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Background Report



This study was prepared under contract with the South Dakota Ellsworth Development Authority, with financial support from the Office of Economic Adjustment, Department of Defense. The content reflects the views of the South Dakota Ellsworth Development Authority and the jurisdictions, agencies and organizations participating in the JLUS program, and does not necessarily reflect the views of the Office of Economic Adjustment.





ELLSWORTH AIR FORCE BASE JOINT LAND USE STUDY

BACKGROUND REPORT

Prepared Under Contract With:

South Dakota
Ellsworth Development Authority

South Dakota Ellsworth Development Authority
14 St. Joseph Street, Suite 200
Rapid City, SD 57709

Prepared By:

Matrix 
DESIGN GROUP

May 2016

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Acknowledgements

Executive Committee

The Executive Committee (EC) served an active and important role in providing policy direction during the development of Ellsworth Air Force Base (AFB) Joint Land Use Study (JLUS). The Executive Committee comprised of the following individuals:

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- **Col Boswell**, *Commander*
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- **Robert Heidgerken**, *Commissioner*
Meade County
- **Scott Landguth**, *Executive Director*
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- **Larry Larson**, *Mayor*
City of Box Elder
- **Nancy Trautman**, *Commissioner*
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The Working Group (WG) served an active and important role in providing policy direction during the development of Ellsworth Air Force Base (AFB) Joint Land Use Study (JLUS). The Working Group comprised of the following individuals:

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The South Dakota Ellsworth Development Authority (SDEDA) served as the overall JLUS project management agency and the administrator of the Office of Economic Adjustment grant that helped to fund the study.



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Acronyms

A

AAB	Army Air Base
ACC	Air Combat Command
AFB	Air Force Base
AFI	Air Force Instruction
AGL	Above Ground Level
AICUZ	Air Installation Compatible Use Zone
AOA	Area Operations Area
API	American Petroleum Institute
APZ	Accident Potential Zone
APZ I	Accident Potential Zone I
APZ II	Accident Potential Zone II
AQ	Air Quality
AQCR	Air Quality Control Regions
AT	Anti-Terrorism / Force Protection
ATC	Air traffic control

B

BAH	Basic Allowance for Housing
BASH	Bird / Wildlife Aircraft Strike Hazard
BHWG	Bird Hazard Warning Group
BIO	Biological Resources
BOD	Biochemical Oxygen Demand
BRAC	Base Realignment and Closure
BW	Bomb Wing

C

CA	Climate Adaptation
CAA	Clean Air Act
CC	Community Commercial
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR	Code of Federal Regulations
CO	Carbon Monoxide
COM	Coordination / Communication
CP	Canadian Pacific
CR	Cultural Resources
CWA	Clean Water Act
CZ	Clear Zone

D

dB	Decibel
dBA	A-Weighted Decibel
DM&E	Dakota, Minnesota, and Eastern Railroad
DNL	Day-Night Sound Level
DOD	United States Department of Defense
DSS	Dust / Smoke / Steam

E

EA	Environmental Assessment
EAFB	Ellsworth Air Force Base
EC	Executive Committee
ED	Energy Development
EIS	Environmental Impact Statement
EOD	Explosive Ordinance Disposal
EMS	Emergency Medical Services
EPA	Environmental Protection Agency
ESA	Federal Endangered Species Act

F

FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FLPMA	Federal Land Management and Policy Act
FONSI	Finding of No Significant Impact
FSI	Frequency Spectrum Impedance / Interference

G

GC	General Commercial
GI	General Industrial
GO	General Office
G&W	Genesee & Wyoming, Inc.

H

HA	Housing Availability
HCP	Habitat Conservation Plan
HI	Heavy Industrial
HQ SAC	Headquarters Strategic Air Command
HUD	United States Department of Housing and Urban Development

I

I-90	Interstate 90
IB	Intercontinental Ballistic
IC&E	Iowa, Chicago & Eastern Railroad
ICBM	Intercontinental Ballistic Missile
ICEMAP	Installation Complex Encroachment Management Action Plan
ICRMP	Integrated Cultural Resources Management Plan
IE	Infrastructure Extensions
INRMP	Integrated Natural Resources Management Plan
IRT	In-Place Reductive Treatment

J

JLUS	Joint Land Use Study
------	----------------------

L

LAS	Land / Air / Sea Spaces
LEG	Legislative Initiatives
LG	Light and Glare
LMI	Logistics Management Institute
LOS	Level of Services
LU	Land Use
LWES	Large Wind Energy System

M

MAR	Marine Environments
MFWE	Moving Forward with Ellsworth Air Force Base
MHPI	Military Housing Privatization Initiative
MILCON	Military Construction
MPO	Metropolitan Planning Organization
MSA	Metropolitan statistical area
MSL	Mean sea level

N

NACo	National Association of Counties
NAAQS	National Ambient Air Quality Standards
NBD	Neighborhood Business District
NEAP	Natural Event Action Plan
NEPA	National Environmental Policy Act
NGO	Non-Governmental Organization
NHPA	National Historic Preservation Act
NLR	Noise Level Reduction
NO2	Nitrogen Dioxide
NOAA	National Oceanic and Atmospheric Administration

NOI	Noise
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List

O

O3	Ozone
OEA	Office of Economic Adjustment
OSB	Oriented Strand Board
OSI	Air Force Office of Special Investigations
OSS	Operations Support Squadron
OU	Operable Units

P

PLSS	Public Land Survey System
PM	Particulate Matter
PM2.5	Fine Particle
PM10	Course Particle
Prime BEEF	Prime Base Engineer Emergency Force
PRTC	Powder River Training Complex
PT	Public Transportation

R

R8	High-Density Multiple-Family Residential Radar
RAPCON	approach control
RC	Roadway Capacity
RCPE	Rapid City, Pierre & Eastern Railroad Recovery
RCS	Credit System
REPI	Readiness Environmental Protection Integration

RF Radio Frequency
 RWWTP Regional Wastewater Treatment Plant

S

S1 Support staff functions
 S2 Ground intelligence and investigations
 S3 Operations and training
 S4 Logistics
 S5 Plans and programs
 SD 44 South Dakota Highway 44
 SA Safety Zones
 SD South Dakota
 SDDENR South Dakota Department of Environment and Natural Resources
 SDDOT South Dakota Department of Roads
 SDEDA South Dakota Ellsworth Development Authority
 SDSU South Dakota State University
 SDWA Safe Drinking Water Act
 SIC Standard Industrial Classification
 SIP State Implementation Plan
 SNR Scarce Natural Resources
 SO2 Sulfur Dioxide
 START Strategic Arms Reduction Treaty
 SWPPP Storm Water Pollution Prevention Plan

T

TBD To Be Determined

U

UAV Unmanned Aerial Vehicle
 UFC Unified Facilities Criteria
 UH Unaccompanied Housing
 US United States
 USAF United States Air Force
 USAHAS United States Avian Hazard Advisory System
 USFWS United States Fish and Wildlife Service

V

V Vibration
 VA Veterans Affairs
 VFR Visual Flight Rules
 VO Vertical Obstructions

W

WF South Dakota Wildland Fire Suppression Division
 WG Working Group
 WQQ Water Quality / Quantity
 WWII World War II
 WWTP Wastewater treatment plant

1-999

28 SFS	28 th Security Forces Squadron
28 th BW	28 th Bomb Wing
28 th OG	28 th Operations Group
37 th BS	37 th Bomb Squadron
432 nd ATKS	432 nd Attack Squadron

Please see the next page.



Inside Chapter 1 . . .

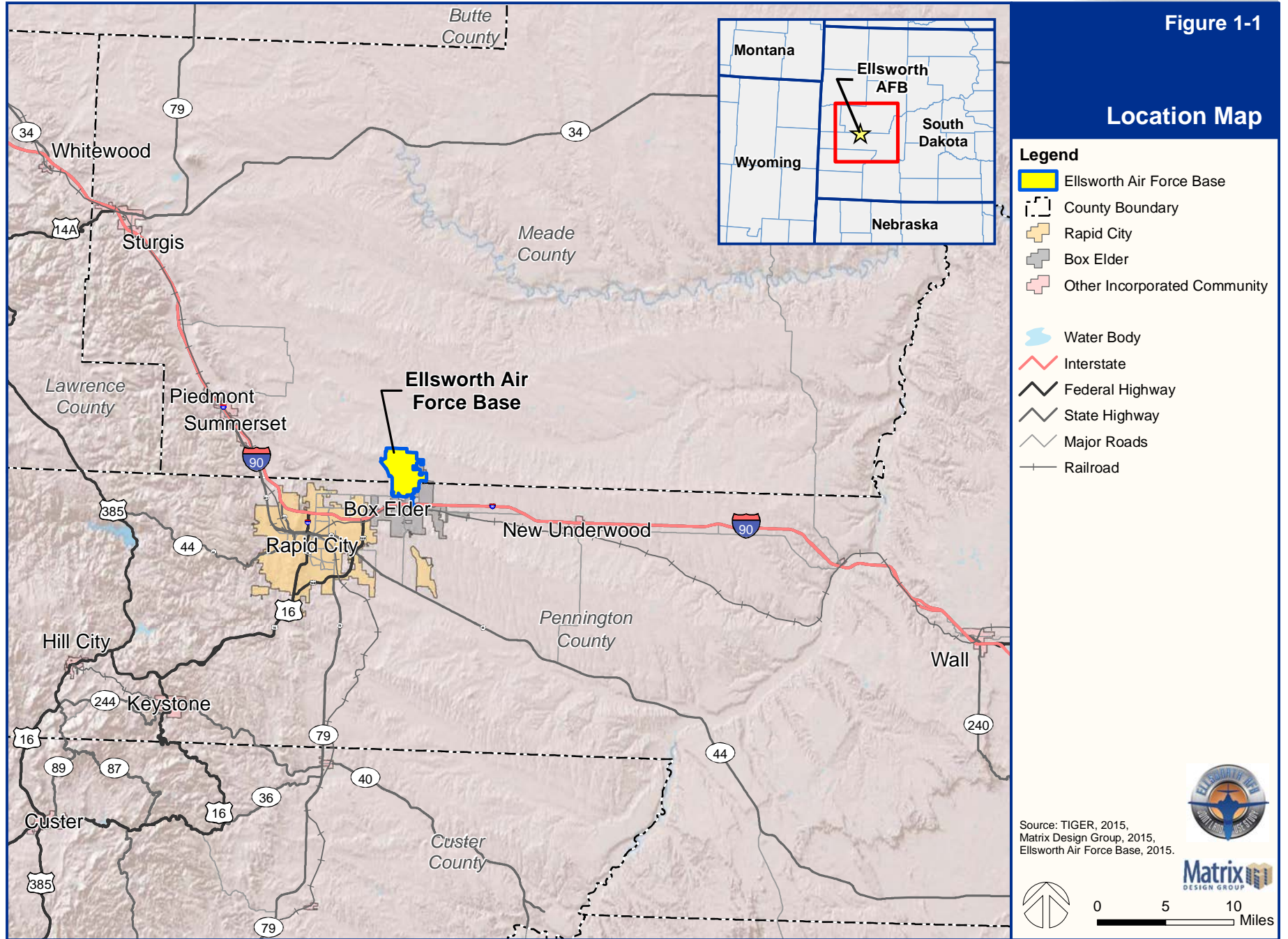
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1.1 Introduction

Military installations are critical to local, regional, and state economies. In the case of Ellsworth Air Force Base (EAFB), the installation is responsible for generating hundreds of civilian jobs and millions of dollars in annual economic activity and tax revenue. In the past, incompatible development has been a factor in the loss of operational capabilities and restructuring of mission-critical components to other military installations. To protect the missions of military installations and health of local economies and industries that rely on them, encroachment must be addressed through collaboration and joint planning between installations and local communities.

This Joint Land Use Study (JLUS) is an update to the JLUS published in 1995. The Mission Statement of the 1995 JLUS is “[to] identify, analyze, and to the extent possible, resolve encroachment issues associated with the development of the surrounding area” (Ellsworth Air Force Base Joint Land Use Study, 1995). The intent of this update is to further the mitigation efforts of the original JLUS, identify and address new or future compatibility issues, and continue to improve coordination among the local communities and Ellsworth Air Force Base (AFB). Ellsworth AFB is located in the counties of Meade and Pennington, South Dakota, approximately five miles northeast of Rapid City. The City of Box Elder is located directly to the south and east of the installation, and a portion of Ellsworth AFB is located within the municipal boundary of Box Elder, (see Figure 1-1).





Ellsworth AFB comprises 4,910 acres, which is owned by the DOD. The host unit at Ellsworth AFB is the 28th Bomb Wing assigned to the Global Strike Command's Eighth Air Force. The 28th Bomb Wing was previously assigned to Air Combat Command's Twelfth Air Force, but as of October 1, 2015, they were reassigned to the Global Strike Command.

The 28th Bomb Wing is one of only two B-1B Lancer strategic bomber wings in the US Air Force (the other wing is based at Dyess AFB in Texas). The Ellsworth installation population is approximately 8,000 and includes military members, family members, and civilian employees.

As a means to promote and coordinate the compatibility of future growth around the installation with military mission activities, an organized communication effort is needed between Ellsworth AFB, partner jurisdictions, and other stakeholder entities that own or manage land and/or resources in the region. In addition to the local residents, the stakeholders in this JLUS include the South Dakota Ellsworth Development Authority (SDEDA), the Cities of Box Elder and Rapid City and the Counties of Pennington and Meade.

The Ellsworth AFB JLUS is a proactive approach for mitigating existing and preventing future military compatibility issues by facilitating collaboration between local communities, agencies, the public, and Ellsworth AFB. This JLUS advocates increased communication for decisions relative to land use regulation, conservation, and natural resource management affecting both the community and the military. This study seeks to prevent conflicts experienced between the United States (US) military and local communities in other areas of the US and throughout the world by engaging the military and local decision-makers in a collaborative multi-agency planning process.

Source: US DOD OEA

1.2 What Is a Joint Land Use Study?

A JLUS is a planning process accomplished through the collaborative efforts of stakeholders in a defined study area to identify compatible land uses and growth management guidelines within, and adjacent to, an active military installation. These stakeholders include local, state, and federal officials, residents, business owners, non-governmental organizations, and the military. The process is intended to establish and encourage a working relationship among military installations and proximate communities to prevent and / or reduce encroachment issues associated with future mission changes and local growth. Although primarily funded through a grant provided by the Department of Defense (DOD) Office of Economic Adjustment (OEA), a JLUS is produced by and for local communities. The local project management entity for the Ellsworth AFB JLUS is the South Dakota Ellsworth Development Authority, which was established in 2009.

1.3 JLUS Goal and Objectives

Encroachment is a risk to military readiness and is currently one of the military's greatest

The goal of the Ellsworth AFB JLUS is to protect the viability of current and future military missions and operations, while simultaneously guiding compatible community growth, sustaining the environmental and economic health of the region, and protecting public health, safety, and welfare.

To achieve this goal, three primary JLUS objectives were identified.

- **Understanding.** Convene community and military representatives to identify, confirm, and understand compatibility issues and concerns in an open forum, considering both the community and military perspectives and needs. This includes increasing public awareness, education, and opportunities for input organized in a cohesive outreach program.

- **Collaboration.** Encourage cooperative land use and resource planning among Ellsworth AFB and surrounding communities so that future community growth and development are compatible with the Ellsworth AFB missions and operations, while seeking ways to reduce operational impacts on land within the study area.
- **Actions.** Provide a set of mutually supported tools, activities, and procedures from which local jurisdictions, agencies, and Ellsworth AFB can select, prepare, and approve / adopt in order to implement recommendations developed during the JLUS process. The actions include both operational measures to mitigate installation impacts on surrounding communities and local government, as well as agency approaches to reduce community impacts on military operations. These tools help decision makers resolve compatibility issues and prioritize projects within their annual budgeting cycles.

1.4 Why Prepare a Joint Land Use Study?

Although military installations are separated from adjacent communities by a defined property boundary, the two often share natural and manmade resources such as land, airspace, water, and infrastructure. Operational areas such as flight patterns and specialized airspace expand the military influence area footprint beyond defined property boundaries. Despite the many positive interactions among local jurisdictions, agencies, and the military, and because so many resources are shared, the activities or actions of one entity can create unintended impacts on another, resulting in potential conflicts, safety concerns and urban growth.

As communities develop and expand in response to growth and market demands, land use approvals have the ability to locate potentially incompatible development closer to military installations and operational areas. The result can generate new, or exacerbate existing compatibility issues. Often referred to as encroachment, these compatibility issues can negatively affect community safety, economic development, and sustainment of military activities and readiness. This risk to military readiness is currently a significant military concern.

Collaboration and joint planning among military installations, local jurisdictions, and agencies protects the long-term viability of existing and future military missions. Working together also enhances local economies and industries by preventing incompatibilities. Recognizing the importance of a close relationship by an installation and its surrounding communities, the OEA implemented the JLUS program to improve military and civilian relationships through communication and to mitigate existing and future conflicts. Fostering healthy relationships between military installations and their surround communities can help all parties co-exist and live in harmony.

Economic Importance

Ellsworth AFB is a significant economic engine in western South Dakota. As the largest employer in the Black Hills region, creating approximately 1,147 civilian jobs, the installation has an estimated total economic value totaling approximately \$300 million in 2015 (Ellsworth Air Force Base, 2015 Economic Impact Statement). Ellsworth also leases an underutilized facility on the base to Advance Health, which uses the office space as a call center. See Section 3.4 for additional information on the base's economic impact.

Local Community Partnership

In addition to the economic benefits Ellsworth AFB provides to the region, the installation is involved with a variety of community outreach and educational programs. Military personnel stationed at Ellsworth AFB have become an integrated part of the surrounding communities' way of life. Some of the actions taken by Ellsworth AFB include educational seminars at local schools, air shows, and various other events. These are hosted by the installation, and staff volunteering with scout groups, churches, veteran organizations and other non-profit organizations in the area. Ellsworth also plays an important role in supporting the large population of retired military personnel in the neighboring communities.

These are just several examples of the many community benefits and stewardship activities to which Ellsworth AFB contributes.

1.5 Public and Stakeholder Outreach

As highlighted previously, the JLUS process is designed to create a locally relevant study that builds consensus and obtains support from the stakeholders involved. The Ellsworth JLUS process included a stakeholder and public outreach program that provided a variety of opportunities for interested parties to contribute to its development.

Stakeholders

The JLUS process is designed to build consensus between military and civilian stakeholders.

A key initial step in the planning process is stakeholder identification. Informing and involving stakeholders early in the JLUS process is instrumental to identifying, understanding, and resolving important issues through the development of integrated strategies and measures. Stakeholders include residents, businesses, landowners, organizations, and governmental entities interested in, affected by, or affecting the outcome of the JLUS document.

Executive Committee and Working Group

The development of the Ellsworth AFB JLUS was guided by two committees, the Executive Committee (EC) and the Working Group (WG). These committees included staff from SDEDA, the affected cities and counties, Ellsworth AFB, federal and state agencies, resource agencies, and local governments. A description of the two committees is provided below.

- JLUS **Executive Committee (EC)**. The EC consisted of officials from participating jurisdictions and military installation leadership. The EC was responsible for the overall direction of the JLUS, including approval of the study design, strategy and tool recommendations, and draft and final JLUS documents.

- JLUS **Working Group (WG)**. The WG was responsible for providing technical expertise, feedback, and suggestions to the JLUS team. The WG identified and addressed technical issues, provided feedback on report development, and assisted in the development and evaluation of implementation strategies and tools. The WG provided recommendations to the EC.

The EC and WG served as liaisons to their respective stakeholder groups. EC and WG members were charged with conveying committee activities and information to their respective organizations and relaying their organization's comments and suggestions to both committees for consideration. EC members were encouraged to set up meetings with their organizations and/or constituencies to facilitate this input. The responsibilities and list of participants for the JLUS sponsors, the EC, and the WG are identified in Tables 1-1, 1-2, and 1-3, respectively.

Table 1-1. JLUS Sponsor Responsibilities and Participants

Responsibilities	Participants
<ul style="list-style-type: none"> ■ Coordination ■ Accountability ■ Grant Management ■ Financial Contribution 	<ul style="list-style-type: none"> ■ Office of Economic Adjustment ■ South Dakota Ellsworth Development Authority

Table 1-2. JLUS Executive Committee Responsibilities and Participants

Responsibilities	Participants
<ul style="list-style-type: none"> ■ Policy Direction ■ Study Review and Approval ■ Monitoring ■ Report Acceptance ■ 	<ul style="list-style-type: none"> ■ City of Box Elder ■ City of Rapid City ■ Meade County ■ Pennington County ■ South Dakota Ellsworth Development Authority ■ Ellsworth AFB

Table 1-3. JLUS Working Group Responsibilities and Participants

Responsibilities	Participants
<ul style="list-style-type: none"> ■ Identify Issues ■ Provide Expertise to Address Technical Issues ■ Evaluate and Recommend Implementation Options to the EC ■ Provide Draft and Final Report Recommendations to the EC 	<ul style="list-style-type: none"> ■ City of Box Elder ■ City of Rapid City ■ Meade County ■ Pennington County ■ South Dakota Department of Transportation ■ South Dakota Ellsworth Development Authority ■ Ellsworth AFB

Meetings were conducted throughout the process to identify and appropriately address local issues. The meetings conducted are highlighted as follows:

- **WG Kick-Off Meeting #1 (May 28, 2015).** The project kick-off meeting was held with the WG. The purpose of the project kickoff meeting was to outline the JLUS process and goals, to inform members about the JLUS and their roles and responsibilities, to identify the preliminary study area, to provide an overview of the 25 compatibility factors, and to discuss initial thoughts on compatibility issues.
- **EC/WG Meeting #2 (September 3, 2015).** The second committee meeting included a review of potential data gaps, a review of initial issues identified to date, identification of additional compatibility issues, and an exercise to establish the priority of the compatibility issues identified. The identification of existing tools for addressing compatibility issues was also reviewed with the EC and WG.

- **EC/WG Meeting #3 (November 13, 2015).** The third committee meeting garnered input from the EC and WG on potential strategies to address the compatibility issues identified. During the meeting, EC and WG members also reviewed the status of strategies developed with the 1995 JLUS to determine which needed revisions.
- **EC/WG Meeting #4 (February 12, 2016).** The fourth meeting was held to present the Draft JLUS and recommendations. The JLUS team developed the Draft JLUS based on committee comments and revisions. The JLUS team provided information regarding review / comments and solicited input from the EC and WG.
- **EC/WG Meeting #5 (May 6, 2016).** The fifth EC meeting was held to present the Final JLUS Report. The final report was prepared with all of the comments and revisions as outlined in the previous tasks and as deemed appropriate by the EC. The presentation of the Final JLUS Report discussed the overall findings, and major changes and revisions to the report that were incorporated based on comments received from the committee members and the public.

Public Workshops

In addition to the EC and WG meetings, a series of public workshops were held throughout the development of the JLUS. These workshops provided an opportunity for the exchange of information with the greater community, assisted in identifying issues to be addressed, and provided an opportunity for input on proposed strategies. Each workshop included a traditional presentation and a facilitated exercise providing a “hands on,” interactive opportunity for the public to participate in the JLUS development. The public workshops were conducted as follows.

- **Public Workshop #1 (November 12, 2015).** The first public workshop explained the purpose and function of the JLUS, provided an overview of the military operations at Ellsworth AFB, introduced project participants, shared the JLUS approach, and discussed the JLUS goal and objectives. The format of this meeting included a presentation to the public followed by an interactive working session where attendees were encouraged to share their input on potential compatibility issues.

A user-friendly JLUS Overview (JLUS Update #1) was distributed at this meeting to provide the public a tool in completing a compatibility issues exercise. Attendees worked in groups around large scale study area maps to complete a compatibility issues worksheet as well as engage in intimate group discussions with the JLUS team. Participants were able to provide input through interactive audience response systems that allow for immediate response viewing and tracking.



- **Public Workshop #2 (February 11, 2016).** The purpose of the second public workshop was to present the compatibility issues identified and to solicit input on resolution of these issues. The first portion of the meeting included a formal presentation detailing information on existing conditions and issues. The second portion of the meeting involved a facilitated exercise to which the public provided input on developing solutions.
- **Public Workshop #3 (May 5, 2016).** The purpose of the third and final public workshop was to present the Draft JLUS findings and recommendations to attendees and to explain the public review and input process. The public and interested stakeholders in attendance were encouraged to provide feedback either during the meeting via comment cards or submission of comments via the project website and

designated SDEDA Project Manager. During the meeting, the JLUS team made direct contact with meeting attendees to solicit final input and provided hard copy comment cards.

Public Outreach Materials JLUS Fact Sheet / Compatibility Factors Brochure



At the beginning of the JLUS process, a Fact Sheet was developed by Matrix Design Group to describe the JLUS program, objectives, methods for public input, and proposed the Ellsworth AFB JLUS study area. This Fact Sheet was made available at the meetings and on the project website for review by interested members of the public.

This Fact Sheet served as an informational brochure, which described each of the 25 compatibility factors considered for JLUS development. While not every factor may apply to the Ellsworth AFB JLUS, this list provided an effective tool to conduct a comprehensive evaluation of compatibility factors within the study area.

Strategy Tools Brochure. JLUS strategies incorporate a variety of actions that local governments, military installations, agencies, and other stakeholders can take to promote compatible land use planning. This brochure provided an overview of strategy types that can be applied to address study area compatibility issues.

Website. A project website was developed to provide stakeholders, the public, and media representatives with access to project information. The website was maintained for the entire duration of the project to make information easily accessible. Information contained on the website included program points of contact, schedules, relevant documents and maps, public meeting information, and downloadable comment forms. The project website is located at www.ellsworthjlus.com.



1.6 JLUS Study Area

The Ellsworth AFB JLUS Study Area is designed to encompass all lands near the base that may impact current or future military operations or be impacted by operations. In total, the JLUS Study Area encompasses approximately 500 square miles that include portions of Meade County and Pennington County. Most cities outside of the JLUS Study Area are characterized as rural with agricultural and ranching land uses featuring large areas designated to forests and open spaces. Rapid City, also outside of the JLUS Study Area, is urban with a population of about 72,000.

The primary characteristics evaluated in determining the JLUS Study Area was general compatibility factors associated with military mission readiness and land uses that may impact or be impacted by military operations. Figure 1-2 illustrates the extent of the JLUS Study Area.

The JLUS Study Area does not include the Powder River Training Complex or any other Military Operations Areas or Military Training Routes outside of Meade and Pennington Counties.

1.7 JLUS Background Report Organization

The following is a brief overview of the organization of the Ellsworth AFB JLUS, including the contents of the main JLUS Report, the Executive Summary brochure, and each of the chapters of the Background Report.

JLUS Report

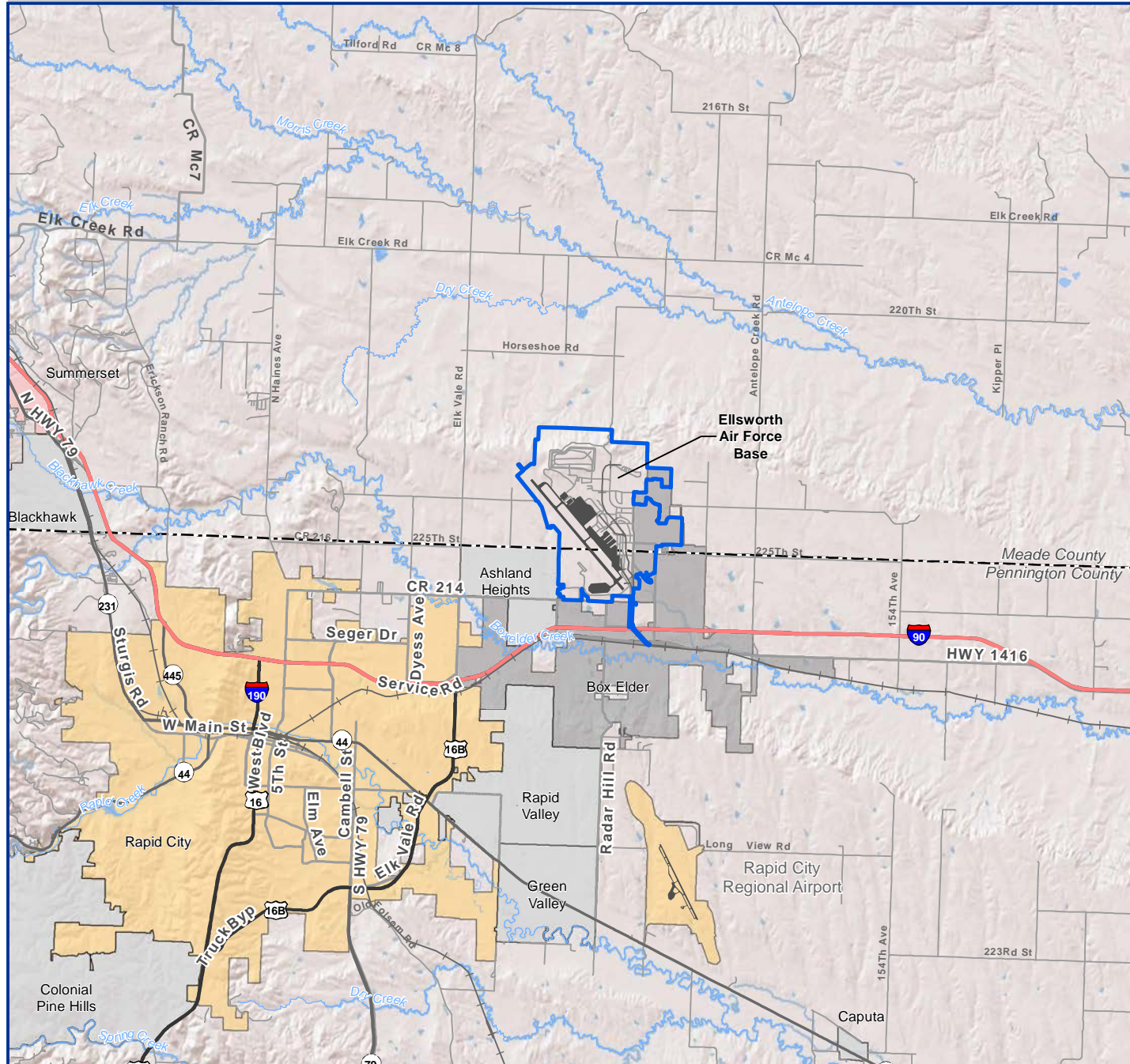
This report provides a brief discussion on the purpose and objectives of a JLUS, describes the overall benefits of the JLUS process, and provides an overview of the various stakeholders that assisted in the development of the study. The JLUS Report then provides a listing of the compatibility issues identified and the recommended strategies developed through the Ellsworth JLUS process to address each issue. The JLUS Report is the action plan for addressing compatibility.

The JLUS Summary Brochure

An Executive Summary brochure was prepared in conjunction with the Final JLUS Report. This graphical brochure provides a brief overview of the JLUS project and process and highlights the major compatibility issues and recommended strategies to address them. It also includes Ellsworth AFB operational footprint maps and descriptions of each footprint.

Figure 1-2

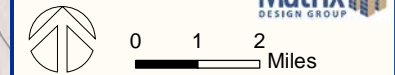
JLUS Study Area



Legend

- Ellsworth Air Force Base
- County Boundary
- Rapid City
- Box Elder
- Incorporated Community
- Other Unincorporated Community
- Water Body
- River
- Interstate
- Federal Highway
- State Highway
- Major Roads
- Local Traffic
- Railroad
- Airfield Surface / Runway

Source: TIGER, 2015,
Matrix Design Group, 2015,
Ellsworth Air Force Base, 2015.



Background Report

The JLUS Background Report is a detailed document that includes information about the communities within the study area, the military, the tools available to both the communities and military, and a compatibility assessment for all identified issues. This report is fairly extensive and provides supporting and supplementary information to the JLUS Report. It is intended to serve as a reference tool to the JLUS Report and is comprised of the following chapters.

Chapter 1: Introduction. Chapter 1 provides an introduction and overview of the Ellsworth AFB JLUS. This chapter describes the working relationships among the entities, background and intent of the JLUS, study area, objectives used to guide development of the JLUS, stakeholders involved in developing the JLUS, public outreach methods, implementation premise, and the document organization.

Chapter 2: Community Profile. In developing this JLUS, an informed understanding of local jurisdictions within the study area is necessary. This chapter identifies the local jurisdictions within the study area and includes an overview of the regional growth potential and a profile of the jurisdictions within the study area, highlighting population, housing, and transportation characteristics.

Chapter 3: Military Profile. This chapter introduces Ellsworth AFB and discusses the installation’s mission, strategic and economic importance, facility and operations, installation role in national defense, and potential future missions. This chapter also includes an overview of the installation’s setting, including a history of the installation, to provide the military baseline for the JLUS.

Chapter 4: Existing Compatibility Tools. This chapter provides an overview of existing relevant plans, programs, and studies at the federal, state, and local levels that provide tools to address compatibility issues in the JLUS study area. The purpose of this chapter is to filter the tools readily available to stakeholders and assess whether the tool is adequate or in need of modification or development to achieve compatibility planning objectives.

Chapter 5: Compatibility Assessment. This chapter presents the issues identified by the EC, the WG, the public, and the JLUS team and provides an assessment of issues based on existing tools to address compatibility and feedback collected throughout the planning process. This chapter enumerates the issues and categorizes them into the 25 compatibility factors listed below. As noted previously, not every factor may apply to the Ellsworth AFB JLUS.

- *Air Quality*
- *Alternative Energy Development*
- *Anti-Terrorism / Force Protection*
- *Biological Resources*
- *Climate Adaptation*
- *Cultural / Historic Resources*
- *Dust, Smoke, and Steam*
- *Frequency Spectrum Capacity*
- *Frequency Spectrum Interference / Impedance*
- *Infrastructure Extensions*
- *Interagency Coordination / Communication*
- *Land and Air Spaces*
- *Land Use*
- *Legislative Initiatives*
- *Light and Glare*
- *Local Housing Availability*
- *Marine Environments*
- *Noise*
- *Public Trespassing*
- *Roadway Capacity*
- *Safety*
- *Scarce Natural Resources*
- *Vertical Obstructions*
- *Vibration*
- *Water Quality / Quantity*

JLUS Implementation

It is important to note that once the JLUS process is completed, the final document is not an adopted plan, but a set of strategies to be used by local jurisdictions, agencies, and organizations in the Ellsworth AFB JLUS Study Area to guide future compatibility efforts. Acceptance of the study by stakeholders will be sought to confirm their collective support for identified implementation efforts. For instance, local jurisdictions may use the strategies in this JLUS to guide future subdivision regulation, growth policy, and zoning updates, and to assist in the review of development proposals.

Ellsworth AFB will use the JLUS process as a guide for interacting with local jurisdictions on future projects, and managing internal planning processes with a compatibility-based approach. Through this process stakeholders will make the strategies in the JLUS a reality. JLUS Coordinating Committee will oversee the execution of the JLUS. Through this Committee, local jurisdictions, the installation, and other interested parties will be able to establish procedures, recommend or refine specific actions for member agencies, and make adjustments to strategies over time.

Please see the next page.



Inside Chapter 2 . . .

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2.2	South Dakota Ellsworth Development Authority.....	2-1
2.3	Regional Overview	2-2
2.4	Study Area Growth Trends	2-6
2.5	Transportation	2-15

2.1 Introduction

This chapter provides an overview of the communities within the Ellsworth AFB JLUS Study Area, including important historical, demographic, and economic information. The JLUS Study Area includes the installation, Meade and Pennington Counties and the cities of Box Elder and Rapid City. These areas are identified and illustrated on maps in Chapter 1.

The purpose of this chapter is to provide information that will enable stakeholders to understand population and development trends that have the potential to affect the future of Ellsworth AFB. This information, combined with the other information presented in Chapter 5, is essential to providing a baseline context from which informed decisions can be made when developing compatibility strategies.

This chapter is also designed to enhance the Base’s understanding of the types of activities occurring “outside the fence” so that military leadership can apply those insights when considering future missions and operations.

2.2 South Dakota Ellsworth Development Authority

The State of South Dakota, through the South Dakota Ellsworth Development Authority (SDEDA), is the local sponsor of the Ellsworth AFB JLUS. In 2009, the South Dakota legislature created the South Dakota Ellsworth Development Authority (“SDEDA” as a body corporate and politic of the State of South Dakota. It is governed by SD Codified Law (SDCL) 1-16J. SDEDA’s mission is: (1) to make sure that the Great State of South Dakota is always a Great Place for the US Department of Defense to conduct its essential National defense mission at Ellsworth Air Force Base; (2) to work hand in hand with local governments, the private sector, and property owners to promote the health and safety of those living or working near the Base; (3) to protect and promote the economic impact of Ellsworth Air Force Base and associated industry; and (4) to work with the Base and local communities to prepare for additional growth in missions at Ellsworth Air Force Base. The Base was originally listed on the 2005 BRAC list designated for closure; however, the State of South Dakota developed and authorized the SDEDA to protect and promote the economic impact of Ellsworth AFB and its associated industry. Due in part to the State’s proactive action, the Base was removed from the BRAC list.

SDEDA is a public entity with the authority to exercise essential public functions. SDEDA reports to the State’s Governor’s Office of Economic Development. SDEDA comprises seven members appointed by the Governor with the advice and consent of the State Senate. The chair is designated by the Governor, and the members elect other officers as is necessary. SDEDA has the authority to employ agents and employees as is necessary to execute the mission and its related duties.

SDEDA is authorized to exercise various powers including, but not limited to, the following:

- Apply for and use gifts, grants, or loans of money or other property from the United States, the state, a unit of local government, or any person for any authority purposes and enter into agreements required in connection therewith;
- Employ fiscal consultants, engineers, attorneys, management service providers, and such other consultants and employees as may be required, and contract with agencies of the state to provide staff and support services;
- Borrow money and issue bonds, certificates, warrants, notes, or other evidence of indebtedness as provided by this chapter; and
- Purchase from a willing seller or by eminent domain, construct, develop, maintain, hold, lease, license, operate, dispose of, or decommission real and personal property projects, facilities, or any undertaking necessary for establishing compatible land use, as provided for in subdivision 50-10-32(2) around Ellsworth Air Force Base, or generally suitable for protecting or promoting the economic impact on the state of Ellsworth Air Force Base and related industries.

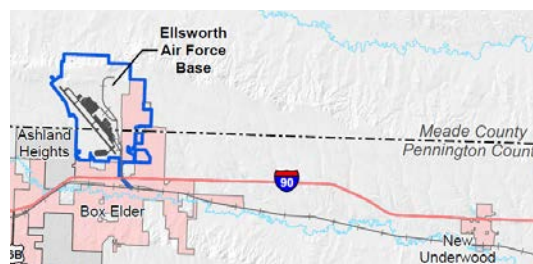


SDEDA received a grant to conduct this JLUS from the Department of Defense Office of Economic Adjustment (OEA) and is the project manager for the JLUS effort as well as guiding the implementation of the programs recommended under the 1995 JLUS.

2.3 Regional Overview

Ellsworth AFB was originally developed in a rural area in Pennington and Meade Counties in western South Dakota. While most of the land surrounding Ellsworth AFB has remained rural, being used for ranching and agriculture, the cities of Box Elder and Rapid City have grown and expanded towards the base.

Meade County



Meade County is located in the western portion of the State of South Dakota and covers 3,483 square miles, of which 3,471 square miles is land and 12 square miles is water. The county was incorporated in 1889 and named after the union civil

war general, General George C. Meade. The county seat is the City of Sturgis, and as of the 2010 Census the county had a population of 25,435 people. Over three-quarters of the total land area of EAFB is situated in Meade County.

The county has a rich military history, featuring cavalry posts present in the Civil War and the two World Wars. Fort Meade was a post in the Civil War, housing both the Fourth and Seventh Cavalries. It was at this post that the Star Spangled Banner was first required to be played. During WWII, the post was a German prisoner-of-war camp; today, it primarily serves as the Black Hills Health Care System, a medical facility administered by the Veterans Administration.

The county boasts over 2 million acres of land, making it the largest county in South Dakota, surpassing the land size of the states of Delaware and Rhode Island. Although Meade County is known for its ranching and agriculture industry, it is one of the top five counties in South Dakota *least* reliant on agriculture. The number one county *least* reliant on agriculture in South Dakota is Pennington County. (Source: 2014 South Dakota Ag Economic Contribution Study, September 2014).



Meade County Courthouse

Meade County employs a commission government where ordinances, budgets, and administration are exercised by an elected board of commissioners. The commission is comprised of five commissioners, each responsible for a

district. Ellsworth AFB is within District 1. The administrative functions of the county are executed by appointed officials.

The county's five commission districts include 4 cities, 20 unincorporated communities, and 8 political townships. The four cities are:

- Faith,
- Piedmont,
- Sturgis (County Seat), and
- Summerset.

Meade County does not have traditional zoning tools to regulate land use; however, County Ordinance #20, originally adopted in 1998, provides the regulations for the subdivision of land, development, and improvements. The ordinance establishes 11 categories of subdivisions of land to which land uses are regulated.

Pennington County

Pennington County is located in western South Dakota, south of Meade County, and covers approximately 2,775 square miles. The county was incorporated in 1875 and named after the fifth Governor of the Dakota Territory at that time, John L. Pennington. The county seat is Rapid City, and as of the 2010 Census, the county had a population of 100,948 people.

Pennington County has a diverse history in mining and arts. The county is home to the Mount Rushmore National Memorial, a granite based mountain, sculpture relief created by sculptor, Gutzon Borglum. As described by Borglum, *"The purpose of the memorial is to communicate the founding, expansion, preservation, and unification of the United States with colossal statues of Washington, Jefferson, Lincoln, and Theodore Roosevelt."* After a presidential dedication in 1927, work on Mount Rushmore began. Today, this National Memorial attracts over 2 million visitors a year from around the world.



Mount Rushmore in the Early Morning

(By User: Bbadgett. https://commons.wikimedia.org/wiki/File:Mt._Rushmore_Early_Morning.jpg#filehistory)

The county also has a notable history with the military. The military had a formal presence in the county beginning in 1941 when Rapid City Army Air Base (AAB) was established to train B-17 crews. After WWII, in 1947, the air base became Rapid City Air Force Base (AFB), home of the B-29 Superfortress. The lead unit at the Rapid City Air Force Base was the

28th Bombardment Wing. In 1948, the base was renamed Weaver AFB before being renamed again in 1953 to Ellsworth AFB after Brigadier General Richard E. Ellsworth, who died in an RB-36 crash in the same year. Ellsworth AFB has been home to several strategic bombers including the B-36 Peacemaker, B-52 Stratofortress, Strategic Missile Wing, the B-1B Lancer and also the MQ-9 Reaper, an unmanned aerial vehicle squadron.

With the establishment of Mount Rushmore, tourism continues to be an important growth generator for Pennington County. However, the employment base continues to be dominated by education, healthcare, and social services, which employs 24 percent of the Pennington County population. Arts, entertainment, and recreation services are also major economic generators, employing 13 percent of the Pennington County population.

Pennington County employs a commission government where the legislative and governing functions are exercised jointly by an elected board of commissioners. The commission is comprised of five commissioners, each responsible for a district. Ellsworth AFB falls within District 4. The administrative functions of the county are executed by appointed officials and their staff.

The county's five commission districts include 8 cities and 11 other unincorporated communities. The eight cities are:

- Box Elder,
- Hill City,
- Keystone,
- New Underwood,
- Quinn,
- Rapid City (County Seat),
- Wall, and
- Wasta.

The Pennington County Zoning Ordinance Section 200 establishes nine zoning districts characterized by typical land uses from low density and suburban residential to commercial and industrial districts. In addition, the

Ordinance establishes airport height and hazard zoning to ensure safe and navigable airspace.

City of Box Elder

The City of Box Elder is located in both Meade and Pennington Counties and covers 13.9 square miles. The city was officially incorporated in 1964 but dates back to 1907 when its first post office was founded, according to the South Dakota State Historical Society. As of the 2010 Census, the city had a population of 7,800 people.

Today, the city is characterized by a few small town businesses and housing for its residents. The city is also home to the South Dakota Air and Space Museum, which is located adjacent to Ellsworth AFB. A portion of Ellsworth AFB is located within the City of Box Elder (see Figure 1-2).

The City employs a mayor-council government where the common council exercises legislative and executive authority. The mayor is elected in a separate election and performs some of the administrative functions of the City.

The city is divided into three wards represented by two council members each. The council is presided over by an at-large mayor.

The City's Zoning Ordinance #50, dated 1970, establishes four zoning districts. They are:

- Residential District,
- Commercial District,
- Industrial District, and
- Agricultural District.

This zoning ordinance establishes traditional land use regulations for the City, including setbacks and permitted uses for each district; however, heights for land uses are not identified in this ordinance.

City of Rapid City

The City of Rapid City is located approximately 11 miles west-southwest of the City of Box Elder and covers 55.5 square miles. The City was incorporated in 1882 and is the county seat of Pennington County. As of the 2010 Census, the city had a population of 67,956 people.

The city has a rich heritage in mining, arts, trading and tourism. The mining occurred in the Black Hills region of the city. In the late 1880s, the convergence of the railroads enabled the City to establish itself as an important regional trade center for the upper Midwest. Towards the turn of the century, the City started becoming a tourist destination, as it is known for today, due to Mount Rushmore, the Black Hills, Custer State Park, Crazy Horse, as well as the rich history and culture of Native Americans. However, WWII devastated the tourism industry during the war. The war effort made up for the revenues lost from tourism through the establishment of the Rapid City Air Force Base that would later be renamed Ellsworth AFB.

Today, Rapid City, the “Gateway to the Black Hills”, is recognized for tourism and recreation. The city is characterized by businesses, higher education institutions, such as South Dakota School of Mines and Technology, West River Graduate and Undergraduate Center, South Dakota State University, the University of South Dakota, West Dakota Tech, and National American University. Other educational facilities include 25 public schools that are a part of Rapid City Area Schools, the Douglas School District, and Black Hills State University – Rapid City. Major healthcare facilities include Rapid City Regional Hospital and Indian Health Service’s Sioux San Hospital. Rapid City also has numerous amenities including golf courses, parks, arboretums, hiking and bike paths, fishing, dog parks, swimming pools, and a community ice arena.

The city is governed by a Mayor-Council form of government whereby the Council exercises legislative and executive authority. The mayor is elected in a separate election and performs some of the administrative functions of the city.



Downtown Rapid City

The city is divided into five wards represented by two council members each. The council is presided over by an at-large mayor.

The City’s Municipal Code, Title 17, Zoning, establishes 22 traditional zoning districts and two overlay districts. The districts include residential, commercial, industrial, and mining and earth resources extraction. The Ordinance regulates land uses and heights relative to airport zoning to protect navigable airspace.

2.4 Study Area Growth Trends

It is important to examine past, current, and future growth trends to understand the types and amount of growth and development occurring in the Study Area. Identifying growth patterns for the area surrounding Ellsworth AFB is one part in determining potential future compatibility issues or areas of concern associated with where new growth may extend that could impact or be impacted by military operations. This section assesses the recent and projected future population changes within the JLUS Study Area, as well as housing and economic trends that could be indicators of future growth.

Population Trends

Population data for South Dakota, its counties, and incorporated communities is based on a combination of information provided by the US Census Bureau and the South Dakota State University (SDSU) Rural Life and Census Data Center. The SDSU Data Center performs statewide demographic work and is informed by a statewide advisory committee.

Table 2-1 shows the population change for the State of South Dakota, and the applicable county and municipal jurisdictions from 2000 to 2010. During this time, Pennington County had a population growth rate of 14 percent. Meade County experienced a growth rate of 4.9 percent during this period. Today, Meade County continues its steady growth at 4.4 percent. According to a 2014 report, this rate ranks Meade County as one of the top ten fastest growing counties in the country. *Source: Rapid City Journal, March 28, 2014.*

Table 2-1. Population Growth From 2000 to 2010

Location	2000	2010	Percent Change 2000 to 2010
State of South Dakota	754,844	814,180	7.9%
Meade County	24,253	25,434	4.9%
Box Elder (Part)	--	2,706	
Pennington County	88,565	100,948	14.0%
Box Elder (Part)	2,841	5,094	79.3%
Rapid City	61,167	67,956	11.10%

Source: US Census Bureau, 2000 and 2010

Pennington County and Rapid City had a growth rate of over 10 percent. Meade County saw a minimal rate of change in population between 2000 and 2010. Compared to other jurisdictions in the Study Area, the rate of change for the City of Box Elder at 79.3 percent is almost seven times more than Rapid City and Pennington County. The increase in Box Elder's population is primarily attributable to the annexation of Ellsworth AFB housing area and the fact that the base population was smaller before this change.

In total, the majority of counties in South Dakota experienced a decline between the years 2000 and 2010. The net effect resulted in a growth rate of approximately 7.9 percent for the state.

Figure 2-1 illustrates the population density in the JLUS Study Area in 2000, and Figure 2-2 shows the change in densities in 2010. These figures are presented to show the change in growth and density of the study area. Population density and overall growth adjacent to the base began to increase from 2000 to 2010. This growth is addressed in the JLUS Report to ensure that future growth is compatible with the mission of Ellsworth AFB.

