

*REVISED DRAFT*  
**ENVIRONMENTAL ASSESSMENT**  
**ADDRESSING**  
**ACTIVITIES ASSOCIATED WITH DEVELOPMENT**  
**OF A REGIONAL WASTEWATER TREATMENT PLANT**  
**ELLSWORTH AIR FORCE BASE, SOUTH DAKOTA**



**APRIL 2012**

## ACRONYMS AND ABBREVIATIONS

µg/m <sup>3</sup>	micrograms per cubic meter	dba	A-weighted decibel
ACC	Air Combat Command	DERP	Defense Environmental Restoration Program
ACHP	Advisory Council on Historic Preservation	DNL	day-night average sound level
ACM	asbestos-containing material	DOD	Department of Defense
AFB	Air Force Base	DOE/EIA	U.S. Department of Energy, Energy Information Administration
AFI	Air Force Instruction	EA	Environmental Assessment
AFCEE	Air Force Center for Engineering and the Environment	EDA	Ellsworth Development Authority
AFOSH	Air Force Occupational and Environmental Safety, Fire Protection, and Health	EIAP	Environmental Impact Analysis Process
AFPD	Air Force Policy Directive	EIS	Environmental Impact Statement
AICUZ	Air Installation Compatible Use Zone	EISA	Energy Independence and Security Act
AOC	Area of Concern	EO	Executive Order
APE	Area of Potential Effect	EOD	Explosive Ordnance Disposal
APZ	Accident Potential Zone	ERP	Environmental Restoration Program
AQCR	Air Quality Control Region	ERSZ	Electromagnetic Radiation Safety Zone
ARSD	Administrative Rules of South Dakota	ESA	Endangered Species Act
AST	aboveground storage tank	FAA	Federal Aviation Administration
BASH	bird/wildlife aircraft strike hazard	FEMA	Federal Emergency Management Agency
BD/DR	Building Demolition/Debris Removal	FIRM	Flood Insurance Rate Map
bgs	below ground surface	FONPA	Finding of No Practicable Alternative
BHPL	Black Hills Power and Light	FONSI	Finding of No Significant Impact
BHRCI	Black Hills-Rapid City Intrastate	ft <sup>2</sup>	square feet
BMP	best management practice	FY	Fiscal Year
BMW	Bombardment Wing	GHG	greenhouse gas
BOD	biochemical oxygen demand	gpd	gallons per day
BW	Bomb Wing	gpdc	gallons per day per capita
CAA	Clean Air Act	gpy	gallons per year
CAIS	Chemical Agent Identification Set	HAP	hazardous air pollutant
CAS	conventional activated sludge	HAZMART	hazardous materials pharmacy
CEQ	Council on Environmental Quality	HQ	headquarters
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	HUD	U.S. Department of Housing and Urban Development
CFR	Code of Federal Regulations	ICRMP	Integrated Cultural Resources Management Plan
CO	carbon monoxide	IFAS	integrated fixed-film activated sludge
CO <sub>2</sub>	carbon dioxide	IICEP	Interagency and Intergovernmental Coordination for Environmental Planning
CRM	Cultural Resources Manager		
CWA	Clean Water Act		
CZ	Clear Zone		

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IRP	Installation Restoration Program	psi	per square inch
JP-8	Jet Propellant 8	QD	quantity-distance
km	kilometer	RAFS	Rushmore Air Force Station
kV	kilovolt	RCRA	Resource Conservation and Recovery Act
kW	kilowatt	RWWTP	regional wastewater treatment plant
LBP	lead-based paint	SAC	Strategic Air Command
LTM	long-term monitoring	SARA	Superfund Amendment and Reauthorization Act
MBBR	moving bed bio-reactor	SBR	sequencing batch reactor
MFH	military family housing	SDDENR	South Dakota Department of Environment and Natural Resources
mg/L	milligram per liter	SDSWDS	South Dakota Surface Water Discharge System
mg/m <sup>3</sup>	milligrams per cubic meter	SDSWQS	South Dakota Surface Water Quality Standards
MGD	million gallons per day	SDWA	Safe Drinking Water Act
MMRP	Military Munitions Response Program	SEL	Sound Exposure Level
MOGAS	mobility gasoline	SHPO	State Historic Preservation Officer
MOU	Memorandum of Understanding	SIP	State Implementation Plan
MSA	Munitions Storage Area	SO <sub>2</sub>	sulfur dioxide
msl	mean sea level	SPCC	Spill Prevention, Control, and Countermeasures
NAAQS	National Ambient Air Quality Standards	SWANCC	Solid Waste Agency of Northern Cook County
NEPA	National Environmental Policy Act	SWD	Surface Water Discharge
NHPA	National Historic Preservation Act	SWPPP	Storm Water Pollution Prevention Plan
NO <sub>2</sub>	nitrogen dioxide	TCP	traditional cultural properties
NO <sub>x</sub>	nitrogen oxides	tpy	tons per year
NPDES	National Pollutant Discharge Elimination System	TSCA	Toxic Substances Control Act
NRHP	National Register of Historic Places	TSS	total suspended solids
NWP	Nationwide Permit	U.S.C.	United States Code
O/W	oil/water	USACE	U.S. Army Corps of Engineers
O <sub>3</sub>	ozone	USAF	U.S. Air Force
ODS	ozone-depleting substance	USEPA	U.S. Environmental Protection Agency
OSHA	Occupational Safety and Health Administration	USFWS	U.S. Fish and Wildlife Service
OU	Operable Unit	UST	underground storage tank
Pb	lead	UXO	unexploded ordnance
PCB	polychlorinated biphenyl	VOC	volatile organic compound
PM <sub>10</sub>	particulate matter equal to or less than 10 microns in diameter	WAPA	Western Area Power Administration
PM <sub>2.5</sub>	particulate matter equal to or less than 2.5 microns in diameter	WP	Waste Pond
ppd	pounds per day	WWTP	wastewater treatment plant
ppm	parts per million		
PSD	Prevention of Significant Deterioration		



