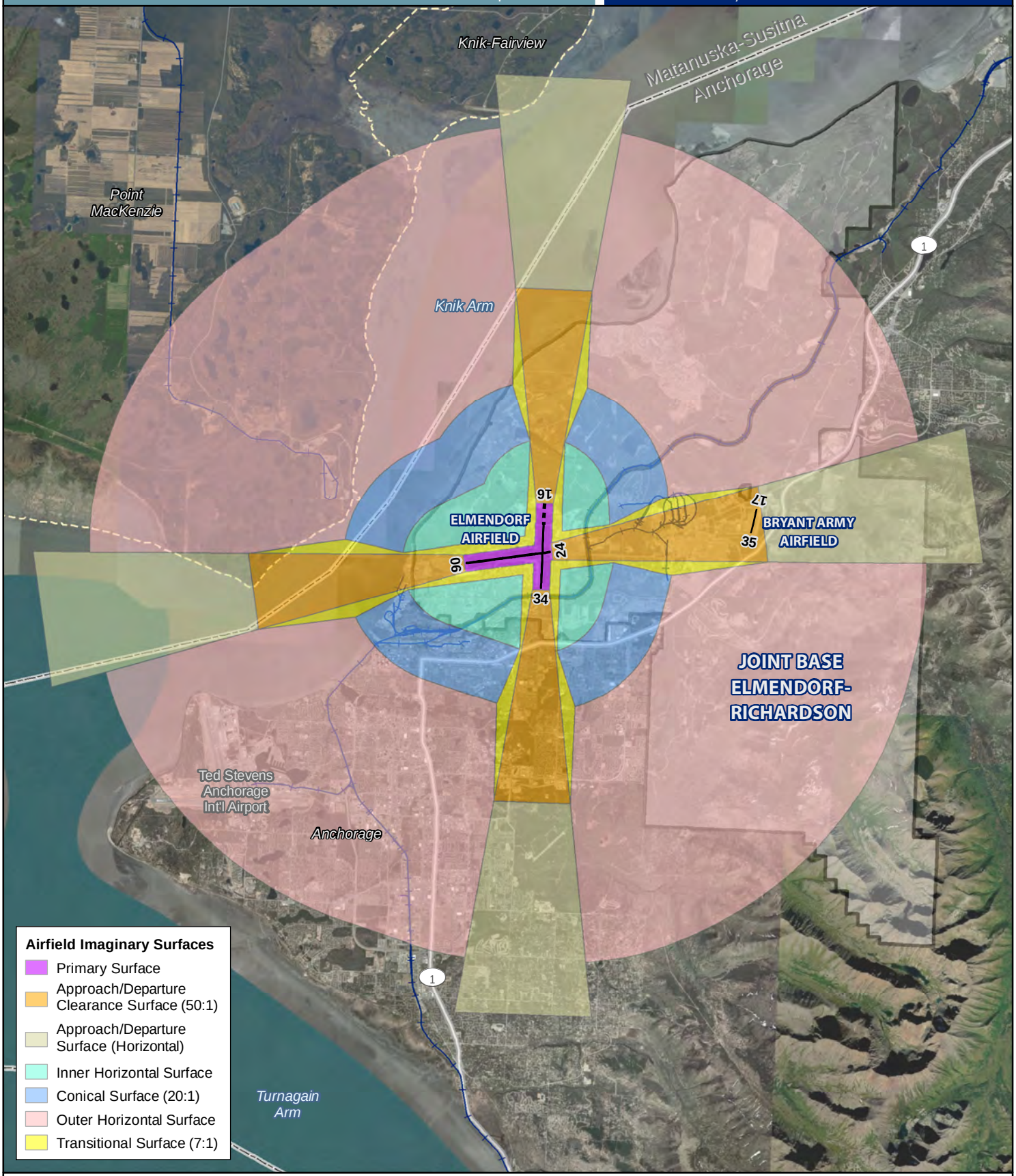
Table 5-2. Descriptions of Class B Fixed-Wing Runway Imaginary Surfaces for Military Airfields

Primary Surface	An imaginary surface symmetrically centered on the runway, extending 200 feet beyond each runway end that defines the limits of the obstruction clearance requirements in the vicinity of the landing area. The width of the primary surface is 2,000 feet, or 1,000 feet on each side of the runway centerline.
Approach-Departure Clearance Surface	This imaginary surface is symmetrically centered on the extended runway centerline, beginning as an inclined plane (glide angle) at the end of the primary surface (200 feet beyond each end of the runway), and extending for 50,000 feet. The slope of the approach-departure clearance surface is 50:1 until it reaches an elevation of 500 feet above the established airfield elevation. It then continues horizontally at this elevation to a point 50,000 feet from the starting point. The width of this surface at the runway end is 2,000 feet, flaring uniformly to a width of 16,000 feet at the end point.
Inner Horizontal Surface	This imaginary surface is an oval plane at a height of 150 feet above the established airfield elevation. The inner boundary intersects with the approach-departure clearance surface and the transitional surface. The outer boundary is formed by scribing arcs with a radius 7,500 feet from the centerline of each runway end and interconnecting these arcs with tangents.
Conical Surface	This is an inclined imaginary surface extending outward and upward from the outer periphery of the inner horizontal surface for a horizontal distance of 7,000 feet to a height of 500 feet above the established airfield elevation. The slope of the conical surface is 20:1. The conical surface connects the inner and outer horizontal surfaces.
Outer Horizontal Surface	This imaginary surface is located 500 feet above the established airfield elevation and extends outward from the outer periphery of the conical surface for a horizontal distance of 30,000 feet.
Transitional Surface	This surface extends outward and upward at an angle to the runway centerline and extended runway centerline at a slope of 7:1. The transitional surface connects the primary and the approach-departure clearance surfaces to the inner horizontal, the conical, and the outer horizontal surfaces.

Figure 5-6

Joint Base Elmendorf-Richardson
Air Installations Compatible Use Zones

Runway Airspace Imaginary Surfaces and Transition Planes, Elmendorf Airfield



Legend

- Installation Boundary
- Airfield Runway
- Runway 16 Extension
- Borough Boundary
- Municipal Boundary/ Census Designated Place
- Major Highway
- Railroad

N

0 1 2 Miles

Source: AFCEC 2018, 2019; Digital Globe 2017; ESRI 2017; NGA/DHS 2015; U.S. Census Bureau 2018.

5.2.2 Bryant Army Airfield

Attributes of a Class A runway, like those at Bryant Army Airfield, are depicted on Figure 5-7. Table 5-3 provides brief descriptions for each of these surfaces. Figure 5-8 depicts the actual runway airspace imaginary surfaces specific to Bryant Army Airfield Class A runways. In general, the ARNG does not permit above-ground structures in the primary surface (located on base), and height restrictions apply to transitional surfaces and approach and departure surfaces. Height restrictions are more stringent for areas closer to the runway and flight paths.

Figure 5-7. Imaginary Surfaces and Transition Planes for Class A VFR Runways

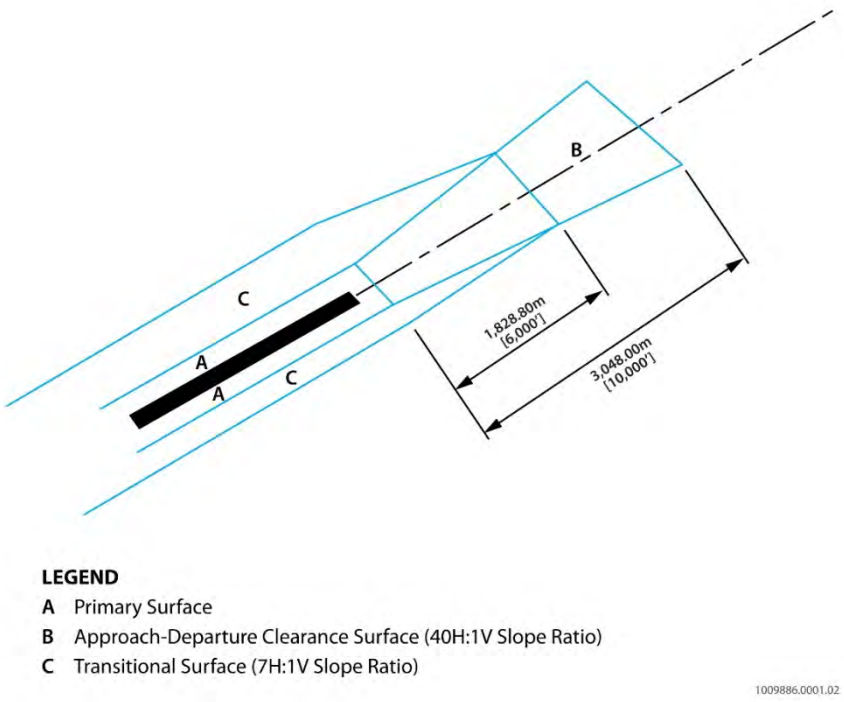


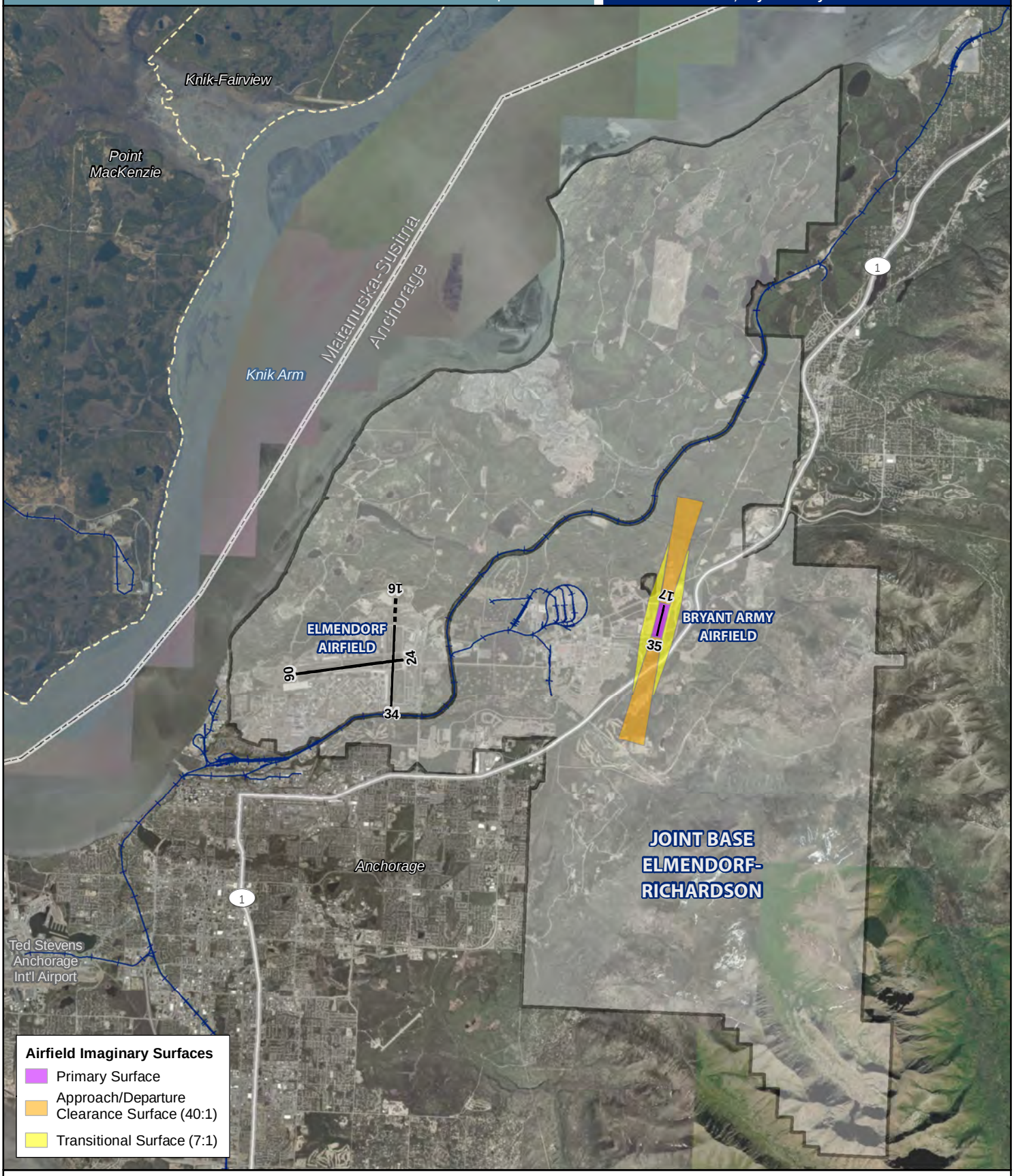
Table 5-3. Descriptions of Class A VFR Runways Airspace Imaginary Surfaces for Military Airfields

Primary Surface	An imaginary surface symmetrically centered on the runway, extending 200 feet beyond each end of the runway that defines the limits of the obstruction clearance requirements in the vicinity of the landing area. The width of the primary surface is 1,000 feet, or 500 feet on each side of the runway centerline.
Approach-Departure Clearance Surface	This imaginary surface is symmetrically centered on the extended runway centerline, beginning as an inclined plane (glide angle) at the end of the primary surface (200 feet beyond each end of the runway), and extending for 10,000 feet. The slope of the approach-departure clearance surface is 40:1 until it reaches an elevation of 250 feet above the established airfield elevation. The width of this surface at the end of the primary surface is 1,000 feet, flaring uniformly to a width of 2,500 feet at the end point.
Transitional Surface	This surface extends outward from the edge of the primary surface and upward at an angle to the runway centerline and extended runway centerline at a slope of 7:1 until it reaches a point 150 feet above the established airfield elevation. The transitional surface edge is parallel to the edge of the primary surface along the length of the runway and extended runway centerline. From there, the transitional surface extends in a straight line to the point at which it connects to the approach-departure clearance surface at a height of 150 feet above the established airfield elevation.

Figure 5-8

Joint Base Elmendorf-Richardson
Air Installations Compatible Use Zones

Runway Airspace Imaginary Surfaces and Transition Planes, Bryant Army Airfield



Legend

- Installation Boundary
- Airfield Runway
- Runway 16 Extension
- Borough Boundary
- Municipal Boundary/ Census Designated Place
- Major Highway
- Railroad

0 1 2 Miles

N

Source: AFCEC 2018, 2019; Digital Globe 2017; ESRI 2017; NGA/DHS 2015; U.S. Census Bureau 2018.

5.3 Hazards to Aircraft Flight Zone

Certain land uses and activities pose potential hazards to flight. To ensure land uses and activities are examined for compatibility, the Air Force has identified a Hazards to Aircraft Flight Zone (HAFZ). The HAFZ is defined as the area within the imaginary surfaces that are shown on Figures 5-6 and 5-8. Please note that the area and shape of the HAFZ may change with the encroachment issue at hand. For instance, issues related to bird/wildlife aircraft strike hazards may follow natural boundaries, encompass local bodies of water, and extend along flight paths. Unlike noise zones and safety zones, the HAFZ does not have recommended land use compatibility tables. Instead, it is a consultation zone recommending that project applicants and local planning bodies consult with the Air Force to ensure the project is compatible with military operations. These land use and activity compatibility considerations include:

- **Height:** Tall objects can pose significant hazards to flight operations or interfere with navigational equipment (including radar). City/county agencies involved with approvals of permits for construction should require developers to submit calculations showing that projects meet the height restriction criteria of 14 Code of Federal Regulations (CFR) 77.17 for the specific airfield described in the AICUZ Study. City and county agencies may also consider requiring a "Determination of No Hazard" issued by the FAA for any tall objects within this zone.

- **Visual Interference:** Industrial or agricultural sources of smoke, dust, and steam in the airfield vicinity can obstruct a pilot's vision during takeoff, landing, or other periods of low-altitude flight. Close coordination between the installation and landowners can often mitigate these concerns. For example, irrigating before plowing can greatly reduce dust concerns.

- **Light Emissions:** Bright lights, either direct or reflected, in the airfield vicinity can impair a pilot's vision, especially at night. A sudden flash from a bright light causes a spot or "halo" to remain at the center of the visual field for a few seconds or more, rendering a person virtually blind to all other visual input. This is particularly dangerous for pilots at night when the flash can diminish the eye's adaptation to darkness. The eyes partially recover from this adaptation in a matter of minutes, but full adaptation typically requires 40 to 45 minutes. Specific examples of light emissions that can interfere with the safety of nearby aviation operations include:

    - Lasers that emit in the visible spectrum, which can be potentially harmful to a pilot's vision during both day and night.

    - The increasing use of energy-efficient LED lighting, which poses potential conflicts in areas where pilots use night vision goggles

(NVGs). NVGs can exaggerate the brightness of these lights, interfering with pilot vision.

- The use of red LED lights to mark obstructions, which can produce an unintended safety consequence because red LED lights are not visible on most NVG models, rendering them invisible to NVG users in the area.

- **Bird/Wildlife Aircraft Strike Hazard (BASH)**: Wildlife represents a significant hazard to flight operations. Birds, in particular, are drawn to different habitat types found in the airfield environment, including hedges, grass, brush, forest, water, and even the warm pavement of the runways. Due to the speed of the aircraft, collisions with wildlife can happen with considerable force. Although most bird and animal strikes do not result in crashes, they cause structural and mechanical damage to aircraft as well as loss of flight time.

  Most aircraft collisions occur below 2,000 feet. To reduce the potential of a BASH, the Air Force recommends that land uses that attract birds not be located near installations with an active air operations mission. These land uses include:

  - Waste disposal operations;
  - Wastewater treatment facilities;
  - Transfer stations;
  - Landfills;
  - Golf courses;
  - Wetlands;
  - Storm water ponds; and
  - Dredge disposal sites.

  Birds and raptors in search of food or rodents will flock to landfills, increasing the probability of BASH occurrences near these facilities. One can also use design modifications to reduce the attractiveness of these types of land uses to birds and other wildlife.

  Large numbers of birds travel to Alaska on their annual migration. Bird migrations create a seasonal BASH risk to JBER. Most bird species in south-central Alaska are occasionally present within the range of habitats located on

JBER. Bird populations on JBER vary with the seasons and migratory patterns, with high-risk species presence being the greatest in spring or autumn. Numbers of Canada geese often increase in autumn as the geese stage in the Anchorage area for migration.

The Anchorage Regional Landfill attracts scavengers, including bald eagles, ravens and other corvids, and gulls. Bald eagles have been known to feed at Anchorage Regional Landfill, and perch in trees near Bryant Army Airfield and pass through its airspace. The Anchorage Regional Landfill is located northeast of JBER's Bryant Army Airfield in Eagle River. It is operated by the Municipality of Anchorage Solid Water Services. The landfill's services include commercial and residential trash disposal, household hazardous waste collection, and recycling (Anchorage 2019). Aircraft flying at low altitudes over and near the landfill are at risk for potential bird strikes. The Anchorage Regional Landfill program and JBER employ U.S. Department of Agriculture's Animal Plant Health Inspection Service employees to manage their depredation program. The U.S. Fish and Wildlife Service and State of Alaska depredation permits issued to JBER and the Anchorage Regional Landfill are almost identical. Landfills are a significant BASH risk, but Anchorage Regional Landfill operations are effective in reducing avian occupancy and foraging activities. If the landfill expands, it could contribute to BASH concerns and have encroachment implications for Bryant Army Airfield's mission.

Elmendorf Airfield and Bryant Army Airfield have active BASH plans, and throughout JBER there are BASH Zones and Wildlife Exclusion Zones to help promote safety. Bryant Army Airfield operates under the 3rd Wing BASH plan through a Memorandum of Understanding. Proposed actions to mitigate BASH concerns at JBER include modifying aircraft operations during high-risk periods and preventing or removing wildlife from the airfields by utilizing fencing or active hazing.

- **Radio Frequency/Electromagnetic Interference:** The American National Standards Institute defines electromagnetic interference (EMI) as any electromagnetic disturbance that interrupts, obstructs, or otherwise degrades or limits the effective performance of electronics/electrical equipment.

  EMI can be induced intentionally, as in forms of electronic warfare, or unintentionally, as a result of spurious emissions and responses, such as high-tension line leakage and industrial machinery. In addition, EMI may be caused by atmospheric phenomena, such as lightning or precipitation static.

  New generations of military aircraft are highly dependent on complex electronic systems for navigation and critical flight and mission-related functions. Consequently, communities should use care when siting any

activities that create EMI. Many of these sources are low-level emitters of EMI. However, when combined, they have an additive quality.

EMI also affects consumer devices, such as cell phones, FM radios, television reception, and garage door openers. In some cases, the source of interference occurs when consumer electronics use frequencies set aside for military use.

- **Remotely Piloted Aircraft:** The use of remotely piloted aircraft (i.e., drones) near military airfields poses a serious flight safety hazard due to the potential for a mid-air collision between military aircraft and small- to medium-sized drones. The FAA maintains specific guidance about where drones can be flown. Currently, non-DoD drone operations are not permitted within certain zones surrounding military bases. Additional restrictions are in place around airports, sports stadiums, and sensitive security areas. For more information on drone use in and around DoD airfields, visit the FAA's website at: www.faa.gov/uas.

6.0 Land Use Compatibility Analysis

CZs, APZs, noise zones, and the HAFZ make up the AICUZ footprint for an air installation. The AICUZ footprint defines the minimum recommended area within which land use controls are needed to enhance the health, safety, and welfare of those living or working near a military installation and to preserve the mission. The AICUZ footprint, combined with the guidance and recommendations set forth in the AICUZ Study, are the fundamental tools necessary for the planning process. The Air Force recommends that local and regional governments adopt the AICUZ noise zones, CZs, APZs, and HAFZ into planning studies, regulations, and processes to best guide compatible development around installations. This AICUZ Study uses the AICUZ noise zones, CZs, and APZs (Figure 6-1) for JBER as the basis for the land use compatibility analysis.

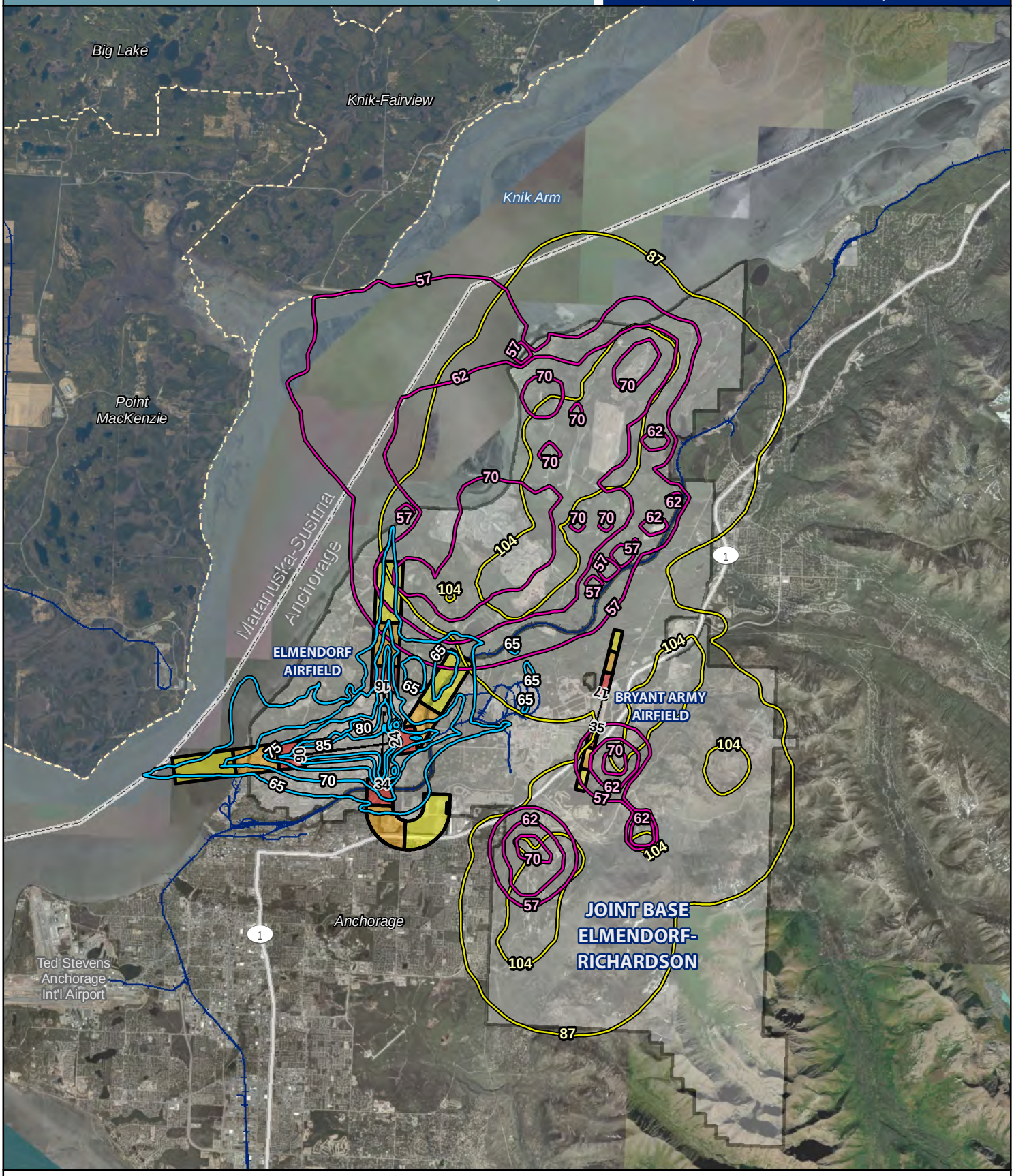
6.1 Land Use Compatibility Guidelines and Classifications

In an effort to establish long-term compatibility for lands within the vicinity of military installations, the DoD has created land use compatibility recommendations based on the Federal Highway Administration's Standard Land Use Coding Manual (SLUCM). These guidelines are used by DoD personnel for on-installation planning and for engaging with the local community to foster compatible land use development. Table A-1 of Appendix A shows the suggested land use compatibility guidelines within the CZs and APZs. Table A-2 of Appendix A provides land use compatibility recommendations within noise zones. Tables A-3 and A-4 provide land use compatibility for noise zones associated with small arms and large caliber weapons and explosives ranges, respectively.