Figure 2-1

Population Density, 2000

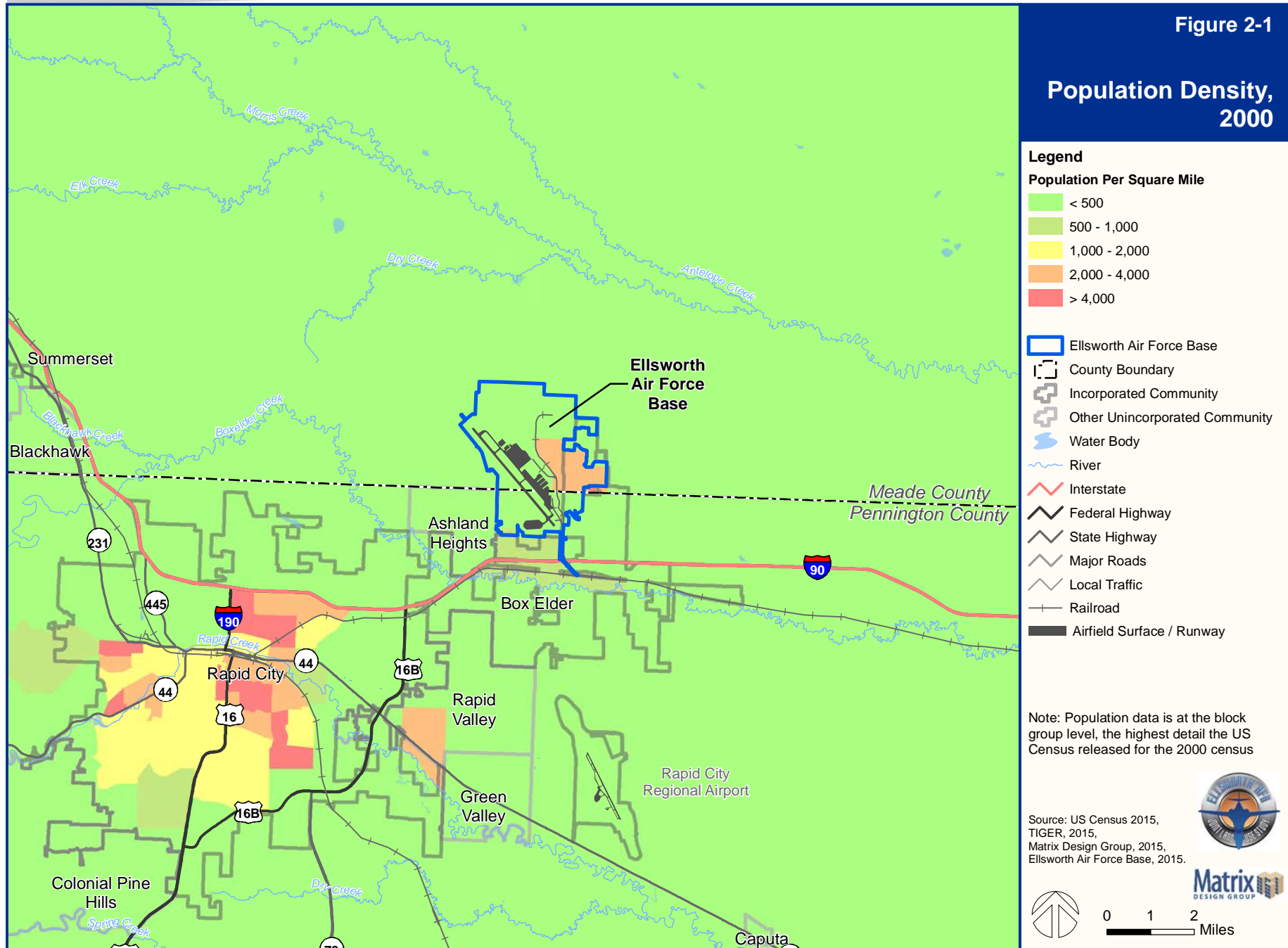
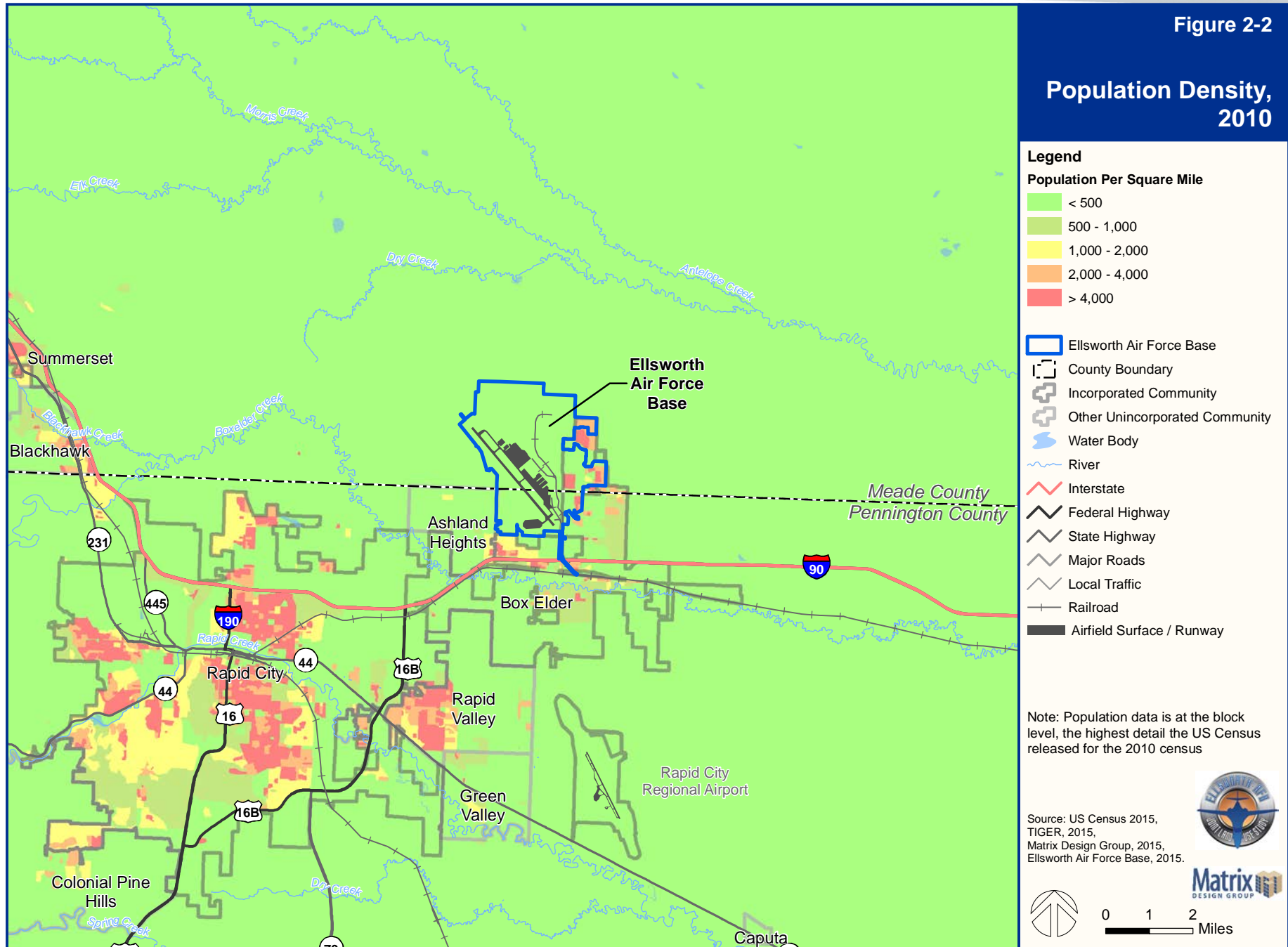


Figure 2-2

Population Density, 2010



Population Projections

It is also important to assess projected population changes. The SDSU Rural Life and Census Data Center has compiled preliminary population projections for South Dakota and its counties, as shown in Table 2-2. SDSU utilizes a population projection model that is refined for local conditions; therefore, the SDSU projections vary slightly from the US Census Data.

Table 2-2. Meade and Pennington Counties Population Projections from 2010 to 2035 in Five-Year Intervals

Location	2010	2015	2020	2025	2030	2035
State of South Dakota	814,180	852,624	889,447	922,748	951,885	977,574
Meade County	25,434	26,407	27,195	27,805	28,317	28,776
Pennington County	100,948	107,845	114,161	119,876	125,154	130,256

Sources: Rural Life and Census Data Center, South Dakota State University
South Dakota Labor Market Information Center

Between the years of 2010 and 2035, the state's total population is projected to grow by 20 percent. Meade County is projected to have a slightly lower percent in population, with an increase of approximately 13 percent from 2010 to 2035. As the center of population and amenities for the MSA, Pennington County is expected to have a higher growth rate than the state at 29 percent.

Although the population for the state of South Dakota is increasing, the population will increase at a slower rate throughout the next 20 years (*Rural Life and Census Data Center, South Dakota State University*). Meade County and Pennington County are two counties that support this trend with a decrease in population growth rates from 2000 to 2010 compared to 2025 to 2035. The growth rate for Meade County was 4.9 percent from 2000 to 2010, but from 2025 to 2035, the growth rate is projected to be 3.5 percent. In Pennington County, the growth rate from 2000 to 2010 was 14 percent, but from 2025 to 2035, it is projected to be 8.7 percent.

Housing Trends

As shown in Table 2-3, Rapid City and the City of Box Elder have experienced housing growth rates that are greater than the state as a whole. In Box Elder, housing growth is primarily attributable to the annexation of base housing on EAFB in Meade County. In 2010, 958 Box Elder units were in Meade County.

Table 2-3. Housing Units from 2000 to 2010

Location	2000	2010	Percent Change 2000 to 2010
State of South Dakota	323,208	363,438	12.4%
Meade County	10,149	11,000	8.4%
Box Elder	1,072	2,828	163.8%
Pennington County	37,249	44,949	20.7%
Rapid City	25,085	30,254	20.6%

Source: US Census Bureau, 2000 and 2010

According to the 2010 Census, of the 958 total housing units in Box Elder (Meade County Part), 708 (74 percent) were occupied while the remaining 250 (26 percent) were vacant for various reasons (i.e. for rent or sale). There is no seasonal housing available in Box Elder, Meade County. In total, Box Elder has seen a notable amount of new growth since 2000 with an increase of 163.8 percent. This is attributable to a combination of new growth and the annexation of the existing housing units on EAFB.

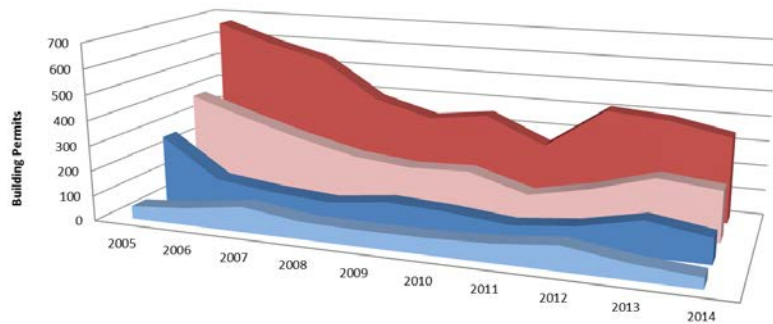
Rapid City is the primary driver of population growth in Pennington County. From 2000 to 2010, Rapid City has seen a larger increase in the rate of new housing units than the county. Rapid City's housing units increased by 20.6 percent between 2000 and 2010, while the county's housing units only increased by 12.4 percent. As a total percent of housing units, Rapid City accounts for 30,254, or 67.3 percent of the total Pennington County housing units. Approximately, 1,668 housing units (5.5 percent) of Rapid City's units are vacant and approximately 129 of those units are designated as seasonal, recreational, or occasional use.

Building Permits

An analysis of the number of single-family building permits issued can be a good indicator of the health of the local economy. In general, the region as a whole has seen positive growth in single-family building permits. Between 2005 and 2014, a total of 2,904 single-family building permits were issued within Box Elder and Rapid City. As noted in Figure 2-3 below, during this time the region experienced a peak in single-family building permit growth in 2005. In 2008, the beginning of the national housing recession, single-family building permit activity began a significant decline.

Beginning in 2010, the region began to see a year over year increase in single-family building permits. This increase has not been a steady climb, but instead an uneven growth which is reflective in the spiked pattern in the trend lines in Figure 2-3.

Figure 2-3. Single-Family Housing Building Permits, 2005-2014



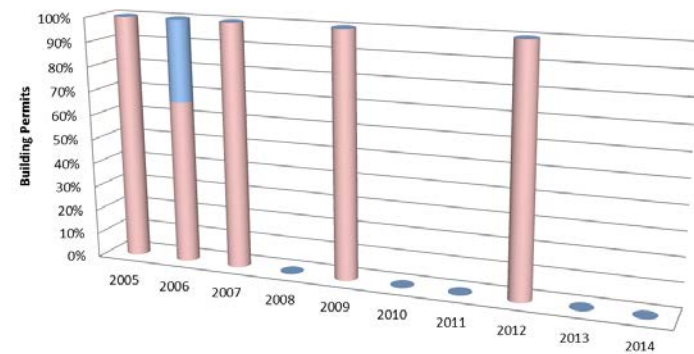
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Box Elder	51	69	101	69	64	65	73	96	61	42
Meade County	273	118	90	73	100	87	63	87	137	100
Rapid City	394	320	253	198	173	180	110	158	226	201
Pennington County	669	595	537	386	322	351	247	410	390	342

Source: <http://censtats.census.gov/bldg/bldgprmt.shtml>

Multi-family residential building permits can be indicative of the type of housing available to military personnel who are single or with a small family. This type of housing is limited in Box Elder with the majority of this type of housing being provided by the City of Rapid City.

Figures 2-4 and 2-5 illustrate the trend line for the different types of multi-family residential building permits issued in Rapid City and the City of Box Elder. As noted above, and reflected in the graphs below, Rapid City has seen virtually all the new growth for this type of housing between 2005 and 2014. In 2006, one building permit for duplex housing was issued in Box Elder and in 2010, one building permit for apartment housing was issued in Box Elder. Outside of these two years, all building permits for this type of housing were issued in Rapid City.

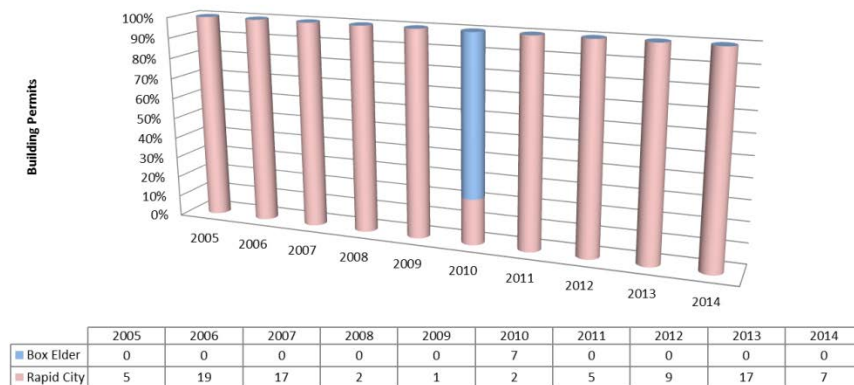
Figure 2-4. Duplex Housing Building Permits, 2000-2014



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Box Elder	0	1	0	0	0	0	0	0	0	0
Rapid City	38	2	3	0	1	0	0	1	0	0

Source: <http://censtats.census.gov/bldg/bldgprmt.shtml>

Figure 2-5. Multi-Family Housing Building Permits, 2000-2014



Source: <http://censtats.census.gov/bldg/bldgprmt.shtml>

Housing Value Trends

Housing value trends indicate the change in land and home values relative to market fluctuations. These fluctuations can be indicative of development activity or inactivity, location or migration of people and where they locate, or supply and demand. Housing prices in South Dakota increased at a substantial rate (more than 66 percent) between the years of 2000 and 2009-2013. Meade County and the City of Box Elder were almost on par with nearly the same percentage increase in median housing prices during the same time frame, while Pennington County and the City of Rapid City were nearly the same percentage increase during this time period. Table 2-4 shows the increase in home values for single-family houses between 2000 and 2009-2013.

Table 2-4. Median Housing Value Changes, 2000 - 2009-2013

Location	2000	2009 -2013	Percent Change 2000 to 2009-2013
South Dakota	\$79,600	\$132,400	66.3%
Meade County	\$82,200	\$157,100	91.1%
Pennington County	\$90,900	\$156,100	71.7%
Box Elder	\$65,800	\$127,300	93.5%
Rapid City	\$89,700	\$155,700	73.6%

Source: US Census Bureau, <http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml>

Economic Development

For purposes of looking at the regional economy, data is often reported for an area called the Rapid City Metropolitan Statistical Area (MSA). An MSA is defined, in general, as a “geographical region with a relatively high population density at its core and close economic ties throughout the area.” The Rapid City MSA is defined to include all of Meade, Pennington and Custer Counties. Source: U.S. Office of Management and Budget.

While there is a diverse economy in this area, much of the non-farm employment in the Rapid City MSA is in the following industries:

- Trade / Transportation / Utilities,
- Government Services,
- Educational / Health Services, and
- Leisure / Hospitality.

The Rapid City MSA serves as an employment and commercial hub for the western portion of South Dakota. While service jobs are a key contributor to the region’s economy, a variety of high quality and diverse employment opportunities exist.



Created by the Labor Market Information Center, South Dakota Department of Labor and Regulation, February 2015.

Source: Labor Market Information Center, February 2015

The majority of employment in the region is the service sector, including healthcare, education, and hospitality. This sector has continued to grow steadily and is expecting continued growth into the future, making this sector the principal sector in the Rapid City MSA. In 2014, there were approximately 58,700 service sector jobs in the MSA, which was a 5.6 percent increase from 2010. From 2000 to 2010, this sector grew by

13.7 percent, while the overall goods producing sector declined by 21.3 percent.

In the Rapid City MSA, the downward trend of the goods producing sector was evident between 2000 and 2010 when the manufacturing industries saw a significant decline of 47.5 percent. Since 2010, the manufacturing industry has slowly regained momentum increasing job numbers by 16 percent through 2014. Thus, this region is characterized by the services industries and continues to remain with those trends. Table 2-5 shows the breakdown of industries by numbers and percent change between 2000 and 2010 and 2014 within the Rapid City MSA.

Table 2-5. Non-Farm, Salaried Workers and Percent Changes of Industries in Rapid City MSA, 2000 – 2010, 2014

Industry	2000	2010	Percent Change 2000 – 2010	2014	Percent Change 2010 - 2014
Trade/Transportation/Utilities	12,200	12,900	5.7%	13,400	3.9%
Government	9,300	11,200	20.4%	11,000	-1.8%
Educational/Health Services	7,700	9,900	28.6%	10,800	9.0%
Leisure/Hospitality	8,000	9,200	15.0%	10,000	8.7%
Retail Trade	8,300	9,000	8.4%	9,400	4.4%
Professional/Business Services	4,100	4,800	17.1%	5,200	8.3%
Mining/Logging/Construction	4,100	4,500	9.8%	4,700	4.4%
Financial Activities	3,700	3,800	2.7%	4,200	10.5%
Other Services	2,700	2,800	3.7%	3,100	10.7%
Manufacturing	4,800	2,500	-47.5%	2,900	16.0%
Wholesale Trade	2,000	2,100	5.0%	2,300	9.5%
Transportation/Warehousing/Utilities	1,900	1,800	-5.2%	1,700	-5.5%
Information	1,000	1,000	0.0%	1,000	0.0%
Service Providing Total	48,900	55,600	13.7%	58,700	5.6%
Goods Producing Total	8,900	7,000	-21.3%	7,600	8.5%
Rapid City MSA Total	57,800	62,600	8.3%	66,200	5.6%

Source: South Dakota Labor Market Information Center, http://dlr.sd.gov/lmic/menu_nonfarm.aspx, <http://apps.sd.gov/d54lmicinfor/NONFARM/NFLISTPUBS>. ASPCurrent Development Overview within the Study Area

Current Development Overview within the Study Area

Land uses throughout the JLUS Study Area range from open space and agriculture to urbanized development within the cities of Box Elder and Rapid City. Development surrounding Ellsworth AFB is characterized as follows (see Figure 2-6).

North

North of Ellsworth AFB is Meade County, which remains mostly undeveloped. The area is primarily used for ranching on large tracts of land. Recently, there has been some very low density residential subdivision development, with lot sizes ranging from one to five acres directly north of EAFB and in the surrounding area. The South Dakota Ellsworth Development Authority (SDEDA) is working with ranchers to purchase easements to prevent more development and maintain the existing ranches adjacent to the base.

A large ridge along the north boundary of Ellsworth AFB lowers development potential immediately next to the base fence line.

East

Directly east of Ellsworth AFB are lands in both Meade and Pennington Counties and the City of Box Elder. Southeast of the installation, within the City of Box Elder, are most of the public facilities serving the city, including the Box Elder City Hall and the elementary, middle, and high schools. Land outside of the City of Box Elder is generally very rural with some low density residential development. The City of Box Elder plans to annex north of the city, to incorporate the existing residential areas east of the base along with vacant land for future residential development.

South

The southern border of Ellsworth AFB is mostly in the City of Box Elder, with incorporated land in Pennington County beyond the city to the south. Existing development in the City of Box Elder includes some residential and commercial development scattered along Highway 1416. South of Ellsworth AFB, commercial development continues to expand, particularly in the area

of Liberty Blvd/I-90 intersection. Recently, a Love's Travel Stop, which includes a Hardee's restaurant, opened in 2015. Additionally, several new commercial businesses have opened in Box Elder during the past year. Extensive future development is not likely in this area, due to potential incompatibility from aircraft noise and aviation safety zones associated with the installation. Of note, SDEDA has been focused on purchasing available land from willing sellers in this area to prevent future incompatibility.

West

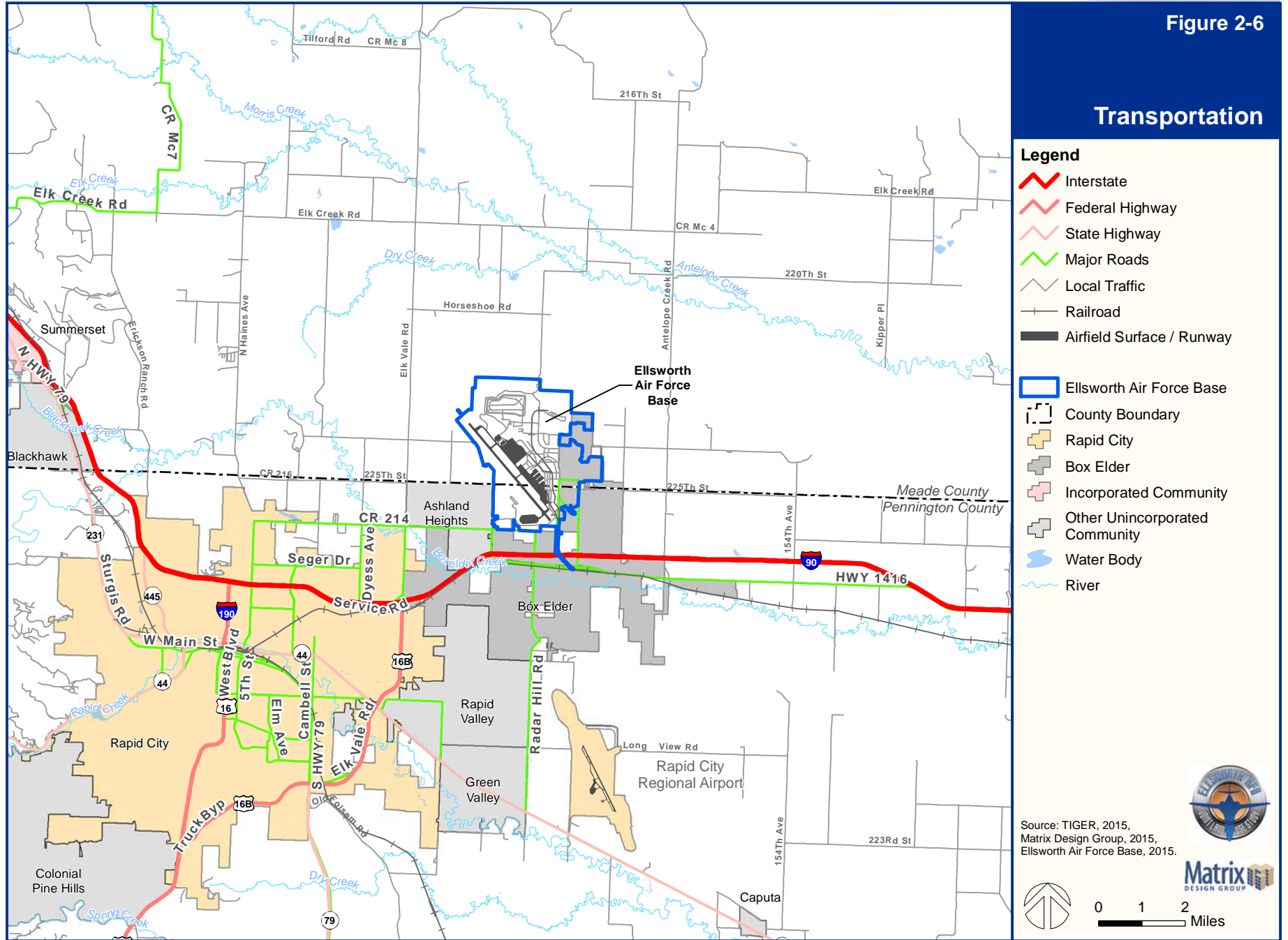
There is little development west of Ellsworth AFB aside from housing in Piedmont and commercial development in Summerset. There is potential for future annexation and development from both the City of Box Elder and the City of Rapid City on the southwest. The City of Box Elder city limits extend to the west until Elk Vale Road, where it meets the city limits of Rapid City. Both cities are planning on the future gradual movement and annexation north along Elk Vale Road, a north / south corridor west of Ellsworth AFB.

In 2016, Meade County will be paving Elk Vale Road, north from Pennington County up to Elk Creek Road. Elk Creek Road will also be paved west of Elk Vale Road to the I-90 in 2016. The roadway improvement is expected to increase residential and commercial development in the area, which could spur annexation.

Roadway improvements are expected to increase residential and commercial development in the area. This could spur annexation.

Figure 2-6

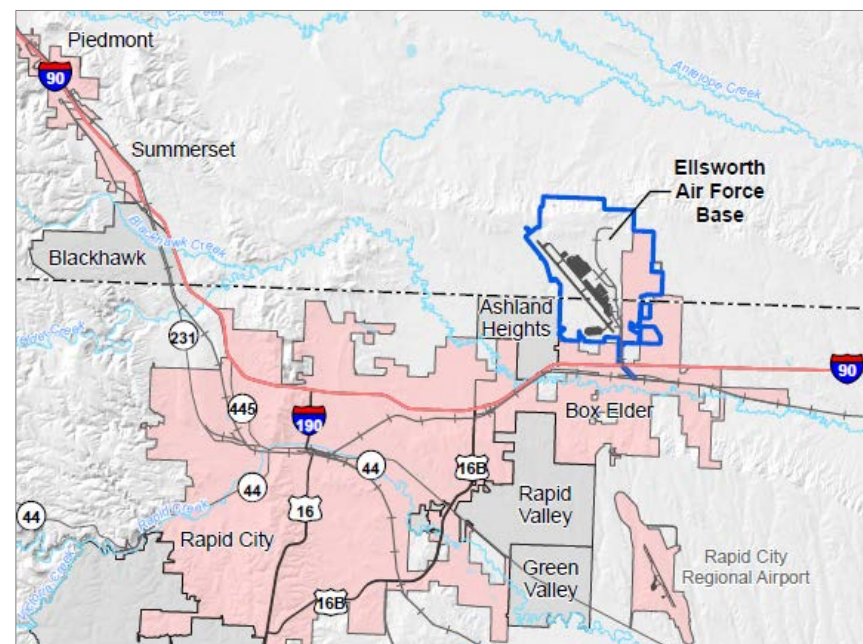
Transportation



2.5 Transportation

There are several major transportation routes through the study area that provide mobility options throughout this region of South Dakota. Figure 2-6 shows the regional transportation routes in the Ellsworth AFB JLUS Study Area.

- **Interstate 90** – Interstate 90 (I-90) is a transcontinental freeway and is the longest interstate highway in the United States. In South Dakota, I-90 is classified as a major road that runs east to west through northern Pennington County. It runs north into Meade County at the northwestern edge of Rapid City to connect the cities of Summerset and Piedmont. I-90 is a four-lane divided highway with a grassy median and is the longest east-west thoroughfare in the state. I-90 runs through Mitchell, Sioux Falls, and Rapid City, but does not go through the state capital of Pierre.
- **US Highway 16** – United States (US) Highway 16 is a major east-west arterial in the state of South Dakota. The highway is also known as Mount Rushmore Road. The highway enters South Dakota (SD) just east of Newcastle, Wyoming and travels near Jewel Cave. When the highway splits off east of Hill City, it becomes a four-lane divided highway.
- **State Highway 44** – South Dakota Highway 44 (SD 44) is a highway located in the southern portion of the state and runs from US Route 385 west of Rapid City to I-29, south of Sioux Falls. The highway is approximately 379 miles long.
- **State Highway 79** – SD 79 is a state highway that runs from its southern most point beginning at Maverick Junction to its northern point of the state of North Dakota. The highway is approximately 116 miles long and once ran through the Rapid City downtown as its Main Street. Elk Vale Road is the new alignment for SD 79.



Air Transportation

Within the Study Area, there is one regional airport. The Rapid City Regional Airport provides commercial service to other cities in the continental US. Located approximately 9 miles south of Ellsworth AFB, the Rapid City Regional Airport covers 1,655 acres. The airport is located within the jurisdictional boundary of Rapid City and is located approximately nine miles southeast of downtown Rapid City. The airport is considered the anchor of air transportation in Pennington County and western South Dakota. It is a public use airport that serves three major commercial airlines (Delta Air Lines, United Airlines, and Southwest Airlines), three seasonal commercial airlines, and supports general aviation. In 2009, the airport served approximately 539,500 passengers.



Rapid City Regional Airport, Passenger Terminal

The Rapid City Regional Airport has one concrete and one asphalt runway. The concrete runway (14/32) is the longest (measuring 8,701 feet by 150 feet). The asphalt runway (5/23) measures 3,607 feet long by 75 feet wide.

There are only two other airports in Pennington County: Wall Municipal Airport and Ellsworth AFB.

- Wall Municipal Airport is a public use airport located in Wall, SD approximately 54 miles east-southeast of Rapid City along I-90. The airport supports general aviation.
- As previously noted, Ellsworth AFB Airport is strictly a military use airport located partially in Meade and Pennington Counties near the City of Box Elder.

Rail Transportation

Rail transportation in this area is characterized as freight transportation. The rail line formerly known as Dakota, Minnesota and Eastern (DME) Railroad was sold by a subsidiary of Canadian Pacific (CP) Railroad to Genesee & Wyoming, Inc. (G&W). G&W renamed the line the Rapid City, Pierre & Eastern Railroad (RCPE). G&W operates the 670 mile freight line from western Minnesota to Rapid City, a freight railroad in northern Pennington County that extends east west along I-90 and north south parallel to SD 79.



Dakota, Minnesota and Eastern Locomotive Courtesy: Sean Lamb (Slambo)

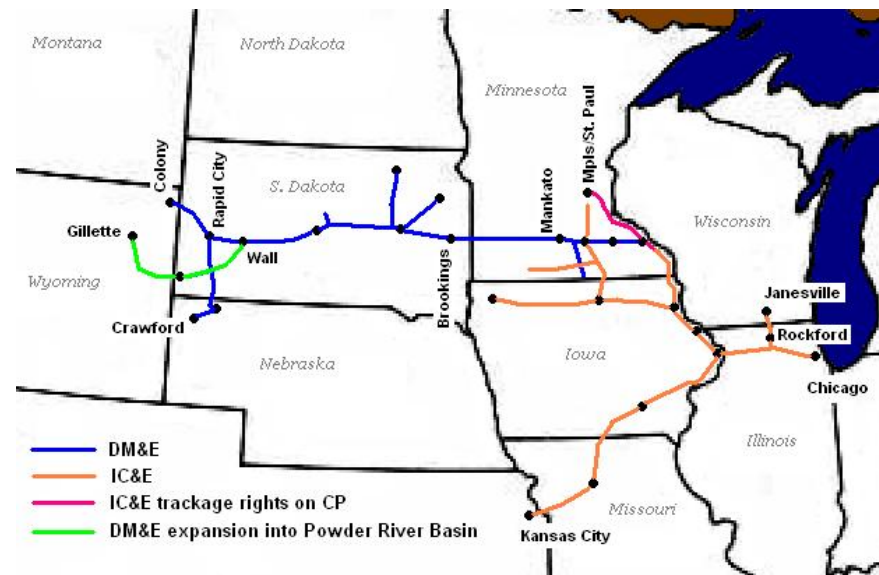
To simplify the corporate structure of CP's holdings in the United States, CP merged its holdings of the Iowa, Chicago & Eastern (ICE) Railroad with the DME; therefore, ICE no longer exists.

The combined DME operates more than 2,500 miles of track running from Rapid City, SD to Winona, MN located on the Mississippi River; and from Minneapolis to Chicago and Kansas City, paralleling the Mississippi River through Iowa. The railroad also operates a line across northern Iowa and one across southern Minnesota. Iowa operations consist of about 660 miles. The railroad has access to all major railroads at gateways in Chicago, Kansas City

and St. Paul, MN. The DME currently employs nearly 1,300 people system-wide with 312 located in Iowa.

The main products handled by the DME include coal, farm products, food products, chemicals, waste products, primary metal products, nonmetallic metals and stone.

The DME planned to build 262 miles and rebuild 650 miles of track, allowing the railroad access to coal located in the Powder River Basin in Wyoming, but CP has not yet determined if it will proceed with the project.



DM&E and IC&E Combined Route Map as of 2002

Please see the next page.



Inside Chapter 3 . . .

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3.1 Introduction

This chapter provides an overview of Ellsworth Air Force Base (EAFB) including mission, economic impact, and current and future operations at Ellsworth AFB. In addition, operational mission profiles are explained and defined. The purpose of providing this information is to enable stakeholders to make informed decisions about the future development and economic growth of communities proximate to Ellsworth AFB that could potentially impact the viability and future role of the installation.



Ellsworth AFB Main Gate

3.2 Ellsworth Air Force Base History



Rapid City Air Force Base B-36 Hangar, 1952

1940—1949

What would later become Ellsworth AFB began in 1941 as the Rapid City Air Army Air Base. The base provided bombing training and instruction for B-17 (Flying Fortress) aircrews. The base trained thousands of pilots, navigators, radio operators, and gunners from nine bombardment groups and several smaller units. This training continued through the end of WWII in 1945. After WW II, the base trained weather reconnaissance and combat squadrons using various aircraft including the P-61 (Black Widow), though this training was only for a brief time.

Rapid City Army Air Base was briefly closed for several months during 1946 to 1947. Operations resumed in 1947 as the renamed Rapid City Air Force Base to train and prepare pilots for the B-29 (Superfortress). The 28th Bombardment Wing was the primary unit assigned to the base at this time. In 1949, training on the B-36 (Peacemaker) began after runway improvements were made. In 1950, the Air Force reassigned the base from the 15th Air Force to the 8th Air Force.

1950—1959

The base suffered a significant loss in March 1953 when a RB-36H aircraft crashed in Newfoundland, killing the entire crew of 25, including the plane's co-pilot, Brigadier General Richard Ellsworth. The aircraft was flying to

Ellsworth AFB from the Azores. Later that year, President Dwight D. Eisenhower personally dedicated the base in memory of Brigadier General Ellsworth, Commander of the 28th Strategic Reconnaissance Wing.

In the late 1950s, the Strategic Air Command set plans to replace the B-36s with the all-jet B-52s Stratofortress. The first B-52 arrived at Ellsworth AFB in mid-June 1957.

1960—1980

In late 1960, Ellsworth AFB's 28th Bombardment Wing would be assigned with the 850th Strategic Missile Squadron and would prepare for a year for the emplacement of the Titan I intercontinental ballistic missile (ICBMs) system. The 44th Strategic Missile Wing was activated when the missiles arrived in January of 1962. The Headquarters Strategic Air Command (HQ SAC) then named the 44th Strategic Missile Wing as the host wing at Ellsworth AFB.

In August 1961, construction began on 150 Minuteman ICBMs silos and launch facilities in and around the Ellsworth AFB. January 1962 marked the initiation of the Strategic Air Command's first Minuteman Intercontinental Ballistic (IB) Wing. Seven months later in July 1962, the Strategic Air Command activated the 66th and 67th Strategic Missile Squadrons, which would be two of three missile squadrons to operate the 150 Minuteman I ICBMs under the 44th Strategic Missile Wing. After the emplacement of the missiles and for the next three decades, the Air Force would train men for their new duties as ICBM launch control facility crews.

Due to contractual issues and workforce delays, the Secretary of Defense inactivated the Titan I and removed them from alert status. Subsequently, the 850th Strategic Missile Squadron was inactivated on March 25, 1965. Later in 1971, the Minuteman I ICBMs were replaced by the newer Minuteman II ICBM system.

1981—1990

In 1986, the base underwent major improvements, including extending the runway to 13,497 feet and adding new aircraft maintenance facilities. This was done to prepare the base and the Bombardment Wing to receive the B-1B (Lancer), which is still in use today. In 1987, the 28th Bomb Wing received the first of 35 B-1B aircraft.

In 1988, the 12th Air Division moved to Ellsworth AFB with the responsibility of training crews for the B-1B, the remaining transient B-52 (Stratofortress), and the 28th's KC-135 Stratotanker aircrews. In the summer of 1989, the SAC activated a third wing, the 99th Strategic Weapons Wing, which assumed responsibility for B-1B and B-52 advanced aircrew training.



1991—Today

In 1991, President Bush ordered the removal of the Minuteman II missiles from alert status to comply with the Strategic Arms Reduction Treaty I (START). The removal of the missiles would last until 1994, and had an impact on the personnel size at the base.

In 1992, the first major reorganization of the Air Force occurred which deactivated SAC and assigned Ellsworth's organizations to the newly activated Air Combat Command (ACC). With this reorganization came a new mission for the 28th Bombardment Wing from a strategic bombardment mission to a mission of worldwide conventional munitions delivery. This remains as the installation's mission today. The Wing is known today as the 28th Bomb Wing (BW) and is assigned to the Global Strike Command. Previously assigned to the Air Combat Command, the 28th BW was moved to the Global Strike Command to further the mission of the Air Force of having all the service's bombers under a unified command.

In 2015, expansion of the bomber training area began. The area, called the Powder River Training Complex, covers about 35,000 square miles in portions of Wyoming, Montana, and the Dakotas. The expansion quadrupled the previously available training space and allows for large scale component exercises. The Powder River Training Complex is outside the JLUS Study Area.

Base Realignment and Closure 2005

In 2005, a vote was put through the Base Realignment and Closure (BRAC) commission to close Ellsworth AFB. The BRAC process has a goal of increasing the efficiency of United States Department of Defense (DoD) through the realignment and closure of military bases that date back to the Cold War Era. The vote to close EAFB was rejected and the base remains active.

3.3 Installation Setting

The installation includes 6,223 acres of land and is located in a relatively sparsely populated area in western South Dakota, although the surrounding cities of Box Elder and Rapid City have been growing at a higher rate than the rest of the state. The majority of the land surrounding the installation is rural and is used for ranching, agriculture and logging in the nearby Black Hills National Forest, which is west of the base. The installation setting is shown on Figure 3-1 and base land uses are shown on Figure 3-2.



Balfour Beatty Communities Privatized Base Housing

Ellsworth AFB participates in the Military Housing Privatization Initiative (MHPI). The MHPI was designed and developed to attract private sector financing, expertise, and innovation to provide necessary housing faster and more efficiently than traditional military construction (MILCON) processes would allow. In 2012, as part of this strategy to provide long-term housing solutions, Ellsworth AFB privatized its base housing.

This commenced with the transfer of ownership of 825 existing, USAF owned, family housing units to Hunt Military Communities. These units are referred to as Antelope Ridge and are located directly to the east of EAFB.

Antelope Ridge is comprised of 2, 3, 4 and 5 bedroom homes that include an attached garage and fenced backyard and are available for rent to military and non-military renters.

In addition to Antelope Ridge, Ellsworth AFB transferred ownership of 283 existing family housing units to Balfour Beatty Communities in 2013. These units consist of 3 and 4 bedroom units with garages and fenced backyards. They are located in the Rushmore Heights (183 units) and Prairie View (100 units) neighborhoods within the fence. Balfour Beatty Communities is also in the process of constructing an additional 214 units, a Community Center and site amenities.

There is also Unaccompanied Housing (UH) in the form of dormitories available for single Airmen. There are a total of 742 rooms in 6 dormitory buildings which are all single-occupancy. These are all located east of the Airfield and all of the operations buildings.



South Dakota Air and Space Museum

Located just off-site, the South Dakota Air and Space Museum, a regional treasure, proudly displays the past, present, and future of aircraft technologies to the public. The museum has multiple exhibits and a gift shop inside, as well as missile and aircraft displays located outside. The

museum was established in 1992, as a Field Museum of the US Air Force. The museum has since flourished in the community and inspires future aviation innovation for future generations.

Figure 3-1

Installation Setting

Legend

-  Gate
- Installation Building**
-  Housing / Lodging
-  Other
-  Airfield Surface / Runway
-  Ellsworth Air Force Base
-  County Boundary
-  Rapid City
-  Box Elder
-  Other Unincorporated Community
-  Interstate
-  Major Roads
-  Local Traffic
-  Railroad



Source: TIGER, 2015,
Matrix Design Group, 2015,
Ellsworth Air Force Base, 2015.

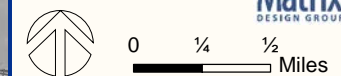
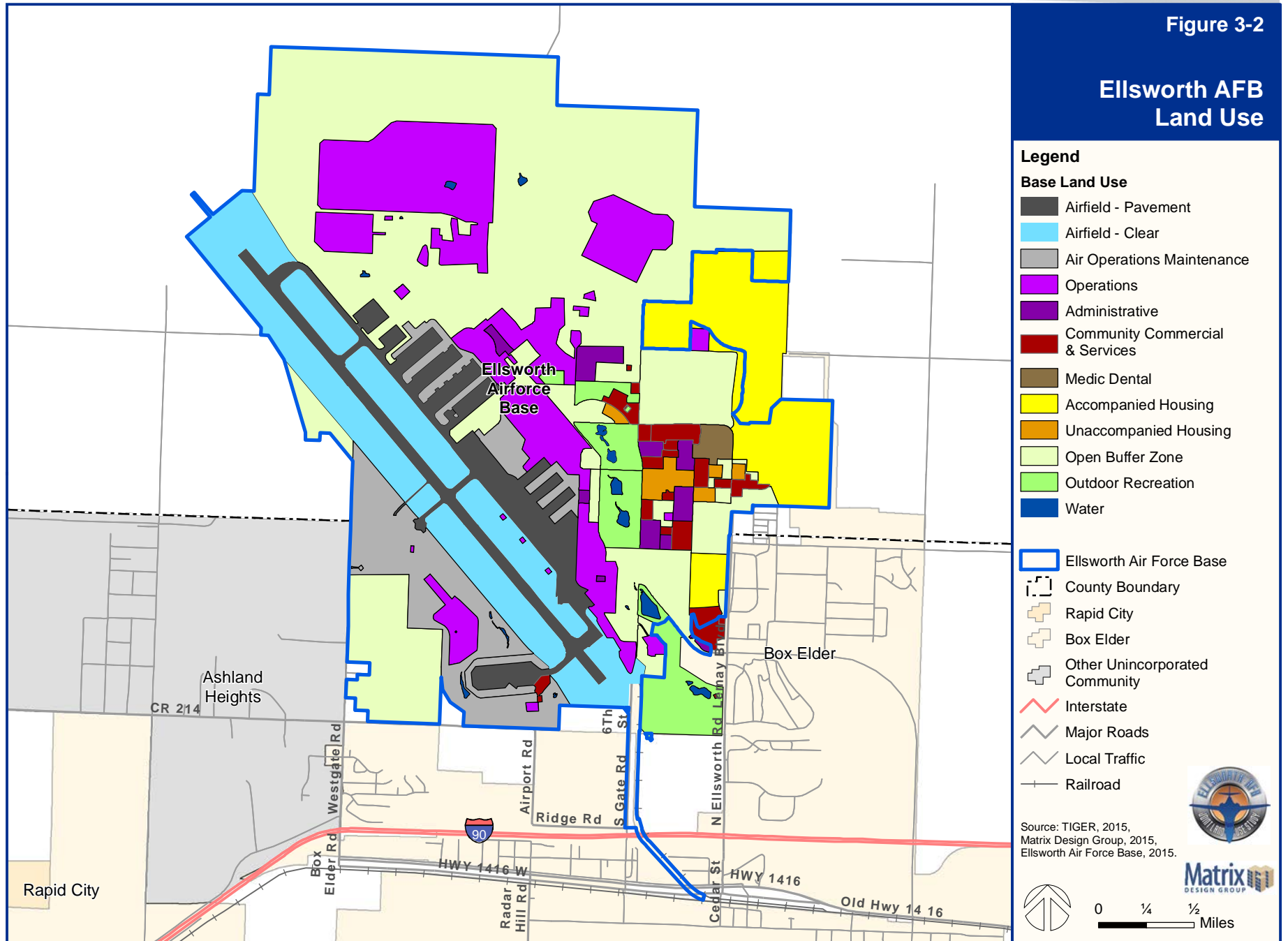


Figure 3-2

Ellsworth AFB Land Use



3.4 Economic and Community Impact

In 2014, Ellsworth AFB had a regional economic impact of over \$300 million. This impact can be broken down among traditional categories that are used to measure economic impact. The categories are annual payroll, annual expenditures, and an estimated dollar value of jobs created from base operations and expenditures

Annual payroll is comprised of payments to both military and civilian personnel. Annual expenditures are comprised of military construction contracts, service contracts, and other materials, equipment and supplies procurement. The value added jobs created number is an estimate based on an evaluation and calculation of a multiplier provided by the Logistics Management Institute (LMI) Economic Impact Database for Installations and indirect/induced job multipliers and an average annual pay rate provided for metropolitan statistical areas (MSAs) by the Bureau of Labor Statistics.

The \$300 million regional economic impact in 2014 for Ellsworth AFB was comprised of over \$180 million in annual payrolls, over \$65 million in annual expenditures, and over \$51 million in added jobs value, as shown in Figure 3-3.

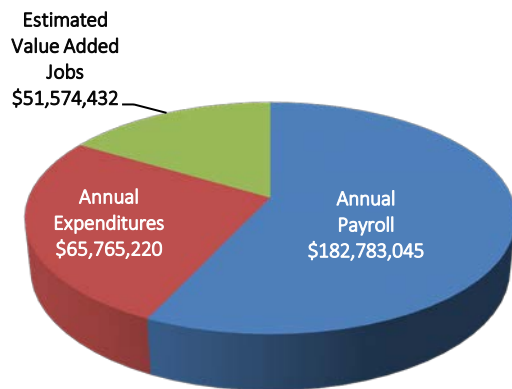


Figure 3-3 2014 Ellsworth AFB Economic Impact

Source: Ellsworth Air Force Base Economic Impact Statement, Fiscal Year 2014

In addition to the economic impacts created through mission operations, the base also leases an underutilized facility on the base to Advance Health, which utilizes the facility as a call center. Advance Health currently employees 50 individuals and is expected to grow soon to over 230 employees. Ellsworth AFB also offers various opportunities for the public to be involved in the mission and vice versa. The community benefits from civilian and military personnel engaged in various community organizations. The base also provides base tours to members of the public upon request and conducts B-1B flyovers for key community events. There is also a museum on base that the public is encouraged to visit and enjoy for a nominal fee.



Courtesy photo provided by the Commemorative Air Force

Ellsworth AFB also hosts an air show and open house about every three years, which is open to the public. The last air show, in September 2015, featured demonstrations by the US Air Force Thunderbirds and the Army Golden Knights. In addition to the

aerial demonstrations, the event also includes static displays and ground acts. The goal of the air show and open house is to highlight the mission, resources and personnel of Ellsworth AFB, while providing education and awareness for civilian and military aviation.

3.5 Military Strategic Importance

Ellsworth AFB is not only important to the local community, through its economic impact and community engagement, but also nationally with the capabilities of the Ellsworth AFB 28th Bomb Wing (28th BW) mission supporting the country's interests around the world.

The 28th BW provides unparalleled expert training of bomber aircrews, which provides the country with superb power and global reach. This is possible due to the lack of any significant encroachment of the airspace for which the bomber crews can train over the sparsely populated region. This installation's mission and assets, including the 35,000 square mile Powder River Training Complex (PRTC). The US Air Force to conducts Large Force Exercises at the PRTC. Held quarterly, the Large Force Exercise allows B-1 bomber aircrews to train alongside other fighter and bomber aircraft; providing realistic training and airspace scenarios involving multi-aircraft operations. This enables the US Air Force to maintain its superiority in putting bombs on target.

3.6 Current Mission Operations

28th Bomb Wing



The host unit at Ellsworth AFB is the 28th Bomb Wing; it is under the 8th Air Force and is one of two strategic bomber wings in the United States Air Force. The 28th BW's mission is to "Guarantee our Nation's Combat Airpower – Anytime, Anywhere" meaning to deliver expert combat power for global military response. The 28th Bomb Wing is divided into the 28th Operations Group, the 28th Maintenance Group, the 28th Mission Support Group and the 28th Medical Group.

28th Operations Group

The mission of the 28th Operations Group (28th OG) is to provide combat-ready B-1B aircrews for worldwide taskings, including conventional operations and power projection. Airmen in the 28th OG fly the B-1, plan and support combat operations, and develop deployment plans. Additionally, they manage the base airfield, radar approach control facilities and air traffic control tower. The group also includes a weather section, a life support flight, and flight and tower simulators.

The 28th OG has three squadrons under its authority: the 28th Operations Support Squadron, the 34th Bomb Squadron, and the 37th Bomb Squadron.

28th Operations Support Squadron

The 28th Operations Support Squadron (OSS) supports the 28th Bomb Wing in all aspects of flying operations to effectively and efficiently train and conduct combat operations. The 28th OSS oversees airfield management, weather support, intelligence analysis, combat crew communications, B-1 and MQ-9 simulator training, aircrew flight equipment, aircrew flight records, the Belle Fourche Electronic Scoring Site, combat survival training, and weapons and tactics training.

34th Bomb Squadron

Known as the Thunderbirds, the 34th Bomb Squadron's mission is to defeat America's enemies across the globe at a moment's notice. The history of the 34th BS dates back to World War I, when the US Army organized the 34th Aero Squadron on June 11, 1917. Throughout its history, the 34th BS has transitioned through numerous types of different aircraft and has gone through many activation and deactivations. Since 1994, the 34th BS has flown the B-1B.