## COVER SHEET

### REVISED DRAFT ENVIRONMENTAL ASSESSMENT ADDRESSING

#### ACTIVITIES ASSOCIATED WITH DEVELOPMENT OF A REGIONAL WASTEWATER TREATMENT PLANT ELLSWORTH AIR FORCE BASE, SOUTH DAKOTA

**Responsible Agencies:** U.S. Air Force (USAF), Headquarters Air Combat Command (ACC), and Ellsworth Air Force Base (AFB), South Dakota.

**Affected Location:** Ellsworth AFB.

**Proposed Action:** Decommissioning and demolition of existing wastewater treatment plant (WWTP) on Ellsworth AFB, granting of an easement on Ellsworth AFB to the South Dakota Ellsworth Development Authority (EDA), and construction of a new sanitary sewer pipeline within the easement to direct wastewater flow from Ellsworth AFB to a proposed future regional wastewater treatment plant (RWWTP) off-installation.

**Report Designation:** Revised Draft Environmental Assessment (EA).

**Abstract:** Ellsworth AFB is faced with having to upgrade its current wastewater treatment systems to meet more stringent State of South Dakota-mandated restrictions on wastewater discharge. Ellsworth AFB is proposing to decommission and demolish its current wastewater treatment plant and allow construction of a new sanitary sewer pipeline on Ellsworth AFB within an easement granted to the South Dakota EDA. The sanitary sewer pipeline would connect to an existing pipeline southeast of the installation that would flow to a proposed future RWWTP off-installation. In addition to evaluating these activities, this EA also evaluates Ellsworth AFB's contribution to the regional wastewater stream. Under this Proposed Action, decommissioning of the existing WWTP would start in early 2014 and the installation would begin sending flow to the proposed future RWWTP by summer 2014. At no time during the decommissioning process would flow be untreated before the RWWTP goes online. The proposed corridor for establishing a new sewer pipeline would cross portions of the Ellsworth AFB's Prairie Ridge Golf Course and a small, unnamed tributary east of the existing WWTP.

This EA has been prepared to evaluate the Proposed Action and alternatives, including the No Action Alternative, and to aid in determining whether a Finding of No Significant Impact/Finding of No Practicable Alternative (FONSI)/(FONPA) can be prepared or whether an Environmental Impact Statement is needed. Resource areas that were considered in the impact analysis are land use, infrastructure, noise, air quality, safety, geological resources, water resources, biological resources, cultural resources, socioeconomic resources and environmental justice, and hazardous materials and wastes. A previous iteration of this Draft EA was made available to the public for a 30-day review period in April and May 2011. The Draft EA was subsequently revised with additional information and analysis regarding wetlands and water use. This Revised Draft EA is being made available to the public for an additional 30-day review period.

Written comments and inquiries regarding this document should be directed to Ms. Melody Jensen, 28 CES/CEAON, 2125 Scott Drive, Ellsworth AFB, SD 57706-4711, by telephone to (605) 385-2685, and by email to [Melody.Jensen@ellsworth.af.mil](mailto:Melody.Jensen@ellsworth.af.mil).

### **PRIVACY ADVISORY**

Your comments on this Draft EA are requested. Letters or other written comments will be addressed in the EA and made available to the public. Any personal information provided will be used only to identify your desire to make a statement during the public comment period or to fulfill requests for copies of the EA or associated documents. Private addresses will be compiled to develop a mailing list for those requesting copies of the EA. However, only the names of the individuals making comments and specific comments will be disclosed; personal home addresses and phone numbers will not be published in the EA.