Figure 6-1

Joint Base Elmendorf-Richardson
Air Installations Compatible Use Zones

Composite AICUZ Footprint: 2019 AICUZ Noise Contours, Clear Zones, and Accident Potential Zones, JBER



Legend

- Installation Boundary
- Airfield Runway
- Runway 16 Extension
- Borough Boundary
- Municipal Boundary/ Census Designated Place
- Major Highway
- Railroad
- Aircraft Noise Contour, dB DNL
- Large Caliber Weapons and Explosives Noise Contour, CDNL
- Small Arms Peak Noise Contour, dB PK15 (met)
- Clear Zone
- Accident Potential Zone I
- Accident Potential Zone II

0 1 2 Miles

N

Source: AFCEC 2018, 2019; Digital Globe 2017; ESRI 2017; NGA/DHS 2015; U.S. Census Bureau 2018.

6.2 Planning Authorities

This section presents information for each governing body that has land use jurisdictions near JBER, including descriptions of existing and future land uses.

6.2.1 State of Alaska

Alaska Statute 29.40 - Planning, Platting, and Land Use Regulation, defines specific authorities of cities and/or boroughs regarding land use regulations. It notes that first class or second class boroughs, as well as home rule boroughs, shall provide for planning, platting, and land use regulations on an area-wide basis within the borough. The borough may delegate these powers to a city within the borough, if the city consents, as noted in AS 29.40.010. The statute defines comprehensive plans as a collection of policies, goals, and standards for guiding the physical, economic, and social development of a community. AS 29.40.040 requires a municipality to adopt a comprehensive plan before adopting land use regulations.

6.2.2 Alaska Native Claims Settlement Act of 1971

In 1971, Congress passed the Alaska Native Claims Settlement Act to settle outstanding land claims and create clear title to land and resources in Alaska. The Act established 12 regional corporations and a method of conveying surface estate (land) and subsurface estate (minerals or other resources) to each of the established regional corporations. In addition to the 12 regional corporations, the Act created village corporations and granted them the right to land surrounding the village, subject to valid existing rights and according to Section 11 of the Act (DCCED 2019). Native corporations are the largest private landowners in Alaska, with title to 44 million acres of selected land throughout the state. The Alaska Native Claims Settlement Act requires every corporation to be organized under Alaskan law (RDC 2019).

Native Corporations

There are several Native Corporations within the Anchorage Bowl and Mat-Su Borough who have an interest in JBER. Of significant influence to JBER is Eklutna Inc., the largest private landholder within the Municipality of Anchorage, owning over 90,000 acres of land, including in Eagle River, Chugiak, Birchwood, Peters Creek, and in Eklutna. The corporation has land holdings in Mat-Su Borough, with additional land to be conveyed from the Bureau of Land Management (Eklutna, Inc. 2019).

Tribal Governments

Four federally recognized Alaska Native tribes have an interest in JBER lands. They are the Chickaloon Native Village, the Native Village of Eklutna, the Knik Tribe, and Native Village

of Tyonek. Memorandum of Agreements exist with the Native Village of Eklutna and Chickaloon Native Village. No formal agreement exists between JBER and the others.

6.2.3 Municipality of Anchorage

The Municipality of Anchorage's Assembly carries out the legislative functions for the municipality, while the executive power is entrusted to the Mayor. Assembly members are elected and serve 3-year terms. Their role includes approving annual budgets, confirming appointments to boards and commissions, and evaluating and facilitating overall municipal operations, among others. The Planning and Zoning Commission prepares and recommends to the Assembly policies, plans, and ordinances relating to land use planning. Members are appointed by the Mayor and confirmed by the Assembly. Land use is further managed by the Municipality of Anchorage's planning department. They are divided into three groups, including Current Planning, Long-range Planning, and Transportation Planning. These groups are collectively responsible for planning, zoning, and development-related activities in the municipality. The municipality adopted the Anchorage 2040 Land Use Plan in September of 2017. The 2040 Land Use Plan serves as an update to the 2020 Anchorage Bowl Comprehensive Plan, adopted in 2001. The Anchorage Bowl is the common term for Anchorage's urban center, located southwest of JBER.

Anchorage Community Councils

The Municipality of Anchorage contains 37 Community Councils. Community Councils provide a direct and continuous form of citizen participation in government and local affairs. The Councils are private, nonprofit, and self-governing associations comprised of residents, property and business owners, and other key representatives. The Councils serve in an advisory role to the Assembly in local government processes.

6.2.4 Mat-Su Borough

The Mat-Su Borough is classified as a second class borough. Alaska State Law requires that home rule, first and second class boroughs, unified municipalities, and first class and home rule cities outside of boroughs provide planning, platting, and land use regulation (Mat-Su 2019). Like Anchorage, legislative authority for Mat-Su is vested to the Assembly elected from districts to serve 3-year terms and executive power is vested with the Mayor. Mat-Su has a Planning Commission comprised of appointed citizens that serve as an advisory group to the Assembly on issues and activities related to planning land use regulation and community development, in general. The Planning Department leads land use planning and is responsible for assisting with permitting needs, providing code compliance information, supporting environmental services, conducting long range planning, and more.

Mat-Su Community Councils

There are 25 Community Councils within the Mat-Su Borough. They generally serve as a nonprofit, voluntary, self-governing association of residents of the respective areas. They are recognized through an assembly resolution, but do not serve as a governing arm of the Borough.

6.3 Land Use and Proposed Development

The land use compatibility analysis identifies existing and future land uses near JBER to determine compatibility conditions. Existing land use and zoning is assessed to determine current land use activity, while future land use plans are used to project development and potential growth areas.

To analyze the compatibility of nearby land uses surrounding JBER, land use is characterized into the categories shown below. While the specific categories used by each local government may vary, these generalized categories provide a starting point for each analysis. Appendix B provides further details on how land uses were generalized for this study. These generalized land use categories are not exact representations of the local community's land use designations, but combine similar land uses into one of several categories:

- **Commercial:** Commercial and retail business uses. This includes large-scale (big box) stores, malls, strip commercial centers, restaurants, repair services, hotels, and highway commercial uses.
- **Parks and Open Space:** Municipal and state parks, open space, and greenways.
- **Heavy Industrial:** Heavy manufacturing, salvage yards, heavy equipment and materials, and other higher-impact industrial uses.
- **Light Industrial:** Low-impact or high-tech manufacturing, wholesale distribution, or warehousing uses. This includes bulk products and outdoor storage as well as auto repair and painting, snow disposal sites, and motor vehicle transportation.
- **Institutional:** Land that the public has access to, including social, civic, and fraternal organizations. This can include schools, colleges, churches, hospitals, museums, and libraries.
- **Mixed Use:** A blend of residential, commercial, and other uses.
- **Multi-family Residential:** These include multi-family residential uses. Some uses can contain over 3 units as well as several other ranges of units such as 5-9 or 10-19 units.

- **Mobile Home:** Areas developed for mobile home parks.
- **Single-family Residential:** Single-family detached residences.
- **Urban Residential High-density:** This includes high intensity residential and densities over 35 dwelling units per acre (DU/Ac). This designation is used specifically in future land use.
- **Medium-density Residential:** This includes a combination of low-density residential areas of up to 3 DU/Ac as well as medium density residential areas of up to 35 DU/Ac. This designation is used specifically in future land use.
- **Single-family and Two-family Residential:** This includes low-intensity detached units. This designation is used specifically in future land use.
- **Low-density Residential:** Rural in character with single-family residential detached housing. It can include a continuation of agricultural uses, open space, equestrian, civic and recreation, and mixed-uses, where appropriate. For Future land use, specifically, this generalized category can include residential units less than 1 and up to 6 DU/Ac.
- **Development Reserve:** Generally suitable for development, but whose location and absence of public facilities and lack of projected demand make near-term and intermediate-term development uncertain. Large-lot, single-family residential development is allowed by right. This designation is used specifically in future land use.
- **Special Study Area:** There are several Heritage Land Bank parcels for which a specific use has yet to be determined. These areas are subject to a site-specific land use study before use designation or development.
- **Transportation:** Marine transportation, docks, and associated facilities. It also includes street and highway rights-of-way. For future land use, this applies to areas with existing or planned public facilities directly related to transportation by rail and air.

- **Utility:** Utility service distribution and freight handling and movement.
- **Water:** Water classification includes areas classified as water features within the borough boundary. This designation does not cover larger waterbodies outside of the borough, such as the Knik Arm.

Section 6.4.1, Land Use Analysis, provides further details on how the categories above are generalized for comparison across the Air Force. Appendix B, Generalized Land Use Crosswalk, provides further details on how land uses were generalized for this study.

6.3.1 Existing Land Uses

JBER's associated aircraft and range noise zones, CZs, and APZs are contained primarily on the installation. Some areas of the AICUZ footprint span across developed areas of Anchorage positioned southwest and northeast of the base, as well as over the Knik Arm and along the coast of areas in Mat-Su. Existing land use geographic information system (GIS) data were provided by the Municipality of Anchorage and are commonly known as 1998 historical land use data. This was the same data set used for the land use analysis in the 2018 F-22 Operational Efficiency FEIS. For the Mat-Su Borough, there was no publicly available existing land use data; however, the Borough utilized parcel data, which have attributes from the Tax Assessor database that are typically derived from building codes. Data were categorized by building codes. The area examined in the Mat-Su Borough is a 1.5-mile buffer from the coast of the Knik Arm into the borough.

The Municipality of Anchorage is located southwest of the base in an area commonly known as the Anchorage Bowl. This area has a wide variety of existing land uses. Transportation, Light Industrial and Heavy Industrial, a mix of Single-family and Multi-family Residential uses, Mobile Homes, Commercial, Vacant, and Institutional uses are located directly along the southwest boundary of the base. Areas of predominantly Parks and Open Space with additional areas of Vacant land and Single-family and Multi-family uses continue along the southwest boundary heading south along the base. Parks and Open Space, Vacant land, Transportation (predominantly Ted Stevens Anchorage International Airport), and Single-family Residential land uses are present toward the western area of the Anchorage Bowl, west of the railroad. Throughout this area, there are pockets of Institutional, Light Industrial, and Water. Commercial, Light Industrial, and Heavy Industrial are located mostly along transportation corridors, including the railroad. Areas of Commercial and Industrial land uses continue east from the railroad, particularly along transportation thoroughfares, including Glenn Highway. Larger areas of Institutional, Parks and Open Space, and Single-family Residential land uses continue with pockets of Mobile Homes, Multi-family Residential, and Vacant land uses located farther east.

Southeast of JBER is classified as "no data available." No GIS data were available for these areas; however, this area is over the Chugach State Park. Along the eastern boundary of JBER, the existing land use is largely comprised of Parks and Open Space. In addition, there

are areas of Institutional, Single-family Residential, Transportation, and Vacant land. Small areas of Commercial and Light and Heavy Industrial, Mobile Homes, and Multi-family Residential land uses are also present, in addition to the railroad.

Across the Knik Arm and northwest of the base in the Mat-Su Borough, the existing land use is mostly Undeveloped. Undeveloped land is land that does not have buildings present on the parcel. Other remaining land uses in the area include Single-family Residential, Institutional, and Mobile Homes on the northern portion in Knik-Fairview. In Point MacKenzie, additional land uses besides undeveloped include Single-family Residential, Mixed Use, Transportation, and Institutional.

Existing land use surrounding the 2019 AICUZ CZs, APZs, and noise contours for JBER are illustrated on Figure 6-2.

6.3.2 Current Zoning

The Municipality of Anchorage provided zoning data for the municipality. The Municipality of Anchorage did not have zoning data for Chugach State Park; these areas are classified as "no data available". The Mat-Su Borough did not have zoning data available for the 1.5-mile extent from the Knik Arm, surrounding the base.

Southwest of the base in the Anchorage Bowl there are various zoning designations. Immediately southwest of JBER's boundary there are areas of Light and Heavy Industrial, Single-family and Multi-family Residential, Commercial, and Institutional zoning designations. Along the southern boundary of the base is mostly zoned Institutional and Low-density Residential.

Areas in the western portion of the Anchorage Bowl, west of the railroad, are largely designated as Institutional, Parks and Open Space, and Single-family and Multi-family Residential, with additional areas of Mixed Use, Low-density Residential, and Commercial. Commercial and Light and Heavy Industrial areas are present along the railroad and Glenn Highway. Moving from the railroad and Glenn Highway toward the west, there is a mix of Single-family and Multi-family Residential areas, Park and Open Space, Low-density Residential, and Institutional designations, with smaller areas of Commercial and Mixed Use.

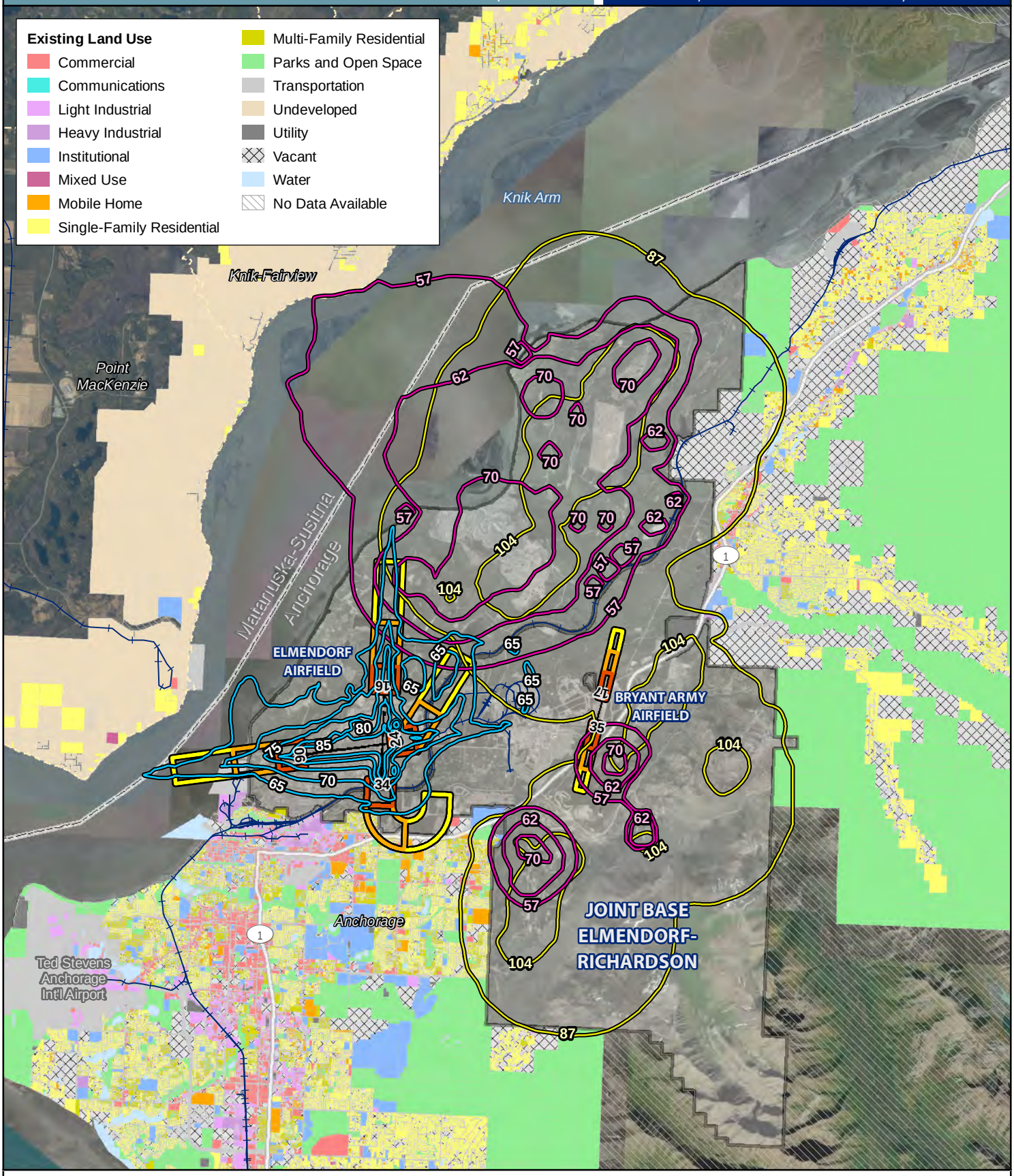
Along the eastern boundary, there are areas of Institutional, Low-density, Single-family, and Multi-family Residential, and Light and Heavy Industrial. Areas of Mixed Use and Commercial designations are also present and occur mostly along Glenn Highway in addition to other areas.

Zoning surrounding the 2019 AICUZ CZs, APZs, and noise contours for JBER are illustrated on Figure 6-3.

Figure 6-2

Joint Base Elmendorf-Richardson
Air Installations Compatible Use Zones

Existing Land Use and 2019 AICUZ Noise Contours, Clear Zones, and Accident Potential Zones, JBER



Legend

- Installation Boundary
- Airfield Runway
- Runway 16 Extension
- Borough Boundary
- Municipal Boundary/ Census Designated Place
- Major Highway
- Railroad
- Aircraft Noise Contour, dB DNL
- Large Caliber Weapons and Explosives Noise Contour, CDNL
- Small Arms Peak Noise Contour, dB PK15 (met)
- Clear Zone
- Accident Potential Zone I
- Accident Potential Zone II

N

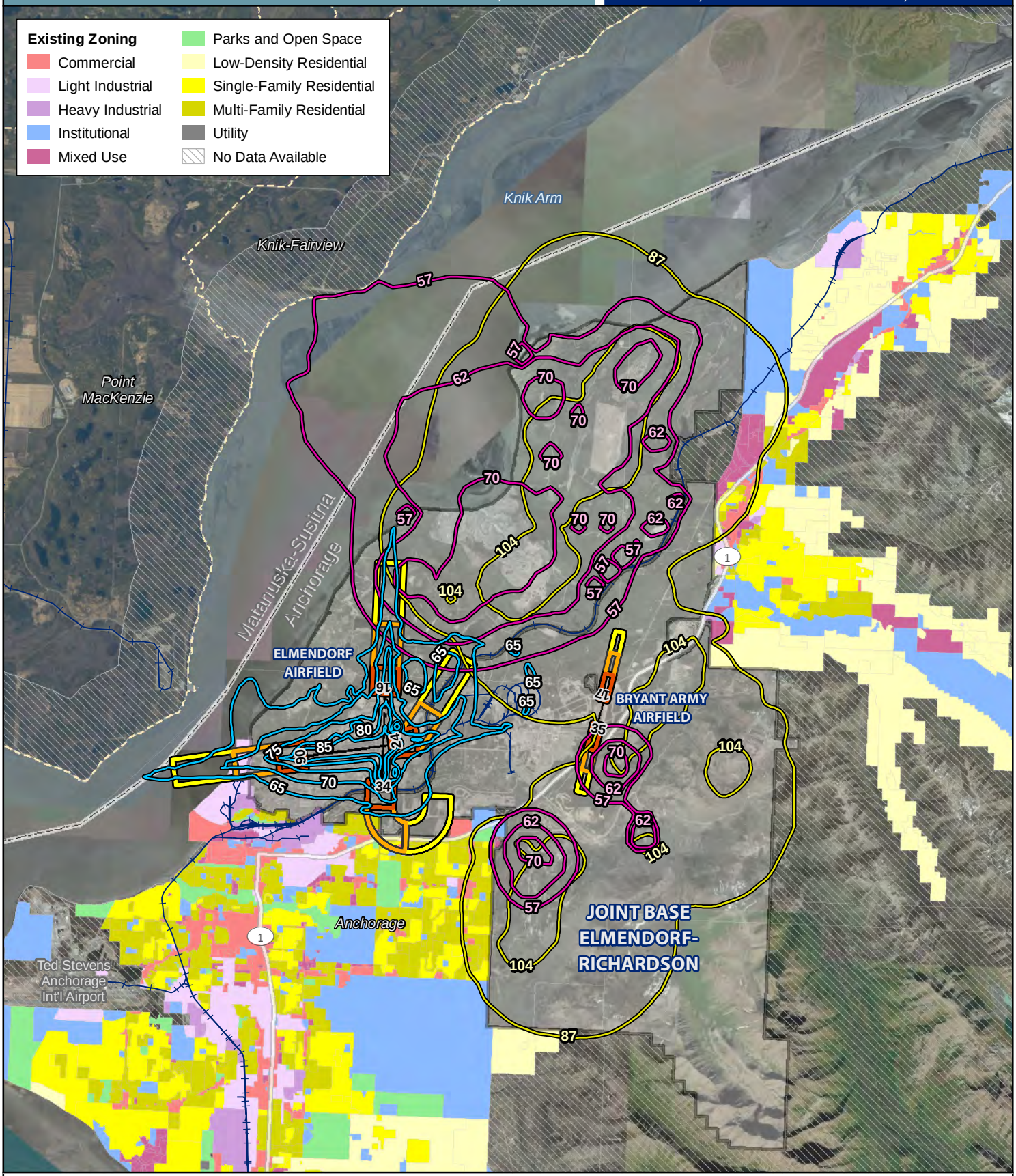
0 1 2 Miles

Source: AFCEC 2018, 2019; Digital Globe 2017; ESRI 2017; Matanuska Susitna Borough 2018; NGA/DHS 2015; U.S. Census Bureau 2018.

Figure 6-3

Joint Base Elmendorf-Richardson
Air Installations Compatible Use Zones

Existing Zoning and 2019 AICUZ Noise Contours, Clear Zones, and Accident Potential Zones, JBER



Legend

- Installation Boundary
- Airfield Runway
- Runway 16 Extension
- Borough Boundary
- Municipal Boundary/ Census Designated Place
- Major Highway
- Railroad
- Aircraft Noise Contour, dB DNL
- Large Caliber Weapons and Explosives Noise Contour, CDNL
- Small Arms Peak Noise Contour, dB PK15 (met)
- Clear Zone
- Accident Potential Zone I
- Accident Potential Zone II

N

0 1 2 Miles

Source: AFCEC 2018, 2019; Anchorage Municipality 2019; Digital Globe 2017; ESRI 2017; NGA/DHS 2015; U.S. Census Bureau 2018.

6.3.3 Future Land Use

Similar to existing land use and zoning data, there were no data available for large areas of the Chugach State Park. Mat-Su Borough did not have available future land use data in the 1.5-mile extent from the Knik Arm, surrounding the base.

Southwest of the base, in the Anchorage Bowl, the future land use along JBER's boundary includes various land uses, such as Transportation, Medium-density, Single-family and Two-family Residential, Institutional, and Commercial. Along the southern boundary of the base there is more Single-family and Two-family Residential, Parks and Open Space, and Low-density Residential future land uses. Future land use surrounding the 2019 AICUZ CZs, APZs, and noise contours for JBER are illustrated on Figure 6-4.

In the western area of the Anchorage Bowl, there are large areas of Transportation, Parks and Open Space, and Single-family and Two-family Residential uses, with smaller areas Institutional and Medium-density Residential uses. Light and General Industrial, Mixed Use, Commercial, and smaller areas of Urban Residential High-density occur along main transportation corridors, such as the railroad and Glenn Highway. The southeast area of the Anchorage Bowl is largely Parks and Open Space and Low-density Residential future land uses.

Northeast of the base, the future land use is predominantly Low-density Residential. From the Knik Arm moving south, future land uses include Low-density Residential, Parks and Open Space, General Industrial, Development Reserve, and Transportation. Future land uses south of the railroad along Glenn Highway consist of various uses such as Institutional, General Industrial, Commercial, Mixed Use, Medium-density Residential, Parks and Open Space, Special Study Area, and Low-density Residential. Southeast of Glenn Highway, the future land use is largely comprised of Low-density Residential with small areas of Institutional, Medium-density Residential, Commercial, and Parks and Open Space. Of note, this area comprises a location that is included in the Chugiak-Eagle River Site-Specific Land Use Plan, which addresses the future use and development of the parcels north of Eagle River. Based on the Land Use Plan, the generalized future land use of this area is generalized as Medium-density Residential.