37th Bomb Squadron

The 37th Bomb Squadron (37th BS) Tigers are responsible for employing the B-1B in support of DOD missions. The 37th BS consists of approximately 70 Airmen, including aviators, intelligence, and aviation resource management Airmen. These Airmen enable the Tigers to remain on the

leading edge of B-1 employment, supporting precision engagement and global attack missions.

28th Mission Support Group

The 28th Mission Support Group provides mission-essential services at home and combat support services to Airmen while deployed. The group provides essential services for active-duty members, retirees and civilians and their families, including food services, security, vehicles, supplies, computer and telephone support, civil engineering, educational and recreational services, and personnel support.

Six squadrons are under the 28th MSG authority: the 28th Civil Engineer Squadron, 28th Contracting Squadron, 28th Communications Squadron, 28th Logistics Readiness Squadron, 28th Security Forces Squadron and 28th Force Support Squadron.

28th Civil Engineer Squadron

The 28th Civil Engineer Squadron provides the necessary assets and skilled personnel to prepare and sustain installations throughout the world, in times of war and peace. The squadron's dual mission is to provide quality home-station engineer services for rapid, decisive, sustainable combat support, anytime, anywhere. Additionally, the Prime Base Engineer Emergency Force (Prime BEEF) mobility teams stand ready to provide fully responsive engineer capabilities. This dual mission of war readiness and infrastructure maintenance is accomplished with a combined military and civilian workforce capable of rapid transition between missions.

The squadron consists of six flights: installation management, engineering, operations, emergency management, explosive ordnance disposal, and fire and emergency services. In addition to daily operations, Prime BEEF is responsible for maintaining, repairing, operating, and helping the base recover before, during, and after a peacetime or wartime disaster, or deploying a fully capable engineer force in support of operations.

28th Contracting Squadron

The mission of the 28th Contracting Squadron is to provide agile contracting support and business advice to Ellsworth and combatant commanders.

The squadron consists of three flights:

- The LGCA Acquisition Flight provides contract support for commodity and service requirements.
- The LGCB Acquisition Flight provides construction and related support to the 28th Civil Engineer Squadron.
- The LGCP Plans and Programs Flight support the base's contract Quality Assurance Program, Government Purchase Card program and Contracting Systems Support activity.

28th Communications Squadron

The 28th Communications Squadron's vision to set the cyberspace standard of excellence for the Air Force is summarized by their motto — Wired for War. The squadron provides combat-ready Airmen in support of warfighter requirements while developing cyberspace professionals focused on world-class customer support to all units assigned to Ellsworth Air Force Base.

28th Logistics Readiness Squadron

The mission of the 28th Logistics Readiness Squadron is to provide responsive, reliable and sustainable logistics support anytime, anywhere. The squadron is made up of more than 340 professionals separated into four flights and two sections. These professionals provide support to 39 wing and tenant units with mobility readiness and operations, vehicle operations, vehicle and equipment maintenance, personal property and cargo shipments, fuel storage and distribution, supply and equipment accountability, and a war reserve materiel program, and maintain B-1 spares packages and aircraft parts.

28th Security Forces Squadron

The defenders of the 28th Security Forces Squadron (28 SFS) provide integrated defense and combat capability for Ellsworth, the United States, and commanders worldwide. Whether at home station or forward deployed, members of the 28th SFS provide an umbrella of force protection encompassing all personnel, property, and resources.

The squadron is divided into five flights that handle: support staff functions (S1); ground intelligence and investigations (S2); operations and training (S3); logistics (S4); and plans and programs (S5). These staff agencies perform such roles as planning, equipping, training, directing and, evaluating mission-related activities and personnel assigned to the 28th SFS.

28th Force Support Squadron

The 28th Force Support Squadron provides services to Ellsworth's active-duty members, DOD civilians, retirees and their families. The 28th FSS includes the following flights: Manpower and Personnel; Force Development; Sustainment Services; Airman and Family Services; and Community Services. These flights, each with a distinct mission, combine to provide important support services to the Ellsworth community.

28th Maintenance Group

The 28th Maintenance Group is responsible for generating airpower for the 28th Bomb Wing and maintaining fleet health and availability of 28 combat-coded B-1 aircraft, associated support equipment and munitions supporting annual flying and training programs, as well as Joint Chiefs of Staff and contingency taskings.

28th Aircraft Maintenance Squadron

The 28th Aircraft Maintenance Squadron is the largest squadron in the 28th Bomb Wing, with more than 700 Airmen who maintain and support 28 combat-coded B-1 aircraft. The 34th and 37th Aircraft Maintenance units provide direct maintenance support to the 34th and 37th Bomb squadrons at home and deployed, with maintenance equipment support from the Support Flight.

28th Maintenance Squadron

The 28th Maintenance Squadron combines avionics, aircraft systems and maintenance capabilities into one squadron consisting of seven flights with more than 460 assigned personnel and contract oversight of Precision Measurement Equipment Laboratories and Transient Alert activities. The squadron is responsible for all off-equipment maintenance and heavy repairs, supports 27 combat-coded B-1 aircraft and related subsystems, and manages the base's Crashed, Damaged, Disabled Aircraft Repair program, which is responsible for a five-state region.

28th Munitions Squadron

The 28th Munitions Squadron provides conventional munitions, armament systems and trained munitions personnel, supporting 27 combat-coded B-1 aircraft assigned to the 28th Bomb Wing. The squadron consists of more than 240 professionals working in four flights supporting the 34th and 37th Bomb squadrons and one National Guard unit.

28th Medical Group

The 28th Medical Group provides outpatient medical care to active-duty members and their families, as well as retired personnel and their families. The medical professionals provide a wide range of services and programs designed to ensure good health and wellness for those they serve, including a family practice clinic, optometry clinic, dental clinic, flight medicine clinic, physical therapy clinic, Health and Wellness Center, mental health clinic and public health clinic. The two squadrons that make up the 28th Medical Group are the 28th Medical Support Squadron and the 28th Medical Operations Squadron.

Tenant Units

Tenant Units are units at an Air Force installation that have a mission that is substantially different than that of the host. Tenant Units typically rely on the installation for their infrastructure needs like sewer, power, security, and recreation. There are 6 such units at Ellsworth AFB, they are:

432nd Attack Squadron

The 432nd Attack Squadron (432nd ATKS), was reactivated on October 1, 2011. The 432nd ATKS mission is to remotely employ MQ-9 Reaper aircraft from ground control facilities located at Ellsworth in support of worldwide combatant commander requirements. The lineage of the 432nd dates back to 1917, when it was first organized as the 89th Aero Squadron operating out of Kelly Field, Texas. The 432nd ATKS provides combatant commanders with actionable precision reconnaissance capabilities for time-critical targets, air interdiction, close air support, and strike coordination.

Air Force Financial Services Center

The Air Force Financial Services Center, which opened on September 14, 2007, provides travel processing and payment of temporary duty and permanent change of station travel that is done outside of the Defense Travel System.

Defense Logistics Agency Disposition Services

The Defense Logistics Agency Disposition Services field office at Ellsworth is a satellite office. Central DLA offices are located at Fort Riley, Kansas, and maintain administrative and operational responsibility for this site in South Dakota. The primary mission of DLADS is the receipt of all excess, surplus and recyclable property from DOD activities in South Dakota.

Defense Security Service

The Defense Security Service makes its contribution to the National Security Community by conducting personnel security investigations, providing industrial security products and services, and offering comprehensive security education and training to DOD and other government entities.

Detachment 226, Air Force Office of Special Investigations

Within the jurisdiction of the United States Air Force, the Air Force Office of Special Investigations (OSI) is the single agency responsible for the investigation of major criminal, fraud, and counterintelligence matters. It identifies, investigates and neutralizes such crimes as espionage, terrorism, fraud, larceny, murder, assault, sex offenses and all other major criminal activities that threaten the people and resources of the Air Force and DOD.

Detachment 8, 372nd Training Squadron

Detachment 8 is one of 46 Air Education and Training Command training detachments throughout the world. They provide formal training for the B-1B and Aerospace Ground Equipment maintenance community. The detachment currently employs 20 personnel at Ellsworth and trains more than 1,600 maintainers annually.

Northwest Area Audit Office, Air Force Audit Agency

The mission of the Air Force Audit Agency is to provide all levels of Air Force management with independent, objective and quality audit services. These services include reviewing and promoting the economy, effectiveness and efficiency of operations; evaluating programs and activities; assisting management in achieving results; and assessing and improving stewardship and the accuracy of financial reporting.

3.7 Ellsworth AFB Mission Footprint

Mission activities conducted on and around Ellsworth AFB can generate potential impacts on surrounding community areas if incompatible land uses develop. Examples of potential mission impacts on surrounding communities include noise and vibration from overhead flights and the risk of aircraft accidents. Conversely, the military mission is susceptible to hazards and other incompatibilities created by certain types of civilian development or activities, such as obstructions to air space or location of noise sensitive uses in high noise zones. Understanding the overlapping spatial patterns of these compatibility zones, or “mission footprint” is essential for promoting compatible land use and informed decision making.

There are several elements that make up the mission footprint that extends outside the Ellsworth AFB boundaries. These essential elements play a key role in the installation’s viability for sustaining current and future mission operations. These elements are listed below and are described in more detail on the following pages.

Ellsworth AFB Footprint Elements

- Airfield Approach and Departure Flight Tracks
- Imaginary Surfaces
- Airfield Accident Potential Zones
- Aircraft Noise Contours
- Airspace Control
- Part 77 Vertical Obstruction Compliance
- Bird / Wildlife Aircraft Strike Hazard (BASH) Relevancy Area

Airfield Approach and Departure Flight Tracks

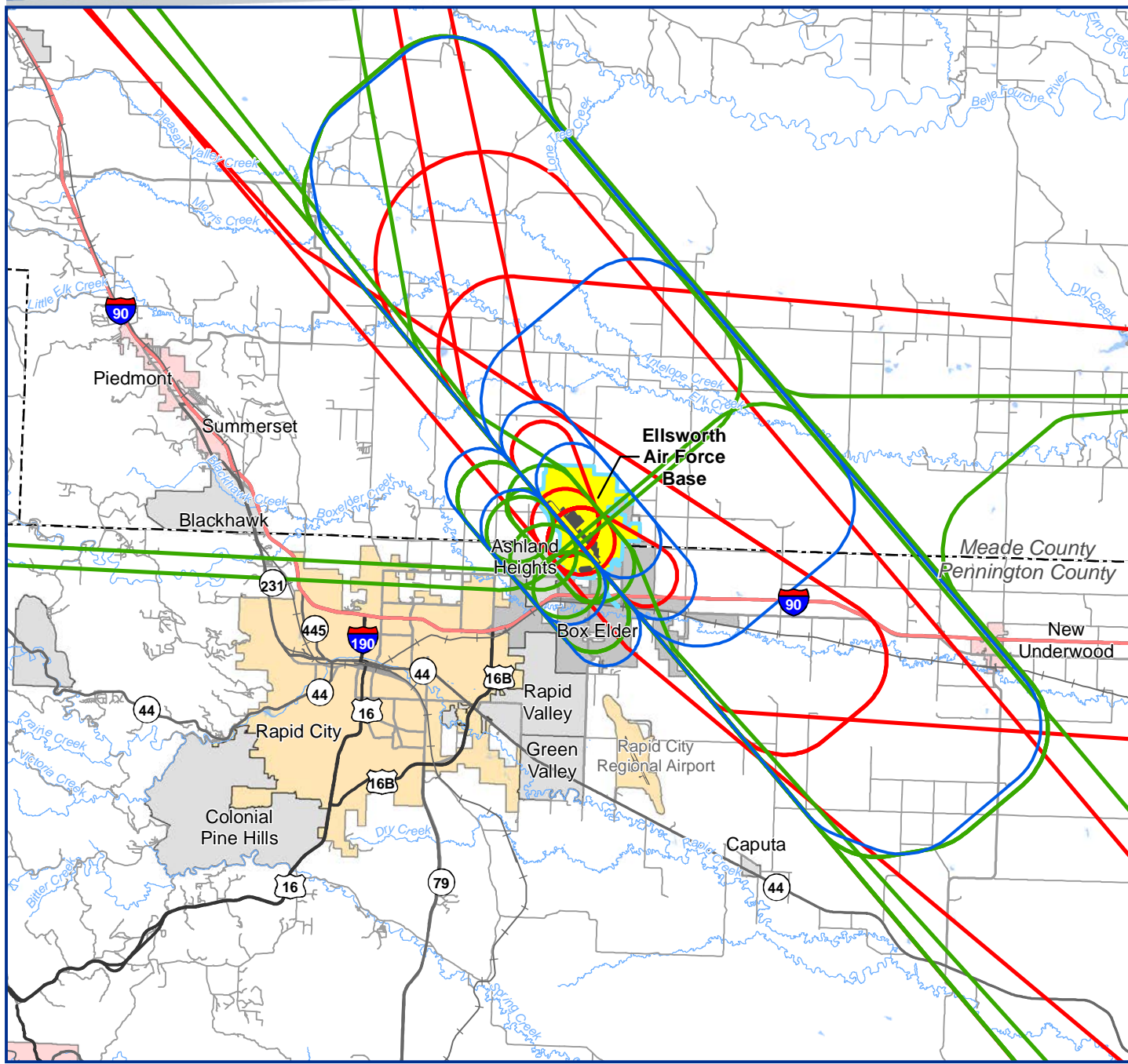
According to the Ellsworth AFB Air Installation Compatible Use Zone (AICUZ) report, flight tracks are developed to provide guidance on the range of standard operations that may occur at the airfield. These are created using information gathered from air traffic controllers, pilots, and other sources. When flight tracks are developed, they attempt to avoid urban development as much as possible to reduce impacts and risk to the general public and commercial or general aviation activities, but safety of operations is paramount in the design of these patterns. Figure 3-4 illustrates the primary flight tracks used by Ellsworth AFB aircraft. Other flight tracks may also be used depending on operational concerns, such as weather or mission.

The closed pattern flight tracks are isolated to areas surrounding the installation and consist of low-level altitude flights. As shown on Figure 3-4, the closed pattern flight tracks tend to stay away from heavily populated areas.

Source: Air Installation Compatible Use Zone Report, Ellsworth Air Force Base, November 2008

Figure 3-4

Mission Footprint: Flight Patterns



Legend

Military Flight Tracks

- Departure (Red line)
- Arrival (Green line)
- Closed Pattern (Blue line)

Ellsworth Air Force Base (Yellow square)

County Boundary (Dashed line)

Rapid City (Orange square)

Box Elder (Grey square)

Other Incorporated Community (Pink square)

Other Unincorporated Community (Light grey square)

Water Body (Blue wavy line)

River (Blue line)

Interstate (Red line with shield)

Federal Highway (Blue line with shield)

State Highway (Black line with shield)

Major Roads (Grey line)

Local Traffic (Thin grey line)

Railroad (Black line with cross-ticks)

Airfield Surface / Runway (Thick black line)

Source: TIGER, 2015, Matrix Design Group, 2015, Ellsworth Air Force Base, 2015.

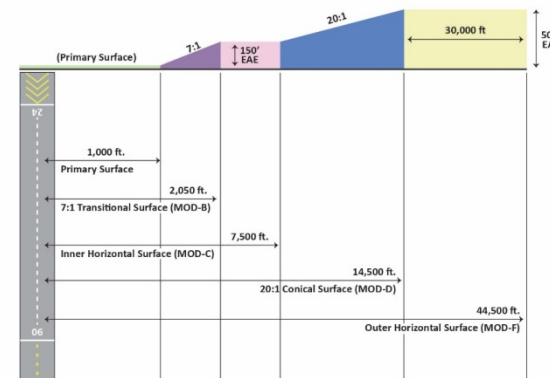
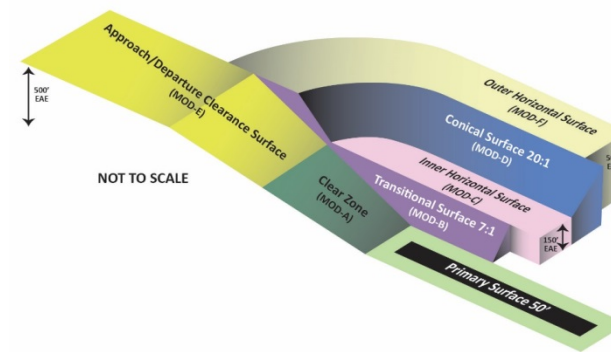
Matrix DESIGN GROUP

0 2 4 Miles

Imaginary Surfaces

Federal Aviation Regulations, Part 77, specifies a series of imaginary height restriction surfaces surrounding an airport. The imaginary surfaces of an active runway are used to define the required airspace that must remain free of vertical obstructions in the vicinity of aviation operations to ensure safe flight operations. The illustration to the right shows the slope of the surfaces that helps guide military and community planners in land use planning around an airfield. Structures should not exceed these heights to protect the navigable airspace associated with the airfield, the safety of pilots and people, and the land uses on the ground. This is especially important in the clear zone and the approach-departure surfaces.

The extent or size of an imaginary surface depends on the type of runway. Military runways are categorized as either Class A or Class B based on the type of aircraft that use the runways. Class A runways are for smaller or lighter aircraft. Class B runways are the category for the majority of military aircraft. Ellsworth AFB runway is classified as a Class B runway and its relative imaginary surfaces are shown in Figure 3-5.



Example views of the different imaginary surface layers

Airfield Accident Potential Zones

In addition to the assessment of imaginary surfaces, the second element of the airfield safety analysis is the assessment of Accident Potential Zones (APZs). Per Air Force regulations, APZs are developed to assist military and community planners in developing land uses that are compatible with airfield operations, thereby protecting the health and safety of the public and aviators. Within these zones, there are recommended types, densities, and intensities of land uses. While the likelihood of an aircraft mishap occurring is remote, the Air Force identified APZs provide the best practical solution for public safety.

There are three safety zones that extend from the ends of runways: Clear Zone (CZ), APZ I and APZ II. These are illustrated on Figure 3-6.

The CZ is the area that begins at each end of the runway. At Ellsworth AFB, the Runway 13/31 CZ measures 3,000 feet wide by 3,000 feet long. This is the area that has the highest potential of an aircraft incident. It is recommended that no development occur in the CZ unless it is a use that is needed for safe operations of aircraft.

The APZ I is the area beginning at the end of each CZ at a width of 3,000 feet and a length of 5,000 feet. This area has a lower potential for accidents and therefore has less restrictive development restrictions recommended.

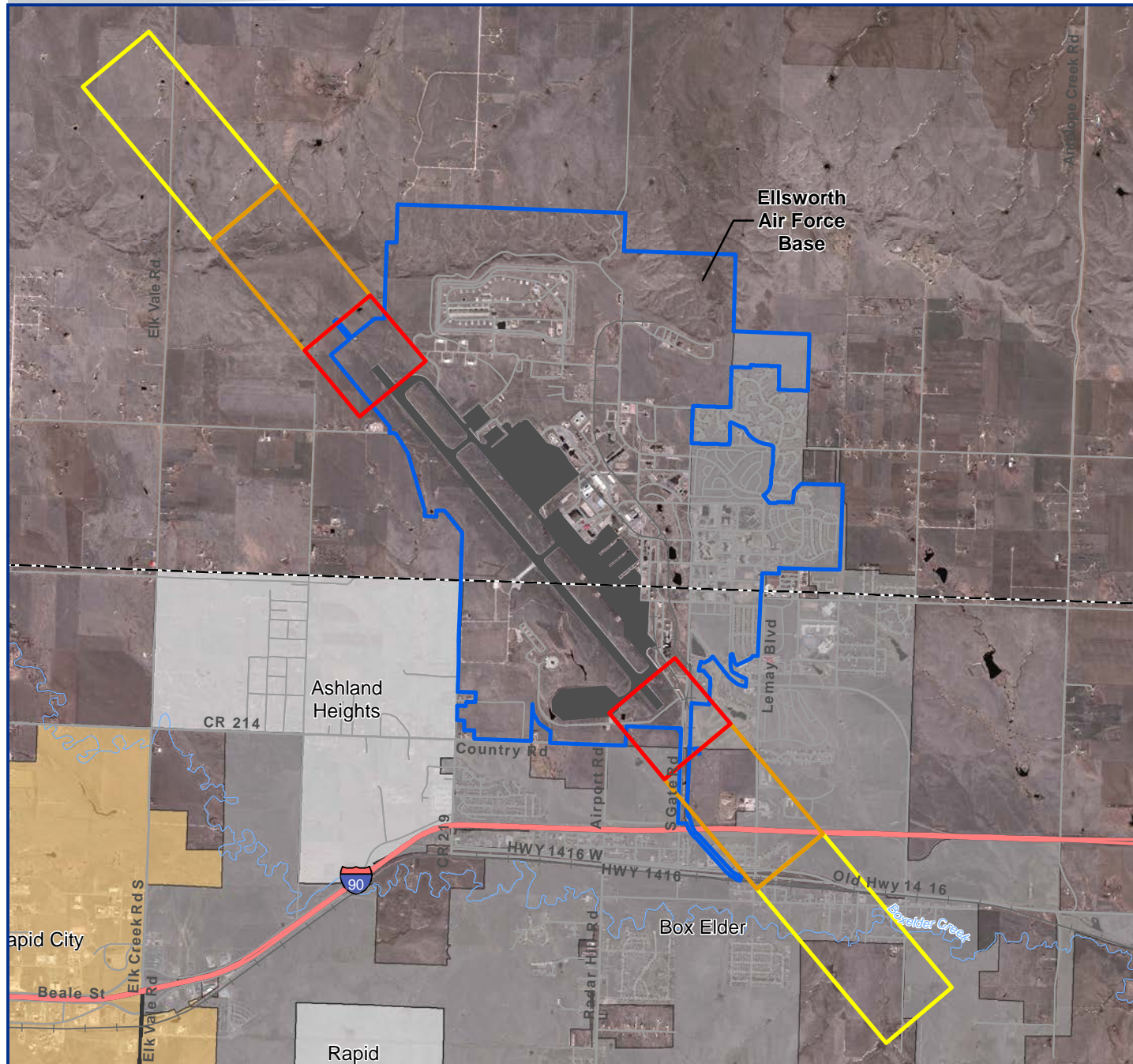
The APZ II is the area that begins at the end of each APZ I and is 3,000 feet wide by 7,000 feet long. The accident potential in this area is further reduced, and with this, some additional development types are allowed.

The Ellsworth AFB AICUZ report provides a complete listing of the land uses that are not recommended for use in the CZ, APZ I and APZ II. In these recommendations, some land uses also have recommended limits on density and intensity of use. Communities are encouraged to incorporate these land use recommendations into their planning and regulatory documents. This helps to protect public health and safety and maintain compatibility with continued operations at the military airfield.

Source: Air Installation Compatible Use Zone Report, Ellsworth Air Force Base, November 2008

Figure 3-6

Mission Footprint: Accident Potential Zones



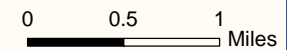
Legend

Accident Potential Zones

- CZ
- APZ I
- APZ II

- Ellsworth Air Force Base
- County Boundary
- Rapid City
- Box Elder
- Other Unincorporated Community
- Water Body
- River
- Interstate
- Federal Highway
- State Highway
- Major Roads
- Local Traffic
- Railroad
- Airfield Surface / Runway

Source: TIGER, 2015,
Matrix Design Group, 2015,
Ellsworth Air Force Base, 2015.



Airfield Noise Contours

Aircraft noise can come from flight operations (overflight, take-offs, landings, touch-and-go operations) and engine maintenance run-ups. The Air Force considers how its operations impact the local community by calculating an average-weighted noise level measured as a day-night average A-weighted sound level (DNL). The Ellsworth AFB AICUZ uses the DOD NOISEMAP program to produce noise contours indicating noise exposure levels from aircraft operations; this is an average of all types of aircraft at Ellsworth AFB.

Low flying military aircraft in the Rapid City and Piedmont areas are typically departing or arriving at Ellsworth Air Force Base. Pilots and air traffic controllers follow specific procedures to mitigate the impact over populated areas, to include remaining at higher altitudes over densely populated areas. However, lower altitudes are necessary during takeoff and landing. On takeoff, the sound generated by the B-1 will be louder as higher engine settings are necessary to safely climb the aircraft away from the ground.

Aircraft preparing to land do not generate as much sound as lower engine settings are used. Some impact to area residents are felt however, procedures are in place to minimize the frequency and time of occurrence of such events. Some of these procedures include implementing a curfew flying window, reducing engine run-ups and turning off afterburners at the earliest time after takeoff.

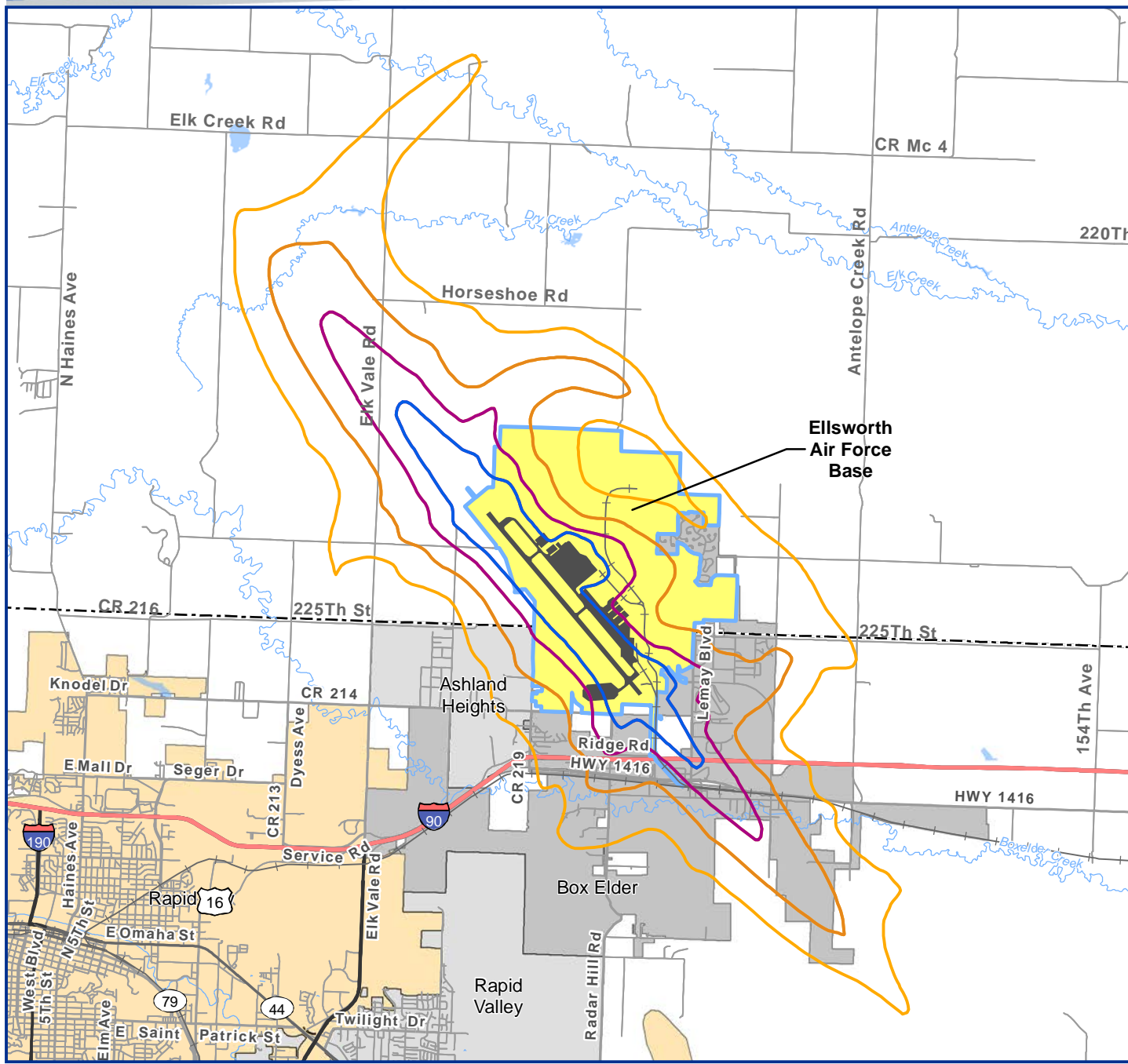
Noise levels are depicted visually as noise contours that connect points of equal value. These noise contours are drawn in 5 dBA increments from DNL of 65 dBA up to 80 dBA, and are overlaid on a map of the Ellsworth AFB vicinity. The 80 dB DNL is the “loudest” contour line computed and the 65 dB DNL is the “quietest”. The DNL measure has been determined to be a reliable measure of community sensitivity to aircraft noise and has become a standard metric used to map aircraft noise impacts. The noise contour map provides important context when important zoning and land use decisions are being made.

The City of Box Elder is the most heavily impacted by the noise contours. This is primarily due to the City’s recent annexations of property within the Ellsworth AFB fenceline. However, portions of Box Elder, southeast of the approach runway fall within the 80 DNL. Outside of the incorporated areas of Box Elder, the noise contour footprint falls over unincorporated areas of Meade and Pennington Counties.

The 2008 noise contours are illustrated on Figure 3-7.

Figure 3-7

Mission Footprint: Noise Contours





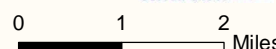
Legend

2008 DNL Noise Contour (dB)

- 65 DNL
- 70 DNL
- 75 DNL
- 80 DNL

- Ellsworth Air Force Base
- County Boundary
- Rapid City
- Box Elder
- Other Incorporated Community
- Other Unincorporated Community
- Water Body
- River
- Interstate
- Federal Highway
- State Highway
- Major Roads
- Local Traffic
- Railroad
- Airfield Surface / Runway

Source: TIGER, 2015, Matrix Design Group, 2015, Ellsworth Air Force Base, 2015.

Airspace Control

To help controllers and pilots deal with varying traffic conditions in the sky, United States airspace has been divided into six different classes (A, B, C, D, E, and G). These different classes have different requirements for entry into the airspace, pilot qualifications, radio and transponder equipment, and Visual Flight Rules (VFR) weather minimums.

Ellsworth AFB is approximately 6 miles northwest of Rapid City Regional Airport. Although Ellsworth AFB is a private-use military airport, and Rapid City Regional Airport is a public use airport, they have a shared Class D airspace. Class D airspace can generally be described as a controlled airspace that extends from the surface or a given altitude to a specified higher altitude. At Ellsworth AFB, Class D airspace extends from the surface up to and including 5,800 feet above mean sea level (MSL) with a 5.9-nautical mile radius from the airport center. Class D airspace for Rapid City Regional Airport extends from the surface up to and including 5,700 feet above MSL with a 4.3-nautical-mile radius.




Class D airspace is designed to provide air traffic control (ATC) into and out of primary airports that have an operational control tower, radar approach capabilities, and where aircraft operations are periodically at high density levels. All aircraft operating within Class D airspace are required to maintain two-way radio communication with the ATC facilities. The 28th Operations Support Squadron manages Ellsworth AFB's radar approach control (RAPCON) and the control tower. In 2008, Ellsworth launched the DOD's first non-contiguous RAPCON facility, the Dakota Air Traffic Control Facility, which controls airspace areas separated by more than 260 miles, including Rapid City Regional Airport, Ellsworth Air Force Base, Minot Regional Airport and Minot Air Force Base in North Dakota.

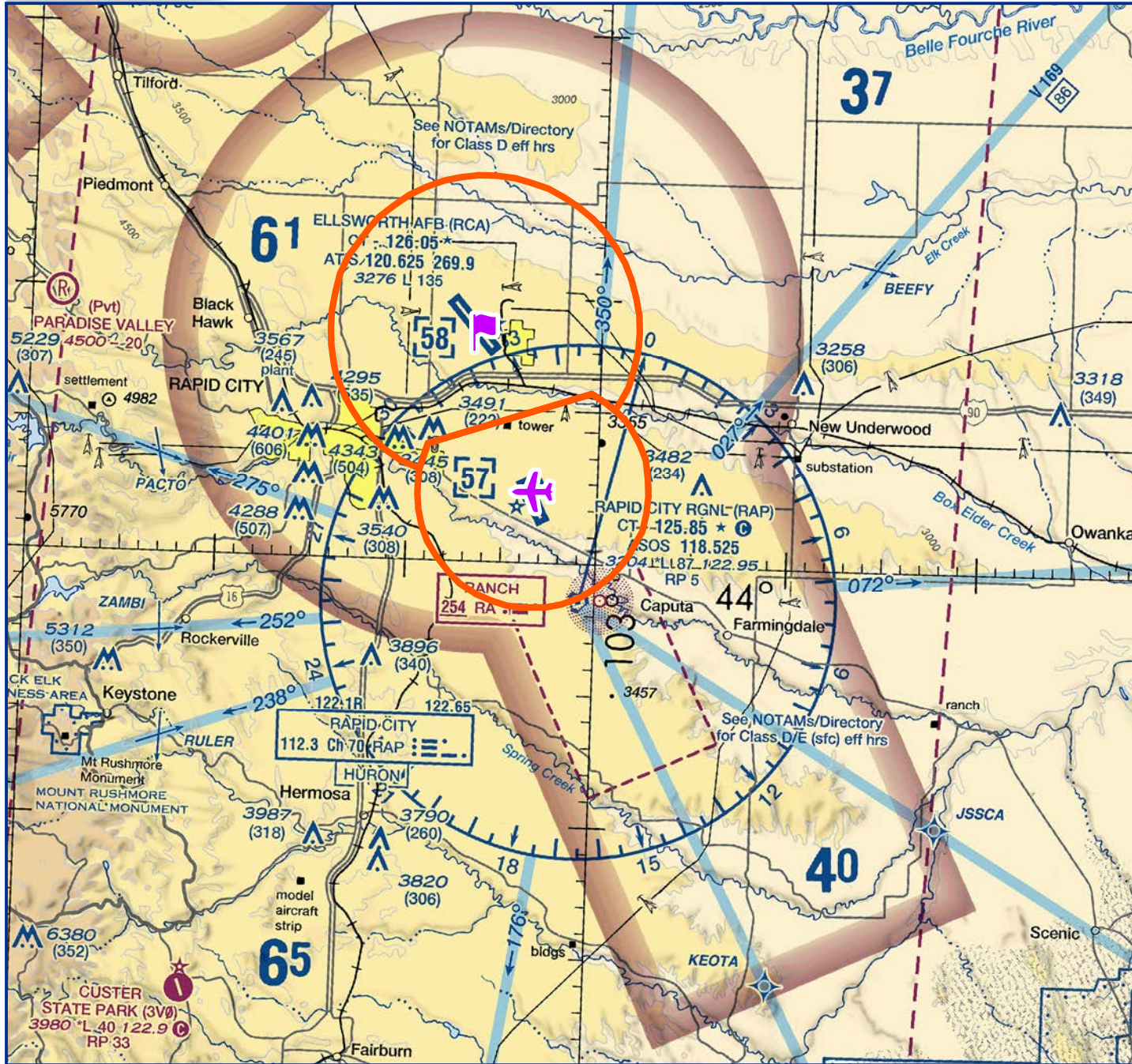
The Class D airspace area is illustrated on Figure 3-8.

Figure 3-8

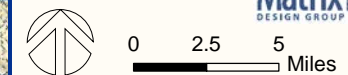
Airspace Control

Legend

-  Class D Airspace (Airspace Control Area)
-  Ellsworth Air Force Base
-  Rapid City Regional Airport



Source: USDOT FAA Sectional Charts, 2015.



Part 77 Vertical Obstruction Compliance

The Federal Aviation Act was enacted in 1958 to provide methods for overseeing and regulating civilian and military use of airspace over the United States. It requires the Secretary of Transportation to make long-range plans that formulate policy for the orderly development and use of navigable airspace. The intent is to serve the needs of both civilian aeronautics and national defense, but it does not specifically address the needs of military agencies. The Federal Aviation Administration (FAA) was created as a result of the Act for a variety of purposes, including the management of airspace over the US.

Another important outcome of the Act is FAA Regulation Title 14 Part 77 commonly known as Part 77, which provides the basis for evaluation of vertical obstruction compatibility. This regulation provides information to evaluate the potential for a vertical obstruction based on the elevation of the airfield, the height and resulting elevation of the new structure or facility, and the location of the structure or facility relative to the airfield in question. This regulation determines compatibility based on the height of proposed structures or natural features relative to their distance from the ends of a runway.

As of January 29, 2013, the main focus of Part 77.17 is to establish standards to determine obstructions within navigable airspace, typically within a certain distance from an airport or airfield. A key reference used for compatibility planning is the following:

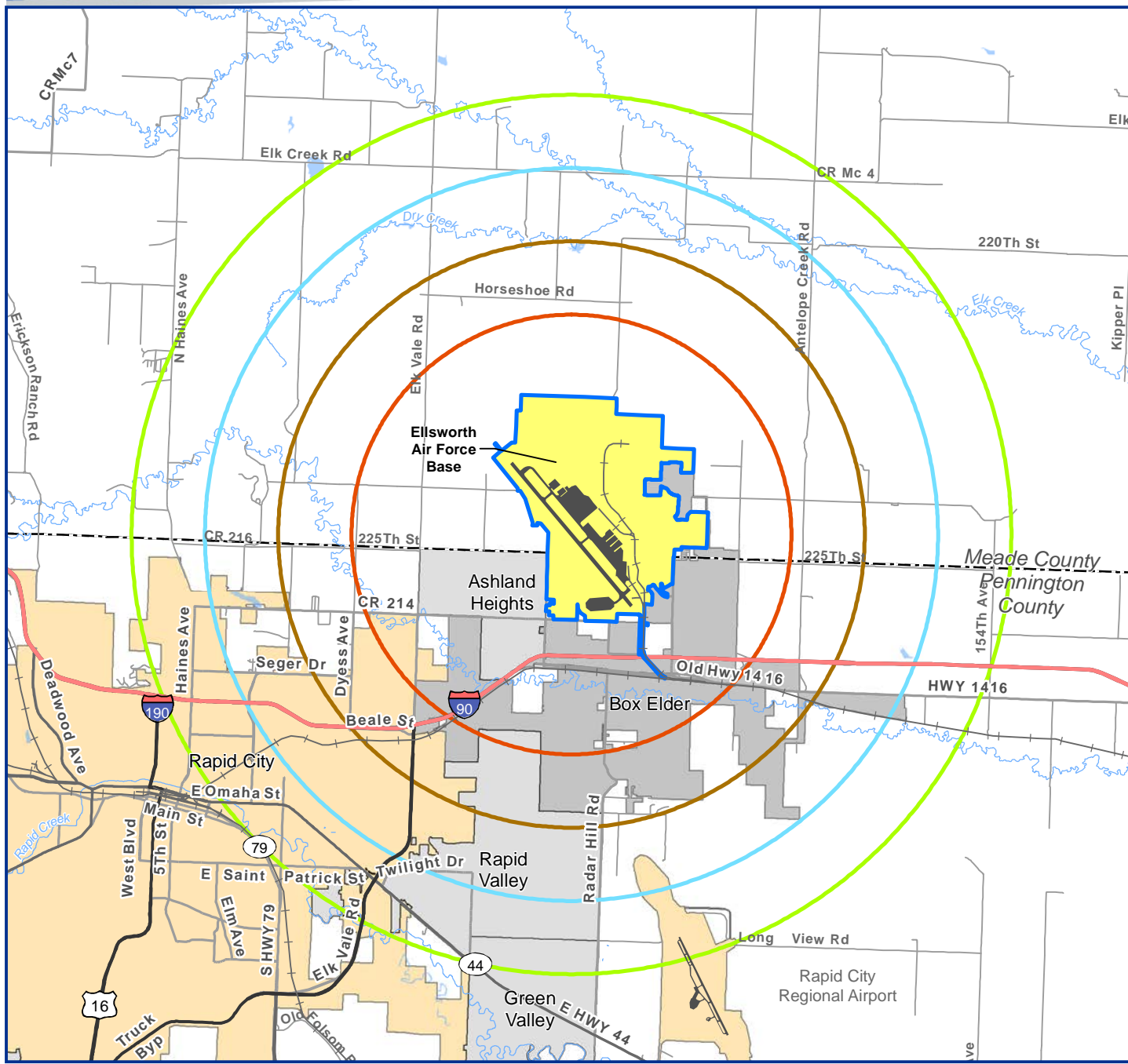
A height that is 200 feet AGL or above the established airport elevation, whichever is higher, and within three nautical miles of the established reference point of an airport, excluding heliports, with its longest runway more than 3,200 feet in actual length is considered a vertical obstruction. This height increases in the proportion of 100 feet for each additional nautical mile of distance from the airport up to a maximum of 499 feet.

Figure 3-9 provides an illustration of this measure of vertical obstruction. Note that this is in addition to, not a replacement of, imaginary surface information discussed previously.

A more detailed discussion of the Federal Aviation Act can be found in Chapter 4, Section 4.2 of this document.

Figure 3-9

Mission Footprint:
Part 77



Legend

- Up to 200' @ 3NM
- Up to 300' @ 4NM
- Up to 400' @ 5NM
- Up to 500' @ 6NM
- Ellsworth Air Force Base
- County Boundary
- Rapid City
- Box Elder
- Other Unincorporated Community
- Water Body
- ~ River
- Interstate
- Federal Highway
- State Highway
- Major Roads
- Local Traffic
- Railroad
- Airfield Surface / Runway

Source: TIGER, 2015,
Matrix Design Group, 2015,
Ellsworth Air Force Base, 2015.

0 1 2 Miles

Bird / Wildlife Aircraft Strike Hazard Relevancy Area

Birds and wildlife can represent a significant hazard to military training and flight operations. Certain types of land uses attract birds and wildlife such as standing water and grasslands. While there have been an insignificant number of fatalities associated with bird air strike hazards (BASH) in the past 30 years, the concern associated with BASH is the significant amount of damage a BASH incident can cost the federal government. Since fiscal 1985, the Air Force has spent more than \$820 million repairing aircraft damaged by collisions with birds.

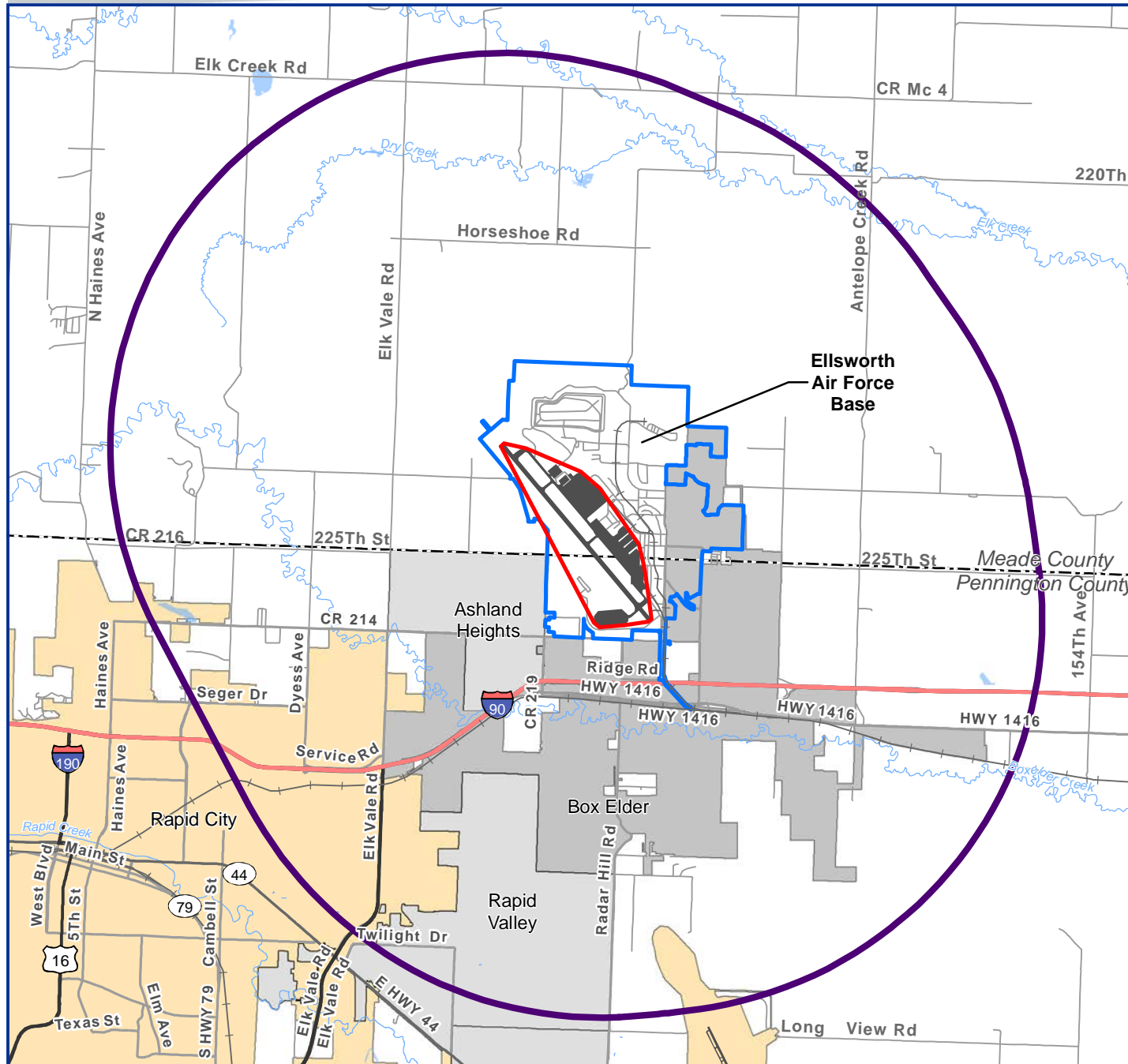
Certain types of land uses attract birds and wildlife, such as open water areas, standing water, and other natural areas. The location of Ellsworth AFB near open space, agricultural land, and wetlands, increases the risk for BASH incidents. Relative to compatibility, the control of attractions near the airfield is important.

According to FAA statistical analysis, the prime area of BASH incidents to occur is within a five mile area around the defined of airport operations area. The BASH Relevancy Area illustrated in Figure 3-10 shows the FAA five-statute mile around the air operations area that has been studied as having a high risk profile associated with aircraft collisions with birds and wildlife due to aircraft flying at lower altitudes and slower speeds. The FAA also identified that birds usually fly in the area from ground level upwards to 3,500 feet above ground level (AGL).

Pest management practices at Ellsworth AFB are addressed in the Pest Management Program. Ellsworth AFB's Pest Management Program currently focuses on control of pest species, in the case of pigeons, Base personnel work to control pigeon populations to lower the probability for bird/wildlife aircraft strike hazard in order to protect USAF property and personnel

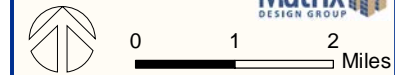
Figure 3-10

Mission Footprint:
BASH Relevancy Area



- Legend**
- 5-mile BASH Relevancy Area
 - Airport Operations Area
 - Ellsworth Air Force Base
 - Airfield Surface / Runway
 - County Boundary
 - Rapid City
 - Box Elder
 - Other Unincorporated Community
 - Water Body
 - River
 - Interstate
 - Federal Highway
 - State Highway
 - Major Roads
 - Railroad

Source: TIGER, 2015,
Matrix Design Group, 2015,
Ellsworth Air Force Base, 2015.



Please see the next page.



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4.1 Introduction

There are many existing tools that can be used to encourage, promote, and manage compatibility between military installations and their neighboring communities. This chapter provides an overview of compatibility tools currently used or applied in evaluating and addressing compatibility issues in the Ellsworth Air Force Base (AFB) Joint Land Use Study (JLUS) area. Relative to compatibility planning, there are a number of existing plans and programs, which are either designed to address compatibility directly or which indirectly address compatibility issues through the topics they cover. This summary provides an overview of key plans and programs that impact compatibility planning organized by level of government.

There are three types of planning tools evaluated relative to their applicability: permanent, semi-permanent, and conditional. Permanent planning tools include acquisition programs, either fee simple purchase of property or the purchase of development rights. Semi-permanent tools include regulations such as zoning or adopted legislation. Conditional tools include memorandums of understanding, intergovernmental agreements, and other policy documents such as comprehensive plans and general plans that can be periodically modified.

The tools listed in this chapter are not exhaustive, but are meant to provide a general overview of the primary tools currently utilized in the JLUS Study Area. The overview of plans and programs is organized by level of government in the following order:

- Federal Programs and Policies
- State of South Dakota
- Local Jurisdiction Planning Tools
- Pennington County
- Meade County
- City of Rapid City
- City of Box Elder
- Other Tools and References

4.2 Federal Programs and Policies

Federal policy, laws, and programs have evolved to impact almost every aspect of land use. A broad range of federal plans, programs, and actions impact Ellsworth AFB both directly and indirectly. However, depending on the subject area, opportunities for vertical integration and cross jurisdictional

collaboration vary widely. Federal programs and policies are carried out by the various arms of the federal government, although, in some cases these tools also authorize state, county, regional or local governmental agencies to implement related policies, programs and regulations. The following federal programs and policies were evaluated to assist in determining where areas of improvement could enable better land use compatibility planning at the local level.

The following is a list of Federal laws or programs, to capture those considered to be most relevant to Ellsworth AFB to assess compatibility issues and to develop potential strategies to avoid or mitigate conflicts.

Air Force Instruction 90-2001

Air Force Instruction 90-2001 was published in September 2014 to implement the Encroachment Management Program. The Instruction applies to all Air Force installations to address encroachment issues and prevent or reduce the impacts of encroachment. The Instruction includes Encroachment Management Framework, which has four elements (Organize, Assess, Act, and Monitor) to address a variety of challenges. Organization encompasses leadership involvement, a cross-functional management structure, an issue evaluation structure, a designated Executive Director at the installation level, and a geographic scope. Assessment includes studying internal and external relationships and developing encroachment studies, such as an Installation Complex Encroachment Management Action Plan (ICEMAP). Acting involves implementation of programs. Lastly, monitoring involves maintaining awareness of mission needs and encroachment issues.

Clean Air Act

The US Clean Air Act empowers the Environmental Protection Agency (EPA) and state environmental agencies to regulate pollution. The Clean Air Act provides the EPA and state regulatory agencies the power to establish heightened air quality regulations in counties designated by the EPA as nonattainment for air quality. A map of these counties is available at <http://www.epa.gov/oaqps001/greenbk/mapnpoll.html>. All of the

jurisdictions in the JLUS Study Area are designated as in attainment for the National Ambient Air Quality Standards pollutants as recognized by the EPA.