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## Executive Summary

### Introduction

This Environmental Assessment (EA) describes the proposal by Ellsworth Air Force Base (AFB) to decommission and demolish its current wastewater treatment plant (WWTP) and grant an easement to establish a new sanitary sewer pipeline.

### Purpose and Need for the Proposed Action

The purpose of the Proposed Action is to decommission and demolish the existing WWTP and provide an easement for the construction of a sanitary sewer pipeline on Ellsworth AFB that would connect to a pipeline off-installation that would flow to the proposed future regional WWTP (RWWTP). Ellsworth AFB and the City of Box Elder are currently faced with upgrading their individual wastewater treatment facilities to meet more stringent South Dakota Surface Water Discharge System (SDSWDS) limits imposed by the South Dakota Department of Environment and Natural Resources (SDDENR) that will become effective for Ellsworth AFB on October 1, 2014. The feasibility of constructing an RWWTP to support the sewage treatment needs of Ellsworth AFB and the City of Box Elder to meet these standards was evaluated. The engineering feasibility study indicated that it would be more cost-effective for an RWWTP to treat Ellsworth AFB's and City of Box Elder's sewage together versus using individual systems.

The existing WWTP at Ellsworth AFB is not capable of meeting future ammonia-removal requirements that will become effective for Ellsworth AFB on October 1, 2014. Ellsworth AFB was issued a new interim discharge permit effective from January 1, 2010, until December 31, 2014.

The need for the Proposed Action is to provide wastewater treatment capacity for Ellsworth AFB to meet more stringent SDSWDS standards. Ellsworth AFB operates a secondary conventional rock media trickling filtration WWTP. Effective October 1, 2014, Ammonia-N 30-day average and daily maximum limits will be instituted for Ellsworth AFB. The current WWTP at Ellsworth AFB is not capable of meeting these future ammonia removal requirements within its current operational profile.

On February 4, 2009, House Bill Number 1301 was enacted by the legislature of the State of South Dakota, creating the South Dakota Ellsworth Development Authority (EDA). The South Dakota EDA seeks to address a number of issues concerning the future of the installation and compatible civilian development around Ellsworth AFB. Ultimately, the South Dakota EDA would be responsible for construction of the RWWTP and associated infrastructure. The creation of a new RWWTP would also help to serve the adjacent City of Box Elder, which is currently above its capacity for treating wastewater and also must comply with the more stringent SDSWDS standards. Box Elder's demand for wastewater treatment is expected to increase because of expected population growth in the region.

### Description of the Proposed Action and Alternatives

**Proposed Action.** The Proposed Action includes three components: (1) decommissioning and demolition of the existing WWTP, (2) granting an easement on Ellsworth AFB to the South Dakota EDA and construction of a sanitary sewer pipeline within the easement, and (3) Ellsworth AFB's contribution to the regional wastewater stream, as discussed in the following paragraphs:

1. ***Decommissioning/Demolition of the WWTP.*** Under the Proposed Action the existing WWTP would be decommissioned and demolished. Decommissioning would begin in early 2014 with flow being sent to the proposed RWWTP in summer 2014. WWTP decommissioning involves disconnecting the influent piping and rerouting it to the new RWWTP; discontinuing effluent outflow; pumping all residual wastewater out of the treatment units; removing and properly disposing of all residual sludge; cleaning or decontaminating all treatment units and equipment; disconnecting utilities (e.g., water and electricity); removing from service petroleum-containing equipment and tanks including generators and transformers; and properly disposing of all residual chemicals, including chlorine, sulfur dioxide, and laboratory analysis chemicals. At no point during decommissioning would flow be untreated before the RWWTP goes online. Demolition involves disassembly and removal of the infrastructure, including treatment units, buildings, and piping. Backfilling, grading, and revegetation would be needed in areas where below-ground structures have been removed. If indicated during the removal process or by historical records or experience, soil and groundwater contamination testing could be required.
2. ***Wastewater Pipeline Easement and Construction.*** The Proposed Action would include the granting of an easement to the South Dakota EDA and the construction of a sanitary sewer pipeline within the easement by the South Dakota EDA. The easement would extend from a manhole just upgradient from the existing Ellsworth AFB WWTP across portions of the installation's golf course and potentially across a former landfill. The easement would begin at a wastewater junction point to the west of Building 3013 and travel southeast along the golf course to a wastewater pipeline junction point east of Ellsworth Road. This easement would be granted to allow construction of an 18- to 36-inch pipeline on Ellsworth AFB to ultimately connect with the proposed future RWWTP. Because of the natural topography of this area, the preferred pipeline route would follow natural contours to allow the pipeline to be gravity-fed versus installing a lift station to pump effluent. The proposed corridor is primarily to the west of a creek and its floodplain, but the corridor would eventually cross the creek and floodplain.
3. ***Ellsworth AFB's Wastewater Contribution to the Regional Waste Stream.*** Under the Proposed Action, after completion of the decommissioning process for the existing Ellsworth AFB WWTP, flow from Ellsworth AFB would be sent through a sanitary sewer pipeline to the proposed future RWWTP off-installation. The current annual average daily flow of wastewater from Ellsworth AFB is 0.5 million gallons per day (MGD) and the maximum daily flow is 1.41 MGD. The projected wastewater flow from Ellsworth AFB in 2028 is an annual average daily flow of 1.5 MGD and maximum daily flow of 2.3 MGD. The City of Box Elder has undergone recent growth by annexing portions of Ellsworth AFB, which have nearly doubled the size of the city to a population of approximately 9,200. This annexation and other future developments by the city have increased the need for the city to expand its current wastewater treatment facilities, which are currently over capacity.