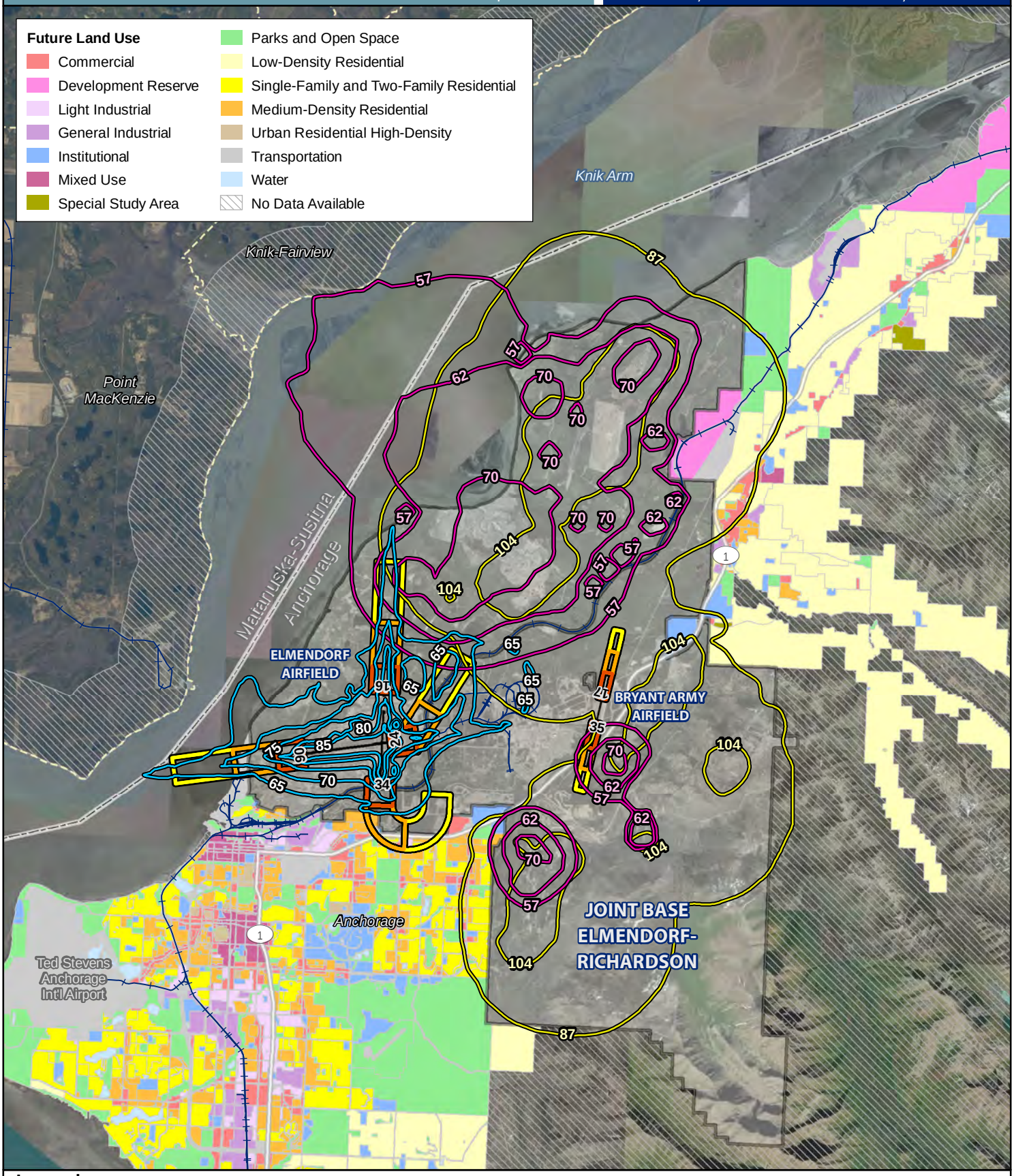
Other future land uses in the area northeast of the base includes Eklutna, Inc. development, with future residential development, such as the Powder Reserve subdivision, and possible conversion of gravel mining areas to industrial areas (Eklutna Inc. 2019b).

Some undeveloped land is not suitable for development. Land that is unsuitable for development could include characteristics or classifications such as bedrock areas, preserved wetlands, floodplains, coastal marshes, areas with slopes that are greater than 45%, and areas located in avalanche hazard areas.

Figure 6-4

Joint Base Elmendorf-Richardson
Air Installations Compatible Use Zones

Future Land Use and 2019 AICUZ Noise Contours, Clear Zones, and Accident Potential Zones, JBER



Legend

- Installation Boundary
- Airfield Runway
- Runway 16 Extension
- Borough Boundary
- Municipal Boundary/ Census Designated Place
- Major Highway
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- Aircraft Noise Contour, dB DNL
- Large Caliber Weapons and Explosives Noise Contour, CDNL
- Small Arms Peak Noise Contour, dB PK15 (met)
- Clear Zone
- Accident Potential Zone I
- Accident Potential Zone II

0 1 2 Miles

N

Source: AFCEC 2018, 2019; Anchorage Municipality 2019; Digital Globe 2017; ESRI 2017; NGA/DHS 2015; U.S. Census Bureau 2018.

JBER has identified areas along the installation's eastern boundary that could be in high demand for housing or other uses in the future and which could affect military readiness and mission sustainment. JBER works with Municipality of Anchorage, Mat-Su Borough, native tribes and corporations, and other stakeholders to monitor these areas and communicate mission impacts with the public. Chapter 7 provides addition information on this outreach.

6.4 Compatibility Concerns

6.4.1 Land Use Analysis

Land use describes how land is developed and managed, and is characterized by the dominant function occurring within an area. There are multiple jurisdictions surrounding JBER, each with different land use and zoning classifications. In order to synthesize the data and conduct a meaningful land use analysis, land use codes for the multiple jurisdictions were assigned a generalized category. To compare land use consistently across jurisdictions, this analysis uses generalized land use classifications illustrating land use compatibility across common land use types. These generalized land use categories are not exact representations of the local community's land use designations, but combine similar land uses together, as described in Section 6.3.

For the purpose of this analysis, the compatibility of the generalized land uses used Air Force guidance and the DoD AICUZ compatibility guidelines (Tables A-1 through A-4 of Appendix A). Land use compatibility falls into one of four categories: (1) Compatible; (2) Compatible with Restrictions; (3) Incompatible; and (4) Incompatible with Exceptions. The conditionally compatible land use (i.e., categories 2 and 4) may require incorporation of noise attenuation measures into the design and construction of structures and further evaluation to be considered "compatible," and may require density limitations for land in APZs. This is demonstrated through an example using conditions for aircraft noise. Although local conditions regarding the need for housing may require residential use in these zones, residential use is discouraged in 65-69 dB DNL and strongly discouraged in 70-74 dB DNL. The absence of viable alternative development options should be determined and an evaluation should be conducted locally prior to local approvals indicating that a demonstrated community need for the residential use would not be met if development were prohibited in these zones. Where the community determines that these uses must be allowed, measures to achieve outdoor to indoor Noise Level Reduction (NLR) of at least 25 dB in 65-69 dB DNL and 30 dB in 70-74 dB DNL should be incorporated into building codes and be considered in individual approvals. For transient housing, an NLR of at least 35 dB should be incorporated in 75-79 dB DNL. The compatible with restrictions land use may also require density limitations for land in APZs. For example, the suggested maximum density for detached single-family housing is two dwelling units/acre (Du/Ac) in APZ II. There are similar examples in Appendix A, Tables A-3 and A-4, for range noise conditions.

This AICUZ Study analyzes existing and future land use compatibility with range and aircraft noise contours, as well as with CZs and APZs. In order to determine the compatibility of a specific area, the user must consider both the noise contours and the CZ and APZs that apply to that specific area. In addition, the Air Force recommends coordination between the land use jurisdictions and JBER for land areas within the AICUZ footprint and adjacent properties.

Of note, the Air Force utilizes a table with generalized land use categories and noise/safety compatibility to provide a visual to further help streamline the DOD AICUZ compatibility guidelines. Table 6-1 through 6-3 provides generalized compatibility guidelines based on AFI 32-1015 to serve as a general reference only. For more detailed compatibility guidelines, see Tables A-1 through A-4 in Appendix A.

Air Force Generalized Land Use Descriptions Specific to Tables-6-1 through 6-3

Residential: All types of residential activity, such as single- and multi-family residences and mobile homes, at a density greater than one dwelling unit per acre.

Commercial: Offices, retail stores, restaurants, and other types of commercial establishments.

Industrial: Manufacturing, warehouses, and other similar uses.

Public/Quasi-Public: Publicly owned lands and land to which the public has access, including military reservations and training grounds, public buildings, schools, churches, cemeteries, and hospitals.

Recreational: Land areas designated for recreational activity, such as parks, wilderness areas and reservations, conservation areas, and areas designated for trails, hikes, camping, etc.

Open/Agriculture/Low Density: Undeveloped land areas, agricultural areas, grazing lands and areas with residential activity at densities less than or equal to one dwelling unit per acre.

Table 6-1. Generalized Land Use Categories and Aircraft Noise/Safety Compatibility

Generalized Land Use Category	Land Use Compatibility with Noise Zone (dB DNL)						CZ	APZ I	APZ II
	<65	65-69	70-74	75-79	80-84	85+			
Residential	Yes	No[1]	No[1]	No	No	No	No	No	No[1]
Commercial	Yes	Yes	Yes[2]	Yes[2]	No	No	No	Yes[2]	Yes[2]
Industrial	Yes	Yes	Yes	Yes	Yes[2]	No	No	Yes[2]	Yes[2]
Public/Quasi-public	Yes	Yes[2]	Yes[2]	Yes[2]	No	No	No	No	Yes[2]
Recreation	Yes	Yes[2]	Yes[2]	No	No	No	No	Yes[2]	Yes[2]
Open/Agriculture/Low-density	Yes	Yes[2]	Yes[2]	Yes[2]	Yes[2]	Yes[2]	No	Yes[2]	Yes[2]
Undesignated	Yes	No	No	No	No	No	No	No	No

Key:

Compatible
Incompatible
1 Incompatible with exceptions
2 Compatible with exceptions

Source: Adapted from AFI 32-1015.

Notes: This generalized land use table provides an overview of recommended land use. To determine specific land use compatibility, see Appendix A. Appendix B provides further details on how land uses were generalized for this study.

Table 6-2. Generalized Land Use Compatibility for Small Arms Noise

Generalized Land Use Category	Land Use Compatibility with Noise Zone dB Peak Pressure (dB PK 15 (met))		
	Noise Zone I	Noise Zone II	Noise Zone III
	<87 dB PK 15 (met)	87-104 dB PK 15 (met)	>104 dB PK 15 (met)
Residential	Yes	No[1]	No
Commercial	Yes	Yes[2]	Yes[2]
Industrial	Yes	Yes[2]	Yes[2]
Public/Quasi-public	Yes	Yes[2]	Yes[2]
Recreation	Yes	No	No
Open/Agriculture/Low-density	Yes	Yes[2]	Yes[2]
Undesignated	Yes	No	No

Key:

Compatible
Incompatible
1 Incompatible with exceptions
2 Compatible with exceptions

Source: Adapted from AFI 32-1015.
Notes: This generalized land use table provides an overview of recommended land use. To determine specific land use compatibility, see Appendix A.
Appendix B provides further details on how land uses were generalized for this study.

Table 6-3. Generalized Land Use Compatibility for Artillery/Explosive Noise

Generalized Land Use Category	Land Use Compatibility with Noise Zone C-weighted Day-night Average Sound Level (CDNL)		
	LUPZ	Noise Zone II	Noise Zone III
	57-62 (CDNL)	62-70 (CDNL)	>70 (CDNL)
Residential	Yes	No[1]	No
Commercial	Yes	Yes	No
Industrial	Yes	Yes[2]	Yes[2]
Public/Quasi-public	Yes	No[1]	No
Recreation	Yes	No	No
Open/Agriculture/Low-density	Yes	Yes[2]	Yes[2]
Undesignated	Yes	No	No

Key:

Compatible
Incompatible
1 Incompatible with exceptions
2 Compatible with exceptions

Source: Adapted from AFI 32-1015.

Notes: This generalized land-use table provides an overview of recommended land use. To determine specific land-use compatibility, see Appendix A.

*LUPZ – Land Use Planning Zone is an area to implement controls to function as a buffer for Noise Zone II to prevent possibility of future noise conflicts.

Appendix B provides further details on how land uses were generalized for this study.

6.4.2 Existing Land Use Compatibility Concerns

JBER'S range and aircraft noise contours, as well as APZs, extend into Anchorage, specifically into the Community Councils of Northeast, Russian Jack Park, Mountain View, Government Hill, Scenic Foothills, Basher, Birchwood, Eagle River, South Fork, and a small portion of Chugiak. The AICUZ footprint also extends into Chugach State Park and over the Knik Arm to an area on the coast of the Mat-Su Borough in the Knik-Fairview Community Council.

The AICUZ noise and safety footprint overlay portions of railroad owned land. Some areas within transportation corridors did not have associated existing land use data available. The following analysis, tables, and figures utilize the best available data and note areas where data were available.

Aircraft Noise

Aircraft noise exceeding 65 dB DNL extends off the installation only in a few areas. This land within 65-69 dB DNL noise zones is mostly Transportation land use and located at the Port or along transportation corridors (i.e., streets or roadways). There are 12.48 acres of compatible with restrictions in the 70-74 dB DNL noise zone. There are 2 acres of existing land use that are classified as incompatible with exceptions in the 65-69 dB DNL noise zone south of Runway 34. These areas are residential uses. Residential use within 65-69 dB DNL is incompatible with exceptions and is discouraged. Table 6-4 summarize the total acreage of existing land uses within the 2019 aircraft noise zones, and existing land use compatibility with aircraft noise contours is illustrated on Figure 6-5.

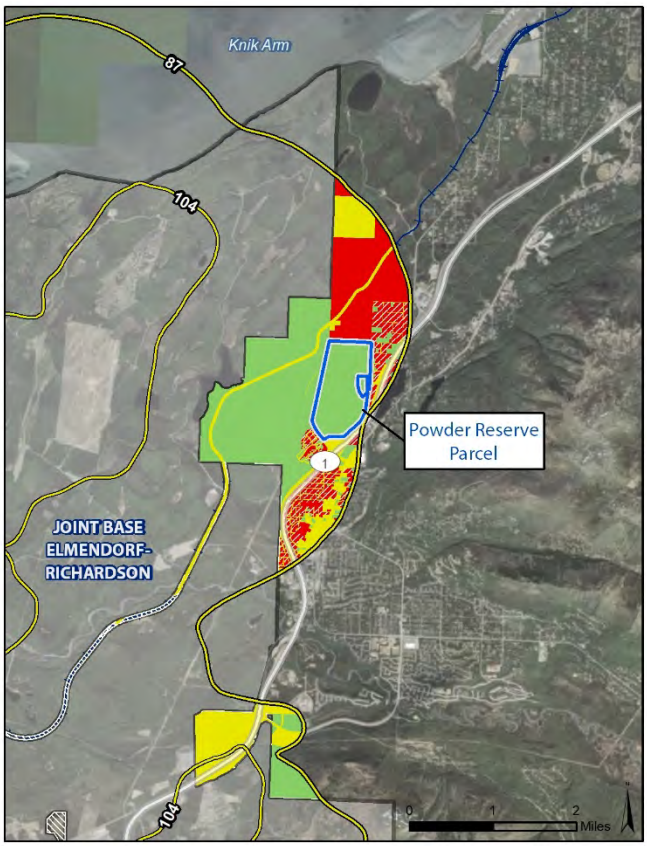
Range Noise (small arms and large caliber weapons and explosives)

Most of the small arms noise zones that extend off the installation are the 87-104 dB PK 15 (met), with only a limited area of >104 dB PK 15 (met) off the installation.

- Southwest of the base, within the 87-104 dB PK 15 (met) noise zone, there are areas that include uses of Institutional, Commercial, and Parks and Open Space. These areas are classified as incompatible within the 87-104 dB PK 15 (met) noise zone, per the AICUZ Instruction, as they include allowable uses such as hospital, medical facilities, or areas of recreation. Open Space can include municipal and state parks, open space, and greenways, and is incompatible, per the AICUZ Instruction. The allowable uses and classification take into account the recreation uses associated with this generalized land use and assumes that these areas are utilized by the public. There are areas of Single-family and Multi-family Residential uses and Mobile Homes, which are incompatible with exceptions. Although local requirements for on- or off-base housing may require noise-sensitive land uses within 87-104 dB PK 15 (met), such land use is generally not recommended per the AICUZ Instruction. Areas southwest of the base include additional Commercial,

Transportation, Utility, and Light Industrial uses. In this instance, Commercial use includes allowable uses, such as daycare, repair services, and commercial horticulture. These areas are classified as compatible with restrictions, as measures to achieve NLR may be needed. Areas of compatibility within the 87-104 dB PK 15 (met) noise zone mostly include land uses classified as Vacant, per the available municipal land use data.

- East and northeast of the base there are areas within the 87-104 and >104 dB PK 15 (met) noise zones, as well as some areas with no data available. Parks and Open Space are classified as incompatible per the AICUZ Instruction. There are areas of Single-family and Multi-family Residential uses and Mobile Homes, which are incompatible, with exceptions. Although local requirements for on- or off-base housing may require noise-sensitive land uses within 87-104 dB PK 15 (met), such land use is generally not recommended per the AICUZ Instruction. Commercial uses are classified as compatible with restrictions, as well as Transportation and Utility—both in the 87-104 dB PK 15 (met) and the >104 dB PK 15 (met)—as NLR measures should be incorporated. Areas of compatibility within the 87-104 dB PK 15 (met) noise zone mostly include Vacant land uses. Although the existing land use data showed areas as Vacant, there are confirmed existing residential uses within the Powder Reserve Parcel (shown in graphic above and on Figure 6-6). Therefore, the Powder Reserve Parcel would be classified as incompatible with exceptions per the AICUZ Instruction, rather than compatible based on the existing land use data that indicate the land is Vacant.



Noise zones from large caliber weapons and explosives are located both on and off the installation.

- Southwest of the base, Single-family and Multi-family Residential and Institutional land uses are present and classified as compatible with restrictions, per the AICUZ Instruction. One area of Institutional (.05 acre) is considered incompatible, as its allowable uses include hospitals and related medical facilities. Compatible areas

within the 57-62 dB CDNL noise zones southwest and east of JBER include Transportation, Vacant, and Utility land uses. A portion (1.87 acres) of the 57-62 dB CDNL noise zone occurs over undeveloped land in the community of Knik-Fairview in the Mat-Su Borough.

Tables 6-5 and 6-6 summarize the total acreage of existing land uses within the 2019 range noise zones, respectively. Existing land use compatibility with small and large caliber weapons and explosives range noise contours are illustrated separately on Figures 6-6 and 6-7.

Safety (CZ and APZs)

While both airfield's CZs are contained within the installation boundary, Elmendorf Airfield's CZs overlay portions of the railroad, which is classified as off-installation because the railroad owns the land. Glenn Highway crosses through Elmendorf Airfield's APZs, as well as through Bryant Army Airfield's CZ and APZ I. Some areas within transportation corridors did not have associated land use data available. These transportation uses are incompatible within the CZ and are classified as compatible with restrictions in APZ I, indicating that no above ground passenger facilities or power lines should be present. Single-family and Multi-family residential, Mobile Homes, Commercial, Mixed Use, and Institutional uses within APZ I south of Runway 34 are classified as incompatible. Mobile Homes are incompatible within APZ II as well. The compatible with restrictions area south of Runway 06 within APZ I includes Transportation land uses. Compatible uses within APZ I and APZ II include Light and Heavy Industrial and some Commercial uses with allowable uses of heavy equipment or repair services, and Vacant land.

Table 6-7 summarizes the total acreage of existing land uses within the 2019 CZs and APZs and existing land use compatibility is illustrated on Figure 6-8.

Table 6-4. Off-Installation Existing Land Use Acreage within AICUZ Aircraft Noise Zones for JBER

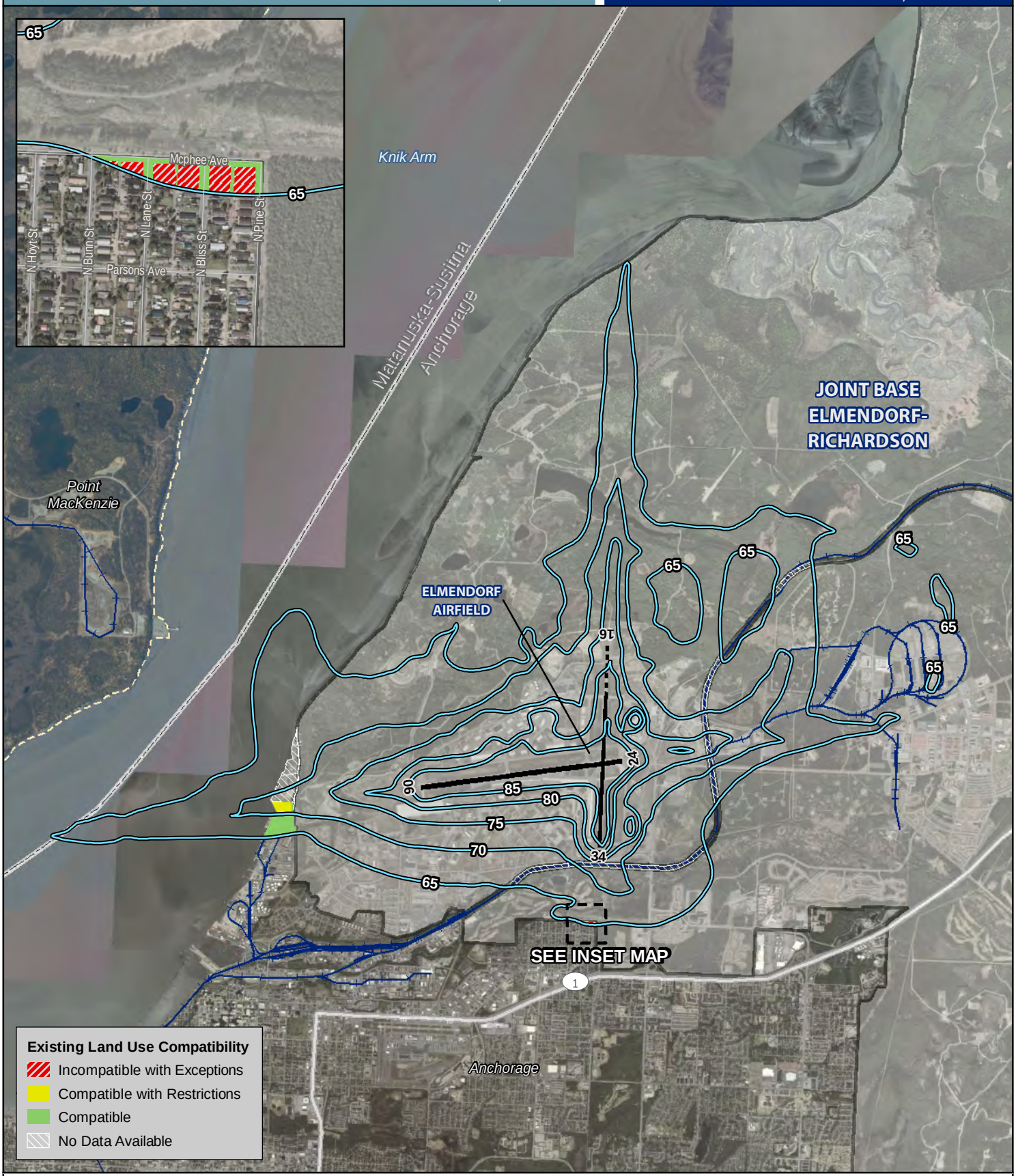
Generalized Land Use Category	Noise Zone (dB DNL)																			
	65-69				70-74				75-79				80-84				85+			
	Compatible	Compatible with Restrictions	Incompatible with Exceptions	Incompatible	Compatible	Compatible with Restrictions	Incompatible with Exceptions	Incompatible	Compatible	Compatible with Restrictions	Incompatible with Exceptions	Incompatible	Compatible	Compatible with Restrictions	Incompatible with Exceptions	Incompatible	Compatible	Compatible with Restrictions	Incompatible with Exceptions	Incompatible
Commercial																				
Light Industrial																				
Heavy Industrial																				
Mixed Use																				
Institutional																				
Multi-family Residential			0.94																	
Single-family Residential			1.06																	
Mobile Home																				
Parks and Open Space	0.05																			
Transportation	34.10				1.06	12.48														
Utility																				
Vacant																				
Water																				
Subtotals	**34.15**	**0.00**	**2.00**	**0.00**	**1.06**	**12.48**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Total	**36.15**				**13.54**				**0.00**				**0.00**				**0.00**			

Notes:
- All contour areas on-installation are excluded from the counts.
- Acreage of land use that had no data available totals 147.96 acres (this includes undesignated areas over Chugach State Park and/or over water, such as Knik Arm).
- For acreage calculations, “Water” represents water features in land use code within a borough boundary, not over bodies of water, such as the Knik Arm.

Figure 6-5

Joint Base Elmendorf-Richardson
Air Installations Compatible Use Zones

Incompatible Existing Land Use within 2019 AICUZ Aircraft Noise Contours, JBER



Legend

- Installation Boundary
- Airfield Runway
- Runway 16 Extension
- Borough Boundary
- Municipal Boundary/ Census Designated Place
- Major Highway
- Railroad
- Aircraft Noise Contour, dB DNL

0 1 2 Miles

N

Source: AFCEC 2018, 2019; Digital Globe 2017; ESRI 2017; Matanuska Susitna Borough 2018; NGA/DHS 2015; U.S. Census Bureau 2018.