Clean Water Act

The Clean Water Act (CWA) governs the management of water resources and controls and monitors water pollution in the US. The CWA establishes goals for eliminating the release of toxic substances and other sources of water pollution to ensure that surface waters meet high quality standards. In doing so, the CWA prevents the contamination of nearshore, underground and surface water sources.

Comprehensive Environmental Response, Compensation, and Liability Act

This law was designed to assist in the clean-up of sites with hazardous contaminants to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment. The Comprehensive Environmental Response, Compensation, and Liability Act:

- established prohibitions and requirements concerning closed and abandoned hazardous waste sites,
- provided for liability of persons responsible for releases of hazardous waste at these sites, and
- established a trust fund to provide for cleanup when no responsible party could be identified.

The Comprehensive Environmental Response, Compensation, and Liability Act has relevance as a potential JLUS tool through the Superfund environmental program, established to address hazardous waste sites. Hazardous waste is sometimes present in or around military installations, particularly where munitions and ordnance are stored and used for training purposes. If not disposed of properly hazardous waste could be potentially harmful to the installation tenants and surrounding communities. The

Superfund cleanup process protects communities and the environment from hazardous waste and further contamination.

Department of Defense Conservation Partnering Initiative

In 2003, Congress amended Title 10 U.S.C. §2684a and §2692a (P.L. 107-314), the National Defense Authorization Act, to add authority to the Department of Defense (DOD) to partner with other federal agencies, states, local governments, and conservation-based Non-Governmental Organizations (NGOs) to set aside lands near military bases for conservation purposes and to prevent incompatible development from encroaching on, and interfering with, military missions.

This law provides an additional tool to support smart planning, conservation, and environmental stewardship on and off military installations. The purpose of the program is to acquire real property interests, such as conservation easements or development rights to address current and potential encroachment or compatibility threats to an installation's mission.

DOD Readiness and Environmental Protection Integration

To implement the authority provided by the Department of Defense Conservation Partnering Integration, the DOD established the Readiness and Environmental Protection Integration (REPI). This integration enables the DOD to work with state and local governments, NGOs, and willing landowners to limit encroachment and incompatible land use.

REPI funds are used to support a variety of DOD partnerships that promote compatible land use. By relieving encroachment pressures, the military is able to test and train in a more effective and efficient manner. By preserving the land surrounding military installations, habitats for plant and animal species are conserved and protected.

It is important for Ellsworth AFB to ensure that military activities are not encroached upon by incompatible land uses. The REPI gives local agencies an opportunity to partner with the military and other local agencies. This allows for buffers around the base to be established that will help further protect its mission.

DOD Energy Siting Clearinghouse

Section 358 of the 2011 National Defense Authorization Act sanctioned the study of the effects of new construction and obstructions on military installations and operations. The Energy Siting Clearinghouse serves to coordinate the DOD review of existing applications for energy projects. Several key elements of Section 358 include designation of a senior official and lead organization to conduct the review of energy project applications, a specific timeframe for completion of a hazard assessment associated with an application (30 days), specific criteria for DOD objections to projects and a requirement to provide an annual status report to Congress. This legislation facilitates procedural certainty and a predictable process that promotes compatibility between energy independence and military capability.

DOD Operational Noise Manual

The Operational Noise Manual provides a practical reference for military and civilian personnel with duties and responsibilities in operational noise management. The manual assists personnel to understand and implement current DOD environmental policy and guidance. The majority of the manual is devoted to the following subjects: Characteristics of Sound; Effects of Noise; Military Noise Sources; Noise Monitoring; Reduction of Noise Conflicts and more.

Department of Housing and Urban Development Noise Regulation

The United States Department of Housing and Urban Development (HUD) has instituted policies through section 24 Code of Federal Regulations (CFR) Part 51 that are designed to promote the creation of controls and standards for community noise abatement by state and local governments. The focus of these regulations is to reduce noise levels within residential developments funded by HUD. Included among the various policies are:

1. a requirement that noise exposure and sources of noise be given adequate consideration as an integral part of urban environment in connection with all HUD programs, which provide financial support to planning;

2. a withholding of HUD assistance for the construction of new dwelling units on sites (which have or are projected to have unacceptable noise exposure), or are in runway Clear Zones or incompatible uses in Accident Potential Zones;
3. encouragement of modernization efforts for existing buildings in noise environments; and
4. grants and allowances to state and local governments to provide acoustical privacy in multifamily dwellings through building design and acoustical treatment.

Generally, external noise exposure within Noise Zone 3 (as identified in an installation's Airfield Installation Compatible Use Zone (AICUZ) Report) is considered unacceptable without exception and within Noise Zone 2 exposure is normally unacceptable with respect to new construction. HUD funds may also be available to encourage noise abatement planning and acoustical treatment for proposed and existing incompatible land uses within the AICUZ.

Residential construction may be permitted within certain noise contours, provided sound attenuation is accomplished. The added construction expense of sound attenuation, however, may make siting in these noise exposure areas financially less attractive. Because the HUD policy is discretionary, variances may also be permitted, depending on regional interpretation and local conditions. HUD also has a policy (24 CFR 51D) that prohibits funding for projects in runway Clear Zones and Accident Potential Zones, unless the project is compatible with any applicable AICUZ recommendations.

Endangered Species Act

The Endangered Species Act (ESA) establishes a program for the conservation of threatened and endangered plants and animals and their habitats. The US Fish and Wildlife Service (USFWS) and National Oceanic and Atmospheric Administration (NOAA) are the lead implementing agencies of the ESA. The ESA requires federal agencies, in consultation with the USFWS and/or the NOAA Fisheries Service, to ensure that actions they "authorize, fund, or carry

out are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat of such species." The law also prohibits any action that causes a taking of any listed species of endangered fish or wildlife. ESA provides a platform for the protection of critical habitat and species that may be at risk of extinction.

Section 7 of the ESA, called Interagency Cooperation, provides the necessary tools to ensure that actions taken by federal agencies do not jeopardize the existence of any listed species. As required by Section 7, federal agencies must consult with the USFWS when any action the agency funds, authorizes, or carries out may affect a listed endangered or threatened species. Section 7 consultation is the main way that federal agencies manage takings of species.

The Endangered Species Act prohibits the "take" of listed species through direct harm or habitat destruction. In the 1982 ESA amendments, Congress authorized the USFWS to issue permits for the "incidental take" of endangered and threatened wildlife species (Section 10a(1)(B) of the ESA). Thus, permit holders can proceed with an activity that is legal in all other respects, but may result in the "incidental" taking of a listed species.

There is a variety of permits for the removal of an endangered or threatened species (incidental take permits, enhancement of survival permits, and recovery and interstate commerce permits). Each type of permit has a number of prerequisites.

Incidental take permits are required when non-federal activities will result in take of threatened or endangered species. A habitat conservation plan (HCP) must accompany an application for an incidental take permit. The HCP associated with the permit ensures that the effects of the authorized incidental take are adequately minimized and mitigated. The 1982 amendment requires that permit applicants design, implement, and secure funding for the HCP that minimizes and mitigates harm to the impacted species during the proposed project. HCPs are legally binding agreements between the Secretary of the Interior and the permit holder.

Enhancement of survival permits are issued to non-federal landowners participating in Safe Harbor Agreements or Candidate Conservation Agreements with Assurances. These agreements encourage landowners to take actions to benefit species while also providing assurances that they will not be subject to additional regulatory restrictions as a result of their conservation actions.

Recovery and interstate commerce permits are issued to allow for take as part of activities intended to foster the recovery of listed species. A typical use of a recovery permit is to allow for scientific research on a listed species in order to understand better the species' long-term survival needs. Interstate commerce permits also allow transport and sale of listed species across state lines (e.g., for purposes such as a breeding program).

However, because some species listed are subject to the Migratory Bird Treaty Act, it is illegal for anyone to take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or the parts, nests, or eggs of such a bird except under the terms of a valid permit issued pursuant to federal regulations. The migratory bird species protected by the Migratory Bird Treaty Act are listed in 50 CFR 10.13.

As authorized by the Migratory Bird Treaty Act, USFWS issues permits to qualified applicants for the following types of activities: falconry, raptor propagation, scientific collecting, special purposes (rehabilitation, educational, migratory game bird propagation, and salvage), take of depredating birds, taxidermy, and waterfowl sale and disposal. Migratory bird permit policy is developed by the Division of Migratory Bird Management and the permits themselves are issued by the Regional Bird Permit Offices. The regulations governing migratory bird permits can be found in 50 CFR part 13 (General Permit Procedures) and 50 CFR Part 21 (Migratory Bird Permits).

Recovery Credit System

The Recovery Credit System (RCS) program was created by the USFWS. An RCS is an optional tool available to federal agencies to promote and enhance the recovery of listed species on non-federal lands. Using RCSs, federal agencies are able to more clearly show how benefits accrued on non-federal

lands offset unavoidable effects of federal actions elsewhere. However, in an RCS, the combined effects of both adverse and beneficial actions must achieve a net benefit to the recovery of the species.

A recovery credit is a unit of measure established by an RCS that quantifies the contribution that an agency's action makes toward the recovery of a listed species. Credits are based on, and linked with, the implementation of specific conservation measures identified in a species' approved recovery plan. If there is no final approved recovery plan, an RCS may employ an equivalent service-approved document that describes specific measures that will contribute to the downlisting or delisting of endangered or threatened species.

The RCS program is a new program, which has thus far only been implemented at one military facility in central Texas. In this case, the RCS is comprised of leases for a term ranging from 5 to 25 years. Landowners are provided confidentiality and, therefore, no public comment is allowed on the merits of RCS credits for particular tracts. Also, the leases may be organized in terms of repayment schedules and a penalty clause. In a rapidly growing region, temporary leases may not be suitable if the intent is to execute conservation requirements. Traditional conservation easements (which are not revocable and run in perpetuity) may be a more preferable approach.

Currently, there are no listed threatened or endangered species at Ellsworth AFB.

Federal Land Management and Policy Act of 1976

The Federal Land Management and Policy Act (FLPMA) established the authority for public agencies that possess public lands to manage and plan according to national and local interests. The law mandates that public lands identified for development shall uphold and protect the scientific, scenic, historical, ecological, environmental, and other values unique to specific geographies. This law provides the impetus for the various resource management plans developed and prepared for public agencies.

Federal Aviation Act

The Federal Aviation Act was enacted in 1958 to provide methods for overseeing and regulating civilian and military use of airspace over the United States. The Act requires the Secretary of Transportation to make long-range plans that formulate policy for the orderly development and use of navigable air space. The intent is to serve the needs of both civilian aeronautics and national defense, but does not specifically address the needs of military agencies. Military planning strives to work alongside local, state, and federal aviation law and policies but sometimes must supersede these and other levels of government due to national security interests. The Federal Aviation Administration (FAA) was created as a result of the Act for a variety of purposes, including the management of airspace over the US.

The 500-foot rule, published by the FAA, states that every citizen of the United States has “a public right of freedom of transit in air commerce through the navigable air space of the United States.” The rule was formally announced in the 1963 Court of Claims ruling in *Aaron v. United States* and states that flights 500 feet or more above ground level (AGL) do not represent a compensable taking because flights 500 feet AGL enjoy a right of free passage without liability to the owners below.

Another important outcome of the Act is FAA Regulation Title 14 Part 77, commonly known as Part 77, which provides the basis for evaluation of vertical obstruction compatibility. This regulation determines compatibility based on the height of proposed structures or natural features relative to their distance from the ends of a runway. Using a distance formula from this regulation, local jurisdictions can easily assess the height restrictions near airfields. Additional information on Part 77 is located on the FAA Internet site at <http://www.faa.gov/>.

As of January 29, 2013, the main focus of Part 77.17 is to establish standards to determine obstructions within navigable airspace, typically within a certain distance from an airport or airfield. It defines an obstruction to air navigation as an object that is of greater height than any of the following heights or surfaces in the following manner:

- A height of 499 feet AGL at the site of the object.
- A height that is 200 feet AGL or above the established airport elevation, whichever is higher, within 3 nautical miles of the established reference point of an airport, excluding heliports, with its longest runway more than 3,200 feet in actual length. This height increases in the proportion of 100 feet for each additional nautical mile of distance from the airport up to a maximum of 499 feet; see Figure 3-9 for an illustration of this portion of the FAA Part 77 Vertical Obstruction Compliance.
- A height within a terminal obstacle clearance area, including an initial approach segment, a departure area, and a circling approach area, which would result in the vertical distance between any point on the object and an established minimum instrument flight altitude within that area or segment to be less than the required obstacle clearance.
- A height within an en route obstacle clearance area, including turn and termination areas, of a federal airway or approved off-airway route, that would increase the minimum obstacle clearance altitude.
- The surface of a takeoff and landing area of a civilian airport or any imaginary surface established under 77.19, Department of Defense (DOD): 77.21, and heliports: 77.2. However, no part of the takeoff or landing area itself will be considered an obstruction.
- Except for traverse ways on or near an airport with an operative ground traffic control service furnished by an airport traffic control tower or by the airport management and coordinated with the air traffic control service, the standards of this section apply to traverse ways used or to be used for the passage of mobile objects only after the heights of these traverse ways are increased by:

- o 17 feet for an Interstate Highway that is part of the National System of Military and Interstate Highways where overcrossings are designed for a minimum of 17 feet vertical distance.
- o 15 feet for any other public roadway.
- o 10 feet or the height of the highest mobile object that would normally traverse the road, whichever is greater, for a private road.
- o 23 feet for a railroad.
- o For a waterway or any other traverse way not previously mentioned, an amount equal to the height of the highest mobile object that would normally traverse it.

The FAA has identified certain imaginary surfaces around runways to determine how structures and facilities are evaluated and identify if they pose a vertical obstruction relative to the airspace around a runway. The levels of imaginary surfaces build upon one another and are designed to eliminate obstructions to air navigation and operations, either natural or man-made. The dimension or size of an imaginary surface depends on the runway classification.

National Environmental Policy Act

The National Environmental Policy Act (NEPA) of 1969 is a federal law establishing a US national policy to promote the protection and enhancement of the environment and requiring federal agencies to analyze and consider the potential environmental impact of their actions. The purpose of NEPA is to promote informed decision-making by federal agencies (including the military) by making detailed information concerning significant environmental impacts available to both agency leaders and the public.

All projects receiving federal funding, requiring a federal permit, or occurring on federal property require NEPA compliance, documentation, and the production of an Environmental Impact Statement (EIS). Though, not all federal actions require a full Environmental Impact Statement (EIS). In some cases, an action may not cause a significant impact, whereby an agency is only required to prepare an Environmental Assessment (EA).

A NEPA document can serve as a valuable planning tool for local planning officials. An EA or EIS can assist in the determination of potential impacts that may result from changing military actions or operations and their effect on municipal policies, plans and programs, and the surrounding community. Public hearings are required for all EIS documents released under NEPA. NEPA requires publishing a draft EA and subsequent Finding of No Significant Impact (FONSI) and allowing public comment for a period of 30 days. An EA may result in a FONSI or Record of Decision concluding that the action will have a significant impact and an EIS is required. The information obtained by the EA / EIS is valuable in planning coordination and policy formation at the local government level.

NEPA mandates that the military analyze the impact of its actions and operations on the environment, including surrounding civilian communities. Inherent in this analysis is an exploration of methods to reduce any adverse environmental impact.

National Pollutant Discharge Elimination System

Pursuant to the CWA, the National Pollutant Discharge Elimination System (NPDES) permit program controls water pollution by regulating point sources that discharge pollutants into US waters. Point sources are discrete conveyances such as pipes or man-made ditches. According to the law, individual homes that are connected to a municipal system, use a septic system, or do not have a surface discharge do not need a NPDES permit, but industrial, municipal, and other facilities must obtain permits if their discharges go directly to surface waters.

Noise Control Act of 1972

The Noise Control Act of 1972 identified that noise not adequately controlled has the potential of endangering the health and welfare of people. It states that all Americans are entitled to an environment free from noise that can jeopardize their general health and quality of life. Along with state, local, and territorial governments, actions from the federal government were needed to ensure that the objectives of the Act were met.

Concurrently, military installations were experiencing the impacts from encroaching urban development located adjacent to the installation and the resulting complaints regarding noise from military flight operations. In 1973, the DOD responded by establishing the AICUZ program.

The Noise Control Act and the AICUZ program are important because encroaching development and increased population near military installations often creates compatibility concerns. As communities grow, it is important that the military installation, developers, and the communities work together to mitigate the issue of noise and develop ways to coexist compatibly.

National Historic Preservation Act of 1966

The National Historic Preservation Act (NHPA) of 1966 requires federal agencies to consider the effects of a proposed project on properties listed in, or eligible for listing in, the National Register of Historic Places. Because no specific action is being proposed as part of this planning process, the review of cultural resources is focused on the identification of existing resources and not potential effects that would result from a specific proposed action.

Partners in Flight Program

The DOD has implemented a program, called Partners in Flight, which sustains and enhances the military testing, training, and safety mission through habitat-based management strategies. The program assists natural resource managers in monitoring, inventory, research, and management of birds and their habitats. As part of the Partners in Flight program, a strategic plan is created that can be incorporated into a Bird/Wildlife Aircraft Strike Hazard (BASH) plan. This program reaches beyond the boundaries of the installation to facilitate community partnerships and determine the current status of bird populations to prevent the further endangerment of birds.

Safe Drinking Water Act

The Safe Drinking Water Act (SDWA) is the main federal law that ensures the quality of drinking water in the United States. The SDWA authorizes the EPA to set national health-based drinking water standards to protect against both

naturally-occurring and man-made water contaminants. The SDWA applies to every public water system in the US.

The Sikes Act

The Sikes Act requires the DOD to develop and implement Integrated Natural Resources Management Plans (INRMPs) for military installations. The INRMPs are prepared in cooperation with the USFWS and state fish and wildlife agencies to ensure proper consideration of fish, wildlife, and habitat needs. The Sikes Act requires INRMPs to be reviewed at least every five years by the military and the states. Air Force Instruction 32-7064, Integrated Natural Resources Management, guides the Air Force implementation of the Sikes Act.

Telecommunications Act of 1996 and the Federal Communications Commission

The Telecommunications Act of 1996 was the first comprehensive update to federal telecommunication law in over six decades and was largely intended to open up the marketplace to greater competition. Changes in the means through which information is produced, accessed, stored and shared made the federal government response imperative. The increasing use and development of personal mobile phones, satellite transmission, high speed fiber optics, and other related factors are often pushing demand beyond the system capacity.

New telecommunication tower siting requires compliance with the Federal Communications Commission's (FCC) environmental review standards and procedures, including NEPA and ESA compliance, NHPA compliance, adherence to any applicable FAA requirements, and structure registration with the FCC. The actual approval of physical installations is subject to state and local permits and approvals; however, state and local authority is limited by FCC law. For instance, states and local jurisdictions cannot base their decisions on any purported environmental effects of radio frequency transmissions.

Telecommunications towers have the potential to cause vertical obstruction issues near Ellsworth AFB. Requirements for tower placement can help to reduce potential incompatibility.

US Avian Hazard Advisory System

The US Avian Hazard Advisory System (USAHAS) is a geographic information system-based bird avoidance model developed by the US Air Force used for “analysis and correlation of bird habitat, migration, and breeding characteristics, combined with key environmental and man-made geospatial data.” The model provides up-to-date information – “near real-time” – about bird activity and movements to assist pilots and flight planners in the scheduling and use of flight routes. The model can also be used as a forecasting tool to estimate bird strike risk. Information from the North American Breeding Bird Survey, Audubon Christmas Bird Count, bird refuge databases, and the US Air Force Bird-Aircraft Strike database as well as public domain information regarding landfill locations is used to formulate the bird activity and movement data. The model is available for use by agencies and the general public on the USAHAS website at <http://www.usahas.com/>.

4.3 Ellsworth AFB Plans and Programs

The Ellsworth AFB plans and programs are the specific, existing tools that the installation, in collaboration with the Department of the Air Force, has developed to implement various federal statutes. These plans may be modified based on mission changes or requirements and funding availability, so they are considered semi-permanent programs.

Air Installation Compatible Use Zone Report

The Air Installation Compatible Use Zone (AICUZ) program was created by the DOD in 1973 to address noise and safety hazards associated with aviation operations. The AICUZ program was established to minimize impacts from aviation operations (noise and accidents) through specific attention to development and land uses. The AICUZ framework evaluates noise from military aircraft, and applies the concept of clear zones / accident potential

zones, with corresponding development / building densities and intensities designed to encourage compatibility between military operations and communities.

The four primary elements of the AICUZ are:

- **Noise Zone Footprint.** Noise zones classified into three categories: Zone I - noise in this area is compatible with most noise sensitive land uses, Zone II - noise is usually incompatible with noise-sensitive land uses, and Zone III - noise is incompatible with noise-sensitive and other land uses.
- **Health, Safety, and Welfare.** These elements seek to reduce the nuisance of excessive noise generated by aircraft operations and public danger by discouraging the development of incompatible land uses such as businesses and housing in Accident Potential Zones (APZs).
- **Public Investment.** Promoting compatibility between a military installation and local communities safeguards military operations and protects the public’s investment in the installation.
- **Public Awareness and Communication.** By working with the community and informing local citizens of operations and safety measures, the military can promote safety for community residents. As local leaders work with military officials to adopt compatible development practices, their relationship is strengthened through the resolution of mutual concerns.

Noise Zone Profile

Noise is the cornerstone of the AICUZ Report. The noise generated by military aircraft operations and the effects of that noise on local communities are presented in a variety of ways in the study (e.g., written text, graphics, etc.). To fully appreciate the findings and recommendations presented in the AICUZ Report, it is beneficial to provide an understanding of how military aircraft noise is measured, evaluated, and graphically illustrated. Day night average sound level (DNL) is a measure of noise commonly used surrounding

a military installation. The main sources of noise at airfields are flight operations, which include take-offs, landings, touch-and-go operations, and engine maintenance run-ups. The Air Force considers how its operations impact the local community by calculating the DNL. The DNL averages the noise levels of all aircraft operations that occur within a 24-hour period. The DNL is depicted as a contour around a noise source connecting points of equal value, usually in five decibel increments.

Accident Potential Zones

As part of the AICUZ program, and to aid in land use planning surrounding military bases, the DOD established Accident Potential Zones (APZs). These are defined as Clear Zones (CZ), Accident Potential Zone I (APZ I), and Accident Potential Zone II (APZ II). These zones are determined using a statistical analysis of all DOD aircraft accidents. APZs follow departure, arrival, and pattern flight tracks and are based on historical data. The CZ is a square area that extends directly beyond the end of the runway and outward along the extended runway center line.

The 2008 Ellsworth AFB AICUZ Study is an update to the Ellsworth AFB AICUZ Study completed in 1994. It presents a description of the current noise environment around Ellsworth AFB. It reaffirms the Air Force policy of promoting public health, safety, and general welfare in areas in close proximity to Air Force installations. This study identifies changes in flight operations that have occurred since the 1994 study, and provides current noise zones and compatible use guidelines for land areas adjacent to the installation. It is provided as a tool to assist local communities in future planning and zoning activities. Changes that required an update of the AICUZ study include:

- number and type of aircraft at Ellsworth AFB,
- installation of quieter aircraft engines,
- changes in the arrival and departure frequencies for all aircraft,
- changes in flight patterns with the additional aircraft and noise abatement procedures,

- operational mission requirements and Air Force reorganization, and
- improvements to the NOISEMAP.

Bird / Wildlife Aircraft Strike Hazard Plan

A BASH plan is designed to control birds, alert aircrew and operations personnel, and provide increased levels of flight safety, especially during the critical phases of flight, take-off and landing operations. Specifically, the plan is designed to:

- designate a Bird Hazard Warning Group (BHWG) and outline the members' responsibilities,
- establish procedures to identify high hazard situations and establish aircraft and airfield operating procedures to avoid these situations,
- ensure that all permanent and transient aircrews are aware of bird hazards and the procedures for avoidance, and
- develop guidelines to decrease the attractiveness of the airfield to birds and disperse the number of birds on the airfield.

Integrated Natural Resources Management Plan

The policy of the DOD is to fully comply with applicable federal, state, and county laws, ordinances, regulations, and guidelines, specifically designed to protect and preserve the environment. The Sikes Act Improvement Amendments of 1997 requires that the DOD manage their natural resources while providing a sustained method for the multiple uses of those resources. The Act also requires the development of the Integrated Natural Resources Management Plan (INRMP) document.

Integrated Cultural Resources Management Plan

DOD Instruction 4715.3 and Air Force Instruction (AFI) 32-7065 require installations to develop an Integrated Cultural Resources Management Plan (ICRMP) as an internal compliance and management tool integrating the entirety of the cultural resources program with ongoing mission activities. As a component of the installation master plan, the ICRMP is the base commander's decision document for conducting cultural resources management actions and specific compliance procedures. It also allows for ready identification of potential conflicts between the US Air Force mission and cultural resources, and identifies compliance actions necessary to maintain the availability of mission-essential properties and acreage.

Environmental Assessment for Access Roads

An EA was completed for Ellsworth AFB in February 2012 to address the construction of new access roads and an associated interior road providing off-base access to former base housing. The proposed action in the EA was to meet the lease requirements of separating Centennial Estates from Ellsworth AFB by providing two access points to the existing on-base housing development without entering the secure areas of the base. The separation also required a change in the existing security fence boundary as well as the implementation of a security fence and providing utilities to Centennial Estates from off-base commercial providers. A Finding of No Significant Impact found that all activities in the EA comply with the criteria or standards of environmental quality and coordinated with the appropriate federal, state and local agencies.

Source: Environmental Assessment: Access Roads and an Associated Interior Road, Centennial Estates Lease, Ellsworth AFB, 2012

Environmental Assessment for the Privatization of Military Family Housing

An EA was completed for Ellsworth AFB in September 2011 to address the privatization of military family housing. The proposed action in the EA was vesting responsibility in a private developer for military family housing at Ellsworth AFB. According to the EA, Headquarters Air Combat Command

proposed to convey 283 military family housing units, lease three parcels of land totaling approximately 279 acres, and transfer responsibility for providing housing and ancillary supporting facilities at Ellsworth AFB to a private developer.

Source: Environmental Assessment: the Privatization of Military Family Housing at Ellsworth ARB, 2011

Environmental Assessment for Development of a Regional Wastewater Treatment Plant

An EA was completed for Ellsworth ARB in April 2011 to decommission and demolish its current wastewater treatment plant (WWTP) and grant an easement to establish a new sanitary sewer pipeline. The new pipeline would connect to a pipeline off-base that would flow to the proposed future regional WWTP. The need for the action is to provide wastewater treatment capacity for Ellsworth AFB in order to meet more stringent South Dakota Surface Water Discharge System standards. A Finding of No Significant Impact found that all activities in the EA comply with the criteria or standards of environmental quality and coordinated with the appropriate federal, state and local agencies.

A 5.5-mile long sewer line now connects Ellsworth AFB to the Regional Wastewater Treatment Plant (RWWTP) operated by SDEDA.

Source: Environmental Assessment: Activities Associated with Development of a Regional Wastewater Treatment Plant, Ellsworth AFB, 2011

4.4 State of South Dakota

The state tools provide further assistance and protection of land uses in the State of South Dakota. The tools authorize or mandate local counties and cities to provide for the protection of the state's valuable industries including the DOD and agriculture. In addition, the state's tools require communities and developers to protect and preserve the state's natural resources, including land and water by establishing further regulatory measures to ensure the natural environment is preserved and protected from over-consumptive practices.

South Dakota Ellsworth Development Authority

The South Dakota Ellsworth Development Authority (SDEDA) was created in 2009 by SD Codified Law § Ch 1-16J. The law establishes membership terms and powers of authority. The purpose of the authority is to protect and promote the economic impact of Ellsworth AFB and associated industry, and to promote the health and safety of those living or working near the base. SDEDA has the authority to issue bonds, apply for and receive grants and donations and acquire surrounding property, either by voluntary sale or eminent domain. The authority then ensures that the future use is compatible with Ellsworth AFB operations to promote compatibility.

Real Estate Disclosures

South Dakota State Statute 43-4-44 requires that all sellers of real estate must complete a property condition disclosure statement. The real estate disclosure is used to notify potential homebuyers of conditions affecting the property that they should be aware prior to its purchase. Real estate disclosures are to be provided to the purchaser on or before the effective date of the contract binding the purchaser to purchase the property. The real estate disclosure for South Dakota does not require any disclosure that the property is nearby a military installation.

State of South Dakota Hazard Mitigation Plan

The State of South Dakota Hazard Mitigation Plan establishes guidelines and procedures for hazardous responses. Elements of the plan include a risk assessment, mitigation strategy and progress, and local mitigation planning coordination. The plan identifies military installations as an example of a high potential loss facility.

South Dakota Game, Fish, and Parks

The South Dakota Game, Fish, and Parks was established due to the need for to protect and care for wildlife resources, parks, and outdoor recreational opportunities. The highest priority is given to the state's wildlife and parks in planning decisions. The South Dakota Legislature established the Game, Fish, and Parks Commission. The commission serves as the advocate and liaison between the department and its stakeholders to conserve and enhance wildlife, parks, and related natural resources. The Division of Wildlife manages South Dakota's wildlife and fisheries resources, which includes issuing an annual report.

South Dakota Department of Environment and Natural Resources

The South Dakota Department of Environment and Natural Resources (SDDENR) provides guidance to balance the demands of natural resources and assesses the impacts for multiple governmental units on topics such as water planning and integrated management, surface water, groundwater, floodplain management, dam safety, field offices, compacts, decrees and interstate water agreements, and natural resources.

South Dakota Department of Transportation

The State of South Dakota Department of Roads (SDDOT) provides efficient statewide transportation systems for the citizens of South Dakota. Efforts of the department include managing and regulating the state's transportation systems by enforcing federal laws and regulations, and developing policies to further ensure the safety of the public. The SDDOT released a State Rail Plan and Strategic Highway Safety Plan in 2014. SDDOT also released the Statewide Transportation Improvement Program for 2015-2018.

4.5 Local Jurisdiction Planning Tools

General Plans, Zoning, and Subdivision Regulations

The planning tools used by the study area jurisdictions were analyzed and categorized as permanent, semi-permanent, or conditional. In South Dakota, as in many other states, cities and counties may exercise land use and development regulatory authority. Cities and counties are legally bound by statute to adopt general plans.

Building Codes

Building codes are intended to regulate building construction, materials, alteration and occupancy to ensure health, safety and welfare. Building codes can regulate building construction such that it is compatible with military operations, including sound attenuation for residences within applicable noise zones. Building codes, similar to other regulatory tools, are considered semi-permanent.

Annexation

Limits of a city are to be determined by the city council, and at any time, may extend the limits as deemed necessary for future growth. The city council must provide the general plan with information stating the need for the proposed annexation and its land-use.

Annexation is not a tool that can be applied with immediate results. Chapter 9-4 of the South Dakota State Statutes governs the expansion of Municipal Boundaries. A municipality can annex property by a petition of voters and landowners. A municipality can extend its boundaries without a petition; however, the governing body must conduct a study to determine the need for the territory and how the area will be served. Annexations can be an important tool in addressing compatibility issues, if done in conformance with state statutes. If land is annexed, municipalities can:

- apply zoning ordinances,
- apply building permit requirements,
- apply other land use provisions (i.e. off-street parking requirements, tree clearing prohibitions, etc.), and
- criminally prosecute developers who fail to comply with zoning ordinances, building permit requirements, and other land use regulations.

Table 4-1 provides an overview of existing planning tools by jurisdiction and an assessment of their applicability to military compatibility.

Table 4-1. City and County Planning Tools

Jurisdiction	Planning Tools									
	Comprehensive Plan	Zoning / Building Code Height Restrictions	Zoning Code Dark Sky	Zoning / Building Code Sound Attenuation	Airport Land Use Compatibility Plan	Subdivision Regulations	Special Zoning Areas / Specific Area Plans	Building Code	Annexation Extraterritorial Jurisdiction)	Acquisition (For Easements)
Pennington County	■	■	■	■	■	■	■	■	■	■
Meade County	■	■	■	■	■	■	■	■	■	■
City of Rapid City	■	■	■	■	■	■	■	■	■	■
City of Box Elder	■	■	■	■	■	■	■	■	■	■

Legend:

- = The tool exists but does not directly address land use issue(s) related to military compatibility.
- = The tool exists but only partially addresses land use issue(s) related to military compatibility.
- =The jurisdiction does not employ this tool.

4.6 Pennington County

Pennington County covers the southern end of Ellsworth AFB in the State of South Dakota. Rapid City is the largest city and County Seat.

The following is a review of the existing planning tools utilized by Pennington County along with a brief analysis identifying their ability to address land use and military compatibility, and where potential improvements can be made.

The following planning tools are evaluated:

- Pennington County Comprehensive Plan
- Pennington County Zoning Ordinance
- Pennington County Subdivision Regulations
- Pennington County Building Code
- Pennington County Master Transportation Plan

Comprehensive Plan

Pennington County's Comprehensive Plan was adopted in July 2003. It is a document to guide long range development plans of the county and its future growth. The plan contains elements such as population, environmental resources, transportation, and future land use. It is important for Pennington County to recognize future development in regards to Ellsworth AFB by implementing encroachment land use policies and goals. While Ellsworth AFB is mentioned as a role in the county's history, none of the policies or goals in the plan include the base.

Pennington County future land use goals state the need to identify and estimate future demands for the various land uses and determine policies to:

- To provide for adequate amounts of commercial and industrial land in the future and to ensure attractiveness and stability of these areas.
- To achieve attractive, stable and safe residential areas and to plan for a desirable and compatible mixture of residential densities.

- To protect prime agricultural areas from the encroachment of non-compatible land uses.
- To protect Pennington County's natural resources and areas of scenic beauty through proper land use practices.

The comprehensive plan does not state any land use regulations regarding military installations directly. This plan is outdated and it is recommended that Pennington County update their comprehensive plan to include encroachment policies to further protect Ellsworth AFB's operations.

Source: Pennington County Comprehensive Plan, 2003

Zoning Ordinance

Zoning ordinances have been amended through November 26, 2014. The zoning ordinance divides the land within the county into nine districts, and provides development regulations for these districts. Pennington County's zoning plan does include a stand-alone district for airports.

Section 315 of the Pennington County Zoning Ordinance establishes development standards for the Ellsworth AFB compatible use area. The section establishes overlay zones for the CZ, APZs, and Noise Zones. All buildings, structures, and land uses within the overlay zones must comply with AICUZ land use compatibility chart. Variances to the development standards may be approved by the Zoning Board of Adjustment.

The following compatibility concerns are based on a review of the zoning provisions:

- It is notable that Ellsworth AFB is recognized within the county's zoning code, yet the standards lack any provisions beyond the APZs and Noise Zones.
- The topics of noise, vibration, hazardous materials, dust/smoke/steam, and lighting associated with compatibility to the military activities are not addressed in the ordinance.

- Height regulations are outlined for property in the vicinity of Rapid City Regional Airport; however, these regulations do not apply to Ellsworth AFB.
- The approval process does not require a real estate disclosure to future property owners purchasing property that may be subject to the effects of military operations.
- The approval process also does not require any response from an Ellsworth AFB official.

Section 200 details district standards and permitted uses for the 9 districts within the county. Most districts have a maximum height of 35 feet, including districts A-2 (Limited Agriculture), LDR (Low Density Residential), SRD (Suburban Residential), GC (General Commercial), and HS (Highway Service). The LI (Light Industrial) district maintains a maximum height of 45 feet. The HI (Heavy Industrial) and A-1 (General Agriculture) districts have no height regulations. Towers are not to exceed 300 feet above ground level.

Section 317 establishes regulations for wind energy systems. A setback from Ellsworth AFB for large wind energy systems prohibits the systems within Class Delta Airspace. In addition, before construction of the system, the developer must submit written documentation from Ellsworth AFB acknowledging the location and size of the proposed large wind energy system.

Source: Pennington County Zoning Ordinance, 2014

Subdivision Regulations

The subdivision regulations outline requirements to implement functional streets, and to provide the community with sufficient lot sizes and open space, while conforming with the comprehensive plan to develop land in an orderly manner.

While subdivision regulations typically define the standards, procedures, and other requirements for land division, they can also help to prevent or limit

future encroachment into an installation or adjacent operational areas by specifying allowable types of infrastructure improvements associated with a subdivision, such as street lights. Subdivision regulations can be used as a foundation to ensure mission sustainability, particularly with dark sky provisions and development density.

The following compatibility concerns are based on a review of the subdivision regulations:

- The Pennington County Subdivision Regulations do not include specific direction that would protect Ellsworth AFB and mission critical activities from encroachment.

Source: Pennington County Subdivision Regulation

Building Regulations

Pennington County has adopted the following building codes:

- 2006 International Building Code
- 2006 National Electric Code
- 2006 National Plumbing Code
- 2006 Uniform Building Code

By adopting international / national codes, the county is unable to make building requirements that reflect military compatibility.

Master Transportation Plan

The Pennington County Master Transportation Plan, completed in 2012, identifies the existing needs to better serve current residents and visitors, while serving as a blueprint for the transportation system, providing a clearly defined future for the network. The threefold purpose of the project is to complete a list of transportation issues and needs facing the county; develop feasible solutions to address those issues and needs that meet current design standards and/or traffic Level of Service expectations under both the current and predicted future traffic conditions; and create final products for use by the county and the SDDOT which will provide guidance to implement

recommended improvements and anticipate future development plans within the area.

The plan cites the Moving Forward with Ellsworth Air Force Base –Box Elder I-90 Corridor Area Master Plan to identify transportation projects and land use considerations associated with the future of Ellsworth ARB.

4.7 Meade County

Meade County covers the northern end of Ellsworth AFB in the State of South Dakota.

The following is a review of the existing planning tools utilized by Meade County along with a brief analysis identifying their ability to address land use and military compatibility, and where potential improvements can be made. The following planning tools are evaluated:

- Meade County Comprehensive Plan
- Meade County Ordinance
- Meade County Building Code

Comprehensive Plan

Meade County's Comprehensive Plan was established to guide land uses with future population growth without impacting the natural environment of the county. Updated in 2006, the plan covers an array of topics, including land use trends, environmental and development resources, stakeholder issues, land use principles, transportation, and infrastructure. Meade County values the protection of the natural environment and cultural activities that take place among the communities.

The following policies have been recognized as a compatibility factor in relation to military installations:

- Development and construction in elevated noise areas around airports or airbases needs to follow established practices written for noise mitigation.

- Adopt noise attenuation guidelines for construction of habitable dwellings and buildings in elevated noise areas established by the Department of Air Force.
- Encourage state and federal agencies to acquire funding for the purchase of development rights for property around Ellsworth Air Force Base to limit development in areas that have noise levels above 70 dBA.

The following deficiencies concerning military compatibility are based on a review of the Comprehensive Plan:

- The goals and policies of some elements, such as land use and transportation, do not take the military installation presence or mission into consideration.

Source: Meade County Comprehensive Plan, 2010

Ordinances

The Meade County does not have a zoning ordinance, but there are other ordinances applicable to military compatibility. Ordinance 20 regulates the subdivision of Property. This ordinance notes that Modified High density subdivisions will be permitted in "High Noise Areas" greater than (65) dBA, per Ellsworth Air Force Base AICUZ (Air Installations Compatible Use Zones). Ordinance 31 regulates communication towers. Section six of the ordinance states that if the commission suspects that a proposed telecommunication tower placement might affect Ellsworth AFB the commission may request the application be reviewed by the base. Ordinance 32 regulates wind generator facilities. Under the ordinance wind facilities and meteorological towers must comply with applicable FAA regulations, including any necessary approvals for installations close to commercial or private airports including Ellsworth AFB. Finally, Ordinance 34 establishes the Building Code which is utilized to regulate building height and noise attenuation.

Source: Ordinances 20, 31, 32 and Ordinance 34

Building Codes

Meade County has adopted the following building codes:

- 2006 International Residential Building Code
- State Electrical Code
- State Plumbing Code
- State Mechanical Code
- State Energy Code
- State Fire Code
- State Handicap Code

By adopting international / state codes, the county is unable to make building requirements that reflect military compatibility.

Source: Ordinance 34, Building Code and Construction Enforcement

4.8 City of Rapid City

The City of Rapid City is located in Pennington County, southwest of Ellsworth AFB. Rapid City is the largest city in Pennington County; and the second largest city in South Dakota. The following is a review of the existing planning tools utilized by Rapid City along with a brief analysis identifying their efficiency in addressing land use and military compatibility and where potential improvements can be made. The following planning tools were evaluated:

- City of Rapid City Comprehensive Plan
- City of Rapid City Future Land Use Plan
- City of Rapid City Zoning Ordinance
- City of Rapid City Subdivision Regulations
- City of Rapid City Building Code

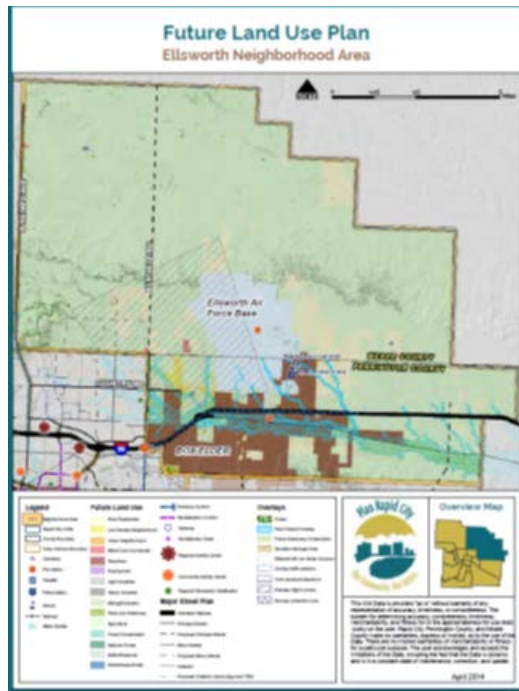
Comprehensive Plan

The City of Rapid City Comprehensive Plan is a tool for ensuring orderly, efficient, and resourceful growth and development in the community. It establishes the long-term vision for Rapid City and provides guidance for decision making to support and advance the vision. Adopted in 2014, the plan covers an array of topics, including community vision and core values, a balanced pattern of growth, transportation, infrastructure, economic growth, and recreational and cultural opportunities. The plan also includes 16 neighborhood area policies, growth and reinvestment framework, and an implementation plan. One of the neighborhood areas is the Ellsworth Neighborhood Area. Even though the entire area is located outside the Rapid City limits, policies for the area include the extension of urban services, annexation, and interjurisdictional coordination. The following policies have been recognized as a compatibility factor in relation to military installations:

- The main goal of the Ellsworth Neighborhood Area is to Support the operation of Ellsworth Air Force base and enhance coordination with Box Elder to proactively plan for the area’s future.
- Minimal new development in the area surrounding the Air Force Base will help limit conflicts between base operations and other land uses.
- A key part of the strategy to minimize the potential impacts of base closure is proactive coordination and cooperation with Ellsworth Air Force Base and Ellsworth Economic Development Authority.
- Aircraft operations on the Base, as well as at nearby Rapid City Regional Airport to the south, mean that much of the Neighborhood Area is already or potentially impacted by air traffic and noise.
- The Ellsworth Air Force Base is one of the primary employers in the Rapid City region.

Source: Rapid City Comprehensive Plan, 2014

Future Land Use Plan



The Rapid City Future Land Use Plan is a compilation of 16 neighborhood plans and will act as an indispensable tool for all sectors of the community. Although the Study Area is divided into separate neighborhood areas for study purposes, a set of common goals for all areas unites the plan. The plan is divided into a community profile and a commercial and industrial profile. Both sections include growth trends and projections.

The City of Rapid City's future land use plan does not directly call out

compatibility with Ellsworth AFB. However, there are some goals and policies that indirectly promote compatibility with Ellsworth AFB. Also, there are a couple land use goals mentioned to establish growth patterns throughout the city. These are:

- *Concentrate new growth in the Rapid City urban area and protect existing rural areas from urban sprawl through planned development.*
- *Encourage compact and contiguous growth along the City's fringe that is linked to both the levels of demand in the market and to the orderly extension and efficient use of public improvements, infrastructure, and services.*

The Ellsworth Neighborhood Area, which includes Ellsworth AFB, can be seen in Inset 1 to the left. The plan analyzes neighborhood growth, concluding that the Ellsworth Neighborhood Area experienced the largest percentage change for public uses. In 1999, the area had 8,355 gross square foot floor area used for public purposes. In 2007, the area had 17,807 square feet, a 53.1 percent change from 1999.

The following item concerning military compatibility is based on a review of the future land use plan:

- The plan does address the importance of protecting the base from encroachment, but it lacks specificity on the land use types, densities and intensities that would be appropriate from a land use compatibility perspective.

Source: City of Rapid City Future Land Use Plan

Zoning Ordinance

The purpose of the zoning ordinance is to serve the general welfare of the city and to recognize specific, sustainable, and compatible uses for areas within the jurisdiction. The zoning regulation divides the land within the city into 21 zoning districts and five overlay districts. Article four describes the regulations and permitted uses for each district.

The following items concerning military compatibility are based on a review of the zoning regulations:

- Maximum heights for the zoning districts Community Commercial (CC), Neighborhood Business District (NBD), and General Commercial (GC) range from 60 to 76 feet, General Office (GO), General Industrial (GI), and Heavy Industrial (HI) with a maximum height of 120 feet, and zoning district High-Density Multiple-Family Residential (R8) exceeding to 150 feet may cause incompatible development and cause potential impacts to Ellsworth AFB and its missions.
- There are no provisions related to military compatibility, e.g., noise, lighting, vibration, uses, setbacks or height.

Source: City of Rapid City Zoning Ordinance, Title 17

Subdivision Regulations

The purpose of Rapid City’s Subdivision Regulations is to provide compatible development to the surrounding areas.

The following items concerning military compatibility are based on a review of the subdivision regulations:

- Subdivision regulations do not offer incentives for desired development near military installations.
- The subdivision regulations do not require disclosure to buyers of the potential effects of being located near a military facility.
- The regulations do not require the delineation of noise contours, where applicable.

Building Code

The City of Rapid City has adopted the following building codes:

- 2006 International Residential Building Code (Amended by the City of Rapid City)
- 2006 International Commercial Building Code
- 2014 National Electrical Code
- 2009 International Energy Conservation Code
- 2006 International Mechanical Code
- 2010 Rapid City Plumbing Code
- 2006 Accessibility Code

By adopting international / national codes, the city is unable to make building requirements that reflect military compatibility.

4.9 City of Box Elder

The City of Box Elder is primarily located south of Ellsworth AFB in Pennington County; however, a portion of Box Elder extends into Meade County, which also includes a portion of Ellsworth AFB. The following is a review of the existing planning tools utilized by Box Elder along with a brief analysis identifying their efficiency in addressing land use and military compatibility and where potential improvements can be made. The following planning tools were evaluated:

- City of Box Elder Comprehensive Plan
- City of Box Elder Zoning Ordinance
- City of Box Elder City Building Code
- City of Box Elder Strategic Transportation Plan

Comprehensive Plan

The City of Box Elder Comprehensive Plan, revised in 2014, is a long range plan to guide and direct growth in the city that includes goals, policies, and objectives. The plan includes Ellsworth AFB and describes the work necessary to transform the local economy by establishing a new long-range

vision. Topics covered in the plan include land use and growth, housing, economic development, transportation, community facilities, parks, and utilities, and implementation. Other plans included in the plan are Future Land Use Plan, Major Street Plan, Neighborhood Opportunities and Constraints, and Non-motorized Vehicle Plan. Five neighborhoods are designated in the plan, including the Liberty Boulevard Neighborhood, which contains the main entrance to Ellsworth AFB, along with land to the east and south of the base.

The plan includes a section dedicated to the 2008 Ellsworth AFB Air Installation Compatible Use Zone (AICUZ) Study, outlining the constraints that result from flight operations and providing land use and zoning suggestion for implementation. Suggestions include the following:

- The municipalities surrounding the installation should provide timely notification to Ellsworth AFB regarding new development plans within the noise zones or APZs.
- Unzoned areas encompassed by the noise zones and APZs for Ellsworth should be zoned to ensure compatible development.
- The zoning ordinances for the City of Box Elder should be modified to reflect the compatible land uses outlined in this AICUZ Study.
- Provide for real estate disclosures in noise zones and APZs around Ellsworth.
- Subdivision regulations should provide for rejection of new subdivisions that are not compatible with AICUZ land use guidelines and provide controls for continued development in existing subdivisions.

- Local municipalities should exercise caution when approving transportation plans, such as the scheduled 2011 bridge replacement on Spruce Street over Box Elder Creek, to ensure that such plans would not impact Ellsworth's ability to fulfill its mission requirements.

The importance and support of Ellsworth AFB is well covered in the City of Box Elder's Comprehensive Plan. The following policies have been recognized as a compatibility factor in relation to military installations:

- There is a pressing need for the City of Box Elder to address airfield operations compatibility issues by establishing guiding policies, goals, and objectives in its Comprehensive Plan.
- Drawing on Ellsworth AFB as an economic engine, the City of Box Elder aims to provide a development climate that encourages, incentivizes, and promotes business and entrepreneurs.
- The plan includes constraints that result from flight operations at Ellsworth AFB and provides land use and zoning suggestion for implementation.
- Any development proposed north of I-90 and west of North Ellsworth Road must be planned to account for the sound contours, APZ-1, and Clear Zone.
- Inform Ellsworth Air Force Base and surrounding municipal and county planning offices regarding planning and zoning actions that have the potential to affect existing ordinances and/or resolutions.
- Provide timely notification to Ellsworth Air Force Base planners regarding new development plans within noise zones, APZs, and airport influence areas.

- Encourage joint planning efforts between the Box Elder and Ellsworth planners that identify subdivision ordinances to identify compatible residential land uses and densities surrounding Ellsworth and APZ1 and APZ-2.
- The City of Box Elder shall coordinate with Ellsworth to plan efficient circulation and for goods deliveries. The City’s transportation system shall work to support Ellsworth’s current mission.