Table 6-5. Off-installation Existing Land Use Acreage within Small Arms dB PK 15 (met) Noise Zones for JBER

Generalized Land Use Category	Noise Zone (dB PK 15 (met))							
	87-104				>104			
	Compatible	Compatible with Restrictions	Incompatible with Exceptions	Incompatible	Compatible	Compatible with Restrictions	Incompatible with Exceptions	Incompatible
Commercial		153.45	3.66	3.60				
Light Industrial		11.00						
Heavy Industrial		18.72						
Mixed Use								
Institutional		197.52		16.78				
Multi-family Residential			286.39					
Single-family Residential			595.59					
Mobile Home			135.55					
Parks and Open Space				1,301.58				
Transportation		732.69				25.57		
Utility		272.08				56.66		
Vacant	2,057.85							
Water	10.11							
Subtotals	**2,067.96**	**1,385.46**	**1,021.19**	**1,321.96**	**0.00**	**82.23**	**0.00**	**0.00**
Total	**5,796.57**				**82.23**			

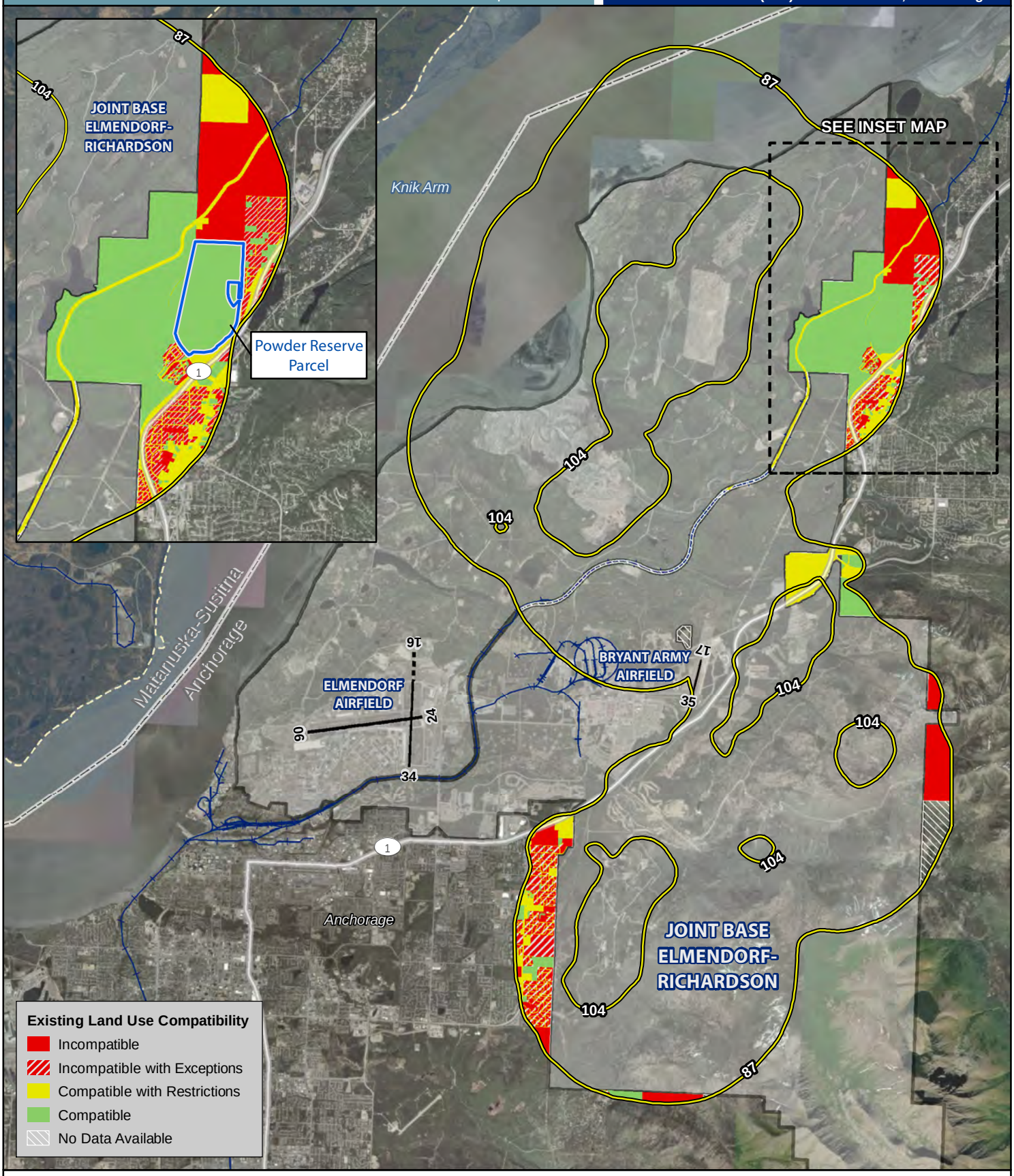
Notes:

- All contour areas on-installation are excluded from the counts.
- Acreage of land use that had no data available totals 477.83 acres (this includes undesignated areas over Chugach State Park and/or over water, such as Knik Arm).
- For acreage calculations, “Water” represents water features in land use code within a borough boundary, not over bodies of water, such as the Knik Arm.

Figure 6-6

Joint Base Elmendorf-Richardson
Air Installations Compatible Use Zones

Incompatible Existing Land Use within 2019 AICUZ
Small Arms dB PK15 (met) Noise Contours, JBER Ranges



Legend

- Installation Boundary
- Airfield Runway
- Runway 16 Extension
- Borough Boundary
- Municipal Boundary/ Census Designated Place
- Major Highway
- Railroad
- Small Arms Peak Noise Contour, dB PK15 (met)

N

0 1 2 Miles

Source: AFCEC 2018, 2019; Digital Globe 2017; ESRI 2017; Matanuska Susitna Borough 2018; NGA/DHS 2015; U.S. Census Bureau 2018.

Table 6-6. Off-installation Existing Land Use Acreage within Large Caliber Weapons and Explosives CDNL Noise Zones for JBER

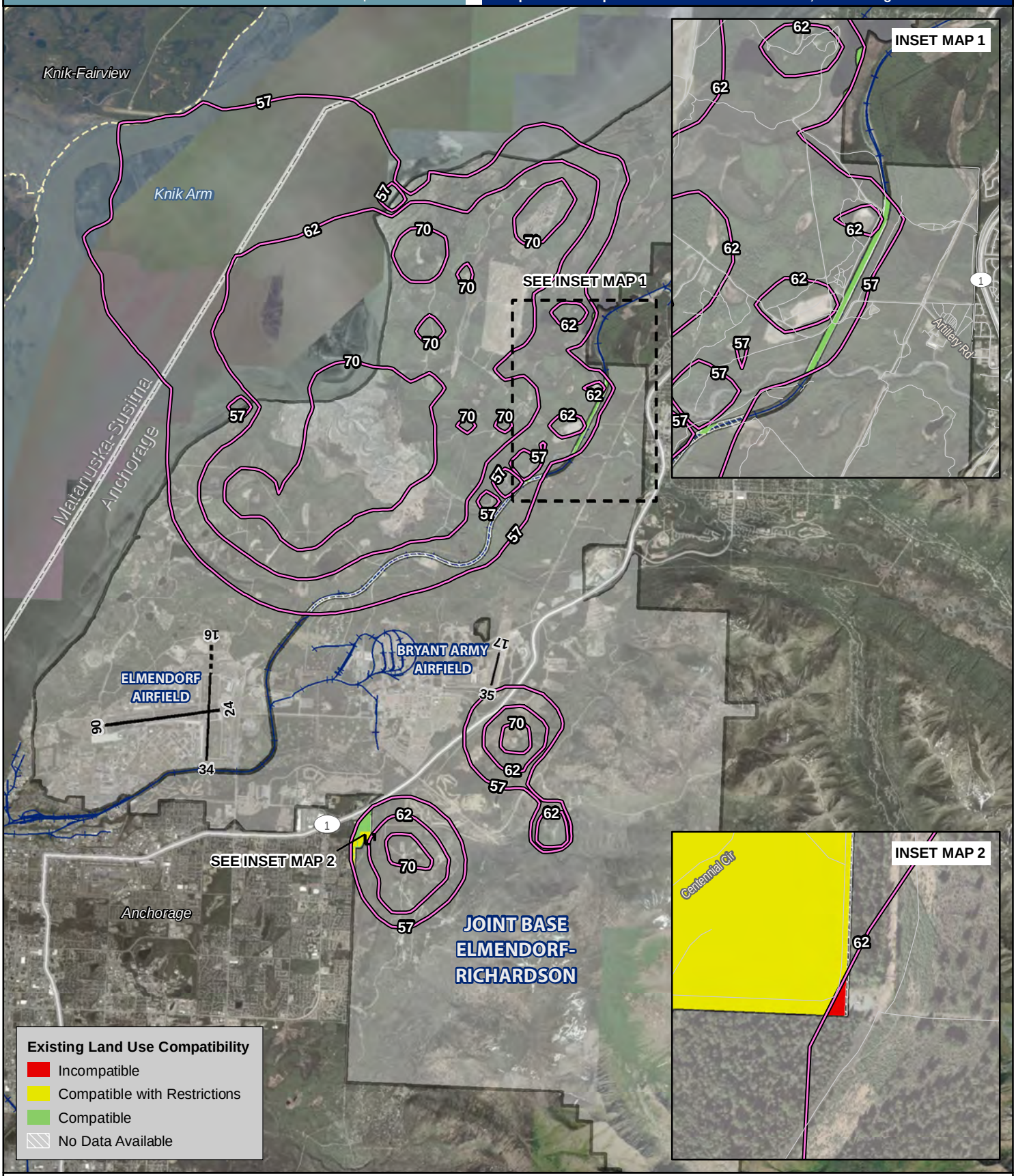
Generalized Land Use Category	Noise Zone (CDNL)											
	57-62				62-70				70+			
	Compatible	Compatible with Restrictions	Incompatible with Exceptions	Incompatible	Compatible	Compatible with Restrictions	Incompatible with Exceptions	Incompatible	Compatible	Compatible with Restrictions	Incompatible with Exceptions	Incompatible
Commercial												
Light Industrial												
Heavy Industrial												
Mixed Use												
Institutional		19.69		0.05								
Multi-family Residential		18.48										
Single-family Residential		0.24										
Mobile Home												
Parks and Open Space	4.12											
Transportation	40.42				0.14							
Utility	40.84											
Vacant	8.25											
Water	0.58											
Subtotals	**94.21**	**38.41**	**0.00**	**0.05**	**0.14**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Total	**132.67**				**0.14**				**0.00**			

Notes:
- All contour areas on-installation are excluded from the counts.
- Acreage of land use that had no data available totals 123.68 acres (this includes undesignated areas over Chugach State Park and/or over water, such as Knik Arm).
- A portion of the 57 CDNL encompasses 1.87 acres of undeveloped land in Mat-Su.
- For acreage calculations, “Water” represents water features in land use code within a borough boundary, not over bodies of water, such as the Knik Arm.

Figure 6-7

Joint Base Elmendorf-Richardson
Air Installations Compatible Use Zones

Incompatible Existing Land Use within 2019 AICUZ Large Caliber Weapons and Explosives CDNL Noise Contours, JBER Ranges



Legend

- Installation Boundary
- Airfield Runway
- Runway 16 Extension
- Borough Boundary
- Municipal Boundary/ Census Designated Place
- Major Highway
- Railroad
- Large Caliber Weapons and Explosives Noise Contour, CDNL

0 1 2 Miles

N

Source: AFCEC 2018, 2019; Digital Globe 2017; ESRI 2017; Matanuska Susitna Borough 2018; NGA/DHS 2015; U.S. Census Bureau 2018.

Table 6-7. Off-installation Existing Land Use Acreage within Clear Zones/Accident Potential Zones for JBER

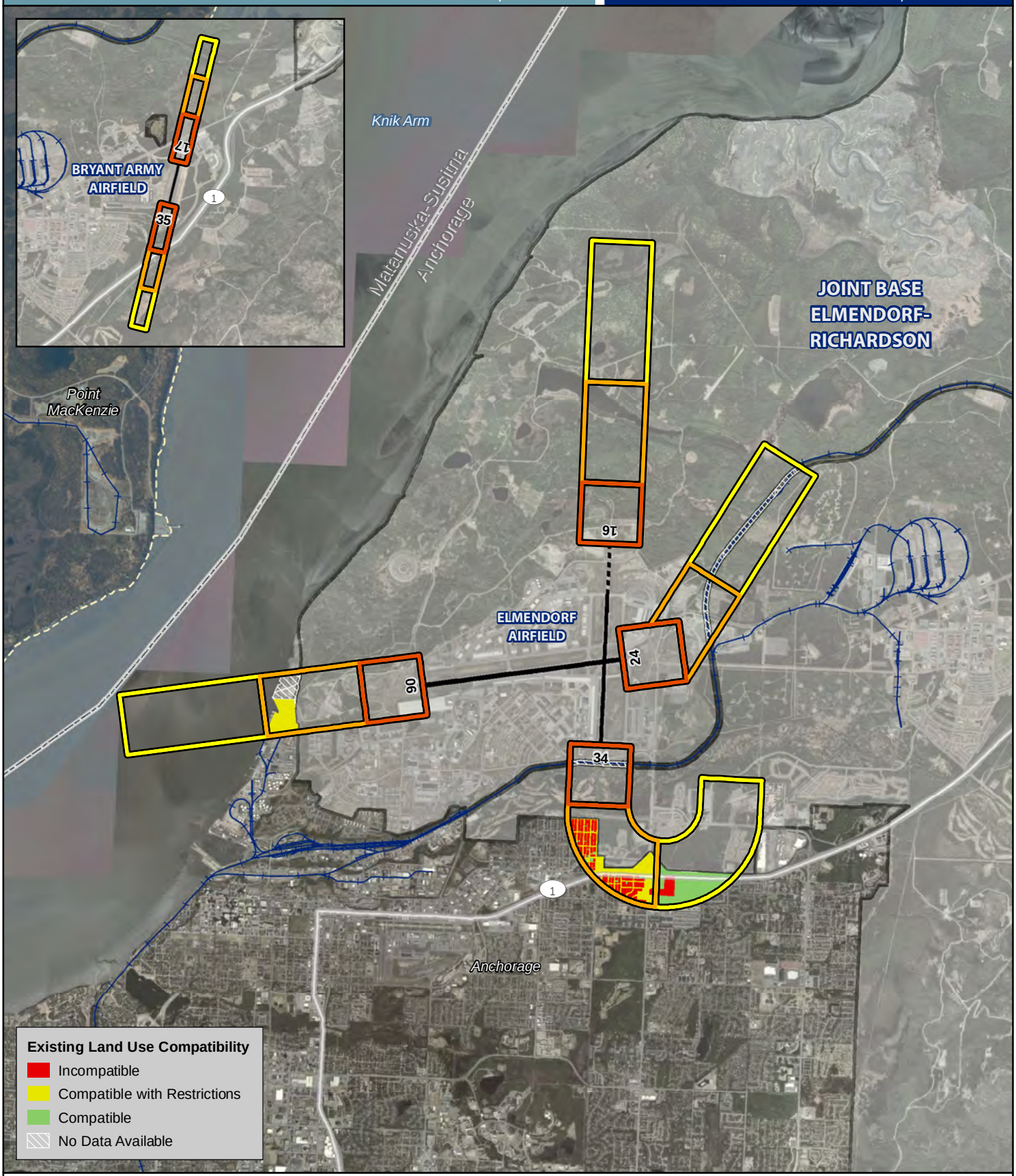
Generalized Land Use Category	CZ				APZ I				APZ II			
	Compatible	Compatible with Restrictions	Incompatible with Exceptions	Incompatible	Compatible	Compatible with Restrictions	Incompatible with Exceptions	Incompatible	Compatible	Compatible with Restrictions	Incompatible with Exceptions	Incompatible
Commercial					2.00	7.47		4.57	1.57			2.01
Light Industrial					2.72	0.94			9.34			
Heavy Industrial					0.46				0.63			
Mixed Use								0.15				
Institutional								0.23				
Multi-family Residential								35.75				4.03
Single-family Residential								36.16				
Mobile Home								1.50				10.33
Parks and Open Space						0.82						
Transportation						129.56			31.70			
Utility												
Vacant					4.59				63.16			
Water												
Subtotals	**0.00**	**0.00**	**0.00**	**0.00**	**9.77**	**138.79**	**0.00**	**78.36**	**106.40**	**0.00**	**0.00**	**16.37**
Total	**0.00**				**226.92**				**122.78**			

Notes:
- All contour areas on-installation are excluded from the counts.
- Acreage of land use that had no data available totals 93.95 acres (this includes undesignated areas over Chugach State Park and/or over water, such as Knik Arm).
- Discrepancies in total are a result of rounding from calculations.
- For acreage calculations, “Water” represents water features in land use code within a borough boundary, not over bodies of water, such as the Knik Arm.

Figure 6-8

Joint Base Elmendorf-Richardson
Air Installations Compatible Use Zones

Incompatible Existing Land Use within 2019 AICUZ Clear Zones and Accident Potential Zones, JBER



Legend

- Installation Boundary
- Airfield Runway
- Runway 16 Extension
- Borough Boundary
- Municipal Boundary/ Census Designated Place
- Major Highway
- Railroad
- Clear Zone
- Accident Potential Zone I
- Accident Potential Zone II

0 1 2 Miles

N

Source: AFCEC 2018, 2019; Digital Globe 2017; ESRI 2017; Matanuska Susitna Borough 2018; NGA/DHS 2015; U.S. Census Bureau 2018.

6.4.3 Future Land Use Compatibility Concerns

As noted in Section 6.4.2, JBER'S range and aircraft noise contours, as well as APZs, extend into Anchorage, over Chugach State Park, and over the Knik Arm to an area on the coast of Mat-Su Borough.

Future land use data were unavailable for Chugach State Park. Some areas within transportation corridors did not have associated future land use data available. The following analysis, tables, and figures reflect this and note areas where no data were available.

Aircraft Noise

The small area of land southwest of the base within the 65-69 dB DNL noise zone is categorized as Medium-density Residential and classified as incompatible with exceptions. The area classified as compatible with restrictions is comprised of the future land use of Transportation. Compatible uses within the 65-69 dB DNL noise zone include future land uses of Open Space and Parks as well as Transportation.

Table 6-8 summarizes the total acreage of existing land uses within the 2019 aircraft noise zones, and future land use compatibility with aircraft noise contours is illustrated separately on Figure 6-9.

Range Noise (small arms and large caliber weapons and explosives)

Small arms noise zones extend off the installation.

- Areas southwest of the base are within the 87-104 dB PK 15 (met) small arms noise zones. Parks and Open Space are categorized as incompatible uses because recreation is an allowable use within this category. This classification takes into account the recreation use associated with this generalized land use and assumes that these areas are utilized by the public. Future land use that is incompatible with exceptions is categorized as residential uses, specifically Low-density, Medium-density, Single-family, and Two-family Residential uses. Although local requirements for on- or off-base housing may include noise-sensitive land uses within 87-104 dB PK 15 (met), such land use is generally not recommended per the AICUZ Instruction. Future land use classified as compatible with restrictions is categorized as Commercial, Institutional, and Transportation.

- Land northeast of the base is within the 87-104 dB PK 15 (met) and >104 dB PK 15 (met). Approximately 57 acres of Institutional future land use are within the >104 dB PK 15 (met) near Glenn Highway. This area is incompatible per the AICUZ Instruction. Adjacent to this area, there is Institutional and Commercial future land use that is classified as compatible with restrictions within the 87-104 dB PK 15 (met) contours. Low-density Residential, Development Reserve, and Special Study

future land uses are classified as incompatible with exceptions in the 87-104 dB PK 15 (met) contours.

- Further north, the Parks and Open Space future land use is classified as incompatible along the eastern boundary of the base. Low-density and Medium-density Residential future land uses are classified as incompatible with exceptions. Areas that are compatible with restrictions include Transportation and Commercial future land uses.

JBER's 57-62 and 62-70 dB CDNL noise zones extend off-base.

- Southwest of the base, 0.05 acre of Medium-density Residential is classified as incompatible, with exceptions within the 62-70 dB CDNL noise zone. Compatible future land uses within the 57-62 dB CDNL noise zone include Institutional, Parks and Open Space, and Single-family and Two-family Residential. Development Reserve future land use within the 57-62 dB CDNL noise zone is located northeast of the base and is classified as compatible.

Tables 6-9 and 6-10 summarize the total acreage of future land uses within the 2019 range noise zones, respectively. Future land use compatibility with small and large caliber weapons and explosives range noise contours are illustrated separately on Figures 6-10 and 6-11.

Safety (CZ and APZs)

As in the case with the existing land use analysis, the Elmendorf Airfield's CZs overlay portions of railroad owned land. Glenn Highway crosses through Elmendorf Airfield's APZs as well as through Bryant Army Airfield's CZ and APZ I. Some areas within transportation corridors did not have associated land use data available. These transportation uses are incompatible within the CZ and are compatible with restrictions in APZ I, indicating that no above ground passenger facilities or power lines should be present.

Future land use within APZ I west of Runway 06 is classified as compatible with restrictions and categorized as Transportation. Areas of incompatibility within APZ I south of Runway 34 is categorized by future land uses that include Medium-density Residential, Single-family and Two-family Residential, and Institutional. Incompatibility within APZ II is categorized by Medium-density Residential and Single-family and Two-family Residential uses. Areas classified as compatible with restrictions south of Runway 34 include land uses categorized as Commercial, Open Space, and Transportation in APZ I and Commercial land uses in APZ II. Compatible uses south of Runway 34 within APZ I include Light Industrial and include Light Industrial and Transportation in APZ II.

Table 6-11 summarizes the total acreage of future land uses within the 2019 CZs and APZs and future land use compatibility is illustrated on Figure 6-12.

Table 6-8. Off-Installation Future Land Use Acreage within AICUZ Aircraft Noise Zones for JBER

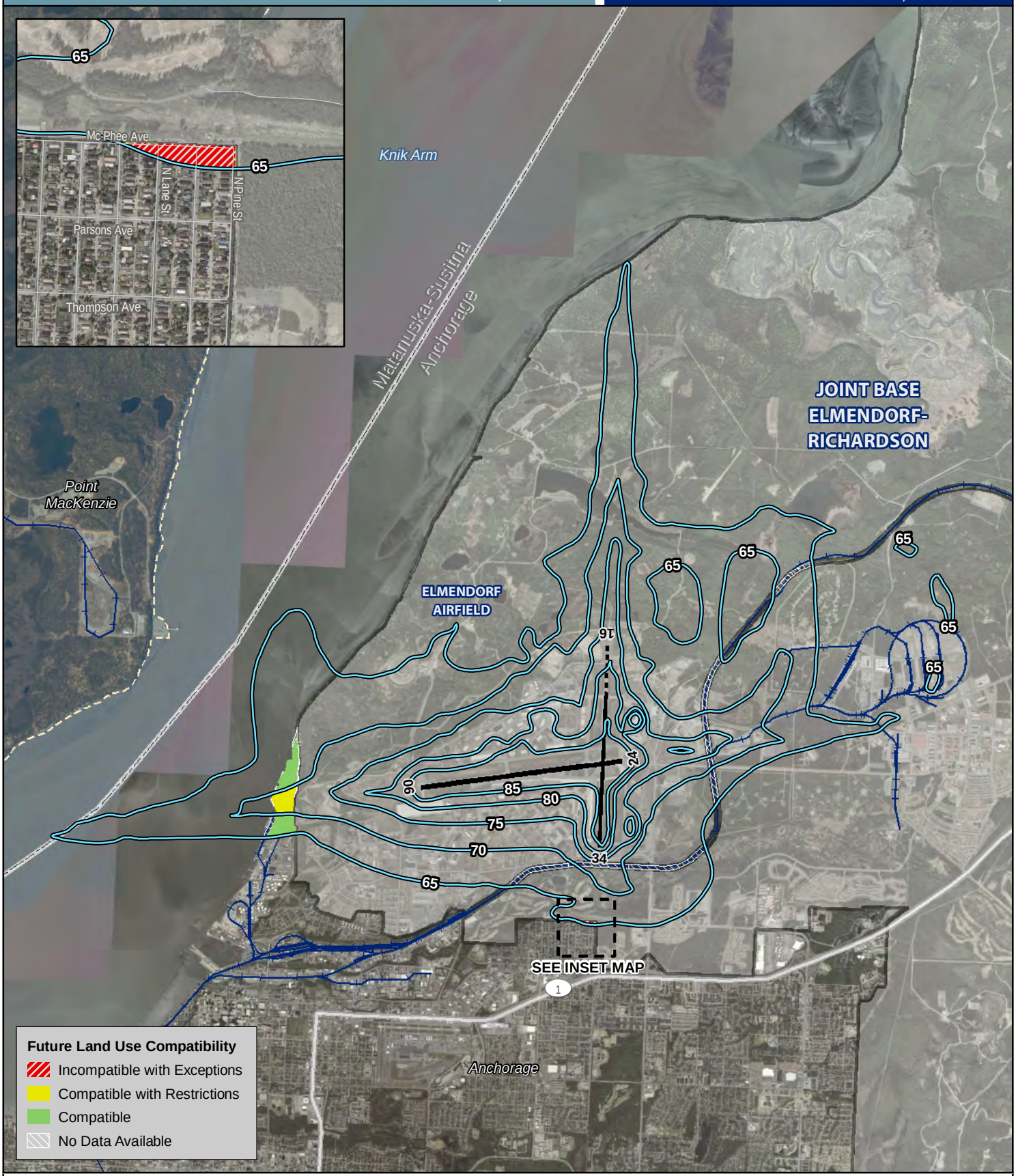
Generalized Land Use Category	Noise Zone (dB DNL)																			
	65-69				70-74				75-79				80-84				85+			
	Compatible	Compatible with Restrictions	Incompatible with Exceptions	Incompatible	Compatible	Compatible with Restrictions	Incompatible with Exceptions	Incompatible	Compatible	Compatible with Restrictions	Incompatible with Exceptions	Incompatible	Compatible	Compatible with Restrictions	Incompatible with Exceptions	Incompatible	Compatible	Compatible with Restrictions	Incompatible with Exceptions	Incompatible
Commercial																				
Light Industrial																				
General Industrial																				
Mixed Use																				
Institutional																				
Urban Residential High-density																				
Medium-density Residential			3.26																	
Single-family and Two-family Residential																				
Low-density Residential																				
Parks and Open Space	0.05																			
Development Reserve																				
Special Study Area																				
Transportation	60.54					28.51														
Water																				
Subtotals	**60.59**	**0.00**	**3.26**	**0.00**	**0.00**	**28.51**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Total	**63.84**				**28.51**				**0.00**				**0.00**				**0.00**			

Notes:
- All contour areas on-installation are excluded from the counts.
- Acreage of land use that had no data available totals 105.3 acres (this includes undesignated areas over Chugach State Park and/or over water, such as Knik Arm).
- Discrepancies in total are a result of rounding from calculations.
- For acreage calculations, “Water” represents water features in land use code within a borough boundary, not over bodies of water, such as the Knik Arm.

Figure 6-9

Joint Base Elmendorf-Richardson
Air Installations Compatible Use Zones

Incompatible Future Land Use within 2019 AICUZ Aircraft Noise Contours, JBER



Legend

- Installation Boundary
- Airfield Runway
- Runway 16 Extension
- Borough Boundary
- Municipal Boundary/ Census Designated Place
- Major Highway
- Railroad
- Aircraft Noise Contour, dB DNL

0 1 2 Miles

N

Source: AFCEC 2018, 2019; Anchorage Municipality 2019; Digital Globe 2017; ESRI 2017; NGA/DHS 2015; U.S. Census Bureau 2018.

Table 6-9. Off-installation Future Land Use Acreage within Small Arms dB PK 15 (met) Noise Zones for JBER

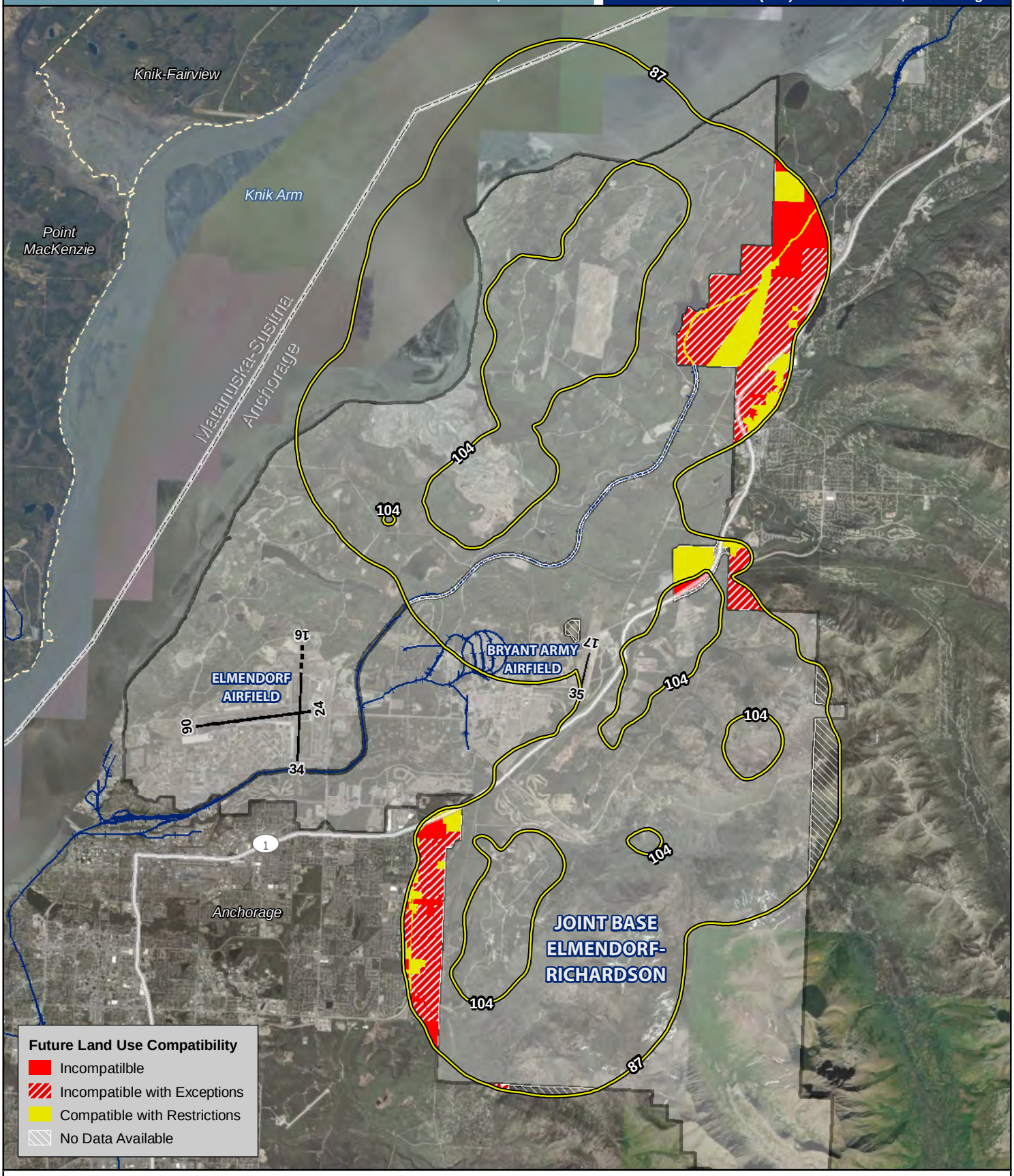
Generalized Land Use Category	Noise Zone (dB PK 15 (met))							
	87-104				>104			
	Compatible	Compatible with Restrictions	Incompatible with Exceptions	Incompatible	Compatible	Compatible with Restrictions	Incompatible with Exceptions	Incompatible
Commercial		301.38						
Light Industrial								
General Industrial								
Mixed Use								
Institutional		497.03						56.90
Urban Residential High-density								
Medium-density Residential			390.95					
Single-family and Two-family Residential			616.30					
Low-density Residential			1225.85					
Parks and Open Space				798.78				
Development Reserve			799.75					
Special Study Area			18.20					
Transportation		529.34						
Water								
Subtotals	**0.00**	**1,327.75**	**3,051.05**	**798.78**	**0.00**	**0.00**	**0.00**	**56.90**
Total	**5,177.58**				**56.90**			

Notes:
- All contour areas on-installation are excluded from the counts.
- Acreage of land use that had no data available totals 1,122.16 acres (this includes undesignated areas over Chugach State Park and/or over water, such as Knik Arm).
- For acreage calculations, “Water” represents water features in land use code within a borough boundary, not over bodies of water, such as the Knik Arm.

Figure 6-10

Joint Base Elmendorf-Richardson
Air Installations Compatible Use Zones

Incompatible Future Land Use within 2019 AICUZ Small Arms dB PK15 (met) Noise Contours, JBER Ranges



Legend

- Installation Boundary
- Airfield Runway
- Runway 16 Extension
- Borough Boundary
- Municipal Boundary/ Census Designated Place
- Major Highway
- Railroad
- Small Arms Peak Noise Contour, dB PK15 (met)

0 1 2 Miles

N

Source: AFCEC 2018, 2019; Anchorage Municipality 2019; Digital Globe 2017; ESRI 2017; NGA/DHS 2015; U.S. Census Bureau 2018.

Table 6-10. Off-installation Future Land Use Acreage within Large Caliber Weapons and Explosives CDNL Noise Zones for JBER

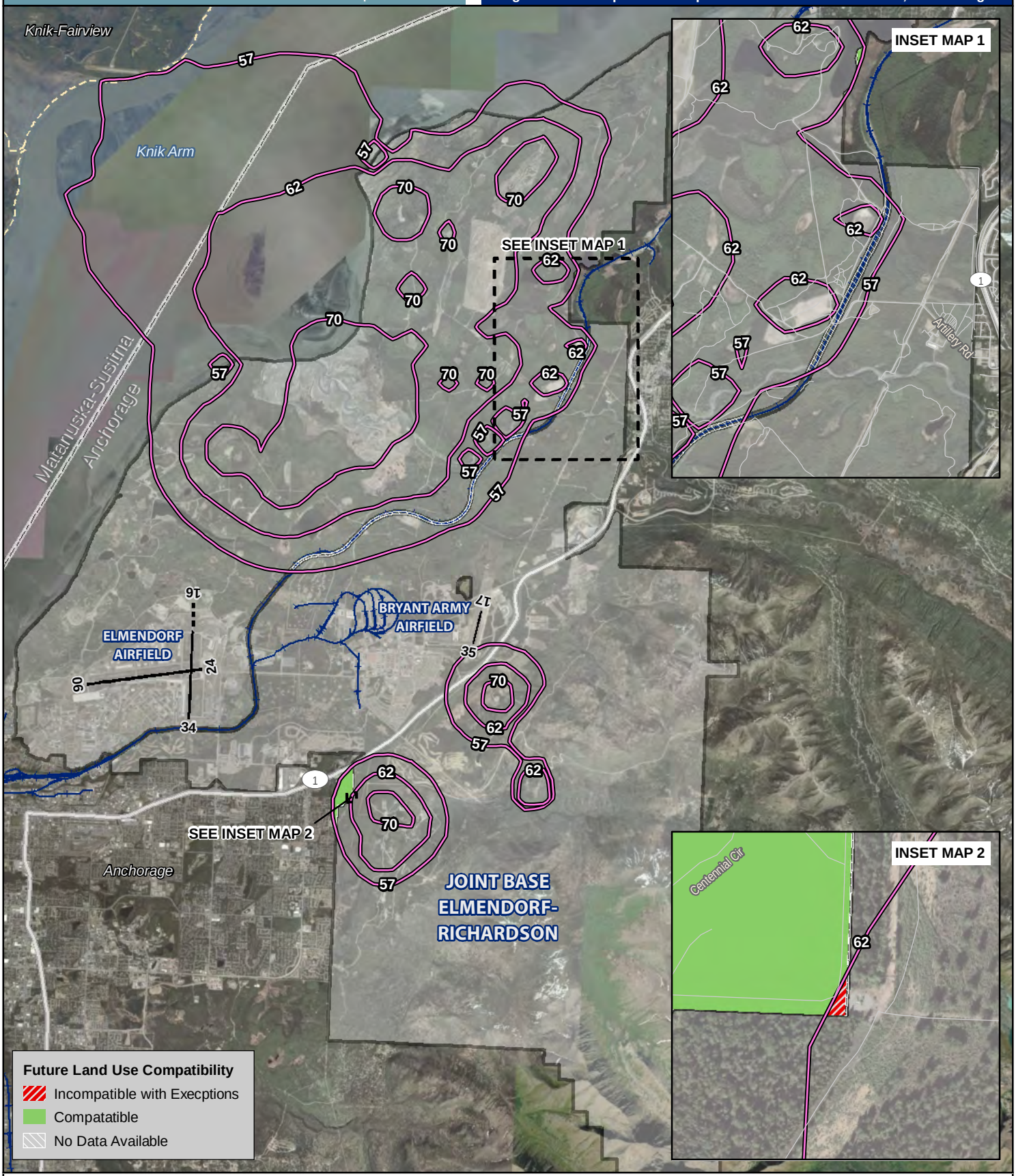
Generalized Land Use Category	Noise Zone (CDNL)											
	57-62				62-70				70+			
	Compatible	Compatible with Restrictions	Incompatible with Exceptions	Incompatible	Compatible	Compatible with Restrictions	Incompatible with Exceptions	Incompatible	Compatible	Compatible with Restrictions	Incompatible with Exceptions	Incompatible
Commercial												
Light Industrial												
General Industrial												
Mixed Use												
Institutional	43.83											
Urban Residential High-density												
Medium-density Residential	34.33						0.05					
Single-family and Two-family Residential	11.16											
Low-density Residential												
Parks and Open Space	4.12											
Development Reserve	3.88											
Special Study Area												
Transportation												
Water												
Subtotals	**97.32**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.05**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Total	**97.32**				**0.05**				**0.00**			

Notes:
- All contour areas on-installation are excluded from the counts.
- Acreage of land use that had no data available totals 159.12 acres (this includes undesignated areas over Chugach State Park and/or over water, such as Knik Arm).
- For acreage calculations, “Water” represents water features in land use code within a borough boundary, not over bodies of water, such as the Knik Arm.

Figure 6-11

Joint Base Elmendorf-Richardson
Air Installations Compatible Use Zones

Incompatible Future Land Use within 2019 AICUZ Large Caliber Weapons and Explosives CDNL Noise Contours, JBER Ranges



Legend

- Installation Boundary
- Airfield Runway
- Runway 16 Extension
- Borough Boundary
- Municipal Boundary/ Census Designated Place
- Major Highway
- Railroad
- Large Caliber Weapons and Explosives Noise Contour, CDNL

0 1 2 Miles

N

Source: AFCEC 2018, 2019; Anchorage Municipality 2019; Digital Globe 2017; ESRI 2017; NGA/DHS 2015; U.S. Census Bureau 2018.

Table 6-11. Off-installation Future Land Use Acreage within Clear Zones/Accident Potential Zones for JBER

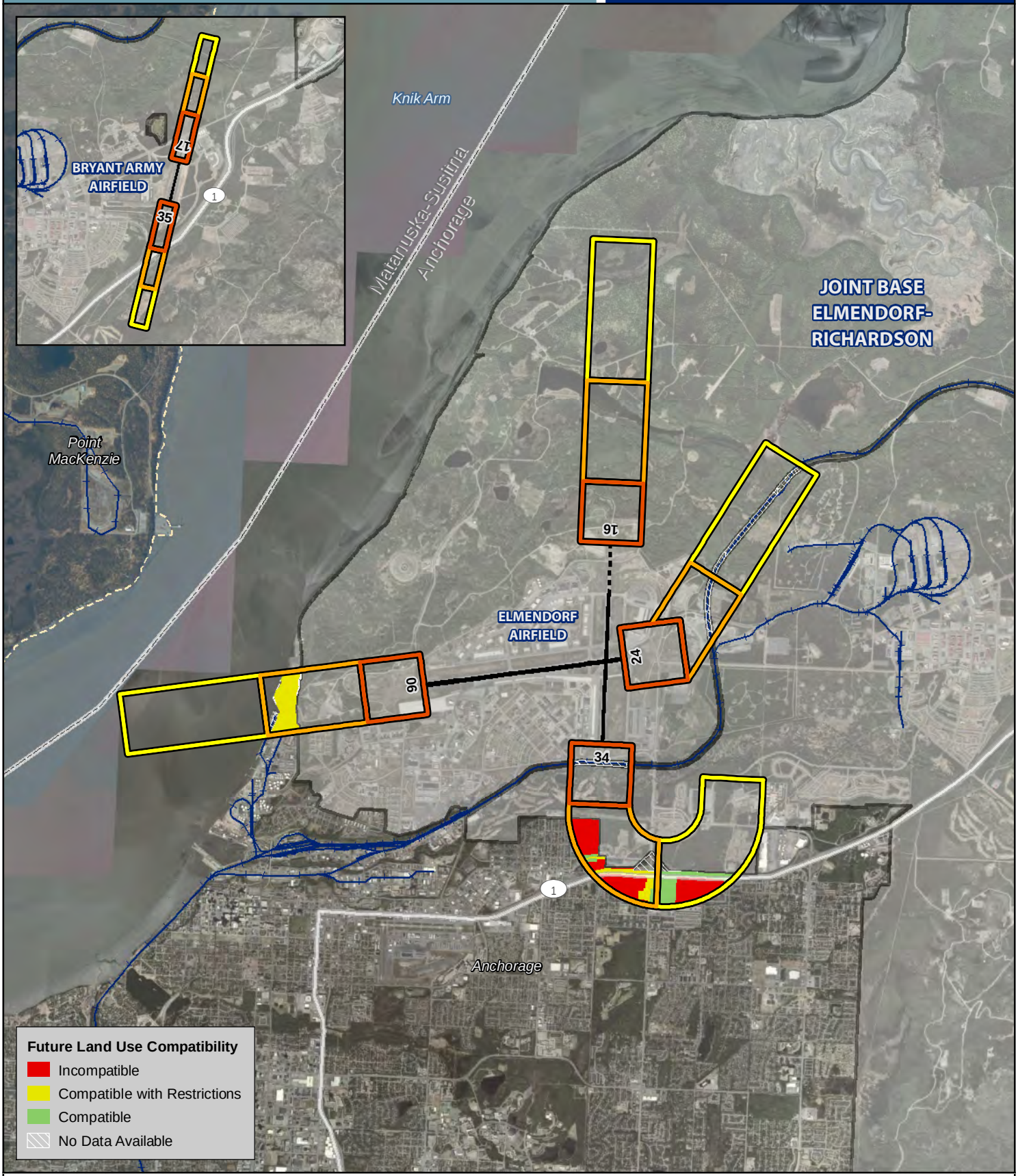
Generalized Land Use Category	CZ				APZ I				APZ II			
	Compatible	Compatible with Restrictions	Incompatible with Exceptions	Incompatible	Compatible	Compatible with Restrictions	Incompatible with Exceptions	Incompatible	Compatible	Compatible with Restrictions	Incompatible with Exceptions	Incompatible
Commercial						5.61				0.86		
Light Industrial					14.68				32.53			
General Industrial												
Mixed Use												
Institutional								4.59				
Urban Residential High-density												
Medium-density Residential								78.05				36.59
Single-family and Two-family Residential								32.91				22.57
Low-density Residential												
Parks and Open Space						0.76						
Transportation						100.18			26.42			
Water												
Subtotals	**0.00**	**0.00**	**0.00**	**0.00**	**14.68**	**106.55**	**0.00**	**115.55**	**58.95**	**0.86**	**0.00**	**59.16**
Total	**0.00**				**236.79**				**118.98**			

Notes:
- All contour areas on-installation are excluded from the counts.
- Acreage of land use that had no data available totals 88.9 acres (this includes undesignated areas over Chugach State Park and/or over water, such as Knik Arm).
- Discrepancies in total are a result of rounding from calculations.
- For acreage calculations, “Water” represents water features in land use code within a borough boundary, not over bodies of water, such as the Knik Arm.

Figure 6-12

Joint Base Elmendorf-Richardson
Air Installations Compatible Use Zones

Incompatible Future Land Use within 2019 AICUZ Clear Zones and Accident Potential Zones, JBER



Legend

- Installation Boundary
- Airfield Runway
- Runway 16 Extension
- Borough Boundary
- Municipal Boundary/ Census Designated Place
- Major Highway
- Railroad
- Clear Zone
- Accident Potential Zone I
- Accident Potential Zone II

0 1 2 Miles

N

Source: AFCEC 2018, 2019; Anchorage Municipality 2019; Digital Globe 2017; ESRI 2017; NGA/DHS 2015; U.S. Census Bureau 2018.

7.0 Implementation

Implementation of the AICUZ Study must be a joint effort between JBER and the surrounding communities. This AICUZ Study provides the best source of information to ensure land use planning decisions made by the local municipalities are compatible with a future installation presence. This chapter discusses the roles of all partners in the collaborative planning.

7.1 Military Role

The goal of the AICUZ Program is to minimize noise and safety concerns for the surrounding communities and to advise these communities about potential impacts from installation operations on the safety, welfare, and quality of life of their citizens.

JBER's AICUZ responsibilities encompass the areas of operational safety, noise abatement, and participation in the land use planning process.

Air Force policy and guidance requires that installation leadership periodically review existing practices for flight operations and evaluate these factors in relationship to populated areas and other local situations.

JBER will:

- Ensure that, wherever possible, air operations planners route flights over sparsely populated areas to reduce the exposure of lives and property to a potential accident.

- Periodically review existing range operations, traffic patterns, instrument approaches, weather conditions, and operating practices and evaluate these factors in relationship to populated areas and other local conditions. The purpose of this review is to limit, reduce, and control the impact of noise from flying and range operations on surrounding communities.

- Consider the reestablishment of a community forum between the installation and surrounding stakeholders to discuss land use and other issues of concern; the installation would hold these meetings on an annual basis.

- Schedule land use planning meetings to provide a forum for agencies to meet and discuss future development and to address issues that may surface because of new proposals.

- Provide copies of the AICUZ Study to local, county, tribal, and regional planning departments and zoning administrators to aid in the planning process and provide copies of the AICUZ Study to appropriate state and federal agencies.

JBER has an Installation Tribal Liaison Officer (ITLO) available for consultation with tribal governments and coordination with their corporations. The JBER ITLO can be contacted at (907) 384-3467.

Other community engagement includes hosting base tours for community figures and organizations, community volunteerism, and hosting the air show called the Arctic Thunder Open House. JBER participates in the Honorary Commander Program, which partners professionals from various areas of the community with commanders to strengthen the relationship between the base and local community.

Preparation and presentation of this 2019 JBER AICUZ Study is one phase in continuing Air Force participation in the local planning process. JBER recognizes that, as the local community updates its land use plans, JBER must be ready to provide additional input, as needed.

7.2 State/Regional Roles

As noted in Section 6.2, growth management is guided by Alaska Statute 29.40- Planning, Platting, and Land Use Regulation and, more specifically, the planning authorities in the communities surrounding JBER. The periodic reviews and updates to the surrounding jurisdiction local plans is an opportunity to revise the AICUZ-specific information within them and implement targeted zoning and land use controls to prevent future incompatibility.

The installation could continue to pursue funding sources through existing federal government programs, such as DoD's Readiness and Environmental Protection Integration (REPI) Program, for protection of mission sensitive areas. JBER's REPI strategy is ongoing and is a collaboration with local stakeholders, such as the Municipality of Anchorage, the Mat-Su Borough, native tribes, corporations such as Eklutna, Inc., and the local community.

In addition to planning legislature, there are military-related organizations, Community Councils, and coordination efforts by JBER that help promote development that is compatible with JBER's mission. These organizations include:

- Alaska Civil/Military Aviation Council - forum for a variety of base personnel, aviation community members, base and community airfield managers, and community planners and leadership to meet biannually.

- Alaska Veterans Advisory Council - appointed by the Governor; the council makes recommendations to the Governor and the Department of Military and Veterans Affairs concerning the needs of and benefits for the state's veterans, for developing public and private partnerships to meet those needs, and for providing information regarding veterans' benefits and services, among other functions.

- Anchorage Military and Veterans Affairs Commission - established under Chapter 4.60.220 of the Anchorage Municipal Code to advise the Mayor. The Commission serves as a liaison between the government and the community's active duty military personnel and veterans.

- The Federation of Community Councils - a non-profit organization whose Board is made up of the representatives of each of Anchorage's Community Councils.

- Alaskan Command Civilian Advisory Board - serves as a mechanism for communication between military and civilian communities.

These organizations and councils interface with JBER's community partnership representative. Community partnership meetings with the Installation and Community Encroachment Partnership group were held regularly. After a short hiatus, there are plans to reinstate these meetings.

7.3 Local Government Role

The role of the local government is to enact planning, zoning, and development principles and practices that are compatible with the installation and protect the installation's mission. The residents of the surrounding community have a long history of working with personnel from JBER. Adoption of the following recommendations during the revision of relevant land use planning or zoning regulations will strengthen this relationship, increase the health and safety of the public, and protect the integrity of the installation's flying mission:

- Local government planners consider AICUZ policies and guidelines when developing or revising city comprehensive plans and use AICUZ overlay maps and Air Force Land Use Compatibility Guidelines (see Appendix A) to evaluate existing and future land use proposals.

- Ensure that new development applications or "changed use of property" are submitted to JBER to afford the opportunity to assess those applications for potential impacts on defense missions. The JBER PA Office can provide a land use planning point of contact.

- Adopt or modify zoning ordinances to reflect the compatible land uses outlined in the AICUZ Study, including the creation of military airport overlay zones.

- Local governments review their capital improvement plan, infrastructure investments, and development policies to ensure they do not encourage incompatible land use patterns near JBER, with particular emphasis on utility extension and transportation planning.

- Local governments implement height and obstruction ordinances that reflect current Air Force and 14 CFR 77 requirements, presented in this study as HAFZs.

- Fair disclosure ordinances be enacted to require disclosure to the public for those AICUZ items that directly relate to military operations at JBER.

- Where allowed, local governments require real estate disclosure for individuals purchasing or leasing property within noise zones or CZs/APZs.

- Enact or modify building/residential codes to ensure that any new construction near JBER has the recommended noise level reduction measures incorporated into the design and construction of structures.

- Government planning bodies monitor proposals for tall structures, such as wind turbines and communication towers, to ensure that new construction does not pose a hazard to navigable airspace around JBER. Where appropriate, coordinate with the FAA on the height of structures.

- Local government land use plans and ordinances reflect AICUZ recommendations for development in CZs/APZs and noise zones.

- Local governments consult with JBER on planning and zoning actions that have the potential to affect installation operations.

- Invite the Air Force leadership to be ex officio members on boards, commissions, and regional councils addressing long-range development and other planning policies.

- Encourage the development of a working group of city, county, and JBER representatives to discuss land use concerns and major development proposals that could affect military operations.

The Mat-Su Borough conducted a JLUS in 2010. The JLUS introduced recommendations for compatible land uses surrounding the installation. Compatibility tools and recommendations from the JLUS were organized by issue area, including noise, airspace conflicts, land use compatibility, and communication. Most of the recommendations or proposed tools have been completed by the JLUS partners, and include:

- Incorporating military noise contours into Mat-Su Borough comprehensive plans and land use regulations. (Note: The JLUS was adopted into the Borough Comprehensive plan in April 2010.)

- Informing landowners within the 65 dB DNL noise zone. (Note: Letters were sent to property owners affected by previous noise footprint.)

- Coordinating with applicable aviation groups about potential air use conflicts. (Note: Base contacts attend Aviation Boards/councils meetings and maintain communication, as needed.)

A few recommendations were tabled, and some are yet to be implemented. These include publicly posting military noise contours, as available. Noise attenuation in construction codes for Mat-Su were tabled as they do not have construction codes and standard Alaska construction meets most levels of recommended attenuation. Identification and acquisition of land that would potentially protect the mission is ongoing.

The Municipality of Anchorage has not conducted a JLUS and has not formally adopted AICUZ policies into their land use planning regulations. However, the municipality is conscious of APZs in planning (e.g., adjusting densities in specific areas to be more compatible with base operations).

7.4 Community Role

Neighboring residents and installation personnel have a long-established history of working together for the mutual benefit of the JBER mission and local community. Adoption of the following recommendations will strengthen this relationship, protect the health and ensure the safety of the public, and help protect the integrity of the installation's defense mission:

- **Real Estate Professionals and Brokers:**
    - Know where noise zones and CZs/APZs encumber land near the air installation and invite installation representatives to brokers' meetings to discuss the AICUZ Program with real estate professionals.
    - Disclose noise impacts to all prospective buyers of properties within areas greater than 65 dB DNL, 87 dB PK 15 (met), 62 CDNL, or within the CZs/APZs.
    - Require the Multiple Listing Service to disclose noise zones and CZs/APZs for all listings.
- **Developers:**
    - Know where the noise zones and CZs/APZs encumber land near the air installation. Consult with JBER on proposed developments within the AICUZ footprint.
    - Participate in local discussions regarding existing zoning ordinances and subdivision regulations to support the compatible land uses

outlined in this AICUZ Study through implementation of a zoning overlay district based on noise contours and CZs/APZs.

- **Local Citizens:**
    - Participate in local forums with the installation to learn more about the installation's missions.
    - Become informed about the AICUZ Program and learn about the program's goals, objectives, and value in protecting the public's health, safety, and welfare.
    - When considering property purchases, ask local real estate professionals, city planners, and installation representatives about noise and accident potential.