Zoning Ordinance

The purpose of the zoning ordinance is to serve the general welfare of the city and to recognize specific, sustainable, and compatible uses for areas within its jurisdiction. The zoning ordinance divides the land within the city into 5 base districts. Section six describes the regulations and permitted uses for each district.

Lighting is regulated to be directed away from adjoining properties, but only applies to parking areas. The maximum structure height in almost all of the zoning districts, AD (Agriculture District), CD (Commercial District), ID (Industrial District), and RD (Residential District), is 35 feet. The maximum structure height for the MD (Mobile Home) district is 24 feet. Telecommunication facilities are permitted up to a height of 100 feet, or 150 feet with a variance. Wind energy systems are to be less than 75 feet.

The following items concerning military compatibility are based on a review of the zoning regulations:

- Ellsworth AFB is not recognized within the City’s zoning code.
- Lighting height standards are permitted to 35 feet unless the City grants an exception.
- Communication towers and alternative energy production devices uses are permitted by special use permits within AG and RR districts, which could interfere with Ellsworth AFB flight operations.

- Maximum heights for wind energy conservation systems are able to exceed 50 percent of the permitted districts height limit.
- The zoning ordinance does not provide sound attenuation standards to further protect the community from military operations.

Source: City of Box Elder Zoning Ordinance, 2009

Building Codes

The City of Box Elder has adopted the following building codes:

- 2006 International Residential Building Code (Amended by the City of Box Elder)
- 2006 International Commercial Building Code (Amended by the City of Box Elder)
- 2006 International Property Maintenance Code (Amended by the City of Box Elder)

By adopting international / national codes, the city is unable to make building requirements that reflect military compatibility.

Strategic Transportation Plan

The purpose of the Box Elder Strategic Transportation Plan is to address planning outcomes and transportation objectives. Several key elements of the plan include existing conditions, forecasted growth, a major street plan, a pedestrian and bike plan, transportation standards, and recommended future transportation project priorities. Part of the inventory of existing conditions includes identifying travel patterns to and from Ellsworth AFB. The plan addresses that the base is one of the largest employers in South Dakota, resulting in a large impact on local traffic patterns.

Source: Box Elder Strategic Transportation Plan, 2014

4.10 Other Resources

In the interest of land use compatibility between the military and the local community, the DOD Office of Economic Adjustment (OEA) and other public interest groups, such as the National Association of Counties (NACo), have prepared educational documents and videos that educate and inform the public about encroachment issues and methods that can be used to address existing or future compatibility concerns. Five resources that have been published to inform the public on land use compatibility:

Guides

The Practical Guide to Compatible Civilian Development near Military Installations (July 2007), OEA

This guide offers general information on community development and civilian encroachment issues. The guide can be found at: <http://www.oea.gov/>.

Joint Land Use Study Program Guidance Manual (November 2006)

This manual provides guidance on the JLUS program, process, and efforts to support compatible development. This manual can be obtained on the OEA internet site at the following address: <http://www.oea.gov/>.

Encouraging Compatible Land Use between Local Governments and Military Installations: A Best Practices Guide (April 2007), NACo

This guidebook presents case studies of best practices between the military and communities through communication, regulatory approaches, and Joint Land Use Studies. The guide can be accessed on the NACo internet site at the following address: <http://www.naco.org/>.

Videos

The Base Next Door: Community Planning and the Joint Land Use Study Program, OEA

This informative video discusses the issue of encroachment near military installations as urban development occurs within the vicinity. This video can be accessed on the official OEA YouTube channel at: <http://www.youtube.com/watch?v=6UiyWDgLeJM>

Managing Growth, Communities Respond, OEA

This video highlights the lessons learned from three communities (Kitsap Naval Base in Bangor, Washington; Fort Drum in Jefferson County, New York; and Fort Leonard Wood in Pulaski County, Missouri) that have successful programs for managing growth near their respective military installations. This video can be accessed on the official OEA YouTube channel at: <http://www.youtube.com/watch?v=rea6d3bDp3c>

Please see next page.



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Introduction

Compatibility, in relation to military readiness, can be defined as the balance or compromise between community needs and interests and military needs and interests. The goal of compatibility planning is to promote an environment where both community and military entities communicate, coordinate, and implement mutually supportive actions that allow both to achieve their respective objectives.

A number of factors can be evaluated to determine whether community and military plans, programs, and activities are compatible or in conflict. For this Ellsworth AFB Joint Land Use Study (JLUS), 25 compatibility factors were used to identify, determine, and establish a set of key JLUS compatibility issues for discussion. While it is unlikely that issues under all 25 factors will be identified, they are used to ensure this JLUS is comprehensive. The 25 compatibility factors are listed on the right side of this page.

An action, or lack of action, undertaken by either the military or community that minimizes, hinders or presents an obstacle to the action of the other is characterized as an issue. Issues arising on the part of either or both the military and community are grouped according to the relevant factor and listed in this chapter.

For each identified issue, a compatibility assessment is provided to discuss the nature and cause of the issue followed by a discussion of applicable existing tools that are currently used, or that may be used, to mitigate the issue or prevent the emergence of encroachment in the future. Some issues are similar to those of the previous 1995 Ellsworth AFB JLUS. For those such issues, the recommendations from the 1995 JLUS are discussed to provide an overview of the status of the issues.

COMPATIBILITY FACTORS

AQ	Air Quality	LAS	Land / Air / Sea Spaces
AT	Anti-Terrorism / Force Protection	LU	Land Use
BIO	Biological Resources	LEG	Legislative Initiatives
CA	Climate Adaptation	LG	Light and Glare
COM	Coordination / Communication	MAR	Marine Environments
CR	Cultural Resources	NOI	Noise
DSS	Dust / Smoke / Steam	PT	Public Trespassing
ED	Energy Development	RC	Roadway Capacity
FSC	Frequency Spectrum Capacity	SA	Safety Zones
FSI	Frequency Spectrum Impedance / Interference	SNR	Scarce Natural Resources
HA	Housing Availability	VO	Vertical Obstructions
IE	Infrastructure Extensions	V	Vibration
		WQQ	Water Quality / Quantity

Methodology and Evaluation

The methodology for the Ellsworth AFB JLUS consisted of a comprehensive and inclusive discovery process to identify stakeholder issues associated with the compatibility factors. At the initial Executive Committee (EC) and Working Group (WG) meetings and public workshop, stakeholders were asked to identify the location and type of issue in conjunction with compatibility factors they thought existed today or could occur in the future. As a part of the evaluation phase, the EC, WG, and the public examined and prioritized the compatibility issues identified. Other factors and associated issues were analyzed based on available information and similarity with other community JLUS experiences around the country.

When reviewing the assessment information in this chapter, it is important to note the following:

- This chapter provides a technical background on the factors and issues discussed based on available information. The intent is to provide an adequate context for awareness, education, and development of JLUS recommendations. It is not designed or intended to be utilized as an exhaustive technical evaluation of existing or future conditions within the Study Area.
- Of the 25 compatibility factors considered, no issues were identified for the following factors:
 - Climate Adaptation
 - Cultural Resources
 - Frequency Spectrum Capacity
 - Frequency Spectrum Impedance / Interference
 - Light and Glare
 - Marine Environments
 - Public Trespassing
 - Scarce Natural Resources
 - Vertical Obstructions

Organization of the Issues

Chapter 5 is organized into two main sections: Major Issues and Minor Issues. Minor issues are issues that have been raised through the public input process, but were not further pursued for various reasons, including, but not limited to: they were outside the scope of this report or did not warrant additional follow up. The Major Issues section provides an in-depth analysis of important issues for the Ellsworth AFB JLUS and as such is organized by compatibility factor. Each factor will be identified with a number, e.g., 5.1, 5.2, etc. The factor's definition, technical background, and key terms information will also be found in each numbered subsection.

The Minor Issues are identified by a simple heading defining the compatibility factor for which it relates and are listed in Section 5.6 'Other Issues' at the end of this chapter.

1995 Joint Land Use Study

This Joint Land Use Study (JLUS) is an update to the 1995 JLUS. The progress made on recommendations of the 1995 JLUS is noted in a call out box as illustrated below.

1995 JLUS Recommendations

Recommendation Number – Completed, Partially Completed or On-going

Description of the 1995 recommendation.

Action Taken

Description of the action that has been taken.

5.1 Air Quality

Air quality is defined by numerous components regulated at the federal and state level. For compatibility, the primary concerns are pollutants that limit visibility (such as particulates and ozone) and potential non-attainment of air quality standards that may limit construction, maintenance, or operations at the installation or in the area.

Key Terms

Attainment Area. An attainment area is a geographic area that meets the National Ambient Air Quality Standards (NAAQS) for a criteria pollutant.

Criteria Pollutants. The criteria pollutants are the six principle pollutants harmful to public health and the environment for which the United States Environmental Protection Agency (EPA) has set NAAQS. The pollutants are: carbon monoxide (CO), lead, nitrogen dioxide (NO₂), ozone (O₃), particulate matter (PM), and sulfur dioxide (SO₂).

National Ambient Air Quality Standards. NAAQS are standards for outdoor air pollutants established by the EPA under authority of the Clean Air Act (CAA).

Nonattainment Area. A nonattainment area is a geographic area where air pollution levels persistently exceeds NAAQS, or that contributes to ambient air quality in a nearby area that fails to meet standards. Designating an area as nonattainment is a formal rulemaking process made by the Environmental Protection Agency, typically only after air quality standards have been exceeded for several consecutive years.

Particulate Matter. Particulate matter (PM) consists of fine metal, smoke, soot, and dust particles suspended in the air. Particulate matter is measured by two sizes for evaluating air quality impacts: course particles (PM₁₀), which are particles between 2.5 and 10 micrometers in diameter, and fine particles (PM_{2.5}), which are particles less than 2.5 micrometers in diameter.

Technical Background

A number of factors can influence air quality in a region. These include a variety of sources and types of pollutants, topographic conditions, weather, and other factors. Community sources of dust, emissions, and other air pollutants can also create adverse impacts on the environment and can potentially limit Ellsworth AFB operations. Permits and funding for important infrastructure and other projects can be delayed or denied in nonattainment areas, or perhaps be issued subject to mitigation measures that increase the costs of project implementation.

Under the CAA, the EPA established NAAQS for air pollutants. The NAAQS have been set for the six criteria air pollutants. Air quality control regions (AQCR) are classified either “attainment” or “nonattainment,” according to whether or not the concentrations of criteria pollutants exceed the NAAQS. Nonattainment designation categories are Marginal, Moderate, Serious, Severe, and Extreme.

The following locations in South Dakota have ambient air monitoring sites: Sioux Falls, Brookings, Watertown, Union County, Aberdeen, Badlands National Park, Wind Cave National Park, Black Hawk, Rapid City, and Pierre.

Issue AQ-1	<p>Regional air monitoring</p> <p>Rapid City was not in attainment for PM₁₀ about 10 years ago, but achieved attainment and needs to stay in attainment.</p>
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Compatibility Assessment

Currently, the air monitoring sites throughout the state indicate that sites within the JLUS Study Area are classified as attainment areas for the six criteria pollutants regulated by the Clean Air Act (ozone, sulfur dioxide, carbon monoxide, lead, particulate matter, and nitrogen dioxide). However, Rapid City had been classified as a nonattainment area for particulate matter (PM₁₀) from 1978 until April 2006. Attainment, measured by three monitoring sites throughout Rapid City, was achieved by the city by working

with the South Dakota Department of Environment and Natural Resources (DENR), taking numerous steps to reduce dust levels, such as the creation of the Natural Event Action Plan (NEAP). The NEAP provides measures to be implemented within specified time frames to help the city prepare for high winds that it is prone to, which uplifts dust. Pennington County also adopted the Fugitive Dust Control Plan in 1978 to control dust from unpaved roads and city operations from Rapid City.

Wind-blown dust from industrial mining operations, construction sites, unpaved roads and tilled fields, as well as smoke from wood burning, were the biggest sources contributing to the city's air quality problem. To address this, many gravel alleys and parking lots in the city were paved, and the street-cleaning and sanding operations were changed from mechanical to vacuum sweepers. The South Dakota DENR, with the cooperation of the local air board and industrial sources, began regulating construction activities on state property and developed a Natural Events Action Plan that identifies the best available control measures for operations that generate dust.

In April 2007, Ellsworth AFB was granted a synthetic minor air emissions permit from the South Dakota DENR. The permit was issued for a period of five years and was renewed in April 2012 for an additional five years. A synthetic minor source is an air pollution source that has the potential to emit air pollutants in quantities at or above the major source threshold levels, but has accepted federally enforceable limitations to keep the emissions below such levels. This permit eliminates the need for a more intense and restrictive federal Title V permit for the base, which could be imposed if the city falls into nonattainment.

Under a nonattainment designation, the CAA authorizes the EPA to impose certain sanctions, such as withholding federal highway funds or prohibiting the issuance of air quality permits for new development, which could impact current and future operations at Ellsworth AFB. To remain in attainment, the city must maintain its air quality levels and continue to provide data to EPA.

Existing Tools

Clean Air Act

The CAA is the comprehensive federal law that regulates air emissions from stationary and mobile sources in order to control air pollution in the United States. Under the CAA, the U.S. EPA establishes limits on six criteria pollutants through the NAAQS. Standards are set to protect public health and public welfare. Individual states may have stronger air pollution laws, but they may not have weaker pollution limits than those set by EPA. Under the law, states have to develop State Implementation Plans (SIPs) that outline how each state will control air pollution under the CAA.

South Dakota Ambient Air Monitoring Annual Plan 2015

The 2015 Ambient Air Monitoring Annual Plan was prepared by the South Dakota Department of Environment and Natural Resources to meet the requirements of the federal regulations set forth in Title 40 of the Code of Federal Regulations, Part 58.10, which requires a state implementation plan for NAAQS. The plan is meant to describe the purpose of each monitoring site, discuss air quality issues, and describe planned and possible changes to the monitoring network through 2016.

Findings

- If sites in Rapid City are declared as nonattainment areas, it could limit current and future operations at Ellsworth AFB.

5.2 Anti-Terrorism / Force Protection

Anti-Terrorism / Force Protection (AT) relates to the safety of personnel, facilities, and information on an installation from outside threats. Security concerns and trespassing can present immediate compatibility concerns for installations. Due to current global conditions and recent events, military installations are required to implement more restrictive standards to address AT/FP concerns.

The Department of Defense (DOD) AT/FP standards require all DOD components to adhere to design/planning criteria and minimum construction standards to mitigate vulnerabilities and threats to an installation and its occupants. Important aspects of these criteria and standards include minimum standoff distances or required separation between buildings and roadways and parking lots and buildings and trash enclosures. These measures can also include operational changes, such as increased security checks at installation gates.

Key Terms

Clear Zones. Clear zones are areas established around the fence to provide an unobstructed view to enhance detection and assessment around fences. This is different than the term “clear zone” used to describe suggested land use protections around an airfield.

Fence Line. The term fence line in this section refers to the exterior fence around Ellsworth AFB.

Sight-Lines (lines-of-sight). This refers to the angles of lines-of-sight from off-installation structures to on-installation structures and vice versa. Lines-of-sight are necessary to maintain an unobstructed view of areas just outside of the installation and to ensure that visual access to sensitive areas from off installation are appropriately screened.

Issue AT-1	Potential observation at the Commercial Gate There are areas where unauthorized civilians could potentially observe operations at the Commercial Gate.
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Compatibility Assessment

The Bismarck Gate at Ellsworth AFB, also known as the Commercial Gate, is located in a rural area south of the installation on Commercial Gate Drive (see Figure 5.2-1 for location). The Bismarck Gate is open from 6:00 a.m. to 6:00 p.m. Monday through Friday and 6:00 a.m. to 1:00 p.m. on Saturday and federal holidays. The objective of an entry control facility is to secure the installation from unauthorized access and intercept contraband, such as weapons, explosives, or classified material, while maximizing vehicular traffic flow. The Commercial Gate is an important access point and is the single point of inspection for all large commercial truck traffic intending to enter the installation.

Observation of the security techniques and procedures conducted at the gate could expose potential vulnerabilities and create security risks. The elevation difference between the gate and the land to the south makes it difficult to establish a visual barrier. It is therefore a concern that new private development could provide observation of the activities that take place at the gate.

Areas of safety concerns are identified on Figure 5.2-1.

Existing Tools














US Air Force Eagle Eyes Program

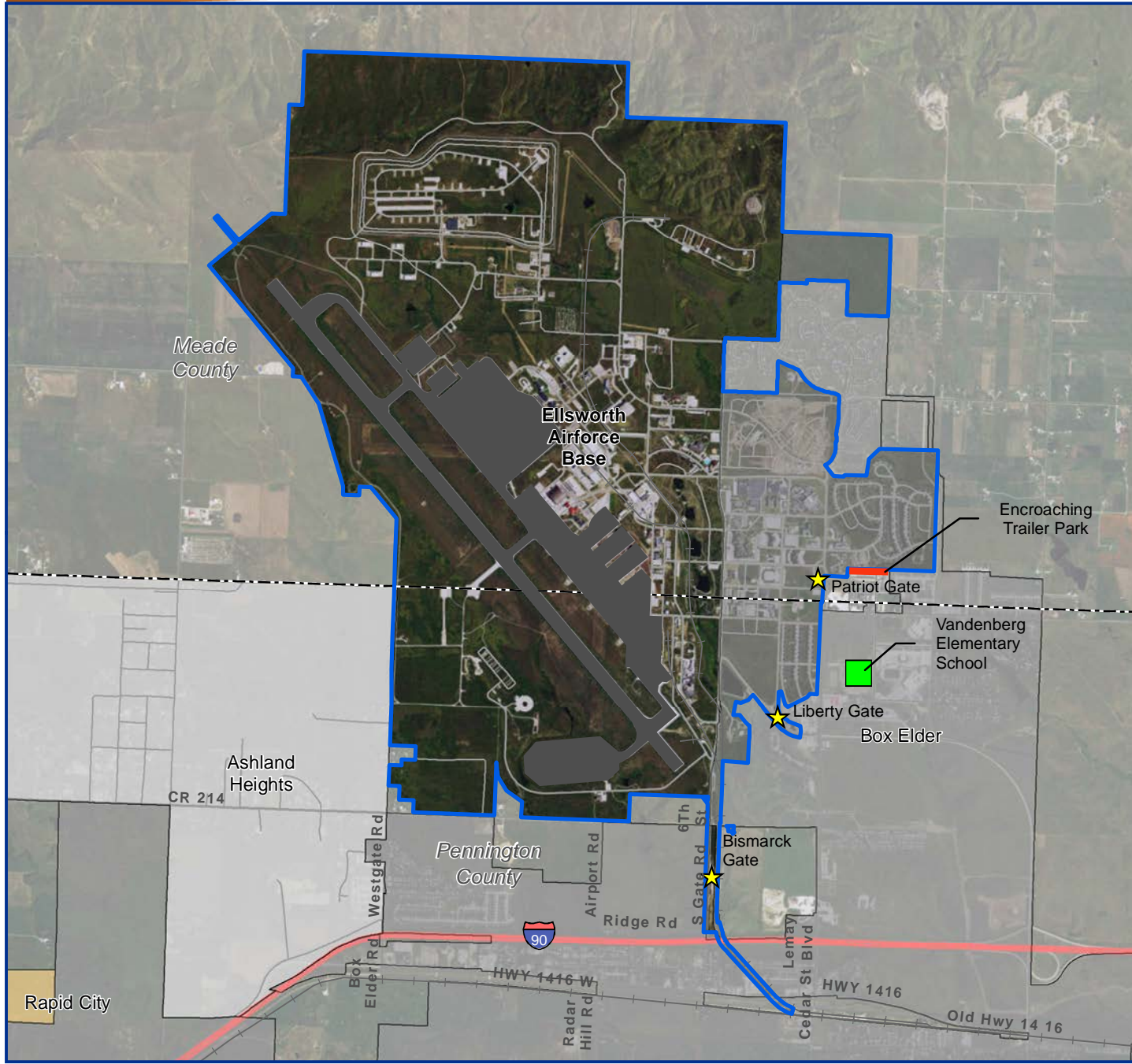
The Eagle Eyes program is an Air Force anti-terrorism initiative to engage the eyes and ears of Air Force members and citizens in the war on terror. The program teaches people about the typical activities terrorists employ to plan attacks to recognize elements of potential terror planning when they see it. The program provides a network of local, 24-hour phone numbers to call whenever a suspicious activity is observed.

Figure 5.2-1

Security Concerns

Legend

-  Gate
-  Vandenberg Elementary School
-  Encroaching Trailer Park
-  Airfield Surface / Runway
-  Ellsworth Air Force Base
-  County Boundary
-  Rapid City
-  Box Elder
-  Other Unincorporated Community
-  Interstate
-  Major Roads
-  Local Traffic
-  Railroad



Source: TIGER, 2015,
Matrix Design Group, 2015,
Ellsworth Air Force Base, 2015.



The 28th Bomb Wing Public Affairs issued a press release informing local residents about recognizing the signs of suspicious behavior and what actions they should take. The release mentions different types of suspicious behavior, including surveillance, tests of security and suspicious vehicles.

Findings

- Observation of the security techniques and procedures conducted at the gate could expose potential vulnerabilities and create security risks.
- Consistently communicating the procedures for reporting suspicious activity may improve security.

Issue AT-2	<p>Potential for observation in sensitive areas north and west of Ellsworth AFB</p> <p>Sensitive areas outside of the northwest area of the base could be developed creating security concerns.</p>
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Compatibility Assessment

Currently, the land north and west of Ellsworth AFB is largely rural and sparsely populated, with land mostly owned by ranchers. However, some property owners in the area have recently been selling their property to developers to construct low density residential subdivisions. For example, one subdivision, Horseshoe Acres, was recently developed with lots ranging from three to 10 acres. The subdivision is located north of Ellsworth AFB, near the intersection of Horseshoe Road and School Road.

It is a concern that as more development spreads north of Rapid City and Box Elder, areas could be developed that provide views into the base, allowing the observation of operations. Effective security at Ellsworth AFB is necessary to ensure confidential operations are protected from observation by unauthorized parties outside of the base. While it is important for the installation to maintain clear lines of sight to view outside the installation for

potential security risks, some lines of sight that provide vantage points and views into the installation may create an undesirable security scenario.

Existing Tools

Unified Facilities Criteria 4-010-01 DOD Minimum Antiterrorism Standards for Buildings

Section 2-4.1.3 of Unified Facilities Criteria (UFC) 4-010-01 states that the fire of weapons from a terrorist is predicated on direct lines of sight and the assumption that weapons could be fired from vantage points outside the control of an installation or facility. Obscuring or screening that minimizes targeting opportunities is the primary means of protecting DOD personnel. Section B-3.2.3 of the standards recommends screening or blocking sightlines of building entries from multiple vantage points.

Readiness and Environmental Protection Integration

This initiative enables DOD to work with state and local governments, non-governmental organizations, and willing landowners to limit encroachment and incompatible land use through land acquisition by the establishment of conservation easements, land trusts, or the purchase of property. The program provides funding to support these land acquisition efforts to preserve the land around military installations, wildlife habitats, and local communities.

Due to the lack of zoning in Meade County, there is limited land use control of what is developed in the areas north and west of Ellsworth AFB. The South Dakota Ellsworth Development Authority (SDEDA) has been working with local ranchers to obtain development rights utilizing Readiness and Environmental Protection Integration (REPI) funds, and state funds to limit development near the base

Findings

- Unobstructed sightlines into Ellsworth AFB could create potential security risks by providing views and vantage points into the sensitive installation locations.

Issue AT-3	Wagon Wheel encroachment Location of homes within 10 feet of fence line.
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Compatibility Assessment

The Wagon Wheel trailer park is located near the Main Gate and the south east corner of Ellsworth AFB, adjacent to the fence line of the installation. While the City of Box Elder controls most of the land to the southeast of the base, the trailer park was not annexed by the City of Box Elder and remains a county island within Meade County (the issue of county islands is further discussed in Issue LU-4). At the time of development, the City of Box Elder regulations permitted the development as proposed. As a result, homes were placed approximately 10 feet from the base fence line. The height of the trailers could facilitate unauthorized access to the installation.

The close proximity of those homes to the fence line not only causes security issues for the base, but safety concerns for residents who are living within the 65 DNL noise contour and in close proximity to APZs.

Existing Tools

Ellsworth AFB Air Installation Compatible Use Zone (AICUZ) Study

The Ellsworth AFB AICUZ identifies mobile homes as incompatible in any Accident Potential Zone or Noise Zone. According to the AICUZ, there are few parcels within the 65 to 75 A-weighted decibel (dBA) noise zones with residential, commercial, public / semi-public, and recreational uses that are considered conditionally compatible; however, Wagon Wheel trailer court is not one of them.

Meade County Ordinance 34 Building Code and Construction Enforcement

The Meade County Building Code adopted section AE 605 of the 2006 International Residential Code into its building code to include building code information about manufactured homes or mobile homes that are located within an airport AICUZ. According to this code, such homes must

have sound attenuating properties, such as under-skirting of one to two inch thickness of fiber cement board, plywood or oriented strand board (OSB) with 10 inch thick fiberglass, mineral fiber, cellulose or five and a half inch thick closed cell sprayed on foam insulation. Skirting must attach to a concrete foundation around the perimeter of the structure or at a minimum pressure treated wood framing, all due to ground contact requirements.

Unified Facilities Criteria 4-002-03: Security Fences and Gates

Unified Facilities Criteria 4-002-03 provides recommendations for DOD security fences and gates. It is recommended that clear zone areas should be established around the fence to provide an unobstructed view to enhance detection and assessment around fences. When required, dimensions of clear zones vary depending on asset being protected and level of protection. For example, outer clear zones may be 30 feet wide and inner clear zones may be 20 feet wide. It is recommended that Ellsworth AFB consult with service policies for assets being protected to determine if clear zones are required and what dimensions are required.

Findings

- Lack of zoning in Meade County allows residential encroachment on Ellsworth AFB to occur.
- The encroachment of the Wagon Wheel trailer park poses a security concern by potentially facilitating unauthorized access to the installation from adjacent rooftops.

5.3 Biological Resources

Sensitive biological resources include federal and state listed species (threatened and endangered) and the habitats they live in or otherwise use. These resources may also include areas such as wetlands and migratory corridors critical to the overall ecosystems. The presence of sensitive biological resources may require special development considerations or operational procedures and their assessment should be included early in the planning process. Changes in the types or amount of habitat off-installation can also make on-installation habitats more constrained by overall reductions in the area.

Key Terms

Critical Habitat. Specific areas found to be essential to the conservation of a threatened or endangered species and which may require special considerations or protection. Under this designation, the US Fish and Wildlife Service (USFWS) must review all federal government activities within a designated critical habitat area to ensure that threatened and endangered species are protected.

Endangered Species Act . The Federal Endangered Species Act (ESA) provides a program for the conservation of threatened and endangered plants and animals and the habitats in which they are found. The lead federal agencies for implementing the ESA are the US fish and Wildlife Service (USFWS) and the US National Oceanic and Atmospheric Administration (NOAA) Fisheries Service. Species included in the act are birds, insects, fish, reptiles, mammals, crustaceans, flowers, grasses, and trees.

Endangered Species. According to the ESA, an endangered species is a species that is “in danger of extinction throughout all or a significant portion of its range”.

Threatened Species. According to the ESA, a threatened species is “any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.”

Issue BIO-1

Sensitive species exist on installation

Sensitive species on the installation, and the habitats that support them, warrant special care during siting and new construction activities on base to minimize habitat disturbance.

Compatibility Assessment

No resident state or federally listed threatened or endangered species are known to occur at Ellsworth AFB; however, three non-listed yet conservation sensitive species, Swainson’s hawk, burrowing owl and the silver-haired bat, have been documented on the installation. Special care is required during new construction to ensure minimal disturbance to bird and mammal habitats.

The most important habitat types identified on base are the remnant mixed-grass prairie and riparian habitat. Regular monitoring of the Federal Register by Ellsworth AFB to determine whether the USFWS proposes to list any new threatened or endangered plant or animal is conducted in coordination with 28th Flight Wing.

Areas of Ellsworth AFB that have not been landscaped consist primarily of grasses native to the mixed-grass prairie of the Great Plains. A Land Condition Trend Analysis program involving plant and wildlife inventories has not been initiated at Ellsworth AFB and is a low priority since grazing pressure on the base’s grasslands from wildlife is minimal. Additionally, a long-term trend monitoring of grazing impacts has not been conducted and is also a low priority.

Existing Tools

Ellsworth AFB Integrated Natural Resources Management Plan

The 2014 Integrated Natural Resources Management Plan (INRMP) provides interdisciplinary strategic guidance for natural resources management on Ellsworth AFB. The INRMP is a dynamic document that contains information pertinent to every office or agency assigned to the base. Natural resource categories addressed in the INRMP includes sensitive, threatened,

endangered, fish and wildlife management, land management, pest management, and urban forestry.

One of the objectives included in the INRMP includes the inventory of the presence or absence of state and federally listed threatened and endangered species at Ellsworth AFB. Although there are currently no threatened or endangered species at Ellsworth AFB, three projects are included to achieve this objective:

- Monitor USFWS and South Dakota Game Fish and Parks proposed listing or delisting of species to assess potential effects on the mission.
- Conduct survey to monitor presence and relative abundance of burrowing owls on base.
- Monitor and maintain riparian habitat to ensure raptor and owl species do not roost or breed in trees adjacent to the airfield.

Findings

- Special care is required during new construction due to the presence of sensitive species at Ellsworth AFB. Protection of these species could impact future development at the base.

5.4 Climate Adaptation

Climate adaptation is the effort to prepare for future climate changes that result from natural factors and human activities that influence long-term atmospheric conditions. The effects may include fluctuations in sea levels, storm and tidal surges, and changes in flood potential, which can present operational and planning challenges for the military and communities.

There were no issues identified for Climate Adaption as part of the JLUS process.

5.5 Coordination / Communication

Interagency coordination and communication relates to the level of interaction on compatibility issues among military installations, jurisdictions, land and resource management agencies, Native American Tribal governments and organizations, and conservation authorities. Interagency communication serves the general welfare by promoting a more comprehensive planning process inclusive of all affected stakeholders. Interagency coordination also seeks to develop and include mutually beneficial policies for both communities and the military in local planning documents, such as comprehensive plans.

Coordination and communication is a foundational compatibility factor that must be recognized to ensure successful balance and / or compromise between community and military needs and interests.

1995 JLUS Recommendations

Recommendation Nine - Completed

The 1995 JLUS recommended that the Cities of Box Elder and Rapid City, and Pennington County and Meade County should coordinate all planning and zoning activities to be as compatible and consistent with each other. Additionally, it recommended that a coordinating committee should continue with policy making representatives and staff for each jurisdiction, including Air Force advisors, Chamber of Commerce representatives, and state transportation representatives. This committee would be coordinated by the Black Hills Council of Local Governments.

Action Taken

The Moving Forward with Ellsworth Steering Committee was formed in 2005 to provide coordinated direction among the cities of Rapid City and Box Elder and the counties of Pennington and Meade. There were representatives from each of the jurisdictions and the private sectors on the committee. This committee provided communication and coordination among the jurisdictions and was the sponsor of the Box Elder I-90 Corridor Area Master Planning Project. SDEDA, following its creation by the

South Dakota State Legislature, has subsequently assumed the leadership role in coordinating the jurisdictions and interested groups. State wide and local community planning efforts are generally supported by the jurisdictions and SDEDA works with the jurisdictions to prevent future encroachment while seeking ways to reduce existing encroachment.

1995 JLUS Recommendations

Recommendation Eleven – Partially Completed

The 1995 JLUS recommended that state legislation should be enacted that would require a disclosure statement with buyer notification for all property transactions occurring within the DNL 65 or greater contours and all APZs. Under the legislation, the potential buyer would be notified prior to closing that the subject property is within a noise zone or accident potential zone and is subject to certain property restrictions.

Action Taken

Currently, SDEDA has taken an educational approach rather than a legislation approach to this issue. South Dakota Real Estate Brokers are currently required to provide a disclosure statement.

Issue	Regional cooperation and coordination
COM-1	Improve and formalize cooperation and relationships with the Rapid City Area Metropolitan Planning Organization (MPO) and jurisdictions, SDEDA, and Ellsworth AFB.

Compatibility Assessment

While Ellsworth AFB and local communities may engage in verbal and electronic communication on certain matters, there is no formal agreement establishing delineated points-of-contact assigned to critical positions, associated contact information, or the roles and responsibilities for each affected agency within the JLUS Study Area.

It is important that the surrounding jurisdictions include Ellsworth AFB in the review of proposed development plans, especially when in close proximity to the base. The review allows for the evaluation of impacts that proposed development could have on missions at Ellsworth ARB or vice versa. When Ellsworth AFB is consulted before incompatible development occurs, there is a better chance of issues being mitigated to all parties' satisfaction.

The primary compatibility factors for development include areas in the safety zones, noise contours, and vertical obstructions. After the 2008 Air Installation Compatible Use Zone (AICUZ) Study was completed, the City of Box Elder and Pennington County both adopted overlay districts incorporating AICUZ study recommendations to better regulate land uses in these areas. Both the City of Box Elder and Pennington County informally coordinate with Ellsworth AFB when development within the overlay district is proposed or when an existing structure increases height. This involvement is not formally required by the ordinances and depends on informal relationships between Ellsworth AFB, SDEDA and the surrounding jurisdictions.

Meade County does not have a zoning ordinance and does not approve development applications, therefore, interaction is limited. While currently coordination with the base is not required; Section 4.11 of the AICUZ recommends that local governments should continue to inform the base of

planning and zoning actions. Establishing official coordination protocols is recommended to ensure continued successful communication.

Incompatible development is not limited to the areas in Meade and Pennington counties and the City of Box Elder that are inside noise and safety areas identified in the AICUZ, since development outside of these overlays can cause compatibility issues. All three jurisdictions have limited formal coordination for proposed development outside of the overlay districts. In some cases development plans are sent to Ellsworth AFB informally; however, proposed development outside of the overlays does not require base review. All jurisdictions require extra review for development applications for variances or special use, but not specific to Ellsworth AFB. This review is conducted by appointed members that represent a geographic area.

Existing Tools

City of Box Elder Zoning Ordinance

The City of Box Elder adopted its Zoning Ordinance through Ordinance 519, which also adopted the 2008 AICUZ regulations and land use matrix. Ordinance 519 was recently replaced with Ordinance 560, which still recognizes the AICUZ regulations.

Pennington County Zoning Ordinance

Section 315 of the Pennington County Zoning Ordinance establishes the Ellsworth Air Force Installation Compatible Use Area, creating the following overlay zones: Clear Zone, Accident Potential Zone I (APZ I), Accident Potential Zone II (APZ II), 65-70 Noise Zone, 70-75 Noise Zone, 75-80 Noise Zone and 80+ Noise Zone. The purpose of the overlay zones is to provide standards for development in the Ellsworth Air Force Installation Compatible Use Area for the protection of the public health, safety, and welfare.

In addition to the requirements of the underlying zoning district, all buildings, structures and land uses located within these overlay zones shall comply with the development standards identified on the Land Use Compatibility chart from the 2008 AICUZ. Variances to these development standards may be approved by the Zoning Board of Adjustment in accordance with all

provisions of Section 509. The approval process does not require notifying Ellsworth AFB of future development.

Ellsworth AFB Air Installation Compatible Use Zone (AICUZ) Study

The purpose of the AICUZ Program is to promote compatible land development in areas subject to aircraft noise and accident potential due to aircraft overflight operations. The program was initiated to protect the public's health, safety, and welfare and to protect military airfields from encroachment by incompatible uses and structures. One of the recommendations included in the Ellsworth AICUZ Study is that the municipalities surrounding the installation provide timely notification to Ellsworth AFB regarding new development plans within the Ellsworth AFB noise zones or APZs. This includes Rapid City and Box Elder.

Findings

- Both the City of Box Elder and Pennington County have limited formal coordination with Ellsworth AFB officially required for proposed development within the overlay districts.
- Meade County has limited coordination with Ellsworth AFB for proposed development due to a lack of land use regulations.
- The AICUZ recommends that local governments should notify the base of planning and zoning actions.
- The AICUZ recommends that local governments and Ellsworth AFB should formalize procedures and a working group to address planning and zoning activities that can be incompatible with Ellsworth AFB operations.
- Adjacent jurisdictions should develop standard communication protocols between the jurisdictions and Ellsworth AFB when new development and / or subdivisions are proposed.

Issue COM-2

Need for improved public communication and transparency of SDEDA operations

The general public in Box Elder needs to better understand the operations of SDEDA, relative to their compatibility actions (land purchase, maintenance, and use).

Compatibility Assessment

The South Dakota Ellsworth Development Authority (SDEDA) was created by Chapter 1-16J of the 2012 South Dakota Codified Laws. The purpose of the authority is to protect and promote the economic benefits of Ellsworth AFB and associated industries, and to promote the health and safety of those living or working near the base.

As one activity that SDEDA conducts to help protect the base, SDEDA utilizes a variety of grants and funding to purchase property or development rights from willing sellers within the safety zones and noise zones. The authority then ensures that the future use is compatible with Ellsworth AFB operations to promote compatibility.

The purchase of property and development rights has caused some public scrutiny of the organization. While SDEDA has successfully purchased land within the safety and noise zones surrounding Ellsworth AFB, there is concern about what is done with these properties, such as future uses, demolition and upkeep, and the reselling of property. The public is not aware of the complex decisions that SDEDA makes regarding the best future use of the land controlled by the organization.

Existing Tools

As part of this JLUS effort, no existing tools were identified that address this compatibility issue.

Findings

- SDEDA utilizes different grants and funding to purchase property and development rights from willing sellers within the safety zones and noise zones.
- The purchase of property and the future action has caused some public scrutiny of the organization and desire for better public outreach on SDEDA actions and plans.

Issue COM-3	Better communication regarding special events on base There is a need for improved notification for atypical base operation events that result in increased noise or smoke.
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Compatibility Assessment

Aircraft operations at Ellsworth AFB include maintenance engine run-ups, tests, and various special takeoffs that create loud noises. Residents nearby Ellsworth AFB who are unfamiliar with operations have the potential to be alarmed by the loud noises produced by maintenance actions and other operations outside of flight. Noise occurring from operations may cause a disturbance to the residents and landowners causing an increase in complaints to Ellsworth AFB.

Maintenance engine run-ups occur approximately five times per day at Ellsworth AFB and results in increased noise. Typically, one maintenance engine run-up is conducted at night (between 10 p.m. and 7 a.m.) and four are conducted during the day (between 7 a.m. and 10 p.m.).

In addition to maintenance run-ups, the base also conducts training, which entails pilots circling the base in a five-mile diameter to gain elevation. Other special takeoffs are combat departures, which occur two to three times a month and involved two to three aircraft at a time in rapid succession. A third special takeoff that the base conducts is the Warrior Flyby, which is a low altitude, high speed pass over the base. The Warrior Flybys currently occur on the last day of each duty week at 1:34 p.m. This is posted on the

Ellsworth AFB website as well as on social media sites. Takeoffs are generally noisy due to the required use of afterburners. Afterburners may be turned off once the aircraft reaches 360 knots, which is about 414 mph. Takeoffs are also loud due to a bang of noise that is caused by the high speeds in which the aircrafts is traveling down the runway, which is at 600 mph.

The base has time frames during the day and week in which they conduct takeoffs; however, it should be noted that curfews may be exceeded past 12:30 a.m. a few times throughout the year for night flights.

Although the majority of noise is from aircraft operations, explosive ordnance disposal (EOD) testing also creates loud and often unexpected noise. In order to better prepare for EOD events, the base provides training for safe removal of explosive devices.

Local jurisdictions need to be notified prior to testing, training, and other special takeoffs in order to enhance awareness and reduce community concerns. When noise from operations is unusual or unexpected, nearby residents can be caught off guard increasing annoyance and generating complaints, which could potentially threaten the operations and mission at Ellsworth AFB.

To minimize noise to local residents, Ellsworth AFB implemented a "quiet hours" program in 1992. Quiet hours are from 10:30 p.m. to 6:00 a.m. Unless absolutely necessary, no afterburners are used after 10:30 p.m. Ellsworth AFB typically puts out a news release and posts a notice to the base website if a special mission requires pilots to takeoff during quiet hours. Notification is especially important when operations occur outside of regular hours. When residents surrounding the installation are notified or can easily find information on operations that may produce noise, they can prepare and expect the noise. By providing notification to residents, there is a decreased risk of noise complaints and the installation can maintain a positive presence in the community.

Existing Tools

Ellsworth AFB Website

Information pertaining to Ellsworth AFB can be found on the Ellsworth AFB website at www.ellsworth.af.mil, although there is limited information regarding noise, special events notices, EOD notices, or general public affairs information. The website provides a FAQ page with a noise complaint section; however, the section is empty with no questions or answers posted. Visitors may go to the Air Combat Command link posted on the Questions page, which leads to information for how to file a noise complaint against Air Force aircraft. The following directions are posted:

Contact the local Air Force base public affairs office. The public affairs office will help you deal with the issue. If the base public affairs is not able to assist you, please contact ACC Public Affairs at (757) - 764-5994.

The Ellsworth AFB telephone directory is linked under the Information tab as “Base Guide”. If visitors still cannot find what they are looking for, the website provides a Contact Us page where people can send an email to various recipients on the base.

Social Media

Ellsworth AFB keeps a Facebook page at www.facebook.com/28thBombWing with over 8,700 likes. The Facebook page provides information such as gate closures, safety tips, events, and accomplishments, but does not post any information about operations or when to expect noise. The installation also maintains a Twitter account at www.twitter.com/28thBombWing with about 2,800 followers. The Twitter account posts things similar to the Facebook page and does not mention when to expect noise from the installation. Ellsworth AFB mostly utilizes this presence for posting internal information directed at personnel that work at the installation and posts are typically not directed at the general public.

Real Estate Disclosures

Through South Dakota State Statute 43-4-44, homeowners should know about conditions affecting their property, such as effects from military operations, prior to purchasing.

Findings

- Ellsworth AFB produces media releases about base readiness exercises that will generate atypical noise or explosions, and about unusual training that will extend standard flying hours. These are distributed to all major local media agencies and posted on the base website, and social media accounts at times.
- Continued extensive notification of special activities at Ellsworth AFB will help civilians be aware of upcoming events that may generate noise or smoke that is atypical.
- There may be events or exercises that occur outside or in addition to the normal training schedule that may be relevant to citizens but not releasable to the public due to operational security concerns. As a result, not all events of this nature will be able to be announced prior to them occurring.

5.6 Cultural Resources

Cultural resources are aspects of a cultural systems that are valued by or significantly representative of a culture or which contain significant information about a culture. A cultural resource may be a tangible element or a cultural practice. Tangible cultural resources are categorized as artifacts, records, districts, pre-contact archaeological sites, historical archaeological sites, buildings, structures, and objects. Historic properties are cultural resources that are eligible or listed on the National Register of Historical Places. Cultural resources may impose development constraints, or require special access by Native American tribal governments or other legitimate interests.

There were no issues identified for Cultural Resources as part of the JLUS process.

5.7 Dust / Smoke / Steam

Dust results from the suspension of particulate matter in the air. Dust (and smoke) can be created by fire (e.g., controlled or prescribed burns, agricultural burning), ground disturbance (e.g., agricultural activities, military operations, grading), industrial activities, or other similar processes. Dust, smoke and steam can be a compatibility issue if sufficient in quantity to impact flight operations (such as reduced visibility or cause equipment damage) or otherwise interfere with military operations.

Key Terms

Particulate Matter . Particulate matter (PM) consists of fine metal, smoke, soot, and dust particles suspended in the air. Particulate Matter is measured by two sizes: course particles (PM10), or particles between 2.5 and 10 micrometers in diameter in size, and fine particles (PM2.5), or particles less than 2.5 micrometers in diameter.

Prescribed Burn. A controlled fire applied to a predetermined area with appropriate safety precautions.

Technical Background

Particles of dust and other materials found in the air are referred to as particulate matter. The term PM-10 refers to particulate matter less than 10 microns in size. At higher concentrations, this particulate matter can be harmful to humans and animals if inhaled, causing strain on the heart and lungs. PM-10 can be caused by many activities, including driving on unpaved roads and surfaces, wind erosion of unpaved vacant lots, disruption of land from vehicle maneuvers, explosions, aircraft operations, and earth-moving activities such as construction, demolition, and grading. Its primary source is typically the exhaust emitted by vehicles, wood burning, and industrial processes.

Issue DSS-1

Smoke from Ellsworth AFB operations

Smoke from prescribed burns or fire training activities at Ellsworth AFB can impact pilot visibility and off-site activity.

Compatibility Assessment

Prescribed burns are utilized to control the buildup of vegetation. These burns are used to prevent larger fires that originate from natural causes (such as lightning strikes), or explosive ordnance disposal activities at the base. The South Dakota Wildland Fire Suppression Division (WF), under the Department of Agriculture, and the Black Hills National Forest conduct prescribed burns in the region.

In addition wildfires started by natural events (e.g., lightning strikes), wildfires in 2007 and 2011 were started as a result of explosive ordnance disposal (EOD) activities on Ellsworth AFB. These fires both moved north onto private lands north of the base during high winds, creating visibility issues as well as consumption of grass lands and property damage.

In response to these events, Ellsworth AFB has taken several actions to reduce the potential for wildfires in the future associated with EOD activities. These include:

- New berms have been created around the EOD area to diminish the spread of any fires.
- New setback standards have been implemented to diminish ability for a fire to spread off-base.
- New Fire Danger EOD Operating Instructions have been implemented, which include a matrix of Wind Speed Danger and allowable wind speeds. The installation follows these instructions to ensure detonations are only conducted during low risk conditions.
- New Memorandums of Understandings (MOUs) were put in place with the local fire departments to ensure a clear process of notification and response is followed.

Flight procedures at Ellsworth AFB require that the control tower have a clear visual contact with aircraft in the flight pattern and pilots have a clear view back to the airfield. According to the UFC Airfields and Transitional Surfaces, Class B runways (like the one at Ellsworth AFB) must have a minimum longitudinal sight distance of 5,000 feet, meaning that any two points eight feet above the pavement must be visible to each other for 5,000 feet. Smoke from prescribed burns needs to be managed so as to not violate this standard.

Current closed loop flight tracks at Ellsworth AFB utilize the area northeast of the base to minimize flying over more populated areas of the City of Rapid City. The majority of the land northeast of the base is currently agriculture or open space.

Existing Tools

Ellsworth AFB Wildland Fire Management Plan

The Ellsworth AFB Wildland Fire Management Plan provides policies and procedures for fire suppression operations on base. The plan lists goals and objectives for how to manage unplanned wildfires, prescribed burns and fuel management / reduction.

The plan describes procedures for prescribed burns designed to manage / reduce smoke from these events. Prescribed burns may only happen when winds are below a specified speed. If the fire is within the air traffic pattern, it will be scheduled on a no fly day or another time during the day that will not affect flight operations.

There are no steps in this plan that discuss the coordination between Ellsworth AFB and surrounding communities in the event that a base related fire spreads outside of the Ellsworth AFB boundaries.

South Dakota State Statute 34A-1-18

State Statute 34A-1-18 establishes open burning requirements and gives authority to the South Dakota Board of Minerals and Environment to create guidelines for open burning. The guidelines for open burning are listed on the state's webpage (<http://denr.sd.gov/des/aq/openburn.aspx>). The State

also follows the EPA's Wildland and Prescribed fires policy, which states that governments and other entities must create a Smoke Management Plan if they conduct prescribed fires, which is true for Ellsworth AFB.

The South Dakota guidelines for prescribed burns indicates that open burning is permissible for fire training, land clearing, right of way maintenance operations, agricultural crop burning, management of ecosystems, elimination of fire hazards, untreated lumber scrap and tress, and recreational or ceremonial campfires.

Findings

- Prescribed burns are coordinated with Ellsworth AFB as to not conflict with flight operations.
- Based on newly adopted EOD Operating Instructions, explosive ordnance disposal activities are only conducted when conditions (including wind speed) are within prescribed limits.
- New MOUs are in place with the local fire departments to ensure a process of notification and response is followed.

5.8 Energy Development

Development of energy sources, including alternative energy sources (such as solar, wind, geothermal, or biofuels) can pose compatibility issues if not planned, sited, and developed with compatibility in mind.

In the area around Ellsworth AFB, a potential key compatibility concern is the development of commercial alternative energy systems, such as wind energy, (vertical height and frequency interference issues) and solar (potential light and glare pollution). The moving blades of a wind turbine create a Doppler effect that can interfere with radio transmissions between air traffic controllers and aircraft and other types of communications, such as satellites. Recent studies indicate that large numbers of wind turbines located between five and eight miles from a radar system can have a negative impact on the system and interfere with readings. The impacts on radar are increased with the height, number, and clustering of turbines. Although research is still being conducted, it is not fully known how tall, large, or how many wind turbines must be present to compromise radar operations.

In addition to the potential interference with radar operations, wind turbines can also cause vertical obstruction issues if placed within the navigable airspace or line of sight radar signal transmission pathways used by the military. Such obstructions create a safety hazard for both the public and military personnel and can also impact military readiness.

Key Terms

Alternative Energy. The term alternative energy is applied broadly to energy derived from non-traditional sources (e.g., solar, wind).

Issue ED-1

Wind energy development

Wind energy potential in the region could attract wind energy generation development near Ellsworth AFB and flight operation areas.

Compatibility Assessment

Future commercial wind energy presents four possible threats to Ellsworth AFB flight operations: radio frequency (RF) clutter, screening, RF interference, and vertical height issues.

RF interference / clutter occurs from radar signals striking and reflection off the spinning blades. This quickly changing reflection has the potential to corrupt the accuracy of radar signals critical to operations. Wind farms heighten this effect due to the increase in density of wind turbines.

An impact of large wind farms is screening, or blocking out portions of the “field of view” of the radar so that aircraft control instrumentation and / or personnel cannot see aircraft that fly behind the “screen”; and causing false readings on the radar that make it appear there are aircraft flying in the area.

All types of wind development have the potential to affect radar operations at Ellsworth AFB. This is because the rotating blades of a wind turbine cause frequency shifted echoes in radar signals. This impact is dependent on the height of the wind turbines, the distance from the base and its operational areas, and the density of the turbines. Typically, large commercial wind farms are often the cause of interference. Individual or personal turbines rarely cause notable interference.

Modern wind turbines can be upwards to 500 feet tall. As such, wind turbines of this height can interfere with navigable airspace and can act as a vertical obstruction to flight operations and training at Ellsworth AFB.

According to the South Dakota Public Utilities Commission, successful wind energy projects need good wind resources, an electricity buyer, and transmission facilities to connect the turbines to utility systems.

South Dakota is considered to have the fourth largest wind resource in the nation, with 13 windfarms generating about 25% of all electricity produced in

the state. None of these wind farms are located in western South Dakota, although land surrounding Ellsworth AFB has potential for wind energy development. Figure 5.8-1 shows the potential for wind generation (based on wind speeds) in the area.

Western South Dakota's wind market will be greater in the future with the Basin Electric and Western Area Power Administration integration with the Southwest Power Pool energy network. This partnership will allow wind energy to be sold to a larger market and at higher prices. The last piece to increasing wind energy potential in this area is developing transmission lines, which western South Dakota currently lacks near wind potential areas.

Existing Tools

Box Elder Comprehensive Plan

Chapter 3 of the Box Elder Comprehensive Plan lists compatible and incompatible future land uses in various zones around an airfield such as the Rapid City Regional Airport and Ellsworth AFB. Commercial wind energy systems are incompatible in runway protection zones, inner approach / departure zones, traffic pattern protection zones, flight corridors, and aviation hazard zones. The applicable areas where this pertains to Ellsworth AFB can be found in Chapter 3 of this Background Report in Section 3.7: Ellsworth AFB Mission Footprint.

Meade County Wind Generator Ordinance

Commercial wind generator facilities are a permitted use under Zoning Ordinance Section 32. Under Section 32, wind generator facilities are permitted on agricultural properties that are at least 73 acres in size. The permit application requires, but is not limited to, an overview of the project, proof that the facility owner or operator is permitted by the property owner to construct and operate a wind facility, and a site plan. The ordinance provides stringent design, installation, inspection, and setback requirements. Specifically, every wind generator facility must be inspected and certified that the facility is within accepted professional standards pertaining to the turbine, foundation, and the tower design. Additionally, wind generator facilities must be in compliance with FAA Part 77 when being constructed.

As wind generator facilities can only be sited on agricultural properties in Meade County, these will be the areas that pose the biggest threats to field operations at Ellsworth AFB. Much of the land northwest of Ellsworth AFB is used agriculturally and thus will be viable for the siting of wind generator facilities.

Pennington County Zoning Ordinance

Section 317 of the Pennington County Zoning Ordinance lays out guidelines and regulations for Wind Energy Systems, which require a conditional use permit. The conditional use permit process includes a public hearing with Planning Commission. The applicant is required to mail a letter to his / her neighbors that give the details of the hearing. After the conditional use permit is approved, a building permit is also required with a site plan.

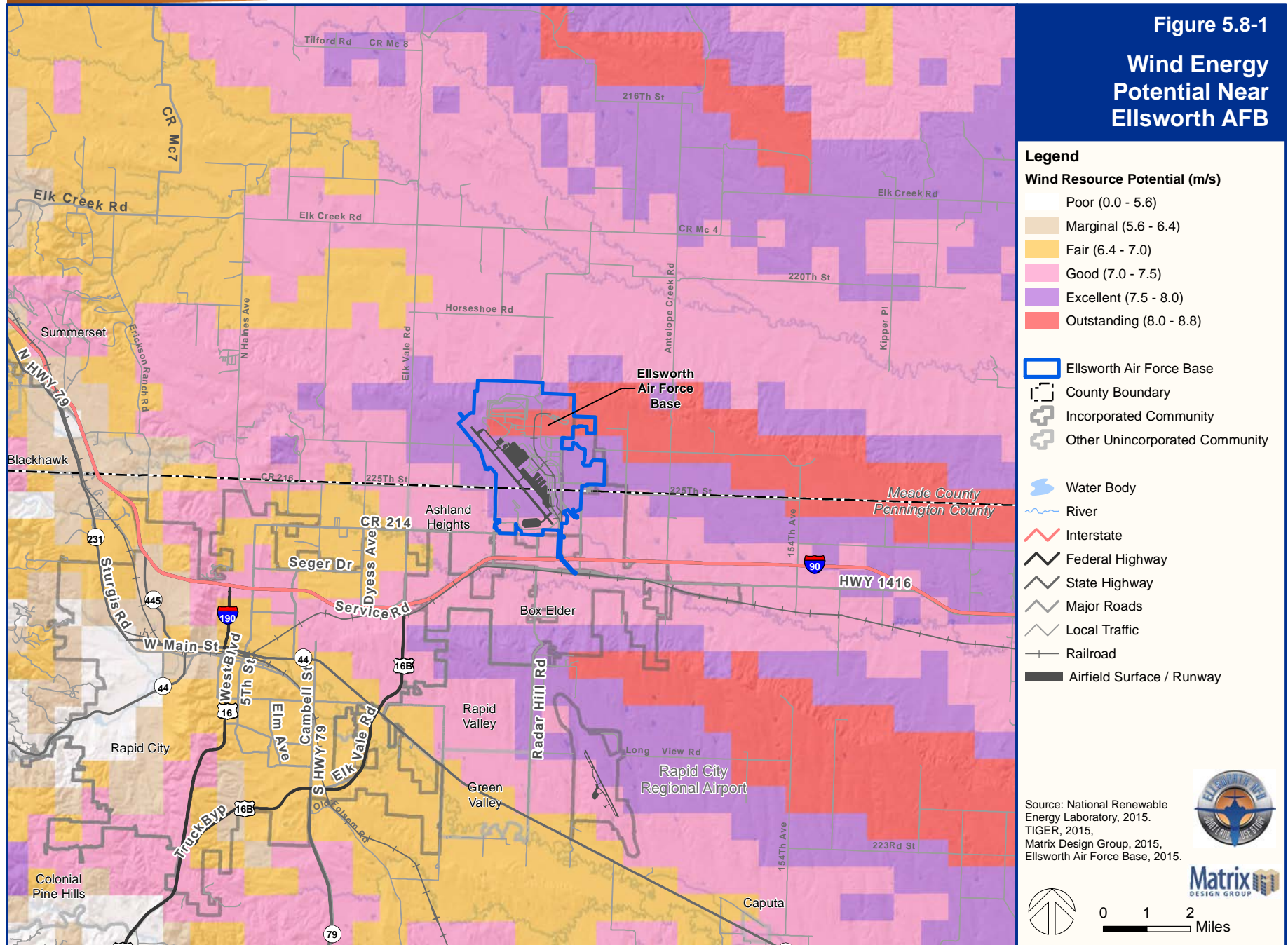
Large Wind Energy Systems (LWESs), with heights over 100 feet and ten acres or larger, are prohibited within Ellsworth AFB's Class D Airspace. Also, wind farms, 40 acres or more and meteorological towers, are prohibited within Ellsworth AFB's Imaginary Airspace. However, Small Wind Energy Systems, which allow tower heights up to 99 feet, are not restricted from locating near Ellsworth AFB. This could create potential vertical obstruction issues. In addition, all wind energy systems, must comply with FAA Part 77.

Rapid City Zoning Code

Section 17.50.215 of the Rapid City Zoning Code permits wind energy conversion systems as accessory structures through conditional use permit process in the light industrial, heavy industrial, and mining and earth resources extraction districts. These three districts are primarily located in the western, northeastern, and the southern portions of the city. The height of any wind energy conversion system may not exceed 90 feet and must be set back one and a half times the height of the system from any property line, overhead utility line, other tower support bases, and any housing structure. Wind energy conversion systems may not interfere with radios, television, microwave towers, or other transmissions. The system must comply with all levels of government regulations, including FAA Part 77.

Figure 5.8-1

Wind Energy Potential Near Ellsworth AFB



As the Rapid City Regional Airport is located nearby, the city itself must be conscious of the effects of wind turbines on both Ellsworth AFB and its airport.

Findings

- Although there are height and setback regulations for wind energy systems in the jurisdictions near Ellsworth AFB, there are also issues regarding RF clutter, screening, and interference.
- Within all of the existing tools, there is little mention of RF interference, screening, and clutter.
- Interference implications should be considered so as to not impede on Ellsworth AFB operations.
- Pennington County has a County Alternative Energy and Mining Committee charged with an ordinance, the Alternative Energy ordinance, which has a focus on solar farms in addition to wind. Although there are not currently any solar farms, there is a proposal within the county to develop a solar facility (referred to as “New Underwood”).

5.9 Frequency Spectrum Capacity

Frequency spectrum refers to the range of electromagnetic waves capable of carrying signals for point-to-point wireless communications. In a defined area, the frequency spectrum is limited and increasing demand for frequency bandwidth from commercial applications, such as cellular phones, computer networking, GPS units, and mobile radios, is in direct competition with the capacity necessary for maintaining existing and future missions and communications on installations.

Frequency spectrum impedance and interference issues associated with wind generation facilities are discussed in Section 5.8 Energy Development. There were no other issues identified for Frequency Spectrum Capacity as part of the JLUS process.

5.10 Frequency Spectrum Impedance / Interference

The frequency spectrum is the entire range of electromagnetic frequencies used for communications and other transmissions, including communication channels used for radio, cellular phones, and television. In the performance of typical operations, the military relies on a range of frequencies for communications and support systems. Similarly, public and private users rely on a range of frequencies in the use of cellular telephones and other wireless devices used on a daily basis.

Frequency Spectrum impedance and interference associated with wind generation facilities are discussed in Section 5.8 Energy Development. There were no other issues identified for Frequency Spectrum Capacity as part of the JLUS process.

5.11 Housing Availability

Local housing availability addresses the supply and demand for housing in the region, the competition for housing that may result from changes in the number of military personnel and the supply of military family housing provided by the installation.

Key Terms

Accompanied Housing. Accompanied housing is family housing for military personnel who have dependents.

Basic Allowance for Housing. Basic Allowance for Housing (BAH) refers to a monthly military entitlement granted to military members for providing housing for themselves and their dependents when they do not live in on-base housing. Factors determining BAH include pay grade, location, and number of dependents.

Family Housing. Family housing is housing for military personnel who have dependents. Family Housing is also referred to as accompanied housing.

Privatized Housing. Ellsworth AFB entered into an agreement with Balfour Beatty Communities to manage and maintain military housing at the base. Since Ellsworth AFB no longer operates military family housing, the housing available to military personnel, either on-base or outside the main base in the Prairie View, Rushmore Heights, or Black Hills communities, is known as privatized housing.

Unaccompanied Housing. Unaccompanied housing is provided for airmen, without dependents, ranking E-1 to E-3 and E-4, with less than three years of service. Rankings higher than E-4 may petition to live in unaccompanied housing or otherwise live in the local community housing.

1995 JLUS Recommendations

Recommendation Seven – Ongoing

The 1995 JLUS recommended that jurisdictions within the environs of Ellsworth AFB should seek grants and other assistance to provide local funding for "energy efficient" rehabilitation of existing compatible residential structures. Compatible residential structures are those which are compatible with AICUZ guidelines for both noise contours and accident potential zones.

Action Taken

Since the 1995 JLUS, SDEDA has received grants to build 12 energy efficient homes outside the area of concern to provide an option for those living in the area of concern.

Issue HA-1

Affordable Housing

Median values and rents of homes are increasing in the area, while changes in military housing have altered housing availability for military personnel and local residents.

Compatibility Assessment

As a part of Air Force Instruction 32-6002, consistent with Office of the Secretary of Defense policy, installations must rely on local community housing and may provide family housing to compensate for shortfalls of adequate, affordable housing in the local housing market. Privatized housing is available for military personnel on the base.

Each jurisdiction surrounding the base has experienced an increase in median housing value and median rent from 2010 to 2014. The increase in population within the Rapid City Metropolitan Statistical Area (MSA) and the success of the Military Housing Privatization Initiative (MHPI) are likely contributors to the increase in housing values and rents due to a surge in housing demand.

Table 5.11-1 shows the change in median housing values and median monthly rents for jurisdictions near Ellsworth AFB between 2010 and 2014.

Table 5.11-1 Median Housing Values and Monthly Rents, 2010 and 2014

Jurisdiction	Median Value 2010	Median Value 2014	% Annual Increase From 2010 to 2014	Median Gross Rent 2010	Median Gross Rent 2014	% Annual Increase From 2010 to 2014
City of Box Elder	\$116,100	\$124,100	1.7%	\$765	\$935	5.6%
City of Rapid City	\$147,200	\$153,900	1.1%	\$668	\$779	4.2%

American Community Survey, 2010, 2014

From 2010 to 2014, home values in the City of Rapid City increased from \$147,200 to \$153,900. Median gross rents increased from \$668 to \$779. In the City of Box Elder, median home values increased from \$116,100 to \$124,100. The most significant increase within the Study Area is the increase in median gross rents in the City of Box Elder from \$765 to \$935. This represents a 5.6% annual increase.

Military personnel are provided with BAH rates, which is a determining factor in where they are able to live. BAH rates for military personnel that have dependents (accompanied personnel), have higher BAH rates than unaccompanied personnel. With increasing housing costs around the base, military personnel may find that housing is unaffordable with their given BAH rate.

Table 5.11-2 shows the BAH rates for the year 2015. The City of Box Elder had one of the greatest rents, which was 20% greater than the lowest BAH rate, \$774. The lowest rent within the Study Area was in Meade County, \$770, which barely falls within the lowest BAH rate. According to Zip Code counts, about 950 military personnel live on Ellsworth AFB and 975 live in Box Elder. The third largest amount of personnel, about 900 personnel, lives in Rapid City. Housing for ranks E-1 through E-3 is provided on base;

however, housing should be available and affordable for all accompanied ranks, such as ranks E-6 and above.

Table 5.11-2 BAH Rates, 2015

Rank	BAH w/o Dependent	BAH w/Dependent
E-1	\$774	\$1005
E-2	\$774	\$1005
E-3	\$774	\$1005
E-4	\$774	\$1005
E-5	\$885	\$1068
E-6	\$1095	\$1458
E-7	\$1131	\$1509
E-8	\$1173	\$1563
E-9	\$1266	\$1620
W-1	\$1098	\$1461
W-2	\$1149	\$1533
W-3	\$1278	\$1599
W-4	\$1473	\$1626
W-5	\$1521	\$1659
O-1E	\$1140	\$1521
O-2E	\$1239	\$1590
O-3E	\$1458	\$1632
O-1	\$939	\$1110
O-2	\$1134	\$1452
O-3	\$1317	\$1596
O-4	\$1515	\$1674
O-5	\$1548	\$1725
O-6	\$1599	\$1743
O-7	\$1632	\$1761

<http://ellsworthhousing.com/bah.php>

Due to the lack of sufficient military housing on bases and the higher cost of military personnel living off base, Congress enacted the MHPI in 1996. This initiative calls for the improvement and construction of military family housing through privatization, with the intent of increasing the quantity and quality of housing.

In 2012, in accordance with the MHPI and in an effort to provide long-term housing solutions for military personnel, Ellsworth AFB transferred Centennial Estates, formerly known as Antelope Ridge, to Hunt Military Communities. The 825 units transferred are within Ellsworth AFB boundaries, but are available to rent by both military and non-military families, although military use has first priority. Suggestions have been made to add a new gate to serve this area, however this may not be a long-term need for this area.

In addition to the transfer of housing units, Ellsworth AFB also privatized additional Military Housing on base. Currently, there are three privatized housing neighborhoods, owned and operated by Balfour Beatty Communities: Prairie View Estates, Rushmore Heights, and the newest and largest neighborhood, Black Hills. Together, the three neighborhoods provide 497 quality housing units. In total, Ellsworth AFB provides over 1,000 units to military personnel, which provides for about 1/3 of the military personnel at Ellsworth AFB. Those who are not able to live in military housing live in either Box Elder or Rapid City, which may create more housing demand and competition for civilians who live in these cities. Figure 5.11-1 shows the different types of housing for Ellsworth AFB.

Existing Tools

Air Force Instruction 32-6002

Air Force Instruction 32-6002, published in 2015, provides housing criteria and guidelines, including Unified Facilities Criteria Family Housing. As part of planning and programming policy, bases must perform a Housing Requirements and Market Analysis to ensure that plans are made to replace, improve, construct, or acquire units that the Air Force needs. Consistent with Office of the Secretary of Defense policy, installations must rely on local community housing first and may only provide family housing to maintain a

minimum family housing requirement and to compensate for shortfalls of affordable housing in the local housing market.

Box Elder Comprehensive Plan 2014

The Comprehensive Plan recognizes the need for new and repaired houses throughout Box Elder. In Section 4.3, Framework, the plan highlights five characteristics of housing stock that should be included in new and existing housing throughout the city, one of which is to include quality options for transient military individuals / families in order to better incorporate them into the community.

One strategy in the Implementation chapter is to work with Neighborhood Works, an organization that helps Black Hills and Western South Dakota residents obtain and maintain affordable housing, to create a housing study that would identify housing deficiencies, inventory existing housing, and identify blighted and substandard housing. The study would also recommend methods for alleviating these issues. This would help the city understand where improved housing is needed, which would provide military personnel with more housing options. The Implementation chapter indicates that this would be a short term action.

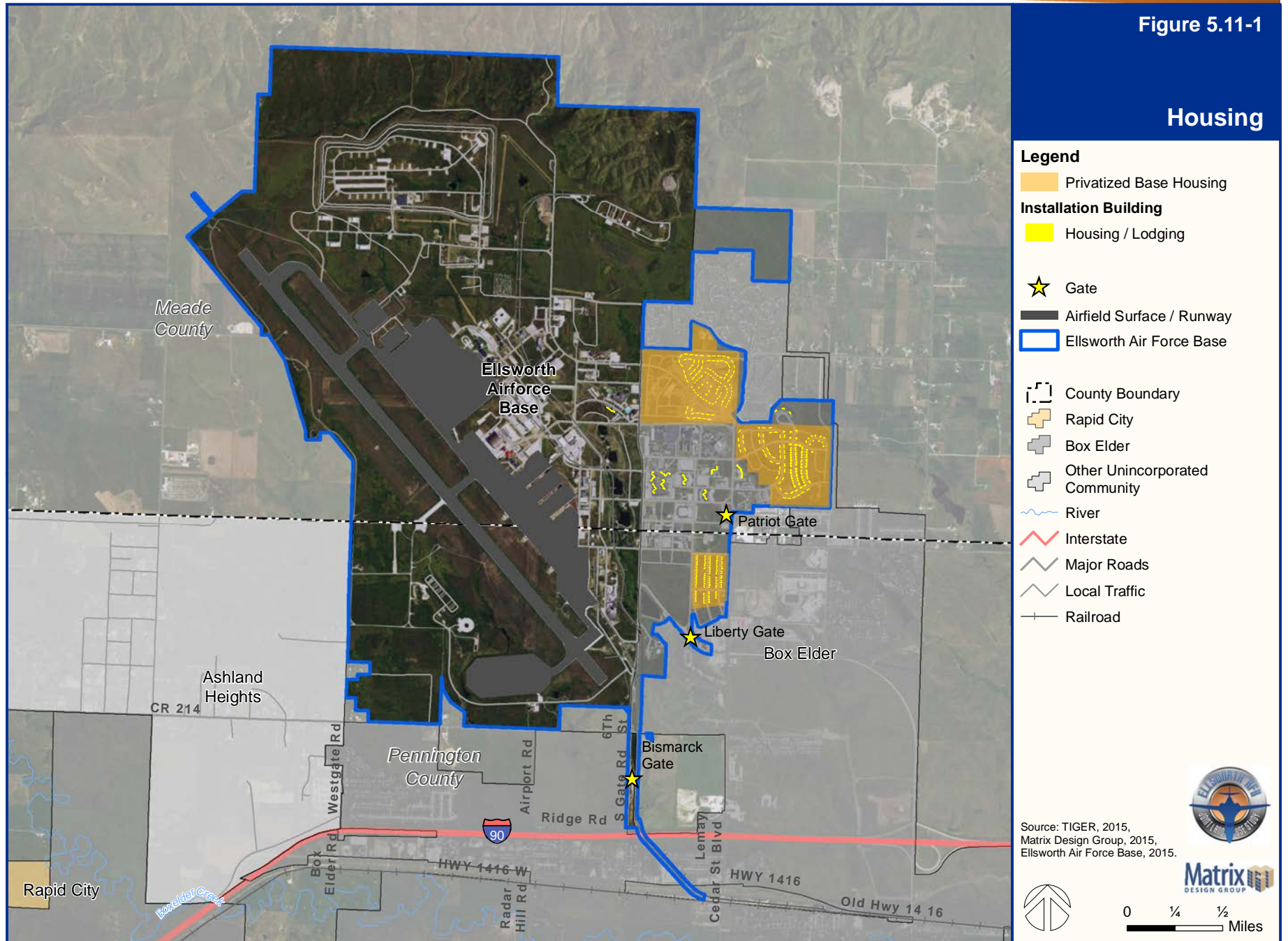
Other actions involve the support of rehabilitating and renovating old housing, subsidized housing, and the development of housing that meets the needs of all income groups. The Implementation chapter indicates that these would be long term actions.

Meade County Comprehensive Plan 2010

A vision of the Meade County Comprehensive Plan is to create more housing options by incorporating mixed use development. These housing options would also include affordable housing. A strategy to meet this vision is to encourage various housing types within new residential developments. A variety of housing provides military personal with more options when selecting housing.

Figure 5.11-1

Housing



Legend

- Privatized Base Housing
- Installation Building**
- Housing / Lodging
- Gate
- Airfield Surface / Runway
- Ellsworth Air Force Base
- County Boundary
- Rapid City
- Box Elder
- Other Unincorporated Community
- River
- Interstate
- Major Roads
- Local Traffic
- Railroad

Source: TIGER, 2015,
Matrix Design Group, 2015,
Ellsworth Air Force Base, 2015.



0 ¼ ½ Miles

Military Housing Privatization Initiative

Enacted in 1996, the MHPI was created to attract private sector financing to provide necessary family housing quickly and efficiently. The MHPI addresses concerns over the conditions of Department of Defense owned housing and shortage of affordable private housing. This initiative is important in ensuring military personnel have adequate housing available to them.

Unified Facilities Criteria (UFC) Family Housing 2006

The Unified Facilities Criteria for military family housing provides guidance for Department of Defense family housing in the US. The goal of the document is to provide quality-housing neighborhoods for those who contribute to the readiness of Military Forces, which would include Ellsworth AFB personnel.

Findings

- Most of the comprehensive plans for the jurisdictions in the Study Area include visions and goals to improve housing and housing affordability. Only the Box Elder Comprehensive Plan acknowledges military housing needs for Ellsworth AFB, although no policies are put in place to directly correct this issue.
- Providing affordable housing is beneficial for both military personnel and the surrounding jurisdictions.
- Information on the availability of affordable housing is limited, but the City of Box Elder is planning to study affordable housing needs.
- Ellsworth AFB has benefitted from the MHPI with the privatization of family housing. There are now almost 500 new and renovated family housing units that provide military personnel with a higher standard of living in addition to the 825 units in Centennial Estates.
- Although there has been an improvement in housing standards, there is still uncertainty that the supply of housing will not fulfill the needs for the base.
- The State of South Dakota is not involved in efforts to increase affordable housing.

5.12 Infrastructure Extensions

Infrastructure refers to public facilities and services such as sewers, water, electric, and roadways that are required to support both existing and proposed development.

Infrastructure should be appropriate for the type of urban or rural development they serve, and limited to the existing and planned needs and requirements of the area. For example, a transportation system should be of adequate size with regards to the jurisdiction it serves. It would be costly and wasteful for a large, expansive highway to be constructed in a rural town that has a small population and small transportation needs.

Infrastructure plays an important role in land use compatibility. Infrastructure can enhance the operations of an installation and community by providing needed services. Conversely, infrastructure can create encroachment issues if expanded without consideration of the consequences of future development. The extension or expansion of community infrastructure to a military installation or areas proximate to an installation has the potential to induce growth, potentially resulting in incompatible uses and conflicts between a military mission and communities.

Within comprehensive planning, infrastructure extensions can serve as a mechanism to guide development into appropriate areas, protect sensitive land uses, and improve opportunities for compatibility between community land uses and military missions.

Key Terms

Infrastructure. In a broad sense, the word infrastructure in this section refers to public facilities and services, such as sewers, water, electric, and roadways that are required to support existing and proposed development.

Issue IE-1

Power lines currently limit the expansion of County Road 214 in Pennington County

There is a desire to expand County Road 214, but the base fence line, power lines, and a contamination site is currently limiting the expansion.

Compatibility Assessment

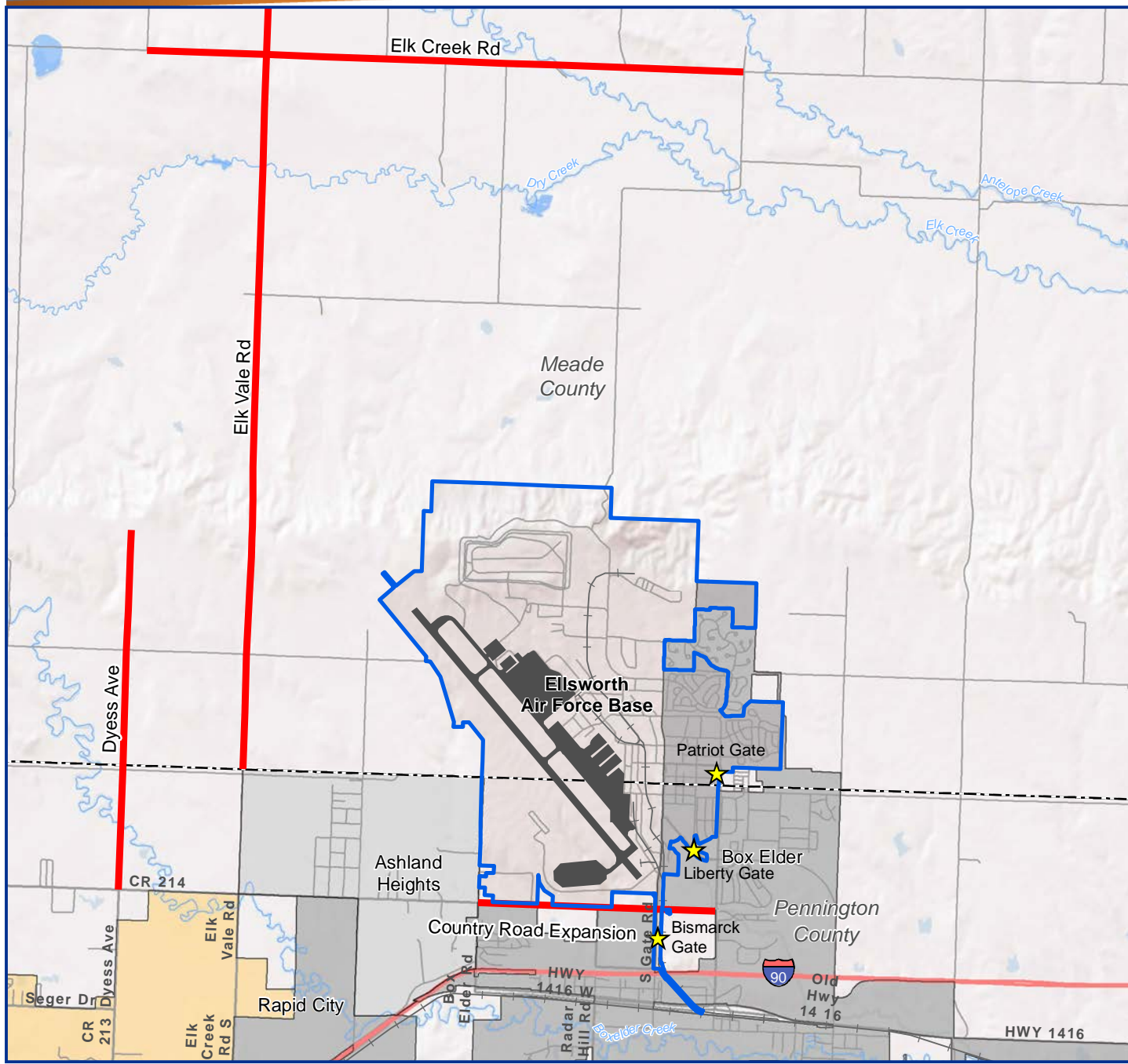
County Road 214 (Country Road) is a major arterial that runs west to east in Pennington County. The pavement of this road currently ends at 147th Avenue, but there is a desire to extend this arterial to Ellsworth Road (see Figure 5.12-1). As an arterial roadway, the road should be able to carry large volumes of traffic and should be able to accommodate maximum speeds. The road currently does not have this capacity to fulfill the maximum potential as a major arterial due to its limited width. Current infrastructure along Country Road, especially in between West Gate Road and Airport Road, hampers the road from making further improvements.

Any expansion to Country Road is obstructed by infrastructure that is currently in place adjacent to the road, especially in between 147th Avenue and Airport Road. The fence line to Ellsworth AFB also directly abuts Country Road with little shoulder in between. This fence is not able to be moved closer into the base due to a contamination site that is located in this area.

In addition to the fence, power lines are located within the fence line, not too far from the road. These power lines would present another obstacle for the expansion of Country Road.

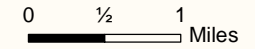
Figure 5.12-1

Infrastructure Extensions



- Legend**
- Infrastructure Extensions
 - ★ Gate
 - Airfield Surface / Runway
 - Ellsworth Air Force Base
 - County Boundary
 - Rapid City
 - Box Elder
 - Other Unincorporated Community
 - Water Body
 - ~ River
 - Interstate
 - Major Roads
 - Local Traffic
 - Railroad

Source: TIGER, 2015, Matrix Design Group, 2015, Ellsworth Air Force Base, 2015.



Existing Tools

Pennington County Transportation Plan

Within the Future Needs Analysis, the transportation plan discusses the Pedestrian and Bicycle Master Plan. There is a recommendation in this section to increase the shoulder of roads that do not meet the recommended four foot minimum for bicycle travel. Country Road between Haines Avenue and West Gate Road is one of the roads that the plan suggests making this improvement. The creation of a wider shoulder for any road would be concurrent with the reconstruction or resurfacing of the road. This conflicts with the feasibility of the expansion of the road. There is no comment as to other improvements on this road, such as pavement or extension.

Pennington County Comprehensive Plan

One of the policies listed in the plan for the transportation goal is to consider road designs that are sensitive to physical limitations. This policy may include the contamination site in Ellsworth AFB that is disabling the road from being further expanded or improved.

The future roadway system of Pennington County should address the following:

- The relationship with the regional transportation network
- Traffic volumes and road capacity
- Existing and future land uses in the surrounding area
- Safety
- Available right-of-ways
- Major traffic generators

Because Country Road is an arterial road and is located by the base fence line, these factors will have to be carefully considered.

Findings

- Country Road will not be easily altered due to the infrastructure already in place and the contaminated site on Ellsworth AFB.

Issue IE-2

Road improvement in Meade County could lead to incompatible residential development

The improvement of Meade County roads could lead to increased and potentially incompatible residential development in southern parts of Meade County.

Compatibility Assessment

There are a few road improvements that will be conducted in the near future that could lead to an increase in residential development serviced by these roads in Meade County. The roads that will be paved are Elk Vale Road from the Pennington County line to Elk Creek Road and Elk Creek Road from 14th Avenue east to Horseshoe Road. Dyess Avenue will have improvements from Country Road extending north (see Figure 5.12-1).

It is important that new developments along the roads do not interfere with Ellsworth AFB operations and that operations do not interfere with future development. These roads are located near Ellsworth AFB, presenting potential incompatible uses that are spurred by the improvements of these roads. Most of the improvements identified are also located in Meade County, which does not have many guidelines that would enforce compatibility with the base.

Increased development in the area has the potential to bring heavy traffic, increased ambient light, and a rise in the cost of property. An increase in property values in the area makes vacant land in the APZs more attractive to sell and develop. Additionally, base operations may generate noise and safety impacts for those living and working nearby. Figure 5.12-1 illustrates the locations of infrastructure extensions around Ellsworth AFB.

This issue is further discussed in Issue LU-3.

Existing Tools

Meade County Transportation Plan

The Meade County Transportation Plan illustrates that the area surrounding Ellsworth AFB has a high future growth area. According to the 2030 Average Daily Traffic projections, all of the roads that are to be improved in Meade County will expect to see a significant increase in use, including the roads listed in the Compatibility Assessment.

Findings

- Enhancement of roadway system in the areas near the base could make suburban or estate / ranchette lots and development (lots from 1 - 5 acres in size) more desirable, thereby inducing residential growth in the area. Such development, if inside the 65 dB noise contour, accident potential zones, or overflight areas, could lead to incompatible development.
- Meade County has applied subdivision regulations and building codes to promote compatibility with Ellsworth AFB however, zoning controls are not available to help avoid future compatibility issues.

Issue IE-3	<p>New sewer line could lead to increased development</p> <p>A new sewer main on Dyess Avenue to Country Road could stimulate residential development in areas with compatibility concerns.</p>
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Compatibility Assessment

The sewer line on Dyess Road is forecasted to be extended north to Country Road and into Meade County. This extension, by Rapid City, would encourage future development in Pennington County as well as further north into unincorporated Meade County.

The extension of the sewer line would be conducted by Rapid City, but would be located in unincorporated Pennington County. Rapid City has a Utility

Support Fund, which provides funding for the expansion of utility services, such as sewer lines. There is currently no sanitary sewer service north of Seger Drive on Dyess Road.

Development along Dyess Road heading north is currently sparse with low density residential and light industrial uses along the road. The extension of the sewer line would provide more utility to this rural area, which could spur additional residential or commercial growth.

As growth in Pennington County continues north, it could generate increased development activity in Meade County, following the extension of the sewer line. Although this is not the closest area of development near Ellsworth AFB, any development in this area is not recommended as it becomes increasingly closer to the base and the safety zones.

Existing Tools

Pennington County Comprehensive Plan

According to the Pennington County Comprehensive Plan, future land use projections for Dyess Road up to Country Road are similar to current land uses – light industrial and low density residential.

Some types of land use development require that sewer sanitation is provided, including Suburban Residential. Although the current land use along Dyess Road is low density residential, the extension of the sewer line supports Suburban Residential land uses.

Pennington Zoning Ordinance

If development extends into the safety zones of Ellsworth AFB, development standards must follow the Ellsworth AFB AICUZ. This suggests that any potential development that is spurred by the new sewer line would not be incompatible with Ellsworth AFB.

Findings

- Residential and commercial land uses are potential future land uses that may develop in Pennington County.
- Pennington County, Rapid City, and Meade County should maintain lines of communication with Ellsworth AFB if and when Dyess Road becomes more developed and if the sewer line is further extended past Country Road in order to ensure compatible development with Ellsworth AFB operations.
- Coordination between the multiple jurisdictions and Ellsworth AFB will promote joint planning which will allow individual communities to leverage limited resources and reduce duplication of efforts. This leads to overall better planning, reduced costs and development that are more compatible with the mission of Ellsworth AFB.

5.13 Land / Air / Sea Spaces

The military manages or uses land and air space to accomplish testing, training, and operational missions. These resources must be available and of a sufficient size, cohesiveness, and quality to accommodate effective training and testing. Military and civilian land and air operations can compete for limited air and sea space, especially when the usage areas are proximate to each other. Use of this shared resource can impact future growth in operations for all users.

Key Terms

Unmanned Aerial Vehicles. Unmanned aerial vehicles (UAVs) are aircraft that are capable of operating without an internal pilot, are tethered by a radio control link, and can be programmed for both flight and payload operations prior to launch.

Technical Background

The demands of extended operational reach, both in terms of breadth and depth, make the military installation, training area, airspace, and sea space of the region, and interconnected collaboration between the military training and test installations, more important as requirements and capabilities of weapons and command and control systems continue to improve.

The land, air, and sea spaces used by the military can be owned by the DOD, designated for DOD use by a federal or state agency, provided through easements or other agreements with public or private entities, or maintained as a historic usage right. Public and private requests to share or assume some of these resources may have a negative impact on military training and test objectives.

Controlled and Uncontrolled Airspace Descriptions

To help air traffic controllers and pilots deal with varying traffic conditions in the sky, US airspace is divided into six different classes (A, B, C, D, E, and G). These classes each have different requirements for entry into the airspace, pilot qualifications, radio and transponder equipment, and Visual Flight Rules (VFR) weather minimums.

Class Airspace. Use of Class D Airspace, which Ellsworth AFB is classified as, requires the use of two-way communication with air traffic control, which must be established prior to entering the airspace. No transponder is required. VFR flights in Class D airspace must have three miles of visibility, and fly an altitude at least 500 feet below, 1,000 feet above, and 2,000 feet laterally from clouds.

Issue LAS-1

Non-military drones

Non-military drones could interfere with military operations at Ellsworth AFB.

Compatibility Assessment

Use of UAVs, commonly called drones, has increased dramatically as they have become cheaper, smaller, and easier to purchase and use. By 2020, the FAA estimates the number of UAVs being used in US airspace to increase to 30,000. The FAA has a ban on UAVs flying over restricted airspace including military bases and within a five mile radius of medium and large airports. Yet, pilots and air traffic controllers in the US reported about 150 incidents in 2014 in which UAVs flew too close to airports or aircraft. Technology can be utilized to limit the range of UAVs using geofencing, which uses GPS or RF identification to create a geographic boundary that location-aware devices know to avoid. Few manufacturers have incorporated this technology in the drones as it is not required.

The FAA Modernization and Reform Act of 2012 established rules for non-commercial / recreational use of model aircraft, which includes civilian use of UAVs. Under these rules, civilian UAVs must be operated to ensure that they do not interfere with any manned aircraft. It also establishes that if the UAV is flown within five miles of an airport, the operator must notify the airport operator and the air traffic control tower. The operator must also maintain visual line of sight of the UAV. The FAA released a proposal governing small commercial UAV operations in February 2015. Small UAVs are classified as 55 pounds or less. The proposal sets a speed limit of 100 miles per hour and flying height limit of 500 feet. Operators must keep

the UAV in sight and avoid hazards, such as restricted airspace, airports, and other planes. It also requires UAV operators to pass an aeronautics test to obtain an operator certificate, but it does not require operators to have an aviator's license. Final rules will take some time and it could be 2017 before the rules are finalized. Until these rules are established, commercial operators must go through the Section 333 exemption process. The exemption process involves filing a petition for exemption, which is granted on a case-by-case basis to perform commercial operations with UAVs. As of March 2015, the FAA granted 69 exemptions. Private recreational UAV use remains regulated under the FAA Modernization and Reform Act of 2012. These regulations should keep UAV sightings relatively low around Ellsworth AFB. These regulations are important because of Ellsworth AFB's proximity to residential communities which have the potential to utilize UAVs recreationally.

In more rural parts of the US, UAVs are becoming increasingly used for agricultural purposes to monitor crops and fields. The UAVs can be programmed to fly low over fields and streams providing photos and videos to a ground station where the images can be stitched together into maps and analyzed to gauge crop health. They can also be programmed to land and take soil and water samples. A 2013 study estimated that future UAV markets would be largely in agriculture. There is uncertainty as to whether a farmer who decides to use a personal drone to survey as part of the agricultural business and make a profit would be considered a commercial or recreational use of a UAV.

Most of the area north of Ellsworth AFB is currently used for agriculture or open space, which may attract both recreational and agricultural use as farms may begin to utilize the growing technology. As the number of UAVs increases, there is potential for increased communication between air traffic control and civilians utilizing UAVs. There will also be the increased risk of UAVs flying into restricted airspace without prior coordination or consent. This raises security concerns as many UAVs are equipped with camera equipment and could provide a line-of-sight into the base. In addition, UAVs can also strike aircraft if they are flown into the flight patterns, causing safety concerns for pilots.

Existing Tools

FAA Modernization and Reform Act of 2012

Section 336 of the FAA Modernization and Reform Act of 2012 establishes special rules for model aircraft, including UAVs. It states that when a UAV is flown within five miles of an airport, the operator of the aircraft must provide the airport operator and the airport air traffic control tower with prior notice of the operation. Model aircraft operators flying from a permanent location within five miles of an airport should establish a mutually-agreed upon operating procedure with the airport operator and the airport air traffic control tower. In June 2014, the FAA issued an Interpretation of the Special Rule for Model Aircraft, which declared that flights within five miles of any airport may be denied by air traffic control. Flying in these areas may only be done if granted permission by the air traffic control and must be inquired upon regardless of the size of the drone and the height of the flight. These regulations will continue to help ensure safety on Ellsworth AFB.

Findings

- In rural parts of the US, such as the area surrounding Ellsworth AFB, UAVs are being used for agricultural purposes, which can cause safety issues for the base.
- The FAA expects the number of UAVs being used in US airspace to increase to 30,000 by 2020.

5.14 Land Use

Land use planning is based on government's role in protecting the public's health, safety, and welfare. County and local jurisdictions' growth policy plans (such as a comprehensive plan), as well as, zoning ordinances, and subdivision regulations can be the most effective tools for preventing or resolving land use compatibility issues. These tools can ensure a separation of land uses that differ significantly in character. For example, industrial uses are often separated from residential uses to avoid impacts related to noise, odors, lighting, etc. These tools

Key Terms

Land Use Planning. In general, land use planning is a method of establishing long-range goals for the future development of property. The intent of long-range planning is to reduce and or eliminate land use conflicts. Long-range planning goals and policies are usually captured in a document referred to as a Comprehensive Plan. Most states have enabling legislation that allow local jurisdictions to create and adopt general or comprehensive plans which typically cover a 10 to 20 year period. The comprehensive plan is not a regulatory document, however; it is typically followed by various land use regulations such as zoning, subdivision and permitting regulations.

Zoning. Zoning Laws stem from the 1926 Supreme Court decision of the Village of Euclid vs. Ambler Realty Company, which enabled the Village to regulate where and how industrial uses would develop in the village. Today, zoning is a tool used by jurisdictions to control uses, density, intensity, building heights, and setbacks on a parcel or lot. Most states have enabling legislation that allows local jurisdictions to also create and adopt zoning ordinances.

Subdivision. Subdivision laws regulate the division of land. Subdivision regulations are used to ensure that the public health, safety and welfare and therefore typically address issues such as access, utilities and drainage.

Local jurisdictions' long-range plans, zoning and subdivision ordinances are the most effective tools to avoid and resolve land use compatibility issues. These tools ensure similar and compatible land uses are properly located and can co-exist while separating land uses that differ significantly in use and can cause potential nuisances.

Sensitive Land Uses. In terms of compatibility assessment, sensitive land uses are uses that are susceptible to, and effected by, nuisances such as noise, dust, and air pollution. Sensitive land uses typically include residential areas, hospitals, convalescent homes and facilities, schools, libraries, churches, recreational areas, and other similar land uses.

Technical Background

Land use planning around military installations is similar to the process for evaluating other types of land uses. For instance, local jurisdictions consider compatibility factors such as noise when locating residential developments near noise generating uses, such as highways, and certain commercial or industrial uses. As the land between local municipalities is developed, or the land between a local municipality and the perimeter of a military installation is developed, both entities are affected. New residents, tenants, or building owners are typically not fully aware of the implications of locating in close proximity to an active military installation and / or training area.

Among the most pressing factors causing incompatibility with installations is encroaching development. This is of particular concern when the installation contains a military airfield or weapons training area. Encroaching development, may introduce incompatible land uses which may threaten an installation's mission success and its continued existence.

1995 JLUS Recommendations

Recommendation One - Complete

The 1995 JLUS recommend that the City of Box Elder update the existing comprehensive plan to reflect future land use recommendations contained in this document and that it be consistent with AICUZ guidelines. The land use maps found within the document should also reflect the noise contours. Since the 1995 JLUS, the City of Box Elder has updated their comprehensive plan to be consistent with AICUZ guidelines including the safety zones and noise contours.

Action Taken

The City of Box Elder has updated their comprehensive plan to be consistent with AICUZ guidelines including Clear Zone, APZ 1 and 2, and sound contours.

1995 JLUS Recommendations

Recommendation Two - Complete

The 1995 JLUS recommended that the City of Box Elder update their zoning ordinance so as to prevent "pyramid" zoning and to allow for land use zoning based, in part, by aircraft generated noise contours. It suggested that the Zoning Code should recognize the importance of the Accident Potential Zones associated with military operations.

It recommended that the code should also require the sound attenuation of residential structures within certain noise contours, as per the AICUZ guidelines. It is recommended that the noise contours be defined by utilizing the smallest and most definitive land parcel definition that is possible, depending upon the location of the particular piece of property and the information available. The use of one-quarter sections to define the contours should be used at a minimum.

Action Taken

Since the 1995 JLUS, the City of Box Elder has updated subdivision ordinances to match their comprehensive plan and AICUZ guidelines. The City of Box Elder has determined that there are areas within the city that are subject to high aviation noise levels and possible crash hazards generated by aviation activities that may endanger lives and property of the occupants of land in the vicinity of Ellsworth AFB. Therefore, the city has adopted one overlay district and is currently reviewing several others. Using a 10 acre or less grid system based on the Public Land Survey System (PLSS) that is being developed, Box Elder can easily identify and legally describe only those portions of property falling in areas of concern.

1995 JLUS Recommendations

Recommendation Three – Partially Complete

The 1995 JLUS recommended that Pennington and Meade Counties should prepare and adopt comprehensive plans based on the land use recommendations contained in the document and that it be consistent with AICUZ guidelines. The land use maps found within these documents should also reflect the noise contours.

Action Taken

In 2009, the Moving Forward with Ellsworth Air Force Base (MFWE) committee conducted a Box Elder I-90 Corridor Area Master Planning Project that included the cities of Box Elder and Rapid City and the counties of Pennington and Meade. This master plan addressed the AICUZ guidelines and made recommendations to Box Elder, Meade County, and Pennington County. Pennington County has adopted a comprehensive plan that includes the AICUZ guidelines. Meade County is reviewing the specific recommendations, but does have restrictions within the county that ensures that residential lots be at least three acres in size, which meets most density criteria with the AICUZ guidelines. The City of Box Elder has adopted a comprehensive plan consistent with the AICUZ guidelines.

1995 JLUS Recommendations

Recommendation Four – Partially Complete

The 1995 JLUS recommended that Pennington and Meade Counties should prepare and adopt a zoning code to allow for land use zoning based, in part, by aircraft generated noise contours. Specific attention should be placed on avoiding "pyramid" zoning of uses and the code should recognize the Accident Potential Zones associated with military aircraft. The code should also require the sound attenuation of residential structures within certain noise contours, as per the AICUZ guidelines. It is recommended that the noise contours be defined by utilizing the smallest and most definitive land parcel definition that is possible, depending upon the location of the particular piece of property and the information available. The use of one-quarter sections to define the contours should be used at a minimum.

Action Taken

Since the 1995 JLUS, Pennington County has adopted land use zoning recommendations based on AICUZ guidelines. These recommendations are still under review in Meade County, but because of the current land use in Meade County, there is minimal impact to the mission at Ellsworth AFB. The City of Box Elder has adopted a comprehensive master plan and is currently drafting zoning regulations. Both the Master Plan and zoning regulations reflect the AICUZ guidelines. Through the current OEA grant, SDEDA is developing a GIS system to help identify incompatibilities surrounding Ellsworth AFB. In addition, SDEDA is working with the City of Box Elder on a grid system based on the PLSS to grid the entire area of concern in small, legally definable land areas. This grid system will be used by Box Elder to define their ordinances. The goal is for these parcels to be 10 acres or less in size. This GIS project is intended to provide consistency between Box Elder and SDEDA and for it to expand out to the other jurisdictions.

1995 JLUS Recommendations

Recommendation Twelve – Complete

The 1995 JLUS recommended that the State Airport Zoning Act should be amended to allow for land use overlay zoning to be adopted by municipalities and counties surrounding military airfields (and public use airports) to control the encroachment of non-compatible land uses around such airfields. The overlay zoning should, at the least, be based on aircraft generated noise contours along with defined distances off of and adjacent to the runways. It would be advantageous if this amendment could be combined with Recommendation Eleven. This land use control authority should override conflicting ordinances and should also contain sound attenuation requirements.

Action Taken

Since the 1995 JLUS, the State Airport Zoning Act has been amended. The City of Box Elder, in concert with SDEDA and Ellsworth AFB, is currently reviewing the establishment of overlay districts.

Issue LU-1

Lack of zoning in Meade County

Meade County does not have Zoning regulations which could result in incompatible development within the noise contours or APZs.

Compatibility Assessment

The land in Meade County in the vicinity of Ellsworth AFB is primarily rural and undeveloped. The county has an adopted comprehensive master plan that shows the majority of area surrounding the base as Agriculture; however, the county does not have an adopted Zoning Ordinance that can implement the comprehensive plan. Without zoning, the county has very limited restrictions on the type, intensity, and scale of new development. Proposed development simply needs to comply with the subdivision and building permit regulations. As a result, since the comprehensive plan is

advisory and not regulatory, a developer may propose an incompatible use within the noise contours or safety zones that would be approved, provided the developer complies with the subdivision and building code requirements.

Development in the area north and northwest of Ellsworth AFB is beginning to encroach on the base. Some residential development (5-acre ranchettes) has occurred along the north fence line of the base. Portions of this area are within the 65 and 70 DNL noise contours.

Residential development would particularly be incompatible in terms of safety for residents and security for the base. The northern CZ and APZs fall within Meade County, making this land incompatible for many types of land uses; however, there is no zoning ordinance that lays out specifications for the subdivision of land uses in this area.

Although Meade County does not have traditional zoning tools to regulate land use, it does have some ordinances to help guide growth and development. Ordinance 20 Regulations for the Subdivision of Land Development and Improvement helps guide land use development in the county. The county has also adopted Ordinance 34 Building Code, which regulates how buildings are constructed. The County has successfully used these tools to address compatibility issues with proposed development.

Existing Tools

Ellsworth AFB Air Installation Compatible Use Zone (AICUZ) Study

The Ellsworth AFB 2008 AICUZ Study, which was an update to the prior 1994 AICUZ study, provides land use compatibility guidelines according to APZs and noise zones. Table 5.14-1 lists all possible combinations of noise exposure and accident potential to show compatible and incompatible land uses.