It is recognized that JBER's activities and operations may affect the community. Likewise, community activities and development decisions can affect JBER's ability to complete its local hometown mission. The local military and community goals can be mutually achieved through a combination of collaborative planning and partnerships, open communication, and close relationships. The AICUZ Study can provide a foundation on which related communication can be based to ensure that the community and its hometown military installation can continue to coexist for many years.

Questions about the AICUZ Program may be directed to the installation PA Office at (907) 552-8151 or jber.pa@us.af.mil.

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Appendix A. Land Use Compatibility Tables

Table A-1. Land Use Compatibility Recommendations in APZs and CZs

SLUCM NO.	LAND USE NAME	CLEAR ZONE Recommendation[1]	APZ-I Recommendation[1]	APZ-II Recommendation[1]	DENSITY Recommendation[1]
10	**Residential**				
11	Household Units				
11.11	Single units: detached	N	N	Y[2]	Maximum density of 2 Du/Ac
11.12	Single units: semi-detached	N	N	N	
11.13	Single units: attached row	N	N	N	
11.21	Two units: side-by-side	N	N	N	
11.22	Two units: one above the other	N	N	N	
11.31	Apartments: walk-up	N	N	N	
11.32	Apartment: elevator	N	N	N	
12	Group quarters	N	N	N	
13	Residential hotels	N	N	N	
14	Mobile home parks or courts	N	N	N	
15	Transient lodgings	N	N	N	
16	Other residential	N	N	N	
20	**Manufacturing [3]**				
21	Food and kindred products; manufacturing	N	N	Y	Maximum FAR 0.56 IN APZ II
22	Textile mill products; manufacturing	N	N	Y	Maximum FAR 0.56 IN APZ II
23	Apparel and other finished products; products made from fabrics, leather and similar materials; manufacturing	N	N	N	
24	Lumber and wood products (except furniture); manufacturing	N	Y	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II
25	Furniture and fixtures; manufacturing	N	Y	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II
26	Paper and allied products; manufacturing	N	Y	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II

Table A-1. Land Use Compatibility Recommendations in APZs and CZs

SLUCM NO.	LAND USE NAME	CLEAR ZONE Recommendation[1]	APZ-I Recommendation[1]	APZ-II Recommendation[1]	DENSITY Recommendation[1]
27	Printing, publishing, and allied industries	N	Y	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II
28	Chemicals and allied products; manufacturing	N	N	N	
29	Petroleum refining and related industries	N	N	N	
30	**Manufacturing[3] (continued)**				
31	Rubber and miscellaneous plastic products; manufacturing	N	N	N	
32	Stone, clay, and glass products; manufacturing	N	N	Y	Maximum FAR 0.56 in APZ II
33	Primary metal products; manufacturing	N	N	Y	Maximum FAR 0.56 in APZ II
34	Fabricated metal products; manufacturing	N	N	Y	Maximum FAR 0.56 in APZ II
35	Professional, scientific, and controlling instruments; photographic and optical goods; watches and clocks	N	N	N	
39	Miscellaneous manufacturing	N	Y	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II
40	**Transportation, communication, and utilities[3, 4]**				
41	Railroad, rapid rail transit, and street railway transportation	N	Y[6]	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II
42	Motor vehicle transportation	N	Y[6]	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II
43	Aircraft transportation	N	Y[6]	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II
44	Marine craft transportation	N	Y[6]	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II
45	Highway and street right-of-way	Y[5]	Y[6]	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II

Table A-1. Land Use Compatibility Recommendations in APZs and CZs

SLUCM NO.	LAND USE NAME	CLEAR ZONE Recommendation[1]	APZ-I Recommendation[1]	APZ-II Recommendation[1]	DENSITY Recommendation[1]
46	Automobile parking	N	Y[6]	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II
47	Communication	N	Y[6]	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II
48	Utilities[7]	N	Y[6]	Y[6]	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II
48.5	Solid waste disposal (landfills, incinerators, etc.)	N	N	N	
49	Other transportation, communication, and utilities	N	Y[6]	Y	See Note 6 below
50	**Trade**				
51	Wholesale trade	N	Y	Y	Maximum FAR of 0.28 in APZ I & .56 in APZ II
52	Retail trade – building materials, hardware and farm equipment	N	Y	Y	See Note 8 below
53	Retail trade – including, discount clubs, home improvement stores, electronics superstores, etc.	N	N	Y	Maximum FAR of 0.16 in APZ II
53	Shopping centers-Neighborhood, Community, Regional, Super-regional[9]	N	N	N	
54	Retail trade – food	N	N	Y	Maximum FAR of 0.24 in APZ II
55	Retail trade – automotive, marine craft, aircraft, and accessories	N	Y	Y	Maximum FAR of 0.14 in APZ I & 0.28 in APZ II
56	Retail trade – apparel and accessories	N	N	Y	Maximum FAR of 0.28 in APZ II
57	Retail trade – furniture, home, furnishings and equipment	N	N	Y	Maximum FAR of 0.28 in APZ II
58	Retail trade – eating and drinking establishments	N	N	N	
59	Other retail trade	N	N	Y	Maximum FAR of 0.16 in APZ II

Table A-1. Land Use Compatibility Recommendations in APZs and CZs

SLUCM NO.	LAND USE NAME	CLEAR ZONE Recommendation[1]	APZ-I Recommendation[1]	APZ-II Recommendation[1]	DENSITY Recommendation[1]
60	**Services[10]**				
61	Finance, insurance and real estate services	N	N	Y	Maximum FAR of 0.22 in APZ II
62	Personal services	N	N	Y	Office uses only. Maximum FAR of 0.22 in APZ II.
62.4	Cemeteries	N	Y[11]	Y[11]	
63	Business services (credit reporting; mail, stenographic, reproduction; advertising)	N	N	Y	Maximum FAR of 0.22 in APZ II
63.7	Warehousing and storage services[12]	N	Y	Y	Maximum FAR of 1.0 in APZ I; 2.0 in APZ II
64	Repair Services	N	Y	Y	Maximum FAR of 0.11 APZ I; 0.22 in APZ II
65	Professional services	N	N	Y	Maximum FAR of 0.22 in APZ II
65.1	Hospitals, nursing homes	N	N	N	
65.1	Other medical facilities	N	N	N	
66	Contract construction services	N	Y	Y	Maximum FAR of 0.11 APZ I; 0.22 in APZ II
67	Government Services	N	N	Y	Maximum FAR of 0.24 in APZ II
68	Educational services	N	N	N	
68.1	Childcare services, child development centers, and nurseries	N	N	N	
69	Miscellaneous Services	N	N	Y	Maximum FAR of 0.22 in APZ II
69.1	Religious activities (including places of worship)	N	N	N	
70	**Cultural, entertainment and recreational**				
71	Cultural activities	N	N	N	
71.2	Nature exhibits	N	Y[13]	Y[13]	
72	Public assembly	N	N	N	
72.1	Auditoriums, concert halls	N	N	N	
72.11	Outdoor music shells, amphitheaters	N	N	N	

Table A-1. Land Use Compatibility Recommendations in APZs and CZs

SLUCM NO.	LAND USE NAME	CLEAR ZONE Recommendation[1]	APZ-I Recommendation[1]	APZ-II Recommendation[1]	DENSITY Recommendation[1]
72.2	Outdoor sports arenas, spectator sports	N	N	N	
73	Amusements – fairgrounds, miniature golf, driving ranges; amusement parks, etc.	N	N	Y[20]	
74	Recreational activities (including golf courses, riding stables, water recreation)	N	Y[13]	Y[13]	Maximum FAR of 0.11 in APZ I; 0.22 in APZ II
75	Resorts and group camps	N	N	N	
76	Parks	N	Y[13]	Y[13]	Maximum FAR of 0.11 in APZ I; 0.22 in APZ II
79	Other cultural, entertainment and recreation	N	Y[11]	Y[11]	Maximum FAR of 0.11 in APZ I; 0.22 in APZ II
80	**Resource production and extraction**				
81	Agriculture (except live-stock)	Y[4]	Y[14]	Y[14]	
81.5,81.7	Agriculture-Livestock farming, including grazing and feedlots	N	Y[14]	Y[14]	
82	Agriculture related activities	N	Y[15]	Y[15]	Maximum FAR of 0.28 in APZ I; 0.56 in APZ II, no activity which produces smoke, glare, or involves explosives
83	Forestry activities[16]	N	Y	Y	Maximum FAR of 0.28 in APZ I; 0.56 in APZ II, no activity which produces smoke, glare, or involves explosives
84	Fishing activities[17]	N[17]	Y	Y	Maximum FAR of 0.28 in APZ I; 0.56 in APZ II, no activity which produces smoke, glare, or involves explosives

Table A-1. Land Use Compatibility Recommendations in APZs and CZs

SLUCM NO.	LAND USE NAME	CLEAR ZONE Recommendation[1]	APZ-I Recommendation[1]	APZ-II Recommendation[1]	DENSITY Recommendation[1]
85	Mining activities[18]	N	Y[18]	Y[18]	Maximum FAR of 0.28 in APZ I; 0.56 in APZ II, no activity which produces smoke, glare, or involves explosives
89	Other resource production or extraction	N	Y	Y	Maximum FAR of 0.28 in APZ I; 0.56 in APZ II, no activity which produces smoke, glare, or involves explosives
90	**Other**				
91	Undeveloped land	Y	Y	Y	
93	Water areas[19]	N[19]	N[19]	N[19]	

1. A "Yes" or a "No" designation for compatible land use is to be used only for general comparison. Within each, uses exist where further evaluation may be needed in each category as to whether it is clearly compatible, normally compatible, or not compatible due to the variation of densities of people and structures. In order to assist air installations and local governments, general suggestions as to FARs are provided as a guide to density in some categories. In general, land use restrictions that limit occupants, including employees, of commercial, service, or industrial buildings or structures to 25 an acre in APZ I and 50 an acre in APZ II are considered to be low density. Outside events should normally be limited to assemblies of not more than 25 people an acre in APZ I, and maximum assemblies of 50 people an acre in APZ II. Recommended FARs are calculated using standard parking generation rates for various land uses, vehicle occupancy rates, and desired density in APZ I and II. For APZ I, the formula is FAR = 25 people an acre/ (Average Vehicle Occupancy x Average Parking Rate x (43560/1000)). The formula for APZ II is FAR = 50/ (Average Vehicle Occupancy x Average Parking Rate x (43560/1000)).

2. The suggested maximum density for detached single-family housing is two Du/Ac. In a planned unit development (PUD) of single family detached units, where clustered housing development results in large open areas, this density could possibly be increased slightly provided the amount of surface area covered by structures does not exceed 20 percent of the PUD total area. PUD encourages clustered development that leaves large open areas.

3. Other factors to be considered: Labor intensity, structural coverage, explosive characteristics, air-pollution, electronic interference with aircraft, height of structures, and potential glare to pilots.

4. No structures (except airfield lighting and navigational aids necessary for the safe operation of the airfield when there are no other siting options), buildings, or above-ground utility and communications lines should normally be located in Clear Zone areas on or off the air installation. The Clear Zone is subject to the most severe restrictions.

5. Roads within the graded portion of the Clear Zone are prohibited. All roads within the Clear Zone are discouraged, but if required, they should not be wider than two lanes and the rights-of-way should be fenced (frangible) and not include sidewalks or bicycle trails. Nothing associated with these roads should violate obstacle clearance criteria.

6. No above ground passenger terminals and no above ground power transmission or distribution lines. Prohibited power lines include high-voltage transmission lines and distribution lines that provide power to cities, towns, or regional power for unincorporated areas.

7. Development of renewable energy resources, including solar and geothermal facilities and wind turbines, may impact military operations through hazards to flight or electromagnetic interference. Each new development should to be analyzed for compatibility issues on a case-by-case basis that considers both the proposal and potentially affected mission.

8. Within SLUCM Code 52, maximum FARs for lumberyards (SLUCM Code 521) are 0.20 in APZ-I and 0.40 in APZ-11; the maximum FARs for hardware, paint, and farm equipment stores, (SLUCM Code 525), are 0.12 in APZ I and 0.24 in APZ II.

9. A shopping center is an integrated group of commercial establishments that is planned, developed, owned, or managed as a unit. Shopping center types include strip, neighborhood, community, regional, and super-regional facilities anchored by small businesses, a supermarket or drug store, discount retailer, department store, or several department stores, respectively.

10. Ancillary uses such as meeting places, auditoriums, etc. are not recommended.

11. Chapels, houses of worship, and other land uses of public gatherings are incompatible within APZ I or APZ II.

12. Big box home improvement stores are not included as part of this category.

13. Facilities must be low intensity, and provide no playgrounds, etc. Facilities such as club houses, meeting places, auditoriums, large classes, etc., are not recommended.

14. Activities that attract concentrations of birds creating a hazard to aircraft operations should be excluded.

15. Factors to be considered: labor intensity, structural coverage, explosive characteristics, and air pollution.

16. Lumber and timber products removed due to establishment, expansion, or maintenance of Clear Zone lands owned in fee will be disposed of in accordance with applicable DoD guidance.

17. Controlled hunting and fishing may be permitted for the purpose of wildlife management.

18. Surface mining operations that could create retention ponds that may attract waterfowl and present bird/wildlife aircraft strike hazards (BASH), or operations that produce dust or light emissions that could affect pilot vision are not compatible.

19. Naturally occurring water features (e.g., rivers, lakes, streams, wetlands) are pre-existing, nonconforming land uses. Naturally occurring water features that attract waterfowl present a potential BASH. Actions to expand naturally occurring water features or construction of new water features should not be encouraged. If construction of new features is necessary for storm water retention, such features should be designed so that they do not attract waterfowl.

20. Amusement centers, family entertainment centers or amusement parks designed or operated at a scale that could attract or result in concentrations of people, including employees and visitors, greater than 50 people per acre at any given time are incompatible in APZ II.

Table A-2. Recommended Land Use Compatibility for Aircraft Noise Zones

LAND USE			SUGGESTED LAND USE COMPATIBILITY			
SLUCM NO.	LAND USE NAME	DNL 65-69	DNL 70-74	DNL 75-79	DNL 80-84	DNL 85+
10	**Residential**					
11	Household units	N[1]	N[1]	N	N	N
11.11	Single units: detached	N[1]	N[1]	N	N	N
11.12	Single units: semidetached	N[1]	N[1]	N	N	N
11.13	Single units: attached row	N[1]	N[1]	N	N	N
11.21	Two units: side-by-side	N[1]	N[1]	N	N	N
11.22	Two units: one above the other	N[1]	N[1]	N	N	N
11.31	Apartments: walk-up	N[1]	N[1]	N	N	N
11.32	Apartment: elevator	N[1]	N[1]	N	N	N
12	Group quarters	N[1]	N[1]	N	N	N
13	Residential hotels	N[1]	N[1]	N	N	N
14	Mobile home parks or courts	N	N	N	N	N
15	Transient lodgings	N[1]	N[1]	N[1]	N	N
16	Other residential	N[1]	N[1]	N	N	N
20	**Manufacturing**					
21	Food and kindred products; manufacturing	Y	Y[2]	Y[3]	Y[4]	N
22	Textile mill products; manufacturing	Y	Y[2]	Y[3]	Y[4]	N
23	Apparel and other finished products; products made from fabrics, leather, and similar materials; manufacturing	Y	Y[2]	Y[3]	Y[4]	N
24	Lumber and wood products (except furniture); manufacturing	Y	Y[2]	Y[3]	Y[4]	N
25	Furniture and fixtures; manufacturing	Y	Y[2]	Y[3]	Y[4]	N
26	Paper and allied products; manufacturing	Y	Y[2]	Y[3]	Y[4]	N
27	Printing, publishing, and allied industries	Y	Y[2]	Y[3]	Y[4]	N
28	Chemicals and allied products; manufacturing	Y	Y[2]	Y[3]	Y[4]	N
29	Petroleum refining and related industries	Y	Y[2]	Y[3]	Y[4]	N
30	**Manufacturing (continued)**					
31	Rubber and misc. plastic products; manufacturing	Y	Y[2]	Y[3]	Y[4]	N
32	Stone, clay and glass products; manufacturing	Y	Y[2]	Y[3]	Y[4]	N
33	Primary metal products; manufacturing	Y	Y[2]	Y[3]	Y[4]	N
34	Fabricated metal products; manufacturing	Y	Y[2]	Y[3]	Y[4]	N

Table A-2. Recommended Land Use Compatibility for Aircraft Noise Zones

LAND USE		SUGGESTED LAND USE COMPATIBILITY				
SLUCM NO.	LAND USE NAME	DNL 65-69	DNL 70-74	DNL 75-79	DNL 80-84	DNL 85+
35	Professional scientific, and controlling instruments; photographic and optical goods; watches and clocks	Y	25	30	N	N
39	Miscellaneous manufacturing	Y	Y[2]	Y[3]	Y[4]	N
40	**Transportation, communication and utilities**					
41	Railroad, rapid rail transit, and street railway transportation	Y	Y[2]	Y[3]	Y[4]	N
42	Motor vehicle transportation	Y	Y[2]	Y [3]	Y[4]	N
43	Aircraft transportation	Y	Y[2]	Y[3]	Y[4]	N
44	Marine craft transportation	Y	Y[2]	Y[3]	Y[4]	N
45	Highway and street right-of-way	Y	Y	Y	Y	N
46	Automobile parking	Y	Y	Y	Y	N
47	Communication	Y	25[5]	30[5]	N	N
48	Utilities	Y	Y[2]	Y[3]	Y[4]	N
49	Other transportation, communication and utilities	Y	25[5]	30[5]	N	N
50	**Trade**					
51	Wholesale trade	Y	Y[2]	Y[3]	Y[4]	N
52	Retail trade – building materials, hardware and farm equipment	Y	25	30	Y[4]	N
53	Retail trade – including shopping centers, discount clubs, home improvement stores, electronics superstores, etc.	Y	25	30	N	N
54	Retail trade – food	Y	25	30	N	N
55	Retail trade – automotive, marine craft, aircraft and accessories	Y	25	30	N	N
56	Retail trade – apparel and accessories	Y	25	30	N	N
57	Retail trade – furniture, home, furnishings and equipment	Y	25	30	N	N
58	Retail trade – eating and drinking establishments	Y	25	30	N	N
59	Other retail trade	Y	25	30	N	N
60	**Services**					
61	Finance, insurance and real estate services	Y	25	30	N	N
62	Personal services	Y	25	30	N	N
62.4	Cemeteries	Y	Y[2]	Y[3]	Y[4,11]	Y[6,11]
63	Business services	Y	25	30	N	N
63.7	Warehousing and storage	Y	Y[2]	Y[3]	Y[4]	N

Table A-2. Recommended Land Use Compatibility for Aircraft Noise Zones

LAND USE		SUGGESTED LAND USE COMPATIBILITY				
SLUCM NO.	LAND USE NAME	DNL 65-69	DNL 70-74	DNL 75-79	DNL 80-84	DNL 85+
64	Repair services	Y	Y[2]	Y[3]	Y[4]	N
65	Professional services	Y	25	30	N	N
65.1	Hospitals, other medical facilities	25	30	N	N	N
65.16	Nursing homes	N[1]	N[1]	N	N	N
66	Contract construction services	Y	25	30	N	N
67	Government services	Y[1]	25	30	N	N
68	Educational services	25	30	N	N	N
68.1	Childcare services, child development centers, and nurseries	25	30	N	N	N
69	Miscellaneous Services	Y	25	30	N	N
69.1	Religious activities (including places of worship)	Y	25	30	N	N
70	**Cultural, entertainment and recreational**					
71	Cultural activities	25	30	N	N	N
71.2	Nature exhibits	Y[1]	N	N	N	N
72	Public assembly	Y	N	N	N	N
72.1	Auditoriums, concert halls	25	30	N	N	N
72.11	Outdoor music shells, amphitheaters	N	N	N	N	N
72.2	Outdoor sports arenas, spectator sports	Y[7]	Y[7]	N	N	N
73	Amusements	Y	Y	N	N	N
74	Recreational activities (including golf courses, riding stables, water recreation)	Y	25	30	N	N
75	Resorts and group camps	Y	25	N	N	N
76	Parks	Y	25	N	N	N
79	Other cultural, entertainment and recreation	Y	25	N	N	N
80	**Resource production and extraction**					
81	Agriculture (except live- stock)	Y[8]	Y[9]	Y[10]	Y[10,11]	Y[10,11]
81.5, 81.7	Agriculture-Livestock farming including grazing and feedlots	Y[8]	Y[9]	N	N	N
82	Agriculture related activities	Y[8]	Y[9]	Y[10]	Y[10,11]	Y[10,11]
83	Forestry activities	Y[8]	Y[9]	Y[10]	Y[10,11]	Y[10,11]
84	Fishing activities	Y	Y	Y	Y	Y
85	Mining activities	Y	Y	Y	Y	Y
89	Other resource production or extraction	Y	Y	Y	Y	Y

1. General

   a. Although local conditions regarding the need for housing may require residential use in these zones, residential use is discouraged in DNL 65-69 and strongly discouraged in DNL 70-74. The absence of viable alternative development options should be determined, and an evaluation should be conducted locally prior to local

approvals indicating that a demonstrated community need for the residential use would not be met if development were prohibited in these zones. Existing residential development is considered as pre-existing, non-conforming land uses.

b. Where the community determines that these uses must be allowed, measures to achieve outdoor to indoor NLR of at least 25 decibels (dB) in DNL 65-69 and 30 dB in DNL 70-74 should be incorporated into building codes and be considered in individual approvals; for transient housing, an NLR of at least 35 dB should be incorporated in DNL 75-79.

c. Normal permanent construction can be expected to provide an NLR of 20 dB, thus the reduction requirements are often stated as 5, 10, or 15 dB over standard construction and normally assume mechanical ventilation, upgraded sound transmission class ratings in windows and doors, and closed windows year round. Additional consideration should be given to modifying NLR levels based on peak noise levels or vibrations.

d. NLR criteria will not eliminate outdoor noise problems. However, building location, site planning, design, and use of berms and barriers can help mitigate outdoor noise exposure particularly from ground level sources. Measures that reduce noise at a site should be used wherever practical in preference to measures that only protect interior spaces.

2. Measures to achieve NLR of 25 must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.

3. Measures to achieve NLR of 30 must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.

4. Measures to achieve NLR of 35 must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.

5. If project or proposed development is noise sensitive, use indicated NLR; if not, land use is compatible without NLR.

6. Buildings are not permitted.

7. Land use is compatible provided special sound reinforcement systems are installed.

8. Residential buildings require an NLR of 25.

9. Residential buildings require an NLR of 30.

10. Residential buildings are not permitted.

11. Land use that involves outdoor activities is not recommended, but if the community allows such activities, hearing protection devices should be worn when noise sources are present. Long-term exposure (multiple hours per day over many years) to high noise levels can cause hearing loss in some unprotected individuals.

Table A-3. Recommended Land Use Compatibility for Small Arms Noise

LAND USE		SUGGESTED LAND USE COMPATIBILITY	
SLUCM NO.	LAND USE NAME	Noise Zone II 87–104 dB Peak	Noise Zone III >104 dB Peak
10	**Residential**		
11	Household units	N[1]	N
11.11	Single units: detached	N[1]	N
11.12	Single units: semidetached	N[1]	N
11.13	Single units: attached row	N[1]	N
11.21	Two units: side-by-side	N[1]	N
11.22	Two units: one above the other	N[1]	N
11.31	Apartments: walk-up	N[1]	N
11.32	Apartment: elevator	N[1]	N
12	Group quarters	N[1]	N
13	Residential hotels	N[1]	N
14	Mobile home parks or courts	N	N
15	Transient lodgings	N[1]	N
16	Other residential	N[1]	N
20	**Manufacturing**		
21	Food and kindred products; manufacturing	Y[2]	Y[3]
22	Textile mill products; manufacturing	Y[2]	Y[3]
23	Apparel and other finished products; products made from fabrics, leather, and similar materials; manufacturing	Y[2]	Y[3]
24	Lumber and wood products (except furniture); manufacturing	Y[2]	Y[3]
25	Furniture and fixtures; manufacturing	Y[2]	Y[3]
26	Paper and allied products; manufacturing	Y[2]	Y[3]
27	Printing, publishing, and allied industries	Y[2]	Y[3]
28	Chemicals and allied products; manufacturing	Y[2]	Y[3]
29	Petroleum refining and related industries	Y[2]	Y[3]
30	**Manufacturing (continued)**		
31	Rubber and misc. plastic products; manufacturing	Y[2]	Y[3]
32	Stone, clay and glass products; manufacturing	Y[2]	Y[3]
33	Primary metal products; manufacturing	Y[2]	Y[3]
34	Fabricated metal products; manufacturing	Y[2]	Y[3]
35	Professional scientific, and controlling instruments; photographic and optical goods; watches and clocks	25	35
39	Miscellaneous manufacturing	Y[2]	Y[3]
40	**Transportation, communication, and utilities**		
41	Railroad, rapid rail transit, and street railway transportation	Y[2]	Y[3]
42	Motor vehicle transportation	Y[2]	Y[3]
43	Aircraft transportation	Y[2]	Y[3]
44	Marine craft transportation	Y[2]	Y[3]
45	Highway and street right-of-way	Y[2]	Y[3]
46	Automobile parking	Y[2]	Y[3]
47	Communication	25	35

Table A-3. Recommended Land Use Compatibility for Small Arms Noise

LAND USE		SUGGESTED LAND USE COMPATIBILITY	
SLUCM NO.	LAND USE NAME	Noise Zone II 87–104 dB Peak	Noise Zone III >104 dB Peak
48	Utilities	Y[2]	Y
49	Other transportation, communication and utilities	25	35
50	**Trade**		
51	Wholesale trade	Y[2]	Y[3]
52	Retail trade – building materials, hardware and farm equipment	25	35
53	Retail trade – including shopping centers, discount clubs, home improvement stores, electronics superstores, etc.	25	35
54	Retail trade – food	25	35
55	Retail trade – automotive, marine craft, aircraft and accessories	25	35
56	Retail trade – apparel and accessories	25	35
57	Retail trade – furniture, home, furnishings and equipment	25	35
58	Retail trade – eating and drinking establishments	25	35
59	Other retail trade	25	35
60	**Services**		
61	Finance, insurance and real estate services	25	35
62	Personal services	25	35
62.4	Cemeteries	Y[2]	Y[3]
63	Business services	25	35
63.7	Warehousing and storage	Y[2]	Y[3]
64	Repair services	Y[2]	Y[3]
65	Professional services	25	N
65.1	Hospitals, other medical facilities	N	N
65.16	Nursing homes	N	N
66	Contract construction services	25	35
67	Government services	25	35
68	Educational services	35	N
68.1	Childcare services, child development centers, and nurseries	35	N
69	Miscellaneous Services	35	N
69.1	Religious activities (including places of worship)	35	N
70	**Cultural, entertainment, and recreational**		
71	Cultural activities	35	N
71.2	Nature exhibits	N	N
72	Public assembly	N	N
72.1	Auditoriums, concert halls	35	N
72.11	Outdoor music shells, amphitheaters	N	N
72.2	Outdoor sports arenas, spectator sports	N	N
73	Amusements	Y	N
74	Recreational activities (including golf courses, riding stables, water recreation)	N	N

Table A-3. Recommended Land Use Compatibility for Small Arms Noise

LAND USE		SUGGESTED LAND USE COMPATIBILITY	
SLUCM NO.	LAND USE NAME	Noise Zone II 87–104 dB Peak	Noise Zone III >104 dB Peak
75	Resorts and group camps	N	N
76	Parks	N	N
79	Other cultural, entertainment and recreation	N	N
80	**Resource production and extraction**		
81	Agriculture (except live- stock)	Y[4]	Y[5]
81.5, 81.7	Agriculture-Livestock farming including grazing and feedlots	Y[4]	N
82	Agriculture related activities	Y[4]	Y[5]
83	Forestry activities	Y[4]	Y[5]
84	Fishing activities	Y	Y
85	Mining activities	Y	Y
89	Other resource production or extraction	Y	Y

[1] General

[a] Although local requirements for on- or off-base housing may require noise-sensitive land uses within Noise Zone II, such land use is generally not recommended. The absence of viable alternative development options should be determined, and an evaluation should be conducted locally prior to local approvals indicating that a demonstrated community need for the residential use would not be met if development were prohibited in these zones. Existing residential development is considered as pre-existing, non-conforming land uses.

[b] Where the community determines that these uses must be allowed, measures to achieve outdoor to indoor NLR of at least 30 decibels (dB) in Noise Zone II should be incorporated into building codes and be considered in individual approvals.

[c] Normal permanent construction can be expected to provide an NLR of 20 dB, thus the reduction requirements are often stated as 10 dB over standard construction and normally assume mechanical ventilation, upgraded sound transmission class ratings in windows and doors, and closed windows year round.

[d] NLR criteria will not eliminate outdoor noise problems. However, building location, site planning, design, and use of berms and barriers can help mitigate outdoor noise exposure particularly from ground level sources. Measures that reduce noise at a site should be used wherever practical in preference to measures that only protect interior spaces.

[2] Measures to achieve NLR of 25 must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.

[3] Measures to achieve NLR of 30 must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.

[4] Residential buildings require an NLR of 30.

[5] Residential buildings are not permitted.

Table A-4. Recommended Land Use Compatibility for Artillery/Explosives

LAND USE		SUGGESTED LAND USE COMPATIBILITY		
SLUCM NO.	LAND USE NAME	LUPZ CDNL 57-62	Noise Zone II CDNL 62-70	Noise Zone III CDNL 70+
10	**Residential**			
11	Household units	Y1	N2,3	N3
11.11	Single units: detached	Y1	N2,3	N3
11.12	Single units: semidetached	Y1	N2,3	N3
11.31	Apartments: walk-up	Y1	N2,3	N3
11.32	Apartment: elevator	Y1	N2,3	N3
12	Group quarters	Y1	N2,3	N3
13	Residential hotels	Y1	N2,3	N3
14	Mobile home parks or courts	Y1	N2,3	N3
15	Transient lodgings	Y	Y	N
16	Other residential	Y1	N2,3	N3
20	**Manufacturing**			
21	Food and kindred products; manufacturing	Y	Y4	Y4
22	Textile mill products; manufacturing	Y	Y4	Y4
23	Apparel and other finished products; products made from fabrics, leather, and similar materials; manufacturing	Y	Y4	Y4
24	Lumber and wood products (except furniture); manufacturing	Y	Y4	Y4
25	Furniture and fixtures; manufacturing	Y	Y4	Y4
26	Paper and allied products; manufacturing	Y	Y4	Y4
27	Printing, publishing, and allied industries	Y	Y4	Y4
28	Chemicals and allied products; manufacturing	Y	Y4	Y4
29	Petroleum refining and related industries	Y	Y4	Y4
30	**Manufacturing (continued)**			
31	Rubber and misc. plastic products; manufacturing	Y	Y4	Y4
32	Stone, clay and glass products; manufacturing	Y	Y4	Y4
33	Primary metal products; manufacturing	Y	Y4	Y4

Table A-4. Recommended Land Use Compatibility for Artillery/Explosives

LAND USE		SUGGESTED LAND USE COMPATIBILITY		
SLUCM NO.	LAND USE NAME	LUPZ CDNL 57-62	Noise Zone II CDNL 62-70	Noise Zone III CDNL 70+
34	Fabricated metal products; manufacturing	Y	Y4	Y4
35	Professional scientific, and controlling instruments; photographic and optical goods; watches and clocks	Y	N	N
39	Miscellaneous manufacturing	Y	Y4	Y4
40	**Transportation, communication and utilities**			
41	Railroad, rapid rail transit, and street railway transportation	Y	Y	Y
42	Motor vehicle transportation	Y	Y	Y
43	Aircraft transportation	Y	Y	Y
44	Marine craft transportation	Y	Y	Y
45	Highway and street right-of-way	Y	Y	Y
46	Automobile parking	Y	Y	Y
47	Communication	Y	N	N
48	Utilities	Y	Y	Y
49	Other transportation, communication and utilities	Y	Y	N
50	**Trade**			
51	Wholesale trade	Y	Y	N
52	Retail trade – building materials, hardware and farm equipment	Y	Y	N
53	Retail trade – including shopping centers, discount clubs, home improvement stores, electronics superstores, etc.	Y	Y	N
54	Retail trade – food	Y	Y	N
55	Retail trade – automotive, marine craft, aircraft and accessories	Y	Y	N
56	Retail trade – apparel and accessories	Y	Y	N
57	Retail trade – furniture, home, furnishings and equipment	Y	Y	N
58	Retail trade – eating and drinking establishments	Y	Y	N
59	Other retail trade	Y	Y	N
60	**Services**			
61	Finance, insurance and real estate services	Y	Y	N

Table A-4. Recommended Land Use Compatibility for Artillery/Explosives

LAND USE		SUGGESTED LAND USE COMPATIBILITY		
SLUCM NO.	**LAND USE NAME**	**LUPZ CDNL 57-62**	**Noise Zone II CDNL 62-70**	**Noise Zone III CDNL 70+**
62	Personal services	Y	Y	N
62.4	Cemeteries	Y	Y	Y
63	Business services	Y	Y	N
63.7	Warehousing and storage	Y	Y4	Y4
64	Repair services	Y	Y	N
65	Professional services	Y	Y	N
65.1	Hospitals, other medical facilities	Y1	N	N
65.16	Nursing homes	Y1	N	N
66	Contract construction services	Y	Y	N
67	Government services	Y	Y	N
68	Educational services	Y1	N	N
68.1	Childcare services, child development centers, and nurseries	Y1	N	N
69	**Miscellaneous Services**			
69.1	Religious activities (including places of worship)	Y1	N	N
70	**Cultural, entertainment and recreational**			
71	Cultural activities	Y1	N	N
71.2	Nature exhibits	Y1	N	N
72	Public assembly	Y1	N	N
72.1	Auditoriums, concert halls	Y1	N	N
72.11	Outdoor music shells, amphitheaters	Y1	N	N
72.2	Outdoor sports arenas, spectator sports	Y	N	N
73	Amusements	Y	Y	N
74	Recreational activities (including golf courses, riding stables, water recreation)	Y	N	N
75	Resorts and group camps	Y	N	N
76	Parks	Y	N	N
79	Other cultural, entertainment and recreation	Y	N	N
80	**Resource production and extraction**			
81	Agriculture (except live- stock)	Y	Y	Y
81.5	Livestock farming	Y	N	N
81.7	Animal breeding	Y	N	N
82	Agriculture related activities	Y	Y	Y

Table A-4. Recommended Land Use Compatibility for Artillery/Explosives

LAND USE		SUGGESTED LAND USE COMPATIBILITY		
SLUCM NO.	LAND USE NAME	LUPZ CDNL 57-62	Noise Zone II CDNL 62-70	Noise Zone III CDNL 70+
83	Forestry activities	Y	Y	Y
84	Fishing activities	Y	Y	Y
85	Mining activities	Y	Y	Y
89	Other resource production or extraction	Y	Y	Y

[1] LUPZ- Land Use Planning Zone is a subdivision of Land Use Zone I and functions as a buffer for Noise Zone II. Communities and individuals often have different views regarding acceptable or desirable levels of noise. To address this, some local governments have implemented land use planning measures beyond Noise Zone II limits. In addition to mitigating current noise impacts, implementing such controls within the LUPZ can create a buffer to prevent the possibility of future noise conflicts.

[2] Although local requirements for on- or off-base housing may require noise-sensitive land uses within Noise Zone II, such land use is generally not compatible within Noise Zone II. Measures to achieve overall noise level reduction inside structures do not solve noise difficulties outside the structure. Barriers are not effective reducing the noise from artillery and armor, the detonation of either large caliber military munitions or a large quantity of explosives. Additionally, noise level reduction inside structures does not mitigate the vibration generated by the low-frequency energy of large caliber weapons firing and detonations.

[3] Within Zones, existing “noise sensitive land uses are considered as pre-existing incompatible land uses. In most cases these uses are not a risk to either mission sustainment or a community’s quality of life. Most long-term members near Army installations or activities acknowledge hearing military operations and activities but they are usually not alarmed or bothered by the noise.

[4] Although noise levels may be compatible, caution should be exercised in siting any activity which may be sensitive to vibration.

Appendix B. Generalized Land Use Crosswalk

Table B-1. Municipality of Anchorage Existing Land Use (within Map Extent)

General Land Use Definition (GENLU_DEF)	PRIMEUSE	Notes	AICUZ Study Generalized Codes
CHUGACH	5200	Chugach State Park	Parks and Open Space
COMMERCIAL	2000	Commercial	Commercial
COMMERCIAL	2100	Commercial Retail	Commercial
COMMERCIAL	2110	General Merchandise/Goods	Commercial
COMMERCIAL	2120	Building Materials and Hardware	Commercial
COMMERCIAL	2130	Automobiles, Boats, Aircraft, Trailers, and Related Goods	Commercial
COMMERCIAL	2140	Retail Petroleum Products Sales: Predominantly petroleum product sales, even if a convenience store is part of the business.	Commercial
COMMERCIAL	2150	Food and Liquor	Commercial
COMMERCIAL	2151	Supermarkets	Commercial
COMMERCIAL	2152	Convenience stores	Commercial
COMMERCIAL	2153	Liquor stores	Commercial
COMMERCIAL	2160	Eating and Drinking Establishments	Commercial
COMMERCIAL	2200	Commercial Office	Commercial
COMMERCIAL	2210	Finance, Insurance, Real Estate, Legal, Professional, and Other Business Services	Commercial
COMMERCIAL	2220	Medical Services (out-patient)	Commercial
COMMERCIAL	2300	Other Commercial Services	Commercial
COMMERCIAL	2310	Construction/Special-Trade Contractors	Commercial
COMMERCIAL	2320	Repair Services	Commercial
COMMERCIAL	2330	Commercial Transportation Services	Commercial
COMMERCIAL	2340	Personal and Home Services	Commercial
COMMERCIAL	2350	Commercial Education Services	Commercial
COMMERCIAL	2351	Child day care and pre-schools	Commercial
COMMERCIAL	2361	Indoor commercial recreation facilities (movie theater, bowling alley, health club, etc.)	Commercial
COMMERCIAL	2362	Outdoor commercial recreation facilities (golf courses, ski area, equestrian facility, go-cart track)	Commercial

Table B-1. Municipality of Anchorage Existing Land Use (within Map Extent)

General Land Use Definition (GENLU_DEF)	PRIMEUSE	Notes	AICUZ Study Generalized Codes
COMMERCIAL	2370	Transient Lodging (hotel, motel, b&b, hostel)	Commercial
COMMERCIAL	2371	Overnight campground or recreational vehicle parking	Commercial
COMMERCIAL	2380	Communication-Related Facilities (admin and broadcast facility for radio, tv, phone)	Utility
COMMERCIAL	2390	Commercial Parking Lots	Commercial
COMMERCIAL	2391	Parking structures	Commercial
COMMERCIAL	2400	Commercial Horticulture	Commercial
INDUSTRIAL	3000	Industrial	Light Industrial
INDUSTRIAL	3100	Truck and Heavy Equipment Repair, Automotive Body Repair and Painting, Maintenance Shops	Light Industrial
INDUSTRIAL	3200	Construction/Special Trade Contractors (heavy equipment storage, warehousing, other storage)	Light Industrial
INDUSTRIAL	3300	Manufacturing and Processing (food, apparel, printing, paint, chemicals, miscellaneous, etc)	Light Industrial
INDUSTRIAL	3400	Natural Resource Extraction (sand, gravel, rock)	Heavy Industrial
INDUSTRIAL	3500	Bulk Products and Outdoor Storage (generally applies to fenced and/or 25% of site covered by storage materials.)	Light Industrial
INDUSTRIAL	3510	Bulk building materials (e.g., lumber yards)	Light Industrial
INDUSTRIAL	3520	Junk and wrecked autos, salvage yards, heavy equipment and materials	Heavy Industrial
INDUSTRIAL	3530	Bulk petroleum storage	Heavy Industrial
INDUSTRIAL	3600	Warehousing, Wholesale Distribution, and Enclosed Storage	Light Industrial
INDUSTRIAL	3610	Air Freight Terminals	Light Industrial
INDUSTRIAL	3700	Motor Vehicle Transportation	Light Industrial
INDUSTRIAL	3810	Electric Utility Related (generation facility, substation)	Utility

Table B-1. Municipality of Anchorage Existing Land Use (within Map Extent)

General Land Use Definition (GENLU_DEF)	PRIMEUSE	Notes	AICUZ Study Generalized Codes
INDUSTRIAL	3820	Natural Gas Utility Related (power plant, pumping station)	Utility
INDUSTRIAL	3830	Water Utility Related (storage tank, well, treatment)	Utility
INDUSTRIAL	3840	Sewer Utility Related	Utility
INDUSTRIAL	3850	Solid Waste Utility Related	Utility
INDUSTRIAL	3851	Hazardous waste incinerators	Heavy Industrial
INDUSTRIAL	3860	Storm Drainage Facilities	Utility
INDUSTRIAL	3870	Snow Disposal Sites	Light Industrial
INDUSTRIAL	3880	Communications Facilities transmission towers, wire centers (Note: broadcasting facilities are coded “2380”)	Utility
INSTITUTIONAL	4100	Educational Facilities	Institutional
INSTITUTIONAL	4110	Public Elementary School	Institutional
INSTITUTIONAL	4120	Public Jr. High School	Institutional
INSTITUTIONAL	4130	Public High School	Institutional
INSTITUTIONAL	4140	Public College or University	Institutional
INSTITUTIONAL	4150	Other Public Schools	Institutional
INSTITUTIONAL	4160	Private Elementary/Secondary School	Institutional
INSTITUTIONAL	4170	Private College or University	Institutional
INSTITUTIONAL	4200	Government Facilities	Institutional
INSTITUTIONAL	4210	Municipal Government - All Other	Institutional
INSTITUTIONAL	4211	Municipal police	Institutional
INSTITUTIONAL	4212	Municipal fire protection	Institutional
INSTITUTIONAL	4220	State Government - All Other	Institutional
INSTITUTIONAL	4230	Federal Government - All Other	Institutional
INSTITUTIONAL	4231	*Post office*	Institutional
INSTITUTIONAL	4300	Social/Civic/Fraternal Organizations	Institutional
INSTITUTIONAL	4400	Churches, Synagogues, Temples, etc.	Institutional
INSTITUTIONAL	4500	Social Service Facilities: Emergency Shelters, Halfway Houses, Head Start Preschools, etc	Institutional
INSTITUTIONAL	4600	Hospitals and Related Facilities	Institutional

Table B-1. Municipality of Anchorage Existing Land Use (within Map Extent)

General Land Use Definition (GENLU_DEF)	PRIMEUSE	Notes	AICUZ Study Generalized Codes
INSTITUTIONAL	4700	Cultural Facilities: museums, libraries, zoos, stadiums, performing arts centers, public indoor recreation facilities	Institutional
INSTITUTIONAL	4810	Correctional facilities	Institutional
INSTITUTIONAL	4820	Cemeteries	Institutional
MULTI FAMILY	1013	Single Family Residential, Attached to 2 or more units not on individual lots (UCIOA) Need to select for RESUNIT count to get attached to how many other units - this is Townhouse/Row Style structures owned by different individuals	Multi-Family Residential
MULTI FAMILY	1014	Multifamily, Containing 4 residential units under individual ownership (UCIOA)	Multi-Family Residential
MULTI FAMILY	1015	Multifamily, Containing between 5 and 9 residential units under individual ownership (UCIOA)	Multi-Family Residential
MULTI FAMILY	1103	Multifamily, Containing 3 residential units	Multi-Family Residential
MULTI FAMILY	1104	Multifamily, Containing 4 residential units	Multi-Family Residential
MULTI FAMILY	1105	Multifamily, Containing between 5 and 9 residential units	Multi-Family Residential
MULTI FAMILY	1110	Multifamily, Containing between 10 and 19 residential units	Multi-Family Residential
MULTI FAMILY	1111	Multifamily, Containing between 10 and 19 residential units under individual ownership (UCIOA)	Multi-Family Residential
MULTI FAMILY	1120	Multifamily, Containing between 20 and 49 residential units	Multi-Family Residential
MULTI FAMILY	1121	Multifamily, Containing between 20 and 49 residential units under individual ownership (UCIOA)	Multi-Family Residential
MULTI FAMILY	1150	Multifamily, Containing 50 or more residential units	Multi-Family Residential

Table B-1. Municipality of Anchorage Existing Land Use (within Map Extent)

General Land Use Definition (GENLU_DEF)	PRIMEUSE	Notes	AICUZ Study Generalized Codes
MULTI FAMILY	1151	Multifamily, Containing 50 or more residential units under individual ownership (UCIOA)	Multi-Family Residential
MULTI FAMILY	1220	Mobile Home(s), one or more as part of a Mobile Home Park	Mobile Home
MULTI FAMILY	1240	Parcel that is associated with a mobile home park - no structure on the lot	Mobile Home
MULTI FAMILY	1500	Mixed-use Commercial/Residential, Containing one or more residential units	Mixed Use
MULTI FAMILY	1920	Parcel with non-residential structure; associated with adjacent Multi-family	Mixed Use
MULTI FAMILY	1940	1940 Parcel containing no structure; associated with adjacent multifamily lot	Vacant
PARK	5000	PARKS, OPEN SPACE, AND RECREATION AREAS	Parks and Open Space
PARK	5100	Municipal Parks, Open Space, and Greenways	Parks and Open Space
RR/ROW	7100	Street and Highway R.O.W.'s	Transportation
RR/ROW	7200	Railroad R.O.W.’s	Transportation
SINGLE FAMILY	1001	Single Family, Detached	Single-Family Residential
SINGLE FAMILY	1011	Single Family Residential, Detached not on its own lot (UCIOA)	Single-Family Residential
SINGLE FAMILY	1201	Mobile Home, Single and Detached	Mobile Home
SINGLE FAMILY	1600	Mixed-use Religious/Residential, Containing one or more residential units (Churches, Temples, or Synagogues that contain as part of their facilities any apartments. A caretaker apartment or a parsonage that is a part of the main church or temple structure is categorized as a mixed-use religious/residential structure.) Could also be a convent	Institutional
SINGLE FAMILY	1950	Residential structure under construction, no building permit	Single-Family Residential

Table B-1. Municipality of Anchorage Existing Land Use (within Map Extent)

General Land Use Definition (GENLU_DEF)	PRIMEUSE	Notes	AICUZ Study Generalized Codes
SINGLE FAMILY	1970	Open space parcel (common/dedicated such as in condo developments)	Parks and Open Space
SINGLE FAMILY	1980	Parcel with non-residential structure, associated with adjacent single family	Single-Family Residential
SINGLE FAMILY	1981	Parcel with non-residential, unimproved cabin (recreation use; no electricity)	Single-Family Residential
SINGLE FAMILY	1990	Parcel with no structure, associated with adjoining single family (e.g., parking, yard, garden)	Vacant
TIDE/WATER	8100	Intertidal Areas	Water
TIDE/WATER	8200	Waterbodies	Water
TRANSPORTATION	6000	TRANSPORTATION - RELATED	Transportation
TRANSPORTATION	6100	Aircraft Transportation --Passenger terminals, runways, taxiways, clear zones, navigation facilities, etc.	Transportation
TRANSPORTATION	6200	Railroad Transportation --Freight yards, terminals, etc	Transportation
TRANSPORTATION	6300	Marine Transportation: Docks and associated facilities	Transportation
TWO FAMILY	1002	Single Family Residential, Attached to one other unit on an adjacent parcel	Multi-Family Residential
TWO FAMILY	1003	Single Family Residential, Attached to 2 or more other units on adjacent parcel(s)	Multi-Family Residential
TWO FAMILY	1012	Single Family Residential, Attached to one other unit not on individual lots (UCIOA)	Multi-Family Residential
TWO FAMILY	1102	Multifamily, Containing 2 residential units	Multi-Family Residential
TWO FAMILY	1700	Mixed-use Industrial/Residential	Mixed use
TWO FAMILY	1930	parking for 2-unit multifamily	Multi-Family Residential

Table B-1. Municipality of Anchorage Existing Land Use (within Map Extent)

General Land Use Definition (GENLU_DEF)	PRIMEUSE	Notes	AICUZ Study Generalized Codes
VACANT	1800	If a ramshackle residential structure is unsound, unlivable, and perhaps dangerous, then it is within the unsound residential structure (1800) category.	Vacant
VACANT	8000	VACANT LAND	Vacant

Table B-2. Borough of Mat-Su Existing Land Use (within Map Extent and 1.5-mile Shoreline Buffer)

Building Use 1 (BLDG_USE1)	Building Use 2 (BLDG_USE2)	Building Use 3 (BLDG_USE3)	AICUZ Study Generalized Codes
1100 -Residential Building (Residential)	1110 - Residential Garage	1120 - Mobile Home	Residential
1100 -Residential Building (Residential)	1110 - Residential Garage		Residential
1100 -Residential Building (Residential)	1120 - Mobile Home	5820 - Bars and Lounges (Commercial - Alcohol)	Mixed Use
1100 -Residential Building (Residential)	1120 - Mobile Home		Residential
1100 -Residential Building (Residential)	1145 - Multi-Family 5+		Residential
1100 -Residential Building (Residential)	4310 - Residential Hangar		Residential
1100 -Residential Building (Residential)	5820 - Bars and Lounges (Commercial - Alcohol)		Mixed Use
1100 -Residential Building (Residential)	8100 - Agriculture		Residential
1100 -Residential Building (Residential)	8200 - Other Agriculture Activity (Agricultural)		Residential
1100 -Residential Building (Residential)	9510 - Under Construct - Res (Residential)		Residential
1100 -Residential Building (Residential)			Residential
1110 - Residential Garage	1120 - Mobile Home		Residential
1110 - Residential Garage	1130 - Duplex		Residential
1110 - Residential Garage			Residential
1120 - Mobile Home			Mobile Home
1130 - Duplex	8200 - Other Agriculture Activity (Agricultural)		Multi-Family Residential
1130 - Duplex			Multi-Family Residential
1140 - Multi-Family			Multi-Family Residential
1141 - Detached Multi-Family			Multi-Family Residential
1150 - Residential with Commercial Use	6600 - Construction Services (Commercial - Heavy)		Mixed Use
4310 - Residential Hangar			Mixed Use

Table B-2. Borough of Mat-Su Existing Land Use (within Map Extent and 1.5-mile Shoreline Buffer)

Building Use 1 (BLDG_USE1)	Building Use 2 (BLDG_USE2)	Building Use 3 (BLDG_USE3)	AICUZ Study Generalized Codes
4400 - Marine Transportation (Transportation)			Transportation
4700 - Communications			Communications
4700 - Communications			Communications
5200 - Retail Building Material (Commercial - Heavy)			Commercial
6300 -Warehousing and Storage (Commercial - Heavy)			Commercial
6713 - Borough Government (Public - Administrative)			Institutional
6911 - Churches	6919 - Other Religious Activity (Churches)		Institutional
6911 - Churches			Institutional
7100 - Cultural Activities (Cultural)			Institutional
9510 - Under Construct - Res (Residential)			Residential
9510 - Under Construct - Res (Residential)			Residential
N/A	N/A	N/A	Undeveloped

1

Table B-3. Municipality of Anchorage Zoning (within Map Extent)

Zoning Designation	District Type	District Name	Generalized Zone	Description	AICUZ Study Generalized Codes
AF	Other	Antenna Farm	Antenna Farm	Intended to create areas dedicated to the erection and maintenance of communication equipment at reasonable cost and to encourage the concentration of such equipment in a few sites throughout the municipality.	Utility
B-1A	Commercial	Local and Neighborhood Business	Commercial	Intended for small, compact commercial sites or areas within or surrounded by residential areas. The district is applied to encourage the provision of small-scale retail, office, and service uses compatible in scale and character with adjacent residential uses, and providing services to the surrounding neighborhood. B-1A centers are between one-half and two acres in size.	Commercial
B-1A SL	Commercial	Local and Neighborhood Business	Commercial		Commercial
B-1B	Commercial	Community Business	Commercial	Intended for consumer-oriented business uses which serve the needs of the surrounding community. The district is intended for small, compact sites at or near the intersection of streets designated for collector (industrial-commercial), arterial, or greater capacity on the Official Streets and Highways Plan.	Commercial