The AICUZ encourages surrounding jurisdictions, such as Meade County, to incorporate recommendations in their planning process and documents. To ensure that development is compatible with accepted planning and development principles and practices. Local community responsibilities are:

- Consider recommendations of the AICUZ study when developing land use regulation and zoning regulations.
- Implement height and obstruction ordinances.
- Enact fair disclosure ordinances to specify disclosure to the public for those AICUZ items that directly relate to aircraft operations.
- Formalize procedures regarding planning and zoning activities that have the potential to be incompatible with aircraft operations.
- Regulations in the North Ellsworth Corridor Overlay District that can potentially minimize risks and noise exposure levels from aircraft operations should be expanded to include all property in Box Elder that is within the AICUZ.
- Review capital improvement programs to discourage incompatible land use patterns.

Table 5.14-1 Compatibility Table

Land Use		Accident Potential Zone			Noise Zones			
SLUM No.	Name	Clear Zone	APZ I	APZ II	65-69	70-74	75-79	80+
10	Residential							
11	Household units							
1.11	Single units: detached	N	N	Y1	A11	B11	N	N
11.12	Single units: semidetached	N	N	N	A11	B11	N	N
11.13	Single units: attached row	N	N	N	A11	B11	N	N
11.21	Two units: side-by-side	N	N	N	A11	B11	N	N
11.22	Two units: one above the other	N	N	N	A11	B11	N	N
11.31	Apartments: walk up	N	N	N	A11	B11	N	N
11.32	Apartments: elevator	N	N	N	A11	B11	N	N
12	Group quarters	N	N	N	A11	B11	N	N
13	Residential hotels	N	N	N	A11	B11	N	N
14	Mobile home parks or courts	N	N	N	N	N	N	N
15	Transient lodgings	N	N	N	A11	B11	C11	N
16	Other residential	N	N	N1	A11	B11	N	N

Land Use		Accident Potential Zone			Noise Zones			
SLUM No.	Name	Clear Zone	APZ I	APZ II	65-69	70-74	75-79	80+
20-30	Manufacturing							
21	Food & kindred products: manufacturing	N	N2	Y	Y	Y12	Y13	Y14
22	Textile mill products: manufacturing	N	N	N2	Y	Y12	Y13	Y14
23	Apparel and other finished products made from fabrics, leather, and similar materials: manufacturing	N	Y2	Y	Y	Y12	Y13	Y14
24	Lumber and wood products (except furniture): manufacturing	N	Y2	Y	Y	Y12	Y13	Y14
25	Furniture and fixtures: manufacturing	N	Y2	Y	Y	Y12	Y13	Y14
26	Paper & allied products: manufacturing	N	Y2	Y	Y	Y12	Y13	Y14
27	Printing, publishing, and allied industries	N	Y2	Y	Y	Y12	Y13	Y14
28	Chemicals and allied products: manufacturing	N	N	N2	Y	Y12	Y13	Y14

Land Use		Accident Potential Zone			Noise Zones			
SLUM No.	Name	Clear Zone	APZ I	APZ II	65-69	70-74	75-79	80+
29	Petroleum refining and related industries	N	N	Y	Y	Y12	Y13	Y14
31	Rubber and misc. plastic products, manufacturing	N	N2	N2	Y	Y12	Y13	Y14
32	Stone, clay and glass products manufacturing	N	N2	Y	Y	Y12	Y13	Y14
33	Primary metal industries	N	N2	Y	Y	Y12	Y13	Y14
34	Fabricated metal products: manufacturing	N	N2	Y	Y	Y12	Y13	Y14
35	Professional, scientific, and controlling instruments; photographic and optical goods; watches and clocks: manufacturing	N	N	N2	Y	A	B	N
39	Miscellaneous manufacturing	N	Y2	Y2	Y	Y12	Y13	Y14

Land Use		Accident Potential Zone			Noise Zones			
SLUM No.	Name	Clear Zone	APZ I	APZ II	65-69	70-74	75-79	80+
40	Transportation, communications, and utilities							
41	Railroad, rapid rail transit and street railroad transportation	N3	Y4	Y	Y	Y12	Y13	Y14
42	Motor vehicle transportation	N3	Y	Y	Y	Y12	Y13	Y14
43	Aircraft transportation	N3	Y4	Y	Y	Y12	Y13	Y14
44	Marine craft transportation	N3	Y4	Y	Y	Y12	Y13	Y14
45	Highway & street right-of-way	N3	Y	Y	Y	Y12	Y13	Y14
46	Automobile parking	N3	Y4	Y	Y	Y12	Y13	Y14
47	Communications	N3	Y4	Y	Y	A15	B15	N
48	Utilities	N3	Y4	Y	Y	Y	Y12	Y13
49	Other transportation communication s & utilities	N3	Y4	Y	Y	A15	B15	N
50	Trade							
51	Wholesale trade	N	Y2	Y	Y	Y12	Y13	Y14
52	Retail trade-building materials, hardware and farm equipment	N	Y2	Y	Y	Y12	Y13	Y14

Land Use		Accident Potential Zone			Noise Zones			
SLUM No.	Name	Clear Zone	APZ I	APZ II	65-69	70-74	75-79	80+
53	Retail trade-general merchandise	N	N2	Y2	Y	A	B	N
54	Retail trade-food	N	N2	Y2	Y	A	B	N
55	Retail trade-automotive, marine craft, aircraft and accessories	N	Y2	Y2	Y	A	B	N
56	Retail trade-apparel and accessories	N	N2	Y2	Y	A	B	N
57	Retail trade-furniture, home furnishings and equipment	N	N2	Y2	Y	A	B	N
58	Retail trade-eating and drinking establishments	N	N	N2	Y	A	B	N
59	Other retail trade	N	N2	Y2	Y	A	B	N
60	Services							
61	Finance, insurance and real estate services	N	N	Y6	Y	A	B	N
62	Personal services	N	N	Y6	Y	A	B	N
62.4	Cemeteries	N	Y7	Y7	Y	Y12	Y13	Y14, 21

Land Use		Accident Potential Zone			Noise Zones			
SLUM No.	Name	Clear Zone	APZ I	APZ II	65-69	70-74	75-79	80+
63	Business services	N	Y8	Y8	Y	A	B	N
64	Repair services	N	Y2	Y	Y	Y12	Y13	Y14
65	Professional services	N	N	Y6	Y	A	B	N
65.1	Hospitals, nursing homes	N	N	N	A*	B*	N	N
65.1	Other medical facilities	N	N	N	Y	A	B	N
66	Contract construction services	N	Y6	Y	Y	A	B	N
67	Governmental services	N	N	Y6	Y*	A*	B*	N
68	Educational services	N	N	N	A*	B*	N	N
69	Miscellaneous services	N	N2	Y2	Y	A	B	N
70	Cultural, entertainment, and recreational services							
71	Cultural activities (including churches)	N	N	N2	A*	B*	N	N
71.2	Nature exhibits	N	Y2	Y	Y*	N	N	N
72	Public assembly	N	N	N	Y	N	N	N
72.1	Auditoriums, concert halls	N	N	N	A	B	N	N

Land Use		Accident Potential Zone			Noise Zones			
SLUM No.	Name	Clear Zone	APZ I	APZ II	65-69	70-74	75-79	80+
72.11	Outdoor music shell, amphitheaters	N	N	N	N	N	N	N
72.2	Outdoor sports arenas, spectator sports	N	N	N	Y17	Y17	N	N
73	Amusements	N	N	Y8	Y	Y	N	N
74	Recreational activities (including golf courses, riding stables, water recreation)	N	Y8,9,10	Y	Y*	A*	B*	N
75	Resorts and group camps	N	N	N	Y*	Y*	N	N
76	Parks	N	Y8	Y8	Y*	Y*	N	N
79	Other cultural, entertainment and recreation	N	Y9	Y9	Y*	Y*	N	N
80	Resources production and extraction							
81	Agriculture (except livestock)	Y16	Y	Y	Y18	Y19	Y20	Y20, 21
81.5 to 81.7	Livestock farming and animal breeding	N	Y	Y	Y18	Y19	Y20	Y20, 21
82	Agricultural related activities	N	Y5	Y	Y18	Y19	N	N

Land Use		Accident Potential Zone			Noise Zones			
SLUM No.	Name	Clear Zone	APZ I	APZ II	65-69	70-74	75-79	80+
83	Forestry activities and related services	N5	Y	Y	Y18	Y19	Y20	Y 20, 21
84	Fishing activities and related services	N5	Y5	Y	Y	Y	Y	Y
85	Mining activities and related services	N	Y5	Y	Y	Y	Y	Y
89	Other resources production and extraction	N	Y5	Y	Y	Y	Y	Y

Legend: SLUCM = Standard Land Use Coding Manual, USURA.

Y = Yes – Land uses and related structures are compatible without restriction.

N = No – Land use and related structures are not compatible and should be prohibited.

Y^x = Yes with restrictions – Land use and related structures generally compatible; see notes indicated by the superscript.

N^x = No with exceptions – See notes indicated by the superscript.

NLR = Noise Level Reduction (NLR) (outdoor to indoor) to be achieved through incorporation of noise attenuation measures into the design and construction of the structures.

A, B, or C = Land use and related structures generally compatible; measures to achieve NLR for A (DNL of 65–69 dBA), B (DNL of 70–74 dBA), C (DNL of 75–79 dBA) need to be incorporated into the design and construction of structures.

A*, B*, and C* = Land use generally compatible with NLR; however, measures to achieve an overall noise level reduction do not necessarily solve noise difficulties and additional evaluation is warranted. See appropriate notes below.

* = The designation of these uses as “compatible” in this zone reflects individual Federal agencies and program considerations of general cost and feasibility factors, as well as past community experiences and program objectives. Localities, when evaluating the application of these guidelines to specific situations, might have different concerns or goals to consider.

Notes:

Suggested maximum density of 1 to 2 dwelling units per acre, possibly increased under a Planned Unit Development where maximum lot coverage is less than 20%.

Within each land use category, uses exist where further deliberating by local authorities might be needed due to the variation of densities in people and structures. Shopping malls and shopping centers are considered incompatible use in any accident potential zone (CZ, APZ I, or APZ II).

The placement of structures, buildings, or aboveground utility lines in the CZ is subject to severe restrictions. In a majority of the CZs, these items are prohibited. See AFI 32-7060, Interagency and Intergovernmental Coordination for Environmental Planning (USAF 1994a), and Air Force Joint Manual 32-8008, Airfield and Heliport Planning Criteria (DOD 1994), for specific guidance.

No passenger terminals and no major aboveground transmission lines in APZ I.

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

1. Low-intensity office uses only. Meeting places, auditoriums, and the like are not recommended.
2. Excludes chapels.
3. Facilities must be low-intensity.
4. Clubhouse not recommended.
5. Areas for gatherings of people are not recommended.
6. a. Although local conditions might require residential use, it is discouraged in DNL of 65–69 dBA noise zone and strongly discouraged in DNL of 70–74 dBA noise zone. The absence of viable alternative development options should be determined and an evaluation should be conducted prior to approvals indicating a demonstrated community need for residential use would not be met if development were prohibited in these zones.
 - b. Where the community determines the residential uses must be allowed, measures to achieve outdoor to indoor NLR for the DNL of 65–69 dBA noise zone and

the DNL of 70–74 dBA noise zone should be incorporated into building codes and considered in individual approvals.

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

7. Measures to achieve the same NLR as required for facilities in the DNL of 65–69 dBA noise zone 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.

8. Measures to achieve the same NLR as required for facilities in the DNL of 70–74 dBA noise zone 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.

9. Measures to achieve the same NLR as required for facilities in the DNL of 75–79 dBA noise zone 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. 15. If noise-sensitive, use indicated NLR; if not, the use is compatible.

10. If noise-sensitive, use indicated NLR; if not, the use is compatible.

11. No buildings.

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

13. Residential buildings require the same NLR as required for facilities in the DNL of 65–69 dBA noise zone.

14. Residential buildings require the same NLR as required for facilities in the DNL of 70–74 dBA noise zone.

15. Residential buildings are not permitted.

16. Land use is not recommended. If the community decides the use is necessary, personnel should wear hearing protection devices.

Meade County Comprehensive Plan

There is currently no zoning ordinance in place for Meade County, but the Comprehensive Plan describes that the county uses subdivision regulations, county ordinances, and will eventually use special zoning areas for the development of land.

The Comprehensive Plan’s future land use map of the county serves as a conceptual guide for future land use decisions and displays land use types and densities that would be appropriate for future development. This future land use map shows scattered residential land uses around the base, although there is no density designation. Most of the future land uses around Ellsworth AFB is agricultural, which is compatible to Ellsworth AFB.

Meade County Ordinance 20 Subdivision Ordinance

Ordinance 20, adopted in 1998, provides regulations for the subdivision of land, development, and improvements within Meade County. The ordinance provides design standards, required improvements, and variances for development throughout the county and establishes nine subdivision categories to which land uses are regulated: high density, modified high density, medium density, and low-density, rural residential, commercial, multi-residential, high density commercial, high density multi-residential.

Meade County Ordinance 34 Building Code and Construction Enforcement

The Meade County Ordinance 34, adopted in 2010, provides building restrictions for the construction of buildings within unincorporated areas of Meade County. The building code puts restrictions on building constructions as well as licensing requirements and variance procedures.

Findings

- Although Meade County does not have a zoning ordinance, there are other planning documents that have been guiding development in the county. Meade County should continue to use these documents and seek opportunities to create other land use plans in an effort to maintain compatibility with Ellsworth AFB.

Issue LU-2	<p>The vacant school adjacent to Ellsworth AFB must be redeveloped according to compatibility with the AICUZ</p> <p>A vacant school nearby the Patriot Gate owned by Douglas Schools may be converted into a use that is incompatible with the existing Ellsworth AFB AICUZ.</p>
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Compatibility Assessment

Vandenberg Elementary School, a part of the Douglas School District, recently relocated directly south from its original location on the northeastern corner of Ellsworth Road and 225th Street. The new school building re-opened in October 2015. This relocation left the original school, built in 1951, vacant. There is a sense of urgency to vacate the building for security reasons as leaving the building vacant can attract unauthorized activity. However, the use must be compatible with the existing Ellsworth AFB AICUZ since it is located directly adjacent to the Ellsworth AFB fence line and within the 65 DNL contour.

The old Vandenberg Elementary School is located within the 65 DNL noise contour, which suggests that many uses are compatible, although some may be discouraged, such as residential uses. As noted in the AICUZ under Section 4.11 titled Planning Considerations, noise zones are subject to change depending on the noise exposure levels from aircraft operations indicating that compatible land uses within that zone may also change. Table 5.14-1 shows which uses are compatible within APZ and noise zones.

The school building falls within Meade County, and although there are no zoning regulations to guide future development, any future uses of the building should be developed as a compatible use according to the Meade County Ordinance 34 Building Code and Construction Enforcement. This ordinance provides guidelines for the development and / or demolition of buildings. Although this building code will help guide the use of the building, a land use regulation through a zoning ordinance would ensure that the land stays within compatibility standards in the future.

Existing Tools

Ellsworth AFB AICUZ

The purpose of the AICUZ program is to recommend compatible land uses in areas subject to aircraft noise and accident potential. The AICUZ recommendations were developed to assist communities to protect the general public from aviation impacts such as noise, overflight, and worst case scenario, aircraft collisions.

Meade County Ordinance 34 Building Code and Construction Enforcement

This ordinance, Meade County adopted the 2006 International Building and International Residential Codes, which provide guidelines and restrictions for the erection, construction, enlargement, alteration, repair, moving, removal, conversion, occupancy, equipment, use, height, area, and maintenance of all buildings and structures.

Findings

- The vacant property outside of the Ellsworth AFB gate should reflect compatible land uses to the base.
- There should be some consideration from Meade County to develop a zoning ordinance. This land could then be zoned to ensure compatibility with the base.

Issue LU-3

Incompatible Development Near Ellsworth AFB

Development in existing unincorporated areas could have compatibility issues depending on land use type and location. Potential infrastructure improvements may be growth inducing in areas near the base if not planned with compatibility in mind.

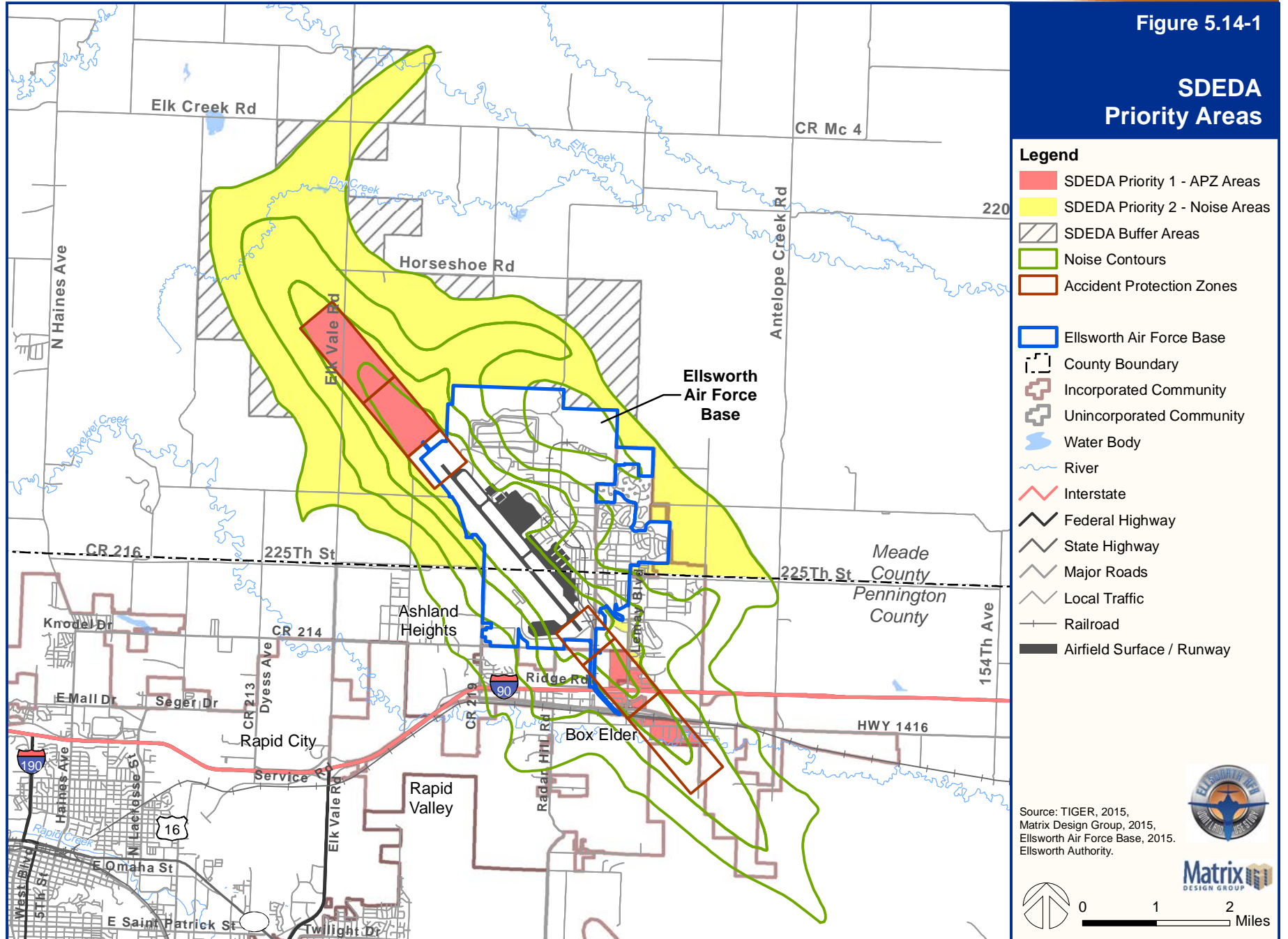
Compatibility Assessment

There is existing development within the noise contours as well as within the northern and southern APZ's. Figures 5.21-3 and 5.18-2 show existing zoning compatibility issues in the APZ's and noise contours, respectively. While land uses in the northwest are largely rangeland and pasture, as discussed in LU-1, the lack of zoning controls in Meade County raises concerns for future compatibility in this area. In the southern area, both Pennington County and Box Elder have zoning controls that adopt AICUZ land use restrictions. These restrictions address future land uses, but do not address historic development or incompatibilities that may be present due to existing development.

One tool that SDEDA has used successfully in the southern area is REPI funding to acquire property that may be incompatible in order to phase out the incompatible land use. As a result, SDEDA has looked to expand the use of this tool to address existing and future compatibility issues in the area west and northwest of Ellsworth AFB. To help guide this initiative, SDEDA has developed three priority areas. Priority Area 1 are properties within the APZ's, Priority Area 2, are properties within the noise contours and Other Priority Areas are properties outside the noise contours, but important for protecting the base mission. See Figure 5.14-1 for SDEDA priority areas.

Figure 5.14-1

SDEDA Priority Areas



Existing Tools

Readiness and Environmental Protection Integration (REPI)

REPI funds are used by SDEDA to protect Ellsworth AFB from encroachment of incompatible land uses. SDEDA has successfully used and continues to use this program in order to protect the base from encroachment. SDEDA should continue to utilize the program to further protect the base from future encroachment as well as to address current compatibility issues.

Findings

- Meade County may consider regulating development within county islands through existing ordinances to ensure compatibility with Ellsworth AFB.
- County islands within APZs in Pennington County may remain unincorporated as these lands could be unsuitable for Box Elder to develop if they were to be annexed.
- REPI funds help protect the base from encroachment as well as address current compatibility issues.

5.15 Legislative Initiatives

Legislative initiatives include those existing and proposed federal, state, and local laws and regulations that may have a direct or indirect effect on a military installation to achieve its current or future mission. Federal, state, and local legislative initiatives are important regulatory tools to guide the actions of both local jurisdictions and the military installation. This legislation is not mutually exclusive, as such, it fosters both parties to work together in partnership to improve operational and community sustainability objectives.

Issue LEG-1	Box Elder jurisdictional authority Box Elder Police respond to low-level property and personal crime occurring on the base that is within the Box Elder incorporated boundary.
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Compatibility Assessment

The incorporated boundary of Box Elder encompasses the eastern portion of Ellsworth AFB. The City of Box Elder Police Department respond to low-level personal and property crimes on the base that is within their jurisdictional boundary.

When low-level incidents occur on base, Box Elder responds. At times, the military police is unaware of the incident and are surprised with the Box Elder Police respond. Confusion over jurisdictional authority could slow emergency response times, leading to safety issues for the residents living on the base.

Existing Tools

Box Elder Comprehensive Plan

The Box Elder Comprehensive Plan recognizes the need to service annexed land. The Cultural and Public Services and Facilities chapter, Chapter 7, sets policies for ensuring that annexed land is being serviced appropriately by both the Police and Fire Departments. As noted in the Implementation

chapter, these policies require the City to have on-going coordination with the Fire Chief and on-going evaluation of the level of service protection from the Police Department. The plan does not lay out explicit strategies for working with the base on housing emergency issues that may arise for Ellsworth AFB. Although there are no strategies for this, the City acknowledges that they must provide quality emergency response for the entire city. Currently, Box Elder provides police and fire protection. In 2003, the Rapid City Fire Department began ambulance service to Pennington County as the primary Emergency Medical Services (EMS) provider.

Findings

- Ellsworth AFB, Meade County, Pennington County, and the City of Box Elder need a coordinated approach for handling criminal and emergency incidences on base.
- The City of Box Elder Comprehensive Plan does not provide detailed criteria or strategies for coordinating public safety responses between military police and city police.
- Better communication between military police and municipal police would alleviate confusion when responding to calls on base.
- Review of operations for fire control between the base and the local responders should be conducted.
- A liaison with emergency responders would improve coordination.

5.16 Light and Glare

This factor refers to man-made lighting (street lights, airfield lighting, building lights) and glare (direct or reflected light) that disrupts vision. Light sources from commercial, industrial, recreational, and residential uses at night can cause excessive glare and illumination, impacting the use of military night vision devices and air operations. Conversely, high intensity light sources generated from a military area (such as ramp lighting) may have a negative impact on the adjacent community.

There were no issues identified for Light and Glare as part of the JLUS process.

5.17 Marine Environments

Regulatory or permit requirements protecting marine and ocean resources can cumulatively affect the military's ability to conduct operations, training exercises, or testing in a water-based environment.

There were no issues identified for Marine Environments as part of the JLUS process.

5.18 Noise

Sound that reaches unwanted levels is referred to as noise. The central issue with noise is the impact, or perceived impact, on people, animals (wild and domestic), and general land use compatibility. Exposure to high noise levels can have a significant impact on human activity, health, and safety. The decibel (dB) scale is used to quantify sound intensity.

To understand the relevance of decibels, a normal conversation often occurs at 60 dB, while an ambulance siren from 100 feet away is about 100 dB. Noise associated with military operations (arrival/departure of military aircraft, firing of weapons, etc.) may create noises in higher dB ranges.

Key Terms

Ambient Noise. Ambient noise is the total noise associated with an existing environment (built or natural) and usually comprising sounds from many sources, both near and far, is referred to as ambient noise.

Attenuation. Attenuation is a reduction in the level of sound resulting from an object's distance from the noise source or absorption by the surrounding topography, the atmosphere, barriers, construction techniques and materials, and other factors. Sound attenuation in buildings can be achieved through the use of special construction practices that reduce the amount of noise that penetrates the windows, doors, and walls of a building. Sound attenuation measures may be incorporated during initial construction for new buildings or as additional construction for existing buildings.

Day-Night Average Sound Level. Day-Night Average Sound Level (DNL) represents an average sound exposure over a 24-hour period. During the nighttime period (10:00 p.m. to 7:00 a.m.), averages are artificially increased by 10 dB. This weighting reflects the added intrusiveness and the greater disturbance potential of nighttime noise events attributable to the fact that community background noise typically decreases by 10 dB at night.

Decibel. A decibel (dB) is the physical unit commonly used to describe noise levels. It is a unit for describing the amplitude of sound, as heard by the human ear.

Noise. From a technical perspective, sound is mechanical energy transmitted by pressure waves in a compressible medium such as air. More simply stated, sound is what we hear. As sounds reach unwanted levels, this is referred to as noise.

Noise Contour. Noise contours consist of noise impact lines constructed by connecting points of equal noise level measured in dB and identify areas on a map that fall within that particular dB noise contour.

Noise Sensitive Receptors/Sensitive Land Uses. Sensitive receptors are locations and uses typically more sensitive to noise, including residential areas, hospitals, convalescent homes and facilities, schools, libraries, churches, recreational areas, and other similar land uses.

NOISEMAP Program. The Department of Defense noise models are based on NOISEMAP technology, using linear acoustics and an integrated formulation to determine the impact of noise.

Technical Background

Due to the technical nature of this resource topic and its importance to the JLUS process, this section provides a discussion of the characteristics of sound and the modeling process used to evaluate noise impacts.

Characteristics of Sound

It is important to understand that there is no single perfect way of measuring sound, due to variations used by different entities when conducting sound studies or sound modeling. Sound is characterized by various parameters that include the oscillation rate of sound waves (frequency), the speed of propagation, and the pressure level or energy content (amplitude). The sound pressure level has become the most common descriptor used to characterize the loudness of an ambient sound level. The decibel (dB) scale is used to quantify sound intensity. Because sound pressure can vary by over one trillion times within the range of human hearing, a logarithmic loudness scale, i.e., the dB scale, is used to present sound intensity levels in a convenient format.

The human ear is not equally sensitive to all frequencies within the entire spectrum, so noise measurements are weighted more heavily within those frequencies of maximum human sensitivity in a process called “A-weighting” written as dBA. The human ear can detect changes in sound levels of approximately 3-dBA under normal conditions. Changes of 1 to 3-dBA are typically noticeable under controlled conditions, while changes of less than 1dBA are only discernible under controlled, extremely quiet conditions.

A change of 5-dBA is typically noticeable to the average person in an outdoor environment. Figure 5.18-1 summarizes typical A-weighted sound levels for a range of indoor and outdoor activities. Environmental noise fluctuates over time. While some noise fluctuations are minor, others can be substantial. These fluctuations include regular and random patterns, how fast the noise fluctuates, and the amount of variation. Weather patterns can have a strong effect on how far sound travels and how loud it is. Certain weather events can change the consistency of the air and either cause sound to travel further and be louder or reduce the distance traveled and the level at which the sound can be heard.

Temperature and wind velocity are prime examples of factors that can affect sound travel. Sound tends to travel further in cold temperatures. Specific combinations of temperature and wind direction can create atmospheric refraction. Atmospheric refraction occurs when atmospheric conditions bend and/or focus sound waves towards some areas and away from others. When describing noise impacts, it is common to look at the average noise levels over an entire average day.

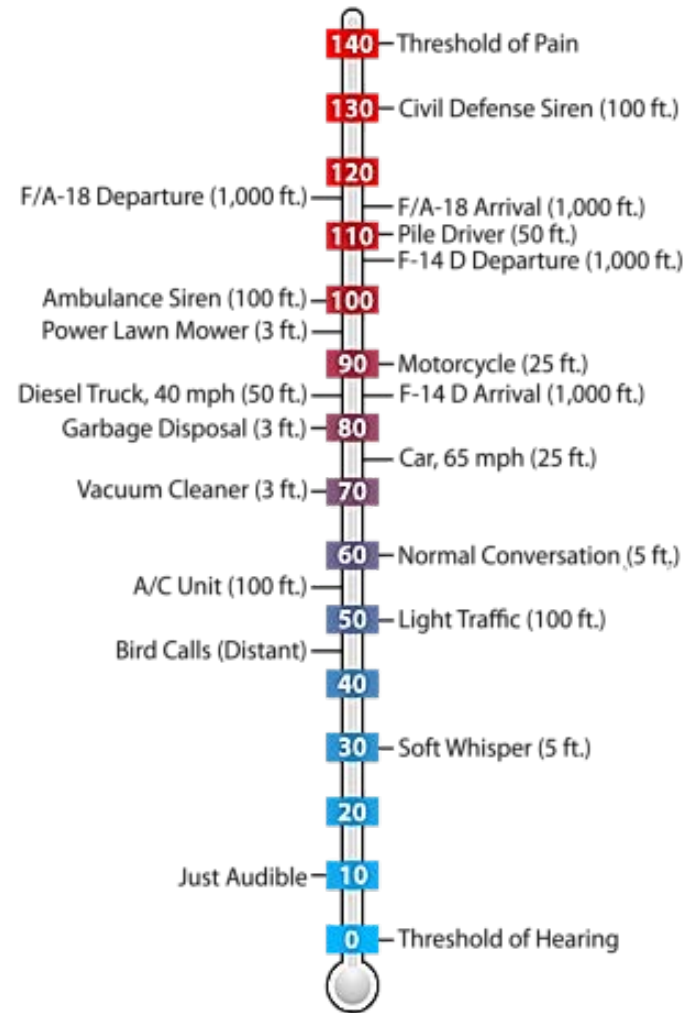


Figure 5.18-1 Sound Levels in dBA

1995 JLUS Recommendations

Recommendation Five – Complete

The 1995 JLUS recommended that residential land uses, which are primarily residential in nature and not ancillary to another primary land use, within the vicinity of Ellsworth AFB should be allowed only if they are sound attenuated so as to achieve a 25 dB noise reduction inside the residence compared to outside noise levels, within the 65 DNL contour and 30 dB within the 70 DNL contour. They should not be allowed within the 75 or greater DNL contour. Mobile homes and manufactured homes should be prohibited within the 65 DNL contour or greater because they cannot be adequately sound attenuated to achieve required noise level reduction. Modular homes could be allowed if they achieve such noise level reductions. Such noise level reductions should be certified by a registered engineer or architect licensed in South Dakota, based on plans and specifications for the residences.

Action Taken

In implementing this recommendation for mobile and manufactured homes (both will be referred to as mobile homes), there should be a distinction between individual mobile homes and mobile home parks. No new primary individual mobile homes or no new mobile home parks should be allowed as outlined above. However, if a mobile home owner or renter moves a mobile home out of an existing mobile home park, then the park owner should be allowed to accommodate another mobile home to take the place of the mobile home that has been relocated to achieve the same number of units in the park. There should be no expansion of the mobile home park nor any additional mobile home spaces allowed in existing mobile home parks.

Currently, the City of Box Elder is using their comprehensive plan to restrict the expansion of property uses beyond their current use. Box Elder is also implementing specific mobile home park restrictions that will help restrict older mobile homes that do not have proper sound attenuation and are not compatible with the AICUZ noise contours. SDEDA is also working to assist local residents living in incompatible areas by providing an

alternative area for them to relocate. SDEDA is currently developing 230 acres of land outside of the area of concern to provide an option for residents living in incompatible areas. SDEDA has identified multiple willing sellers that would like to relocate outside of the area of concern and is seeking funding to purchase the current land from these willing sellers.

1995 JLUS Recommendations

Recommendation Six – Complete

The 1995 JLUS recommended, as an alternative to requiring certification by a registered engineer or architect, that the jurisdiction make available generalized sound attenuation guidelines for an individual to use in construction. The owner must agree to incorporate sound attenuation in the structure, and as a condition for waiving the certification requirement, grant an aviation (noise) easement to the jurisdiction. Such an easement would recognize the right of aircraft flyovers and associated noise would "run with the land" and would give up the right to initiate litigation for noise intrusion.

Action Taken

Since the 1995 JLUS the City of Box Elder has established sound attenuation guidelines. SDEDA is currently identifying properties that could be upgraded and / or easements purchased. This is part of the GIS project SDEDA is currently working on. SDEDA is also making an application for REPI funding to assist in the purchase of these easements to ensure that the restrictions "run with the land."

1995 JLUS Recommendations

Recommendation Thirteen – Complete

The 1995 JLUS recommended that the Air Force, to the greatest extent possible, attempt to determine the long-range mission of Ellsworth AFB and develop aircraft generated noise contours to provide the land use control authorities with some reasonable assurances on which to base land use control decisions and implementation strategies.

Action Taken

Since the 1995 JLUS, the Air Force recommended new guidelines for noise contours based on current and anticipated missions in December of 2008. The City of Box Elder adopted the new guidelines into their comprehensive plans. The SDEDA plans concentrate on reducing encroachment in APZ 1, APZ 2, and greater than 75 db noise contours. SDEDA has identified many willing sellers, and has been working with these sellers to understand their needs.

Issue NOI-1

Noise exposure to areas surrounding Ellsworth AFB

Flight operations, including typical flight operations, nighttime operations, engine testing and combat departures, generate noise exposures to surrounding areas.

Compatibility Assessment

Ellsworth AFB is an active air base with multiple tenants conducting air operations. The 28th Bomb Wing averages approximately eight arrivals, eight departures, and 17 closed patterns per day at Ellsworth AFB, operating a total of 240 flying days per year. The 34th Bomb Squadron and the 37th Bomb Squadron each fly Monday through Friday for 48 weeks per year for a total of 240 flying days per year and approximately 50 daily operations. Day operations occur from 7:00 a.m. to 10:00 p.m. and night operations occur from 10:00 p.m. to 7:00 a.m. Approximately 69% of the operations

occur during the day, with approximately 31% of 28th Bomb Wing operations occur at night.

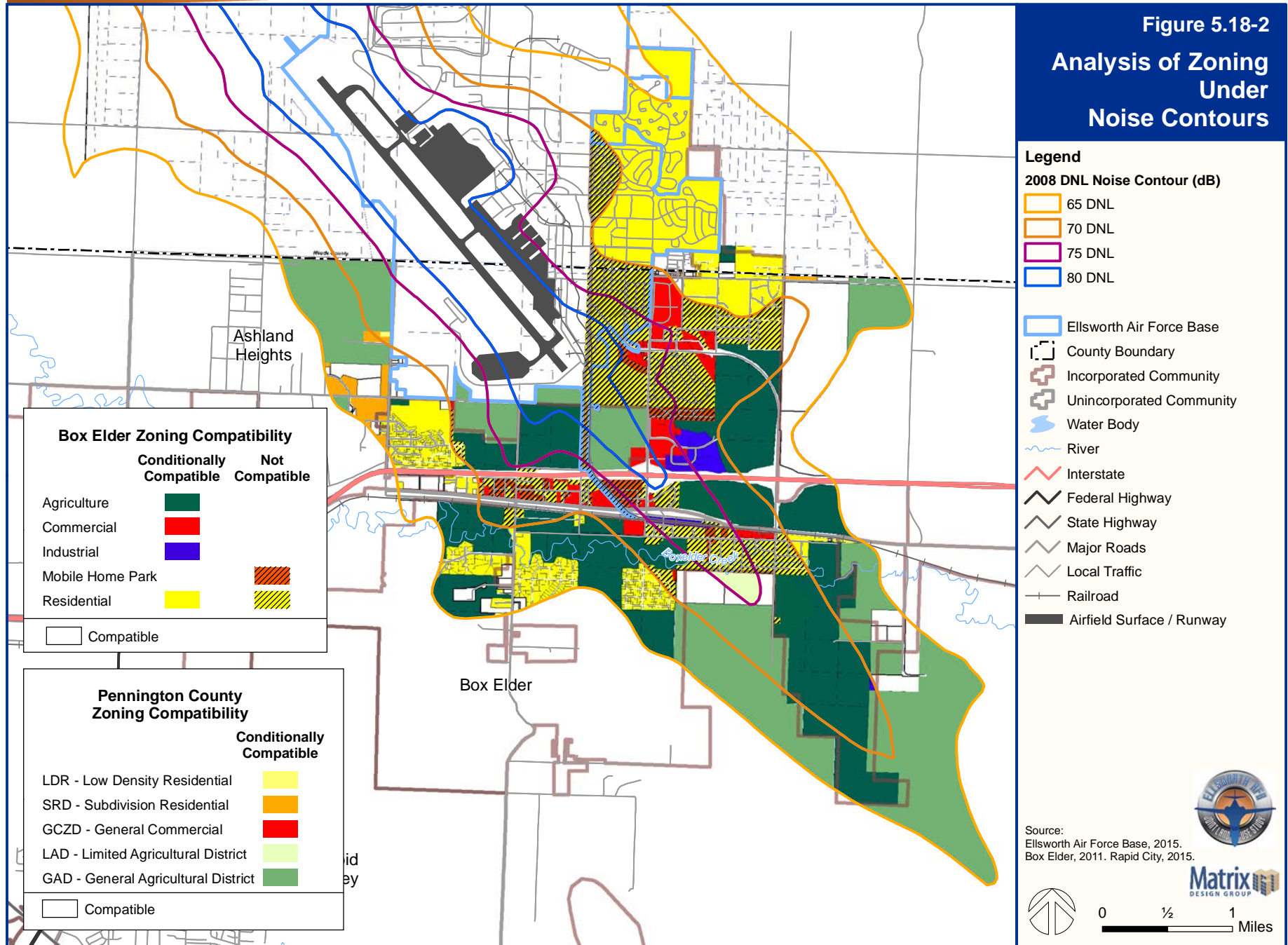
Noise associated with aircraft is usually considered a nuisance where land uses are incompatible with the aircraft activity. The Ellsworth AFB AICUZ describes compatible and incompatible land uses for the varying noise zones. With the exception of compatible land uses, the remaining uses within the 65-79 dBA DNL noise contours are conditionally compatible with AICUZ recommendations provided noise level reduction measures are integrated into the construction of buildings, except for industrial uses where noise level reduction measures are integrated into the construction of public access areas in buildings. Figures 5.18-2 and 5.18-3 show the noise contours and existing zoning and future land uses respectively.

Residential uses under aircraft approach and departure corridors are most likely to consider the noise associated with aircraft operations to be an annoyance due to loud and frequent noise. Residential uses are typically the most sensitive to noise along with hospitals, education facilities including daycares, and cultural, entertainment and recreational uses. Residential uses within the 65-69 dBA DNL noise contours are discouraged and within the 70-74 dBA DNL noise contours are strongly discouraged; although, both can be conditionally compatible provided that noise level reduction measures are put in place. There are some areas designated Low Density Residential between the 75-79 dBA DNL noise contours in Box Elder, which is incompatible regardless of noise reduction measures.

Currently, there are residential uses in all of the noise zones associated with Ellsworth AFB. These uses were mostly likely constructed without any type of noise level reduction, as recommended by the Ellsworth AFB AICUZ. Mobile homes are common within noise zones, which are further impacted by noise due to their construction.

Some residents living within the noise zones lack the financial capacity to move from their homes and the noise nuisance, making noise attenuation a less expensive option to decrease the impact of noise from the installation.

Figure 5.18-2
Analysis of Zoning Under
Noise Contours



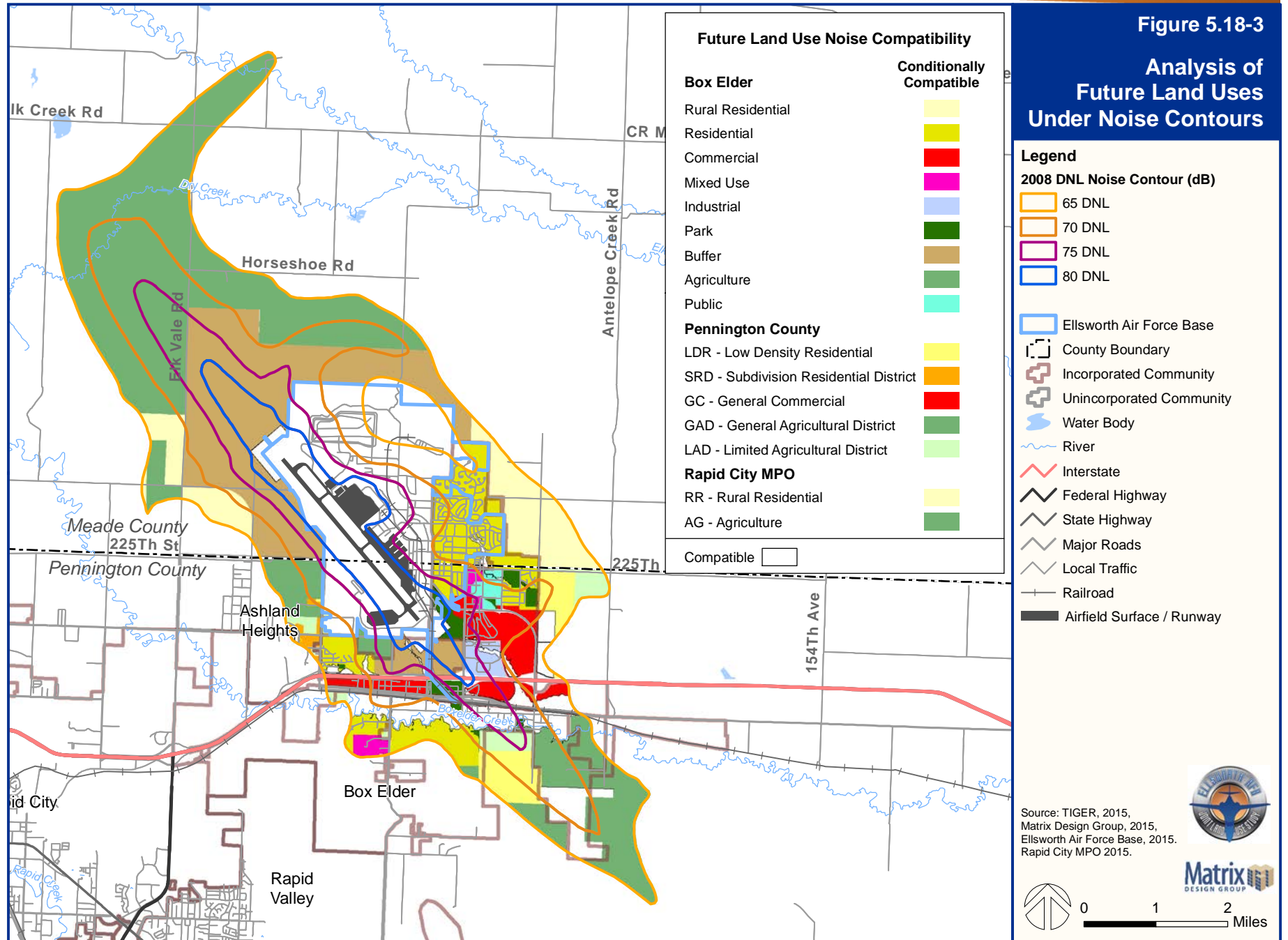


Figure 5.18-3

Analysis of Future Land Uses Under Noise Contours

Source: TIGER, 2015, Matrix Design Group, 2015, Ellsworth Air Force Base, 2015, Rapid City MPO 2015.



The United States Department of Housing and Urban Development (HUD) has instituted policies through section 24 Code of Federal Regulations (CFR) Part 51 that are designed to promote the creation of controls and standards for community noise abatement by state and local governments.

The focus of these regulations is to reduce noise levels within residential developments funded by HUD. Included among the various policies is the encouragement of modernization efforts for existing buildings in noise environments. This includes providing grants and allowances to provide acoustical privacy in multifamily dwellings through building design and acoustical treatment.

Noise levels can also impact areas that are located outside of the Ellsworth AFB noise contours. Noise zones established by the AICUZ are based on the cumulative Day-Night Average A-weighted Sound Level (DNL), which is a time-averaged noise metric. Because it is an average, there are many areas that are still impacted by noise outside of the designated noise zones. Some residents in northern Rapid City and Rapid Valley have experienced noise impacts from operations at Ellsworth AFB despite being outside of the noise zones. It can be difficult to regulate noise attenuation and other procedures to decrease the impact of noise on land outside of the noise contours.

Existing Tools

Ellsworth AFB Air Installation Compatible Use Zone (AICUZ) Study

Table 5.14-1 in the Land Use Section of this chapter provides the AICUZ Study land use compatibility guidelines for land uses within the noise zones. The general recommended maximum interior noise level for residential use is 45 dBA. Noise zones 65-69 dBA and 70-74 dBA have less restrictive guidelines, but recommend Noise Level Reductions for some land uses.

Box Elder Comprehensive Plan

The Box Elder Comprehensive Plan includes policies that encourage both the city and residents to seek grants and loans for housing rehabilitation and reconstruction. Housing rehabilitation in the form of sound attenuation is especially supported for those who live in a 64 or greater DNL.

City of Box Elder Zoning Ordinance

The City of Box Elder adopted its Zoning Ordinance through Ordinance 519, which also adopted the 2008 AICUZ regulations and land use matrix. Ordinance 519 was recently replaced with Ordinance 560, which still recognizes the AICUZ regulations.

Department of Housing and Urban Development Noise Regulation

According to the HUD Noise Regulation, generally, external noise exposure within Noise Zone 3 (as identified in an installation's Airfield Installation Compatible Use Zone (AICUZ) Report is considered unacceptable without exception and within Noise Zone 2 exposure is normally unacceptable with respect to new construction. HUD funds may also be available to encourage noise abatement planning and acoustical treatment for proposed and existing incompatible land uses within the AICUZ.

Residential construction may be permitted within certain noise contours, provided sound attenuation is accomplished. The added construction expense of sound attenuation, however, may make siting in these noise exposure areas financially less attractive. Because the HUD policy is discretionary, variances may also be permitted, depending on regional interpretation and local conditions. HUD also has a policy (24 CFR 51D) that prohibits funding for projects in runway Clear Zones and Accident Potential Zones, unless the project is compatible with any applicable AICUZ recommendations.

Meade County Ordinance 20

Meade County Ordinance 20 regulates the subdivision of Property. This ordinance notes that Modified High density subdivisions are not permitted in "High Noise Areas" greater than (65) dba, per Ellsworth Air Force Base AICUZ (Air Installations Compatible Use Zones).

Pennington County Zoning Ordinance

Section 315 of the Pennington County Zoning Ordinance provides standards for development in the Ellsworth Air Force Installation Compatible Use Area for the protection of the public health, safety, and welfare. All building, structures, and land uses located within the overlay zones must comply with specific development standards, which consist of the land use compatibility

guidelines from the Ellsworth AFB AICUZ. Variances to the development standards may be approved by the Zoning Board of Adjustment.

Findings

- Residential uses under aircraft approach and departure corridors are most likely to consider the noise associated with aircraft operations to be an annoyance.
- The noise zones surrounding Ellsworth AFB represent an average exposure to sound. Noise from Ellsworth AFB can travel beyond those zones, including into areas of Rapid City and Rapid Valley.
- Because the areas are located outside of the noise zones, there are limited regulations that can be enforced to help decrease the impact of the noise.
- Low income residents lack the financial capacity to incorporate noise attenuation and reduce external noise exposure.
- HUD offers various grants and allowances to provide acoustical treatment.

Issue NOI-2	Incompatible land uses in 75-80+ noise zone Residential, commercial, and public / semi-public land uses in the City of Box Elder are located in this noise zone.
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Compatibility Assessment

The 75-80+ dBA DNL noise zone is the area that is impacted the most by noise from Ellsworth AFB operations. The land use compatibility guidelines in the AICUZ consider a large number of uses incompatible within the 75-80+ dBA DNL noise zone. There is a one-acre parcel directly south of the northern CZ, which is considered incompatible in the 80+ dBA noise zone.

There are two general areas with public / semi-public land use that are considered incompatible in the 80+ dBA noise zone. The public / semi-public parcel in the 80+ dBA noise zone and the southern APZ I contains the Emmanuel Baptist Church. Residential land in the 75 to 79+ dBA noise zone that is considered incompatible consists of mobile homes south of Interstate 90 and north of Old U.S. Highway 1416 as well as mobile homes and single family homes south of Old U.S. Highway 1416. There are a total of 135 acres of Residential existing land use located in the 75-79 dBA DNL noise contour. There are a total of 17 acres of incompatible uses within the 80+ dBA DNL noise contour, consisting of residential, commercial, and public/semi-public land uses.

According to the Ellsworth AFB AICUZ Study, residential use between the 80 dBA DNL and 75-79 dBA DNL noise contours are incompatible and cultural activities, including churches, are incompatible in the 80+ dBA DNL.

Existing Tools

Ellsworth AFB Air Installation Compatible Use Zone (AICUZ) Study

Table 5.14-1 in the Land Use Section of this chapter provides the AICUZ Study land use compatibility guidelines for land uses within the noise zones. Noise zones 75-79 dBA and 80+ dBA are the most restrictive zones, especially for noise sensitive uses, such as residential use. This is so because it is unlikely that building materials can be used to mitigate the interior noise level to a minimum of 45 dBA, which is generally the recommended maximum interior noise level.

Findings

- Most uses within the 75-80+ dBA DNL noise zone are not recommended by the land use compatibility guidelines.
- There are a total of 135 acres of Residential existing land use located in the 75-79 dBA DNL noise contours, which is considered incompatible. There are a total of 17 acres of incompatible uses within the 80+ dBA, consisting of residential, commercial, and public / semi-public land uses.

5.19 Public Trespassing

This factor addresses public trespassing, either purposeful or unintentional, onto a military installation. The potential for trespassing increases when public use areas are proximate to an installation. Military areas that are located on, or adjacent to, public lands owned by other entities (i.e., federal, state, or local) that are designated for public access, recreation, or for livestock grazing often experience issues related to public trespassing into training ranges and other areas with safety hazards related to military operations.

There were no issues identified for Public Trespassing as part of the JLUS process.

5.20 Roadway Capacity

Roadway capacity relates to the ability of existing freeways, highways, arterials, and other local roads to provide adequate mobility and access between military installations and their surrounding communities. As urban development expands into rural areas, roads once used primarily to provide access for agricultural uses and limited local traffic begin to function as urban major arterial roadways. These once rural roads often become the main transportation corridors for all types of traffic - from residential to commercial trucking – and can assist or impede access to military installations. As transportation systems grow and provide more capacity, these facilities induce and encourage growth as rural areas become more accessible.

Key Terms

Level of Service. Level of Service (LOS) is a common measurement used by traffic engineers to determine the effectiveness of a traffic system. This grading system assigns a letter grade from A to F to roadways and intersections based upon traffic flow and safety characteristics as shown in Table 5.20-1.

Table 5.20-1 Level of Service of Roadway

	LOS Rating	Definition
ACCEPTABLE	A	Represents a free-flow operation. Vehicles are almost completely unimpeded in their ability to maneuver within the traffic stream.
	B	Represents reasonably free-flow operation. Ability to maneuver within the traffic stream is slightly restricted.
	C	Represents a traffic flow with speeds near or at free-flow speed of the freeway. There is noticeable restricted ability to maneuver within the stream of traffic.
	D	Speeds begin to decline with increased density. Ability to maneuver within the traffic stream is noticeably limited.
UNACCEPTABLE	E	Operation is at capacity. Vehicles are closely spaced within the traffic stream and there are no useable gaps to maneuver.
	F	A breakdown of vehicle flow is present. This condition exists within the queues forming behind the breakdown points.

Roadway Capacity. Roadway capacity refers to the ability of existing freeways, highway, arterials and other local roads to provide adequate mobility and access among military installations and their surrounding communities.

Issue RC-1	Demand for transit service to and from Ellsworth AFB According to findings in the Box Elder Transportation Plan, there is an unmet demand for transit to and from Ellsworth AFB.
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Compatibility Assessment

Currently, there is no type of transit that serves the area surrounding Ellsworth AFB, leaving residents who live on or near the installation to depend on personal vehicles for travel. There has been some demand from these residents for transit to run to downtown Rapid City. Downtown Rapid City is the nearest metropolitan area that offers shopping, restaurants, and numerous events, including a concert series every Thursday night. The Rapid City Downtown Association is planning to test a trolley service on Thursday nights, running from the base to downtown Rapid City. This service would be only run as a test and not as a permanent service. The Rapid City Transportation Plan recommends a feasibility study to evaluate the new service.

Despite the new service connection, there remains a lack of transit service in Box Elder, Rapid Valley, and other areas outside of Rapid City that connect to Ellsworth AFB. Transit would help alleviate congestion on roads and would provide mobility for those who may not own a car. Congestion is further discussed in Issue RC-2.

Existing Tools

As part of this JLUS effort, no existing tools were identified that address this compatibility issue.

Findings

- The Rapid City Downtown Association will begin to offer a shuttle to and from downtown Rapid City and Ellsworth AFB. However, the service is temporary and will be evaluated before being permanently established.
- Other transit surrounding Ellsworth AFB remains limited.

Issue RC-2	Increased traffic congestion on roads due to closure of highway access, Exit 66 The closure of highway access at Exit 66 has created traffic congestion on other roads.
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Compatibility Assessment

Access to Ellsworth AFB is available only at its three access control points; therefore, the traffic counts at intersections immediately outside these controlled access points give important insight into the travel patterns of EAFB personnel during peak hours. Most Ellsworth related traffic uses Commercial Gate Drive to enter and leave the base during the morning and evening commutes. This is due to the relatively quick and easy access to Commercial Gate from I-90 via Highway 1416. Patriot Gate, located at the north end of Ellsworth Road, experiences the second highest level of traffic and, therefore, impacts the intersection of Ellsworth Road and 225th Street. Liberty Gate, which has direct access to I-90 via Liberty Boulevard, is the least used access control point by EAFB personnel and visitors during the morning and evening commutes.

The highest levels of peak hour volumes in the City of Box Elder occur along Highway 1416, Ellsworth Road, Tower Road, and Liberty Boulevard and at the Tower Road / Liberty Boulevard at the Highway 1416 / Ellsworth Road intersections. Movements through these intersections were found to operate at Level of Service (LOS) C or better during peak hours, with the exception of the westbound Highway 1416 intersection with Ellsworth Road, which operates at LOS F during peak hours.

At the westbound Highway 1416 intersection, the Ellsworth Road approaches are controlled by stop signs, and as a result, turn movements crossing the heavy traffic volumes from eastbound to northbound operate at LOS F during the peak hours. The highest levels of peak hour volumes at the Highway 1416 / Ellsworth Road intersection is generated by public school traffic and Ellsworth AFB traffic.

Existing Tools

City of Box Elder Strategic Transportation Plan

The City of Box Elder currently receives from the South Dakota Department of Transportation (SDDOT) an allocation of Local Urban Systems Projects funds. Local roadways classified as rural major collectors and urban collectors and above are eligible for Federal-Aid funds. The local roadways eligible for these funds include West Gate Boulevard, Cheyenne Boulevard, Radar Hill Road, Liberty Boulevard, Tower Road, Ellsworth Road, Highway 1416, and a portion of 225th Street. With the adoption of the Major Street Plan, the city can request changes in the functional class. This request is submitted through SDDOT, and SDDOT forwards the functional class changes to FHWA for approval.

Table 5.20-2 provides an overview of transportation projects that may improve traffic surrounding Ellsworth AFB.

Table 5.20-2 Prioritized Roadway Projects

Street	Project Description	Funding Source	Cost (Millions)	Priority
Cheyenne and Ellsworth	Build new arterial from Radar Hill Road to a new Ellsworth arterial extension south from existing neighborhood	Private / Public	6.1	Mid
Cimarron Drive	Extend new arterial from Ellsworth Road to Liberty Boulevard	Private	4.4	Mid
Ellsworth Road	Widen existing roadway from existing neighborhood to 1416 to provide curb and gutter and left turn lane according to the arterial typical section standard	Public	0.83	Mid
Cheyenne Boulevard	Build new arterial from Ellsworth Road to 151 Avenue	Private	15.4	Long
Cimarron Drive	Build new arterial from West Gate Road east to Cimarron Drive intersection with Ellsworth Road	Public	16.9	Long

Findings

- The westbound Highway 1416 intersection with Ellsworth Road operates at LOS F during peak hours due to increased traffic from public schools and Ellsworth AFB.

5.21 Safety

Safety zones are areas in which development should be more restrictive, in terms of use and concentrations of people, due to the higher risks to public safety. Issues to consider include aircraft accident potential zones, weapons firing range safety zones, and explosive safety zones.

Military installations often engage in activities or contain facilities that, due to public safety concerns, require special consideration by local jurisdictions when evaluating compatibility. It is important to regulate land use near military airfields in order to minimize damage from potential aircraft accidents and to reduce air navigation hazards. To help mitigate potential issues, the Department of Defense (DOD) has delineated Clear Zones (CZ) and Accident Potential Zones (APZ) in the vicinity of airfield runways. APZs are usually divided into APZ I and APZ II. Each zone was developed based on the statistical review of aircraft accidents. Studies show that most mishaps occur on or near the runway, predominately along its extended centerline.

1995 JLUS Recommendations

Recommendation Eight – Complete

The 1995 JLUS recommended that existing structures that are incompatible with AICUZ guidelines should not be enlarged with additional rooms unless the value of the additional construction is less than 50% of the value of the structure prior to the addition. It should be considered a nonconforming use for all other considerations.

Action Taken

This recommendation has been adopted by the City of Box Elder.

Key Terms

Area Operations Area. The Area Operations Area (AOA) is an area that encompasses all of the airport's approach or departure airspace including the circling space.

Accident Potential Zone I. Accident Potential Zone I (APZ I) is an area beginning at the end of each clear zone (see definition below) and continuing out to a length of 5,000 feet long by 3,000 feet wide. APZ I follows a curved shape to reflect the predominant flight tracks, and can even split to reflect differences in standard approaches/departures and closed pattern tracks. This area has a lower potential for accidents and therefore has less restrictive development restrictions recommended.

Accident Potential Zone II. Accident Potential Zone II (APZ II) is an area that begins at the end of each APZ I and extends an additional 7,000 feet long by 3,000 feet wide. This APZ can also be curved as the flight tracks are considered in designating this APZ. Again, the accident potential in this area is further reduced, and with this, some additional development types are allowed.

Bird / Wildlife Aircraft Strike Hazard. Bird / Wildlife Aircraft Strike Hazard (BASH) refers to the likely occurrence for a collision between an airborne animal (usually a bird) and a human-made vehicle, particularly aircraft.

BASH Relevancy Area. The BASH Relevancy Area is a five-statute mile area from the airport operational area, including the runway. This area has been determined by the FAA as an area where BASH incidences are likely to occur due to the types of flying operations that occur near the airfield, such operations are typically at slower speeds and lower altitudes making the conditions for BASH opportune.

Clear Zone. The Clear Zone (CZ) is the area that has the highest statistical potential of an aircraft incident (but again, a very low probability). As the name reflects, this area should be kept clear of all structures, including fences. A CZ begins at the physical end of a runway and extends outward, typically covering an area that is 3,000 feet wide by 3,000 feet long. At Ellsworth AFB, the Runway 13/31 CZ measures 3,000 feet wide by 3,000 feet long.

Primary Surface. This surface defines the limits of the obstruction clearance requirements in the immediate vicinity of the landing area. The primary surface comprises surfaces of the runway, runway shoulders, and lateral safety zones and extends 200 feet beyond the runway end. The width of the primary surface for a Class B runway is 2,000 feet, or 1,000 feet on each side of the runway centerline.

Issue SA-1	<p>Existing and future bird attractants on and surrounding Ellsworth AFB pose strike threats</p> <p>Ponds that are located on and off of the base attract waterfowl.</p>
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Ellsworth AFB has ponds on base, which are utilized to contain and control storm water and floating pollutants. There are three ponds on base, which are fisheries and are used to allow separation for water control: Bandit, Gateway, and Heritage. These ponds are used as stormwater outfalls on base and are monitored to ensure that they do not contain high pollutants. Also on the base is the Lemay wetland, which is an engineered wetland directed by the EPA.

In addition to these ponds, landowners of agricultural land surrounding Ellsworth AFB often have water impoundments for their livestock. Waterfowl, such as geese, ducks, and raptors are attracted to this source of water and often fly from these impoundments, located near the base, to the ponds on the installation. As birds fly across, they frequently fly above the end of the runway as well as along flight paths. As of yet, no discussion has been had with land owners about the attraction of birds to the base or methods that land owners can implement to alleviate the attraction of birds. There is additional concern that future ponds could be constructed due to limited restriction of these ponds.

Collisions with birds on the ground or in the air are dangerous for pilots, people on the ground, and aircraft operations in general. Bird aircraft strikes can result in significant and sometimes irreparable damage to aircraft and in

some cases, they may even result in injury or loss of life to pilots and citizens. This is also a concern to Ellsworth AFB as BASH incidents can be extremely costly when attempting to repair or replace damaged equipment. Figure 5.21-1 shows all BASH areas within the BASH Relevancy Area and surrounding the BASH Area.

Existing Tools

Ellsworth AFB Integrated Natural Resources Management Plan (INRMP)

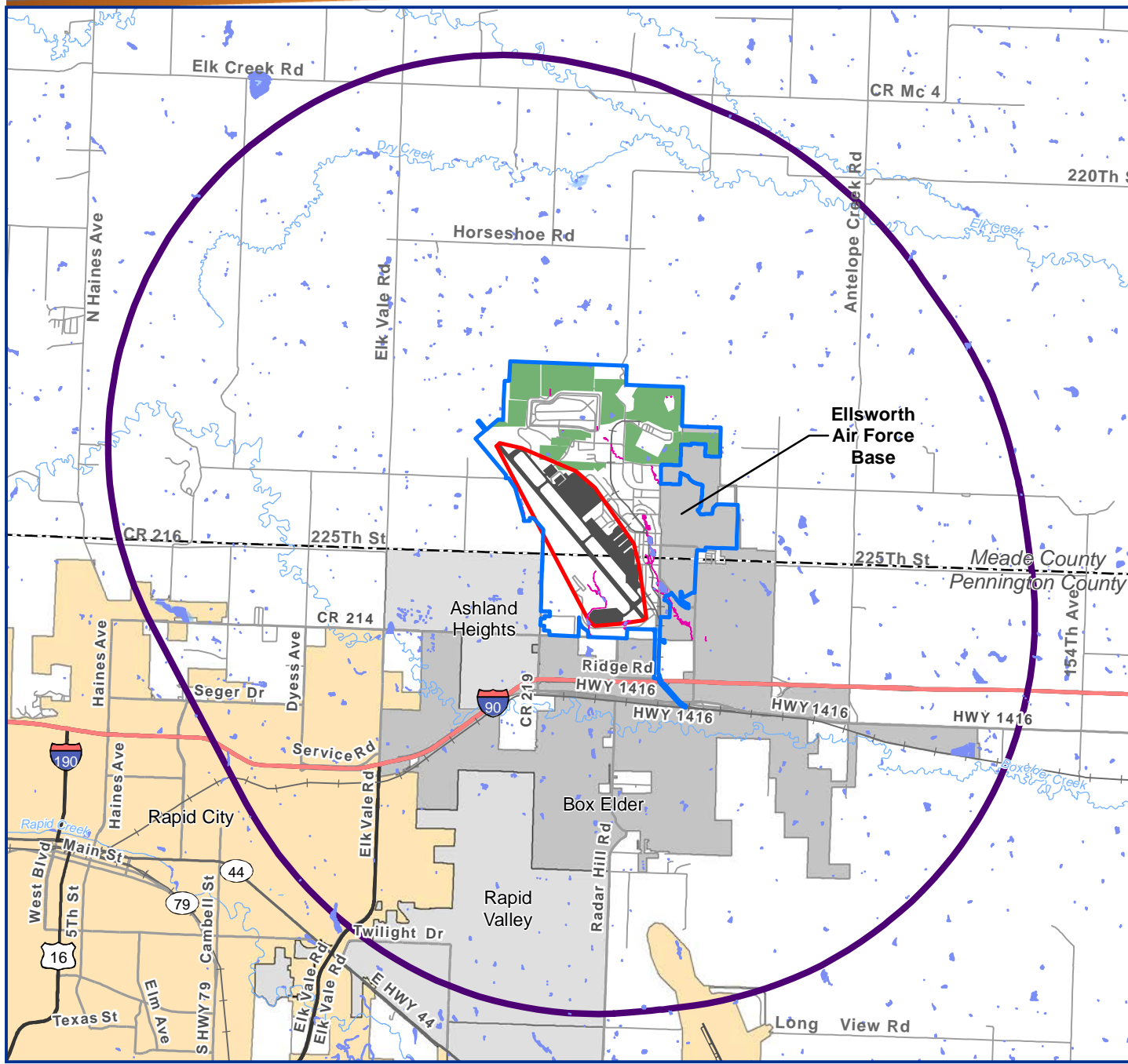
The Bird / Wildlife Aircraft Strike Hazard Plan is part of the INRMP and implemented by the 28th BW Safety Office. According to the plan, there is a low tolerance for waterfowl and raptors and the base will use dispersal techniques to rid of the birds. The base has a zero tolerance policy for gulls, and does not encourage smaller birds on the base since they may attract larger raptor species. Birds that may nest off the installation are monitored; however, lakes or bodies of water nearby the base are not.

Findings

- Waterfowl are attracted to ponds both on and off base and often fly between the two.
- The BWASH Plan in the INRMP does not discuss long term mitigation strategies.
- There is no communication or coordination with ranch owners about the use of their ponds.

Figure 5.21-1

Bird Aircraft Strike Hazard Concerns



- Legend**
- 5-mile BASH Relevancy Area
 - Wetlands
 - Ellsworth Wetlands
 - Ellsworth Agricultural Outlease
 - Airport Operations Area
 - Ellsworth Air Force Base
 - Airfield Surface / Runway
 - County Boundary
 - Rapid City
 - Box Elder
 - Other Unincorporated Community
 - Water Body
 - ~ River
 - = Interstate
 - = Federal Highway
 - = State Highway
 - = Major Roads
 - + Railroad

Source: TIGER, 2015, Matrix Design Group, 2015, Ellsworth Air Force Base, 2015, US Fish and Wildlife 2015.

Matrix DESIGN GROUP

Issue SA-2	<p>Ellsworth AFB does not own all of the land within the Primary Surface</p> <p>Land that is part of the Primary Surface is located outside of the fence line and is not owned by Ellsworth AFB.</p>
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Compatibility Assessment

The width of a primary surface for a Class B runway is 2,000 feet. The primary surface is made up of the runway, runway shoulder, and lateral safety zones and extends 200 feet beyond the runway end. This surface defines the limits of the obstruction clearance requirements in the immediate vicinity of the landing area.

On the northwestern side of the runway, there is a portion of the primary surface that lies outside the Ellsworth AFB fence line – (see Figure 5.21-2). The area of the primary surface that is outside the fence line is approximately 2.5 acres and is privately owned. SDEDA is currently working with the property owner to acquire this property and deed it back to the installation. This would allow the fence line to be moved to enclose the entire primary surface.

Figure 5.21-2 shows the primary surface area that is not within the Ellsworth AFB fence line.

Existing Tools

As part of this JLUS effort, no existing tools were identified that address this compatibility issue.

Findings

- Base ownership of the land would ensure that the primary surface is completely unobstructed.

Issue SA-3	<p>Existing land uses in runway safety zones</p> <p>There are some incompatible uses that currently exist within safety zones.</p>
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Compatibility Assessment

Airfields have designated safety zones composed of Clear Zones (CZ) and Accident Potential Zones (APZ) that extend out from each end of a runway. Development is a concern in these areas because this is statistically where aircraft accidents are more likely to occur. The 2008 AICUZ Study provides recommendations for compatible land uses within the safety zones. Incompatible development in these areas increases the safety risk for the general public and pilots.

The CZs are the most hazardous considering it is the area closest to the end of the runway where accidents are more likely to occur. The AICUZ Study states that Agricultural uses (without buildings) are the only land uses that should be allowed in CZs. It is common for the installation to either purchase the land to prevent development or obtain an easement for the land within the CZ.

The APZs are the second most hazardous area, located just beyond the CZ. Since these areas are further away from the runway where the probability of accidents is lessened, it is not always necessary for acquisition or an easement. Because there still is a high risk in the APZs, it is strongly encouraged that land uses are carefully planned and controlled for the protection of the public.








There are currently 39 acres within the safety zones that are not compatible. Land in the northern CZ and APZs are compatible, although there is one acre of residential land that is located directly south of the northern CZ. There are 223 acres that are considered conditionally compatible in the southern APZs. Lastly, there are 39 acres that are incompatible in the southern APZS.

Figure 5.21-2

Primary Surface Concern



Legend

-  Area Of Concern
-  Ellsworth Air Force Base Approximate Fence Line
- Airfield Imaginary Surface**
-  Primary Surface
-  Approach/Departure Clearance Surface (50:1)
-  Inner Horizontal Surface
-  Transitional Surface (7:1)
-  Airfield Surface / Runway

Source: TIGER, 2015,
Matrix Design Group, 2015,
Ellsworth Air Force Base, 2015.



0 100 200 300 Feet

Incompatible uses in the southern APZ I consists of mobile homes between Highway 1416 and Interstate 90 and two Baptist churches. Incompatible uses in the southern APZ II consist of mobile homes and single family homes south of Highway 1416. All of these incompatible uses are located in the City of Box Elder, except for the single family homes south of Highway 1416, which are part of unincorporated Meade County.

Figure 5.21-3 and 5.21-4 show current zoning and future land use under the Ellsworth AFB safety zones respectively.

Existing Tools

Ellsworth AFB Air Installation Compatible Use Zone (AICUZ) Study

The AICUZ Study for Ellsworth AFB provides land use guidelines for the land in the APZs and CZs. Because it is the area with the highest statistical probability for an accident to occur, no development should exist in the CZs. Residential development is not compatible within APZ I and APZ II, except for single units detached, which is conditionally compatible. Table 5.14-1 in the Land Use Section lists the recommended land uses for the CZs and APZs. Cultural activities, which include churches, are not compatible in either APZ I or APZ II. In APZ II, churches may exist where further deliberating by local authorities might be needed due to the variation of densities in people and structures, but is still not recommended.

Pennington County and Box Elder Zoning Ordinance

In the southern APZ's, both Box Elder and Pennington County have adopted AICUZ overlay zones that restrict development in the safety zones and noise contours. However, Pennington County's Ordinance adopts the 1994 AICUZ Study, while Box Elder Ordinance adopts the 2008 AICUZ Study. The distinction between these two studies is primarily in the footprint of the noise contours. The 1994 Study generally shows a larger footprint in the southwest and northwest areas, while the 2008 Study generally shows a larger footprint in the northwest area.

Readiness and Environmental Protection Integration (REPI)

REPI funds are used by SDEDA to protect Ellsworth AFB from encroachment of incompatible land uses. SDEDA has successfully used and continues to use this program in order to protect the base from encroachment. SDEDA should continue to utilize the program to further protect the base from future encroachment as well as to address current compatibility issues.

See issue LU-3 for further discussion on this issue.

Findings

- Incompatible land uses in safety zones, both residential and cultural activity, present a danger to residents who utilize these uses.
- The 1994 and 2008 Ellsworth AFB AICUZ Studies contain information about recommended land uses for land within safety zones.
- The 1994 and 2008 Ellsworth AFB AICUZ Studies differ in their noise contour footprint.
- REPI funds help protect the base from encroachment as well as address current compatibility issues.

Figure 5.21-3

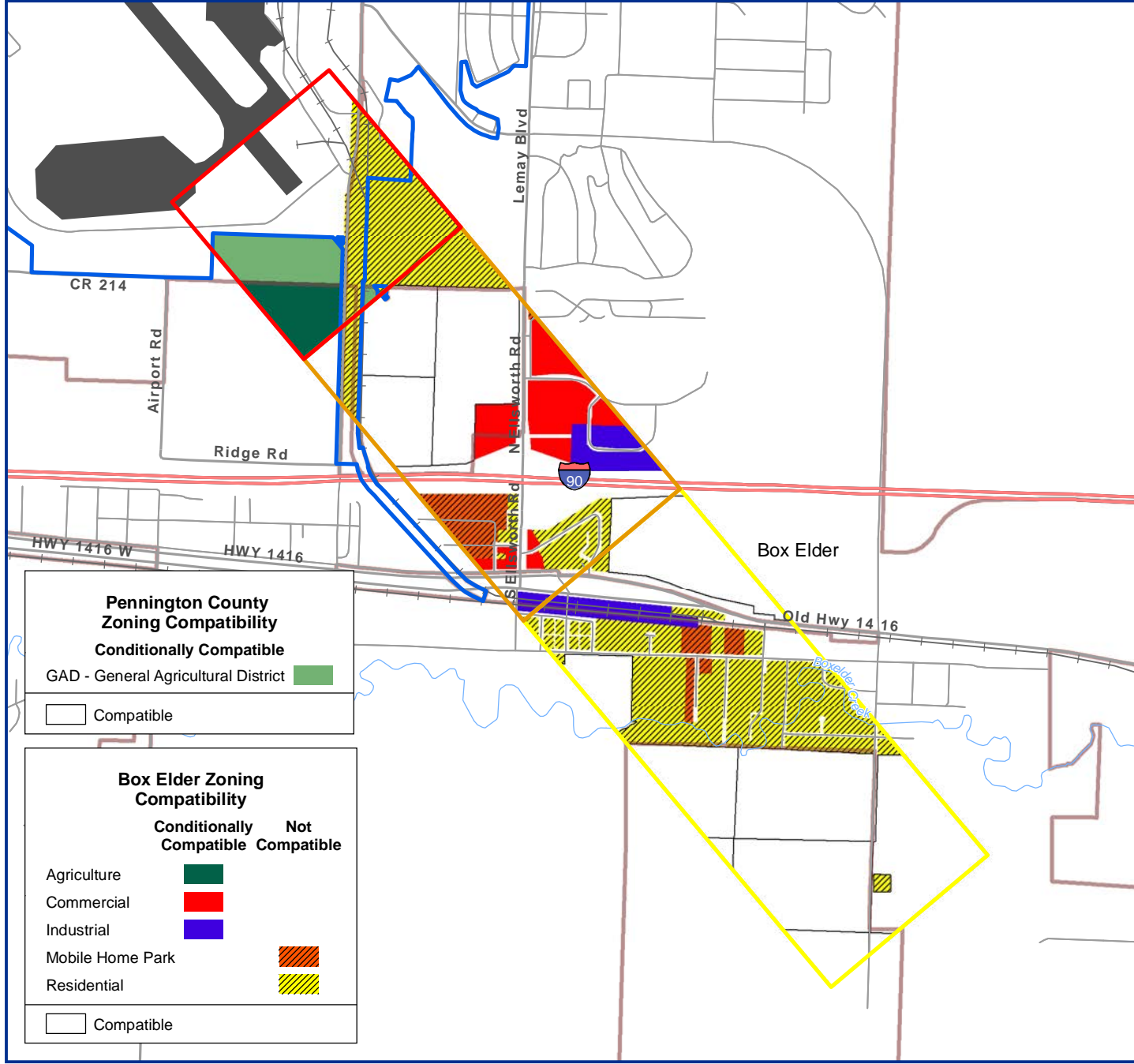
Analysis of Zoning Under Safety Zones

Legend

Accident Potential Zones

- CZ
- APZ I
- APZ II

- Ellsworth Air Force Base
- County Boundary
- Box Elder
- ~ River
- Interstate
- Federal Highway
- Major Roads
- Local Traffic
- + Railroad
- Airfield Surface / Runway

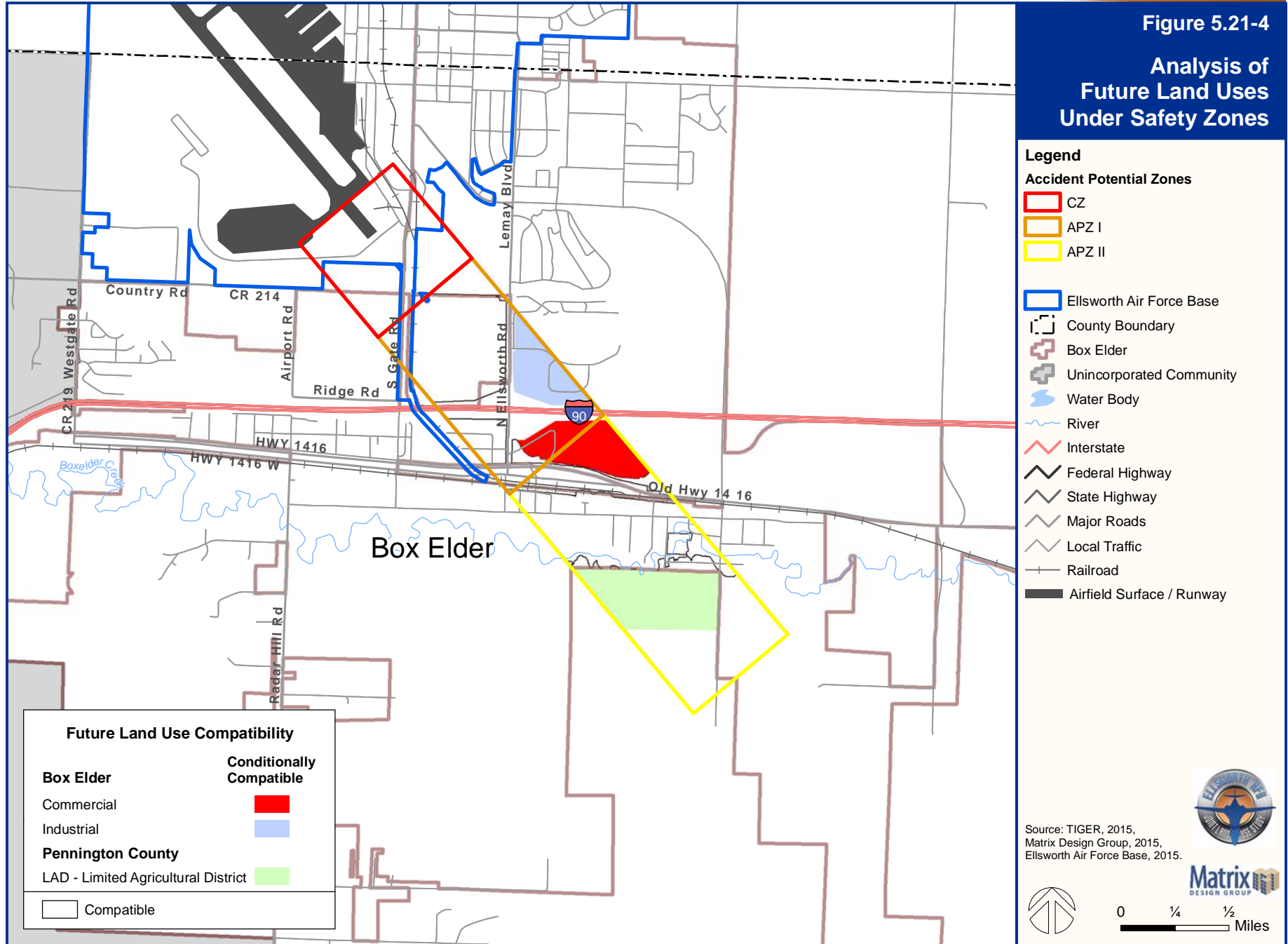


Source:
 Ellsworth Air Force Base, 2015.
 Box Elder, 2011. Rapid City, 2015.



Figure 5.21-4

Analysis of Future Land Uses Under Safety Zones



5.22 Scarce Natural Resources

Pressure to gain access to valuable natural resources (such as oil, natural gas, minerals, and water resources) located on military installations, within military training areas, or on public lands historically used for military operations can impact land utilization and military operations.

There were no issues identified for Scarce Natural Resources in this JLUS.

5.23 Vertical Obstructions

Vertical obstructions are created by buildings, trees, structures, or other features that may encroach into the navigable airspace or line-of-sight radar signal transmission pathways used by the military. These obstructions can be a safety hazard to both the public and military personnel and potentially adversely impact military readiness.

1995 JLUS Recommendations

Recommendation Ten – Complete

The 1995 JLUS recommended that legislation that enables state height hazard airport zoning should be amended to include military airports, such that any municipality or county which has a military airport within their jurisdiction has the authority to implement such height hazard zoning to prevent the construction / growth of obstructions to air navigation.

Action Taken

Currently, state height hazard airport zoning can be applied to any air navigation facility including military airports. Additionally, local jurisdictions have the authority to implement height hazard zoning.

Issue VO-1

Power poles in Accident Potential Zone

Incompatible wooden poles that are not easily breakable need to be moved underground.

Compatibility Assessment

APZ I and II are areas of accident risk for flight operations. Although both of these zones do not have high risk associated with them, it is still encouraged that the land uses within them are not obstructive towards flight operations. Currently, there are power lines that are located throughout both of the

southern APZs that could pose a safety hazard for Ellsworth AFB flight operations.

Some of the power poles mentioned are located along Country Road by the Ellsworth AFB fence line. These are particularly a risk factor due to their close proximity to the runway. An electric company has shown interest in moving the power lines that are located by base underground, but it would occur within the installation’s fence line. This is a challenge as this area is a remediation site and is in the process of a chemical cleanup.

The power lines within APZ I are currently incompatible with the AICUZ as it states that APZ I utilities are only compatible with the condition that there are no major aboveground transmission lines. Utilities are compatible within APZ II without any conditions, making these power lines compatible with the AICUZ, but still a hazard for the base. Undergrounding all of the power lines is the preferred end state for the poles within the APZs. This would improve the safety for both the base and the surrounding community in which these power lines are located, since it would reduce risk of aircraft accidents with the poles.

Existing Tools

Ellsworth AFB Air Installation Compatible Use Zone (AICUZ) Study

The AICUZ Study for Ellsworth AFB provides land use guidelines to prevent uses that can increase risk within APZs. Utilities, listed in the Transportation, Communications, and Utilities land use category are conditionally compatible within APZ I. Utilities within APZ II are compatible with no condition listed. These standards should be referred to when determining the located of existing and future power lines that fall within safety zones.

Findings

- The Ellsworth AFB AICUZ provides guidelines for utilities and suggests that utilities should not be above ground in APZ I.
- Power lines along the Country Road not able to be undergrounded due to a contamination site.
- Other power lines within the APZs are still not accounted for in terms of being undergrounded.

5.24 Vibration

Vibration is an oscillation or motion that alternates in opposite directions and may occur as a result of an impact, explosion, noise, mechanical operation, or other change in the environment. Vibration may be caused by military and / or civilian activities.

Issue V-1	Vibration from aircraft operations Vibrations occur during Ellsworth AFB aircraft takeoffs.
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Compatibility Assessment

The relationship between sound and vibration is inextricably linked since vibration is the pressure wave usually accompanied by sound (noise) and amplified in the lower frequency ranges. While numerous studies have been conducted to quantify the impacts of noise, very little research has been conducted to correlate vibration from low frequency sound and human response. One common conclusion across studies is that as the frequency decreases, the degree of annoyance or state of irritation from the noise and vibrations increases more rapidly with sound pressure level. A low-frequency signal can go from being audible, to annoying, to oppressive and vibrational with a relatively small change in level and it is not absorbed by the atmosphere or blocked by terrain and buildings as effectively as higher frequencies.

Studies have been conducted regarding the potential for structural damage resulting from vibration. Homeowners typically become concerned about structural damage due to the rattling effect when sound that causes vibration reaches 120 dBP.

Some residents near Ellsworth AFB have expressed concerns about the vibrations associated with the aircraft operations at the installation. These airborne vibrations are generally the result of high powered aircraft flying at low levels while taking off and landing. Surrounding jurisdictions have

reported experiencing vibration from aircraft about once a week. In general, residents are concerned about potential damage to their homes or property.

Existing Tools

As part of this JLUS effort, no existing tools were identified that address this compatibility issue.

Findings

- Residents have experienced vibration from aircraft operation at Ellsworth AFB.

5.25 Water Quality / Quantity

Water quality / quantity concerns include the assurance that adequate water supplies of good quality are available for use by the installation and surrounding communities as the area develops. Water supply for agriculture and industrial use is also considered.

Issue WQQ-1	Deicing fluid Although most is captured in basins, there is potential that residual deicing fluid could affect water quality.
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Compatibility Assessment

The primary activities of EAFB are best described by use of the following Standard Industrial Classification (SIC) Codes; each of these activities requires the application of a discharge permit:

- SIC 9711, National Security (Armed Forces)
- SIC 4952, Sewer Systems
- SIC 4959, Sanitary Services

Deicing fluid used at Ellsworth AFB is composed of propylene glycol, along with other ingredients such as thickening agents, wetting agents, corrosion inhibitors, and colored, UV-sensitive dye. Propylene glycol exerts a high biochemical oxygen demand (BOD), which can alter the quality of the water by introducing high aerobic activity.

Discharge from aircraft deicing activities is authorized in the following areas: 60 Row, 70 Row, 80 Row, 90 Row, 100 Row, Operational Apron, Hot Cargo Pad, Lola Pad, and the Bomber Alert Apron. In order to mitigate contamination, drain insert valves are to be kept closed during any deicing operations or spills. According to the Ellsworth AFB 2013 Storm Water Pollution Prevention Plan, a plan developed for Ellsworth AFB to identify and prevent sources of pollution, not all drain insert valves are kept closed during

such events. All authorized deicing areas which do not have drain insert valves are designated as “No Discharge Areas”, which means that spent glycol is not collected. These areas are: Hot Cargo Pad, 100 Row, Taxiways and the Bomber Alert Apron.

Another preventative measure is to utilize and a vacuum truck, a fluid recovery vehicle, to collect as much excess deicing fluid as possible, minimizing its runoff potential. While the deicing fluid is mostly captured in basins, it can be difficult to contain. It is especially difficult to contain when snow melts or storm water rinses the areas.

Existing Tools

Integrated Natural Resources Management Plan

The Ellsworth AFB Integrated Natural Resources Management Plan (INRMP) has seven watersheds, which are used as storm water drainage areas. Each watershed has an outfall, which drains storm water out of Ellsworth AFB and into tributaries of Box Elder Creek or Elk Creek. Deicing residuals must be monitored at Outfalls 001, 002, and 003 during the deicing season.

Ellsworth AFB Storm Water Pollution Prevention Plan

The Storm Water Pollution Prevention Plan (SWPPP) is developed for all areas on Ellsworth AFB that discharges stormwater into state waters. The plan identifies potential sources of pollution that have the potential to affect the quality of storm water discharge from the installation. Ellsworth AFB maintains the SWPPP (Permit SD0000281) issued by the South Dakota Department of Environment and Natural Resources and periodically revises the plan. Subject matter experts evaluate the installation’s compliance with state and federal stormwater requirements through a Comprehensive Site Compliance Evaluation. This permit should be referred to for specific monitoring locations and requirements as it is amended from time to time.

The Ellsworth SWPPP provides a map of where deicing may occur. It also includes the 28th Bomb Wing aircraft Deicing Policy, which lays out procedures and instructions for how deicing should be completed as well as how the fluid should be transferred and disposed of.

Findings

- Deicing fluid can be difficult to contain despite restrictions and procedures to prevent runoff.
- Water quality standards have been established in the SWPPP for each beneficial use classification--as a result, discharge risks are evaluated and result in limitations being applied to prevent degradation of water quality.
- SWPPP Permit SD0000281 sufficient addresses potential spills and containment measures and procedures.

Issue WQQ-2	Fuel spill potential Containment features are typically very effective, yet when high wind and heavy rains are present, it is possible for fuel spills to move off-base.
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Compatibility Assessment

Containment features that prevent fuel spills are generally very effective at Ellsworth AFB. There are many measures in place to mitigate contamination due to large storm events involving heavy rain and high speed wind. An example is Fuel Storage Area D, which has two dikes, one with a 1.47 million gallon storage tank and the other with a 2.31 million gallon storage tank. The fuel held at Area D is contained in tanks which are inspected on a regular basis for integrity and undergo periodic maintenance as required by API (American Petroleum Institute), UFC, and AFI guidelines. Expansion joints in the concrete secondary containment dikes are filled with sealant. These dikes are also inspected on a regular basis. Any cracks that develop over time are sealed, and joint sealant is replaced on a regular basis.

After being inspected for the presence of fuel, runoff from Fuel Storage Area D runs off into Outfall 6, which is located on the southeast corner of the Base.

Runoff from Outfall 6 drains through LeMay Lakes, Bandit Lake, Heritage Lake, Gateway Lake, and the golf course ponds.

The inspection and maintenance of Fuel Storage Area D is conducted periodically as required by the American Petroleum Institute (API), UFC, and AFI guidelines. Currently, all tanks at Ellsworth AFB are double-walled or have an impervious secondary containment structure to prevent fuel releases in accordance with the Spill Prevention Control and Countermeasure Plan.

The LRS Fuels Management Team is inspected by local CE Environmental on a routine basis, and also receives inspections from Defense Logistics Agency-Energy who also provide realistic spill training exercises. It is important that fuel spills are prevented in the future or properly contained when they do occur, as is currently done.

Existing Tools

Ellsworth AFB Storm Water Pollution Prevention Plan

The Ellsworth AFB Storm Water Pollution Prevention Plan (SWPPP) documents existing storm water management practices at Ellsworth AFB. The plan acts as a guide for to ensure that storm water contamination is minimized. The plan includes the designated individuals responsible for storm water pollution prevention at Ellsworth AFB, a description of storm water outfalls, activities that could influence storm water quality, and the Ellsworth AFB's plan to minimize storm water pollution. Table 5.25-1 outlines the required monitoring per the Surface Water Discharge Permit at Ellsworth AFB. As stated in the Surface Water Discharge Permit, deicing residuals must be monitored at Outfalls 001, 002, and 003 from October 1st through April 30th. TPH sample are taken when an oil sheen or floating oil is observed in the outfalls.

Spill Prevention Control and Countermeasure Plan

The Spill Prevention Control and Countermeasure Plan was developed through the Facility Response Plan, which Ellsworth AFB is required to have by the Oil Pollution Act. The plan identifies HAZMAT spill threats and those responsible for the spill threats. Analysis is conducted to locate critical environmental resources and develop response supplies, equipment, and

practices to contain and clean up HAZAMAT spills. These plans must be updated frequently and practiced annually. The Spill Prevention Control and Countermeasure Plan and the Facility Response Plan will soon be merged to create an Integrated Response Plan.

Table 5.25-1 Outfalls 001-003 Storm Water Monitoring Required from 1 October – 30 April

Sample Characteristic	Frequency	Sample Type	Responsible Party
Rate of Discharge	Monthly	Instantaneous	Wastewater Treatment Facility
pH	Monthly	Instantaneous	Wastewater Treatment Facility
Total Petroleum Hydrocarbons	Weekly	Visual/Grab	Wastewater Treatment Facility
Floating Solids and Visible Foam	Weekly	Visual	Wastewater Treatment Facility
Benzene, Toluene, Ethylbenzene, and Xylenes (BETX)	Daily after fuel spill	Grab	Wastewater Treatment Facility
Naphthalene	Daily after fuel spill	Grab	Wastewater Treatment Facility
Biochemical Oxygen Demand	Monthly	Grab	Wastewater Treatment Facility

Findings

- Ellsworth AFB has experienced fuel spills in the past. Today, mitigation measures are in place and monitoring is performed regularly.
- Water exiting off of Ellsworth AFB is monitored by Ellsworth AFB personnel, with special sampling conducted daily after an oil spill.

Issue WQQ-3	<p>Past fuel operations and groundwater contamination</p> <p>Fuel contamination on Ellsworth AFB from past operations has contributed to some groundwater contamination in the local area.</p>
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Compatibility Assessment

Ellsworth AFB was put on the EPA’s National Priorities List (NPL) in 1990 as a Superfund site. Twelve operable units (OUs) were identified at the time of the listing, but after partial deletions in 2012, all that is remaining on the NPL is OU-11 Basewide Groundwater.

In 2007, the base began using in-place reductive treatment (IRT) technologies to treat the groundwater, which treats groundwater aquifers without any removal by adding biostimulants and microbes. This method has been effective in degrading chlorinated compounds; however, contaminants are still present in the soil and in the groundwater on Ellsworth AFB and some have the potential to move off-base. Maintenance and monitoring of the groundwater is still on going. The Air Force, with oversight from the EPA, conducts five-year reviews at the site to ensure that methods used to treat the contaminants are functioning.

At present, the OU trichloroethylene plume extends eight miles to the east of Ellsworth AFB and a second plume extends southwest of the base. Homes within this boundary have been affected by the contamination. In response, Ellsworth AFB now pays for water for 17 homes to the southwest and 80 homes to the east which it sources from Box Elder and Rapid City.

Source: United State Environmental Protection Agency

More recently, in early 2016, the EPA released a health advisory regarding two types of perfluorinated compounds. These PFCs are components of film forming foam, which is used during base operations, such as training, as a fire suppressant. The release of this foam has occurred on about 200 air force installations, four of which have PFC levels above the EPA limit in drinking water. Ellsworth AFB is scheduled to be tested for PFC levels in October 2016 to determine if PFCs are present in the groundwater.

Source: Air Force Civil Engineer Center

Existing Tools

Comprehensive Environmental Response, Compensation, and Liability Act

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 authorizes USEPA to respond to spills and other releases of hazardous substances to the environment, and authorizes the National Oil and Hazardous Substances Pollution Contingency Plan. CERCLA also provides a Federal “Superfund” to respond to emergencies immediately. Although the “Superfund” provides funds for cleanup of sites where potentially responsible parties cannot be identified, USEPA is authorized to recover funds through damages collected from responsible parties. This funding process places the economic burden for cleanup on polluters.

Findings

- All landfill sites have been capped with clean soil and long term monitoring programs are ongoing.

Issue WQQ-4

Potential for fertilizer and pesticide runoff

Fertilizers and pesticides from base and golf course can potentially runoff into water courses.

Compatibility Assessment

Although minimized under the pest management program, fertilizers and pesticides are used at the golf course and where needed on the base, to fend off unwanted and invasive plants and animals.

The Prairie Ridge Golf Course at Ellsworth AFB has an active pest control program to address occasional pests such as grasshoppers, webworms, prairie dogs, and broadleaf weeds. In addition, certain aquatic weeds may require control in base lakes to prevent their encroachment in other bodies of water. These species are controlled as needed as part of the Pest Management program.

Fertilizer runoff and herbicide use for invasive species has the potential to runoff into water courses and contaminate surface and groundwater and damage non-target species. Measures, described in the Storm Water Pollution Prevention Plan, are in place to mitigate contamination. For example, when these chemicals are not in use, they are stored indoor to contain potential spills, further the storage areas are daily for any leaks.

Existing Tools

Ellsworth AFB Storm Water Pollution Prevention Plan

The Storm Water Pollution Prevention Plan provides descriptions of existing best practices when dealing with chemicals on buildings within the base. Herbicides may not be applied within 10 feet of drainage, except when needed to control noxious weed, as required by the State of South Dakota. Insecticides and fertilizers may not be applied within 50 feet of drainage. No specific instruction is provided for the use of pesticides and fertilizers on the golf course.

Findings

- Fertilizer runoff and herbicide use for invasive species has the potential to contaminate surface and groundwater and damage non-target species.
- Natural methods of pest control are not being used on Ellsworth AFB.

5.26 Minor Issues

During the process of developing this JLUS, all concerns raised as potential compatibility issues are reviewed and analyzed in order to determine an appropriate response. Some issues were not recommended for further action either because the issue fell outside the scope of this project or the issue did not merit a formal strategy. Concerns that were raised, but were not considered for further action are found below.

Land / Air / Sea Spaces (LAS)

Other Issue 1	<p>Powder River MOA</p> <p>The Powder River MOA may result in an increase in flight frequency around Ellsworth AFB.</p>
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The Powder River Training Complex (PRTC) is the result of the Air Force’s request to modify existing Power River A and B Military Operations Areas and associated Air Traffic Control Assigned Airspaces, which overly parts of Montana, Wyoming, and South Dakota. The original MOA was positioned at 32,000 feet. The original had issues with cross overs and so the MOA was changed to 17,000 feet. In addition to the height change, corridors were created for commercial flight. The airspace extension has created concerns regarding how the extension could impact flights traffic, noise, and safety.

According to the Powder River Training Complex Environmental Impact Statement (EIS), flight traffic and congestion should not increase significantly. Civil aviation will be the most effected and may be affected by delays and potential reroutes, but will not decrease the amount of civil flights. The EIS lays out strategies to sustain efficiency. One of the strategies for the reduction of high concentration corridors, to minimize impacts on civil aviation while still accommodating for military training needs, was the widening of Gap MOAs.

With low level flights and training, there is a concern that noise will create an impact on the surrounding community. The PRTC EIS states that there is not

expected to be a significant increase in noise within the operational area. According to FAA standards, a significant increase in noise would be an increase of DNL 1.5 dB or more at or above 65 dB noise exposure. The proposed air space is in DNLmr 48dB. Although the FAA’s level of significance is based on DNL and not DNLmr, it can be said that the noise is below the

There were no findings of safety risks and this issue is outside the scope of this project.

Land Use (LU)

Other Issue 2	<p>Leasing underutilized properties at Ellsworth AFB</p> <p>Underutilized property at Ellsworth AFB creates opportunities for land to be leased out.</p>
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Compatibility Assessment

There are thousands of acres of land on Ellsworth AFB that are not currently being utilized for any base operations. This land could be leased out for renewable energy use such as solar, wind, or geothermal, which could help to bring jobs to the region.

Some alternative energy development areas suggested are the 400 acres north of MSA, 100 acres north of Centennial Estates (formally, Antelope Ridge), 140 acres on the southwest corner of the base, and 1,400 acres in the Badland Bombing Range.

There is also an underutilized hangar to the south of the base, which can be leased for alternative uses.

This issue in does not affect compatibility as Ellsworth AFB controls land within the fence line.

**Other
Issue 3****SDEDA land acquisition concerns**

There is concern about property maintenance and future uses on SDEDA owned properties.

Compatibility Assessment

SDEDA has the authority to purchase properties that are within safety zones or general compatibility concerns. There has been some concern regarding property maintenance and future uses of SDEDA owned property. Once acquired by SDEDA, incompatible land uses are removed. Future redevelopment of properties must follow local plans, codes and ordinances relative to compatibility with Ellsworth AFB. This improves overall compatibility with the base.

Roadway Capacity (RC)**Other
Issue 4****Commercial traffic nearby Ellsworth AFB Commercial Gate**

Commercial traffic on Box Elder roads causes road damage.

Compatibility Assessment

The commercial gate at Ellsworth AFB generates traffic, which has been creating damage to the roads in Box Elder. The city received a federal grant for the maintenance of the roads. This issue does not affect compatibility.

Water Quality / Quantity (WQQ)**Other
Issue 5****Golf course water supply**

There is no guaranteed water supply available to irrigate Prairie Ridge Golf Course.

Compatibility Assessment

There is currently a shortage of water that is available for Prairie Ridge Golf Course at Ellsworth AFB. The golf course was previously irrigated by treated effluent water on a wastewater treatment plant (WWTP) on the base. This issue does not affect compatibility.

Please see the next page.