Table B-3. Municipality of Anchorage Zoning (within Map Extent)

Zoning Designation	District Type	District Name	Generalized Zone	Description	AICUZ Study Generalized Codes
B-1B SL	Commercial	Community Business	Commercial		Commercial
B-2A	Commercial	Central Business, Core	Commercial	These are not specifically in the municode except for this note: 21.04.040 - Downtown districts. New downtown districts will be adopted separately through the preparation of updated land use regulations specific to downtown, as indicated in the Anchorage Downtown Comprehensive Plan. Until the new downtown districts are implemented, all areas located in the B-2A, B-2B, and B-2C districts shall remain subject to the Title 21 Land Use Regulations that existed prior to the implementation of the Title 21 Rewrite Project (2002-2012) and were current as of December 31, 2013. A. DT-1: Downtown core. [RESERVED] B. DT-2: Downtown mixed-use. [RESERVED] C. DT-3: Downtown mixed-use residential. [RESERVED]	Commercial
B-2B	Commercial	Central Business, Intermediate	Commercial		Commercial
B-2C	Commercial	Central Business, Periphery	Commercial		Commercial
B-3	Commercial	General Business	Commercial	Intended primarily for general commercial uses in commercial centers and areas exposed to heavy traffic. These commercial uses are intended to be located on arterials, or within commercial centers	Commercial

Table B-3. Municipality of Anchorage Zoning (within Map Extent)

Zoning Designation	District Type	District Name	Generalized Zone	Description	AICUZ Study Generalized Codes
				of town, and to be provided with adequate public services and facilities.	
B-3 SL	Commercial	General Business	Commercial		Commercial
B-4	Commercial	Rural Business	Commercial		Commercial
CE R-6-SL	N/A	N/A	N/A		Low-Density Residential
CE-B-1A	N/A	N/A	N/A		commercial
CE-B-3	Commercial	General Business	Commercial	Intended primarily for uses that provide commercial goods and services to residents of the community in areas that are dependent on automobile access and exposed to heavy automobile traffic. These commercial uses are intended to be located on collector or greater roads and to be provided with adequate public services and facilities	Commercial
CE-B-3 SL	Commercial	General Business	Commercial		Commercial
CE-RO	Commercial	Residential Office	Commercial	Intended to support residential use while extending professional, business, and office uses, or areas with a compatible mix of office and residential uses to the Chugiak-Eagle River area. The district provides for small to medium sized office or residential buildings, often in transition areas. The district allows multifamily residential, group living, and visitor accommodations.	Mixed Use
CE-RO SL	Commercial	Residential Office	Commercial		Mixed Use

Table B-3. Municipality of Anchorage Zoning (within Map Extent)

Zoning Designation	District Type	District Name	Generalized Zone	Description	AICUZ Study Generalized Codes
CE-RC SL	Commercial	Rural Commercial	Commercial	Intended for uses that provide a range of commercial goods and services including some light manufacturing, processing, retail service, and services performed on site for residents of the community.	Commercial
MC	Commercial	Marine Commercial	Marine Commercial	Intended primarily for commercial water-dependent uses and is located as designated in the comprehensive plan. Water-related uses may be allowed as conditional uses. Emphasis is on development flexibility of water-dependent and water-related commercial uses and on public access to the waterfront and Ship Creek.	Commercial
CE-I-1	Industrial	Light Industrial	Light Industrial	Intended primarily for public and private light manufacturing, processing, service, storage, wholesale, and distribution operations along with limited commercial uses that support and/or are compatible with industrial uses. Business-industrial parks and single-commodity bulk retail sales and building supply stores and services are allowed.	Light Industrial
CE-I-1 SL	Industrial	Light Industrial	Light Industrial		Light Industrial

Table B-3. Municipality of Anchorage Zoning (within Map Extent)

Zoning Designation	District Type	District Name	Generalized Zone	Description	AICUZ Study Generalized Codes
I-1	Industrial	Light Industrial	Light Industrial	Intended primarily for public and private light and general manufacturing, processing, service, storage, wholesale, and distribution operations along with other uses that support and/or are compatible with industrial uses. Business-industrial parks and single-commodity bulk retail sales and building supply stores and services are allowed. Many commercial uses are also permitted and/or conditionally allowed, with some limitations on the more intensive customer retail, community service, and commercial employment establishments, to reduce land use and traffic conflicts, promote efficient use of industrial lands, and encourage the location of intensive commercial activities in commercial centers.	Light Industrial
I-1 SL	Industrial	Light Industrial	Light Industrial		Light Industrial
CE-I-2	Industrial	Heavy Industrial	Heavy Industrial	Intended primarily as an industrial activity area and reserve for public and private heavy manufacturing, warehousing and distribution, equipment and materials storage, vehicle and equipment repair, major freight	Heavy Industrial

Table B-3. Municipality of Anchorage Zoning (within Map Extent)

Zoning Designation	District Type	District Name	Generalized Zone	Description	AICUZ Study Generalized Codes
				terminals, waste and salvage, resource extraction and processing, and other related uses. Non-industrial uses are limited to prevent land use and traffic conflicts and to maintain and protect the supply of industrial lands within the Chugiak-Eagle River area.	
CE-I-2 SL	Industrial	Heavy Industrial	Heavy Industrial		Heavy Industrial
CE-I-3 SL	Industrial	Rural Industrial	Heavy Industrial	Intended for certain rural areas which, because of their topography, soil conditions, or location, or any combination of these factors, are better suited for industrial rather than residential or commercial development.	Heavy Industrial
MI	Industrial	Marine Industrial	Marine Industrial	Intended primarily for a mix of marine commercial and industrial manufacturing, processing, storage, wholesale, and distribution operations that are water-dependent and/or water-related.	Light Industrial

Table B-3. Municipality of Anchorage Zoning (within Map Extent)

Zoning Designation	District Type	District Name	Generalized Zone	Description	AICUZ Study Generalized Codes
I-2	Industrial	Heavy Industrial	Heavy Industrial	Intended primarily as an industrial activity area and reserve for public and private heavy manufacturing, warehousing and distribution, equipment and materials storage, vehicle and equipment repair, major freight terminals, waste and salvage, resource extraction and processing, and other related uses. Some commercial uses, that support or are compatible with industrial uses, are also permitted or conditionally allowed. Non-industrial uses are more limited than in other districts, to prevent land use and traffic conflicts, retain a preserve of activities that is supportive of industrial establishments, and to maintain and protect the supply of industrial lands within the municipality.	Heavy Industrial
I-2 SL	Industrial	Heavy Industrial	Heavy Industrial		Heavy Industrial
CE-PCD	Other	Planned Community Development	Planned Community	Intended to accommodate large-scale acreage for residential, commercial, industrial, or other land use developments and activities, including combinations of uses. It allows for flexibility under controlled conditions not	Mixed Use

Table B-3. Municipality of Anchorage Zoning (within Map Extent)

Zoning Designation	District Type	District Name	Generalized Zone	Description	AICUZ Study Generalized Codes
				possible with the other defined districts.	
CE-PCD SL	Other	Planned Community Development	Planned Community		Mixed Use
CE-PLI	Other	Public Lands and Institutions	Public Lands and Institutions	Intended to include major public and quasi-public civic, administrative, and institutional uses and activities as well as areas designated as a park use (but not dedicated as park) or natural resource use designated by an adopted local plan, and lands under the management of the Eagle River-Chugiak Parks and Recreation Service District. This district also is intended for municipal lands of high natural value or that are environmentally sensitive.	Institutional
CE-PLI SL	Other	Public Lands and Institutions	Public Lands and Institutions		Institutional
CE-PLI-p	N/A	N/A	N/A		Institutional
PLI	Other	Public Lands and Institutions	Public Lands and Institutions	Intended to include major public and quasi-public civic, administrative, and institutional uses and activities.	Institutional
PLI SL	Other	Public Lands and Institutions	Public Lands and Institutions		Institutional
PLI-p	Other	Parks	Parks		Parks and Open Space

Table B-3. Municipality of Anchorage Zoning (within Map Extent)

Zoning Designation	District Type	District Name	Generalized Zone	Description	AICUZ Study Generalized Codes
CE-R-1	Residential	Single-Family Residential	Single Family Residential	Intended primarily to provide for detached single-family residential areas with gross densities up to six dwelling units per acre. These areas generally are intended to have well-developed infrastructure and municipal services.	Single-Family Residential
CE-R-1 SL	Residential	Single-Family Residential	Single Family Residential		Single-Family Residential
CE-R-10	Residential	Low-Density Residential, Alpine/Slope	Rural Residential	Intended for use in those areas where natural physical features and environmental factors such as slopes, alpine and forest vegetation, soils, slope stability, and geologic hazards require unique and creative design for development.	Low-density Residential
CE-R-10 SL	Residential	Low-Density Residential, Alpine/Slope	Rural Residential		Low-density Residential
CE-R-1A	Residential	Single-Family Residential	Single Family Residential	Intended primarily for detached single-family residential areas with gross densities up to four dwelling units per acre, and minimum lot size is slightly larger than the CE-R-1 district.	Single-Family Residential
CE-R-1A SL	Residential	Single-Family Residential	Single Family Residential		Single-Family Residential
CE-R-2A	Residential	Single- and Two-Family Residential	Two Family Residential	Intended primarily for single- and two-family residential areas with gross densities up to ten dwelling units per acre. These areas generally are intended to have well-developed	Multi-family residential

Table B-3. Municipality of Anchorage Zoning (within Map Extent)

Zoning Designation	District Type	District Name	Generalized Zone	Description	AICUZ Study Generalized Codes
				infrastructure, and municipal services generally are intended to be provided.	
CE-R-2A SL	Residential	Single- and Two-Family Residential	Two Family Residential		Multi-family residential
CE-R-2D	Residential	Two-Family Residential	Two Family Residential	Intended primarily for single- and two-family residential areas with gross densities up to 12 dwelling units per acre. These areas generally are intended to have well-developed infrastructure, and municipal services generally are intended to be provided.	Multi-family residential
CE-R-2M	Residential	Mixed Residential	Multiple Family Residential	Intended primarily for residential areas that allow for a variety of single-family, two-family, and multifamily dwellings, with gross densities up to 15 dwelling units per acre. The CE-R-2M district provides residential neighborhoods with a greater diversity of housing by allowing a mix of both detached and a variety of attached dwelling types in close proximity to each other, rather than separated into different use districts	Multi-family residential
CE-R-3	Residential	Multifamily Residential	Multiple Family Residential	Intended primarily for residential areas that allow for a variety of multifamily, two-family, and single-family dwellings, with gross	Multi-family residential

Table B-3. Municipality of Anchorage Zoning (within Map Extent)

Zoning Designation	District Type	District Name	Generalized Zone	Description	AICUZ Study Generalized Codes
				densities up to 30 dwelling units per acre.	
CE-R-3 SL	Residential	Multifamily Residential	Multiple Family Residential		Multi-family residential
CE-R-5	Residential	Suburban Residential with Mobile Homes	Single Family Residential	Intended for single- and two-family residential areas with gross densities up to six dwelling units per acre where public sewer and water are generally available, and to encourage affordable housing. Mobile homes on individual lots are allowed in this district.	Single-Family Residential
CE-R-5 SL	Residential	Suburban Residential with Mobile Homes	Single Family Residential		Single-Family Residential
CE-R-5A	Residential	Rural Residential with Mobile Homes	Rural Residential	Intended for single- and two-family residential areas with gross densities up to one dwelling unit per acre, where public sewer and water are generally not available, to encourage affordable housing, and to protect the rural setting by maintaining large lots and low population densities in the Chugiak-Eagle River area. Mobile homes on individual lots are allowed in this district.	Low-Density Residential
R-5	Residential	Low-Density Residential	Single Family Residential	Intended primarily for single- and two-family residential areas with gross densities up to five dwelling units per acre. Mobile homes on individual lots are allowed in this district.	Single-Family Residential

Table B-3. Municipality of Anchorage Zoning (within Map Extent)

Zoning Designation	District Type	District Name	Generalized Zone	Description	AICUZ Study Generalized Codes
CE-R-6	Residential	Low-Density Residential	Rural Residential	Intended for those land areas where large lot development is desirable. The CE-R-6 district is designed to encourage low-density residential development with gross densities of up to one dwelling unit per acre, while at the same time protecting and enhancing those physical and environmental features which add to the desirability of rural residential living.	Low-Density Residential
CE-R-6 SL	Residential	Low-Density Residential	Rural Residential		Low-Density Residential
R-6	Residential	Low-Density Residential (1 acre)	Rural Residential	Intended primarily for single- and two-family large-lot residential areas, with gross densities of up to one dwelling unit per acre.	Low-Density Residential
R-6 SL	Residential	Low-Density Residential (1 acre)	Rural Residential		Low-Density Residential
CE-R-7	Residential	Medium-Density Single-Family Residential	Single Family Residential	Intended primarily for single- and two-family residential areas with gross densities up to two dwelling units per acre. This district may also be applied to areas between larger lot districts and higher density districts while at the same time protecting and enhancing those physical and environmental features which add to the	Single-Family Residential

Table B-3. Municipality of Anchorage Zoning (within Map Extent)

Zoning Designation	District Type	District Name	Generalized Zone	Description	AICUZ Study Generalized Codes
				desirability of rural residential living.	
CE-R-7 SL	Residential	Medium-Density Single-Family Residential	Single Family Residential		Single-Family Residential
R-7	Residential	Single-Family Residential (20K)	Single Family Residential	Intended primarily for single- and two-family residential areas with gross densities between one and two dwelling units per acre. This district may also be applied to areas between larger lot districts and higher density districts.	Single-Family Residential
R-7 SL	Residential	Single-Family Residential (20K)	Single Family Residential		Single-Family Residential
CE-R-8	Residential	Low-Density Residential	Rural Residential	Intended primarily for single- and two-family residential areas with gross densities up to one dwelling unit per four acres, where topographic or other natural conditions are such that higher-density development would be unfeasible.	Low-Density Residential
CE-R-9	Residential	Low-Density Residential	Rural Residential	Primarily for single- and two-family large lot residential areas with gross densities up to one dwelling unit per two acres, where public sewer and water are unlikely to be provided, or where topographic or other natural conditions are such	Low-Density Residential

Table B-3. Municipality of Anchorage Zoning (within Map Extent)

Zoning Designation	District Type	District Name	Generalized Zone	Description	AICUZ Study Generalized Codes
				that higher-density development would be unfeasible.	
CE-R-9 SL	Residential	Low-Density Residential	Rural Residential		Low-Density Residential
R-9	Residential	Low-Density Residential (2 acres)	Rural Residential	Intended primarily for single- and two-family large lot residential areas with gross densities less than one dwelling unit per two acres, where public sewer and water are unlikely to be provided or where topographic or other natural conditions are such that higher-density development would be unfeasible.	Low-Density Residential
R-1	Residential	Single-Family Residential	Single Family Residential	Intended primarily for detached single-family residential areas with gross densities up to five dwelling units per acre. These areas generally are intended to have well-developed infrastructure, and municipal services generally are intended to be provided.	Single-Family Residential
R-1 SL	Residential	Single-Family Residential	Single Family Residential		Single-Family Residential
R-10 SL	Residential	Low-Density Residential, Alpine/Slope	Rural Residential	Intended for use in those areas where natural physical features and environmental factors such as slopes, alpine and forest vegetation, soils, slope stability, and geologic	Low-Density Residential

Table B-3. Municipality of Anchorage Zoning (within Map Extent)

Zoning Designation	District Type	District Name	Generalized Zone	Description	AICUZ Study Generalized Codes
				hazards require unique and creative design for development.	
R-1A	Residential	Single-Family Residential (larger lot)	Single Family Residential	Intended primarily for detached single-family residential areas with gross densities up to four dwelling units per acre The minimum lot size is slightly larger than the R-1 district. These areas generally are intended to have well-developed infrastructure, and municipal services generally are intended to be provided.	Single-Family Residential
R-1A SL	Residential	Single-Family Residential (larger lot)	Single Family Residential		Single-Family Residential
R-2A	Residential	Two-Family Residential (larger lot)	Two Family Residential	Intended primarily for single- and two-family residential areas with gross densities between five and seven dwelling units per acre. The minimum lot size is slightly larger than the R-2D district.	Multi-family residential
R-2A SL	Residential	Two-Family Residential (larger lot)	Two Family Residential		Multi-family residential
R-2D	Residential	Two-Family Residential	Two Family Residential	Intended primarily for single- and two-family residential areas with gross densities between five and eight dwelling units per acre.	Multi-family residential

Table B-3. Municipality of Anchorage Zoning (within Map Extent)

Zoning Designation	District Type	District Name	Generalized Zone	Description	AICUZ Study Generalized Codes
R-2M	Residential	Mixed Residential	Multiple Family Residential	Intended primarily for residential areas that allow for a variety of single-family, two-family, and multifamily dwellings, with gross densities between five and 15 dwelling units per acre. The R-2M district provides residential neighborhoods with a greater diversity of housing by allowing a mix of both detached and a variety of attached dwelling types in close proximity to each other, rather than separated into different zoning districts.	Multi-family residential
R-2M SL	Residential	Mixed Residential	Multiple Family Residential		Multi-family residential
R-3	Residential	Mixed Residential	Multiple Family Residential	Multifamily residential district with gross densities between 15 and 40 dwelling units per acre, provided, however, that housing allowed in the R-1, R-1A, R-2A, and R-2D are a permitted use. It is intended primarily for multifamily and townhouse dwellings characterized by low-rise multistory buildings. It allows a higher percentage of lot coverage than the R-2M zone, while also maintaining the residential living environment with landscaping, private/common open spaces, and other amenities for residents.	Multi-family residential

Table B-3. Municipality of Anchorage Zoning (within Map Extent)

Zoning Designation	District Type	District Name	Generalized Zone	Description	AICUZ Study Generalized Codes
R-3 SL	Residential	Mixed Residential	Multiple Family Residential		Multi-family residential
R-3A	N/A	N/A	N/A	Medium density, mixed-use multi-family district with gross densities between 12 and 30 dwelling units per gross acre. The R-3A district is primarily residential, but allows a variety of compatible commercial, retail, services, or office uses, as identified in Table 21.05-1. To maintain and provide desired housing densities with the addition of other uses, the R-3A district allows greater building heights and greater lot coverage than the R-3 district, based on site-specific criteria, while maintaining a residential living environment with common open space, landscaping, and other features that benefit residents and the community.	Multi-family residential
R-4	Residential	Multifamily Residential	Multiple Family Residential	Multifamily medium to high density residential district. It is intended primarily for multifamily and multi-story residential buildings, but also allows single-family, duplex, and townhouse residential development.	Multi-family residential
R-4 SL	Residential	Multifamily Residential	Multiple Family Residential		Multi-family residential

Table B-3. Municipality of Anchorage Zoning (within Map Extent)

Zoning Designation	District Type	District Name	Generalized Zone	Description	AICUZ Study Generalized Codes
R-4A	Residential	Multifamily Residential Mixed-Use	Multiple Family Residential	Primarily residential district intended for high-density multifamily dwellings, with gross densities intended to be greater than 35 dwelling units per acre. Commercial retail, services, and office uses are also allowed in combination with housing to create a truly mixed-use neighborhood environment, although a majority of the gross floor area of the development shall be a residential use.	Mixed use
D-2	Residential	Residential Development	Multiple Family Residential		Multi-family residential
CE-TR	Other	Transition	Transition	Intended to include suburban and rural areas that, because of location in relationship to other development, topography or soil conditions, are not developing and are not expected to develop in the immediate future along definitive land use lines. The permitted uses in these districts are intended to be as flexible as possible consistent with protection from noxious, injurious, hazardous, or incompatible uses.	Other
CE-WS	N/A	N/A	N/A		Other
PCD	Other	Planned Community Development	Planned Community	Intended to accommodate large-scale acreage for residential, commercial, industrial, or other land use developments and activities, including combinations of uses. It	Mixed use

Table B-3. Municipality of Anchorage Zoning (within Map Extent)

Zoning Designation	District Type	District Name	Generalized Zone	Description	AICUZ Study Generalized Codes
				allows for flexibility under controlled conditions not possible with the other defined districts.	
RO	Commercial	Residential Office	Commercial	Intended to provide areas for professional, business, and medical service (outpatient) office uses, or areas with a compatible mix of office and residential uses. The district provides for small- to medium-sized office buildings, often in transition locations between residential areas and more intense commercial uses and road traffic, or in commercial locations inappropriate for auto-oriented retail uses or intense mixed-uses. The district allows multifamily residential, group living, and visitor accommodations.	Mixed use
RO SL	Commercial	Residential Office	Commercial		Mixed use
TR	Other	Transition	Transition	Developed in the 1960s as the unrestricted district (U), was originally intended for areas that were not expected to develop in the immediate future, and as development patterns occurred, were intended to be rezoned to more restrictive zoning classifications.	Other

Table B-3. Municipality of Anchorage Zoning (within Map Extent)

Zoning Designation	District Type	District Name	Generalized Zone	Description	AICUZ Study Generalized Codes
WS	Other	Watershed	Watershed	Intended to preserve and protect the potable water reserves available to the municipality in the Chugach range. The major responsibility in the management of watershed areas is the control of factors that may contaminate or pollute the water. Agricultural, residential, commercial, industrial, or other urban land uses are incompatible with the concept of watershed conservation.	Other

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Table B-4. Municipality of Anchorage Future Land Use (within Map Extent)

Land Use Category	Description	AICUZ Study Generalized Codes
Airport_Railroad_or_Port_Facility		Transportation
City_Center		Mixed Use
Commercial_Corridor		Commercial
Community_Facility_or_Institution		Institutional
Compact_Mixed_Residential__Low	Approximately 8-15 DU/ac	Medium-Density Residential
Compact_Mixed_Residential__Medium	Approximately 15-30 DU/ac	Medium-Density Residential
General_Industrial		General Industrial
Large_Lot_Residential	Approximately 1-3 DU/ac	Low-Density Residential
Light_Industrial_Commercial		Light Industrial
Main_Street_Corridor		Commercial
Neighborhood_Center		Commercial
Other_Open_Space		Parks and Open Space
Park_or_Natural_Area		Parks and Open Space
Potential_Open_Space_Alternative		Parks and Open Space
Regional_Commercial_Center		Commercial
ROW		Transportation
Single_Family_and_Two_Family	Approximately 1-8 DU/ac	Single-Family and Two-Family Residential
Town_Center		Commercial
University_or_Medical_Center		Institutional
Urban_Residential_High		Urban Residential High Density
Water_Feature		Water
Chuigiak-Eagle River Future Land Use		
Commercial		Commercial
Community Facility	Areas substantially developed for active public and institutional use, and undeveloped areas designated for future public and institutional use.	Institutional
Development Reserve	Generally suitable for development but whose location and absence of public facilities and lack of projected demand make near-term and intermediate-term development uncertain. Large-lot, single-family residential development is allowed by right.	Development Reserve
Industrial		Industrial
Park and Natural Resource		Parks and Open Space

Table B-4. Municipality of Anchorage Future Land Use (within Map Extent)

Land Use Category	Description	AICUZ Study Generalized Codes
Refer to Update of the Chugiak-Eagle River Site Specific Land Use Plan	Parcel includes residential, open space, and AWWU Reservoir site (Dispose of land to Anchorage Water and Wastewater Utility (AWWU) to accommodate the development of a water reservoir(s).	Medium-Density Residential
Residential <1 - 1 DU/ac		Low-Density Residential
Residential 1 -2 DU/ac		Low-Density Residential
Residential 11 - 15 DU/ac		Medium-Density Residential
Residential 16 - 30 DU/ac		Medium-Density Residential
Residential 3 - 6 DU/ac		Low-Density Residential
Residential 7 - 10 DU/ac		Medium-Density Residential
Special Study Area	There are several Heritage Land Bank parcels for which a specific use has yet to be determined. These areas are subject to a site-specific land use study before use designation or development. The Land Use Plan map depicts these areas as Special Study Area using a diagonal line pattern over a white background. This classification also includes the former borough landfill site off Eagle River Loop Road, which is owned by the Alaska Mental Health Trust Authority.	Special Study Area
Town Center		Commercial
Transportation Facility	Applies to areas with existing or planned public facilities that are directly related to transportation by rail and air.	Transportation

Appendix C. Key Terms

Aircraft Operation – An aircraft operation is defined as one takeoff or one landing. A complete closed pattern or circuit is counted as two operations because it has a takeoff component and a landing component. A sortie is a single military aircraft flight from the initial takeoff through the termination landing. The minimum number of aircraft operations for one sortie is two operations, one takeoff (departure) and one landing (approach).

Day-night Average Sound Level (DNL) – DNL is a composite noise metric accounting for the sound energy of all noise events in a 24-hour period. In order to account for increased human sensitivity to noise at night, DNL includes a 10 dB penalty to events occurring during the acoustical nighttime period (10 p.m. through 7 a.m.). See section 4.3 for additional information.

Decibel (dB) – Decibel is the unit used to measure the intensity of a sound.

Flight Profiles – Flight profiles consist of aircraft conditions (i.e., altitude, speed, power setting, etc.) defined at various locations along each assigned flight track.

Flight Track – The flight track locations represent the various types of arrivals, departures, and closed patterns accomplished at air installations. The location for each track is representative for the specific track and may vary due to air traffic control, weather, and other reasons (e.g. one pilot may fly the on one side of the depicted track, while another pilot may fly slightly to the other side of the track).

Range Operation –Ground training activities conducted within the JBER ranges consist of munitions delivery from aircraft as well as munitions use on the ground. The live fire training at the JBER ranges considered in this study consists of various small arms and large caliber weapons and ammunition sizes, as well as explosives.