***WWTP Upgrade Alternative.*** This alternative would require certain upgrades to meet the more stringent SDSWDS standards. The associated upgrades include the following to bring the existing WWTP into compliance:

- Activated sludge equipment (e.g., blowers, air diffusers, aeration basins) and a new process building to house the equipment
- New secondary clarification designed for the activated sludge process
- Ultraviolet disinfection to eliminate the hazards associated with chlorine gas handling
- Conversion of the existing anaerobic digesters to aerobic digesters to eliminate ammonia loading associated with effluent recycle

- Addition of sludge cake storage and vehicle equipment storage to address current needs at the facility.

The WWTP Upgrade Alternative would not help the City of Box Elder meet the SDSWDS permit requirements for ammonia or address issues with its lagoon treatment facility, which is operating over capacity. The WWTP Upgrade Alternative would therefore require the City of Box Elder to expand its own current wastewater treatment facilities.

**No Action Alternative.** Under the No Action Alternative, Ellsworth AFB would not implement the Proposed Action, nor would the existing WWTP be upgraded to meet the SDSWDS permit requirements for ammonia discharge limits. Ellsworth AFB would continue to use their existing WWTP to treat wastewater discharge. The existing WWTP would however be unable to meet the more stringent SDSWDS standards for ammonia. The No Action Alternative would likely be an infeasible alternative, as Ellsworth AFB's existing WWTP would not meet future ammonia discharge limit requirements.

## Summary of Environmental Effects from the Proposed Action and Alternatives

**Land Use.** Under the Proposed Action, land use of the WWTP would remain industrial through decommissioning of the existing WWTP. Following decommissioning, the facilities associated with the WWTP would be demolished, resulting in short-term, negligible, direct, adverse impacts on land use from the use of demolition equipment in the area and the increased presence of construction vehicles related to demolition activities. Long-term, minor, direct, beneficial effects on land use would be expected if the area currently occupied by the WWTP is returned to open space, thus resulting in fewer uses in Accident Potential Zone (APZ) 1. No impacts on land use would be expected from granting an easement to the South Dakota EDA as land use would not change. Short-term, minor, adverse impacts on land use would be expected from the construction of the sanitary sewer pipeline due to the temporary closure of a portion or all of the golf course during pipeline construction. No impacts on land use would be expected from the contribution of Ellsworth AFB's wastewater to the regional waste stream.

Under the WWTP Upgrade Alternative, short-term, minor, adverse impacts on land use would be expected due to an increased presence of construction vehicles and disturbances related to construction activities. Land use surrounding the existing WWTP would remain the same.

**Infrastructure and Utilities.** Short-term, moderate, direct adverse impacts on water supply would be expected from a temporary increase in water use during decommissioning and demolition phases of the Proposed Action; however, these increases are not anticipated to exceed existing capacity. Long-term, moderate, direct, adverse impacts on water supply would be expected due to a reduction in water supply within the unnamed tributary for downstream livestock farmers and a reduction in water supply for irrigation of the golf course. During peak irrigation season, use of the existing water source for golf course irrigation would likely increase the installation's potable water demand by approximately 250,000 gpd, as it is anticipated that the water required for irrigating the golf course would be obtained through Ellsworth AFB's potable water supply. Under its current contract, Ellsworth AFB is allotted 1.6 MGD (590 million gpy) of potable water. Since the remaining available water capacity at Ellsworth AFB is approximately 1.04 MGD (378 million gpy) and the golf course would only require 250,000 gpd during peak irrigation season (i.e., during summer months), it is not expected that the increase in water demand from the Ellsworth AFB potable water supply associated with golf course irrigation would exceed existing available capacity. Since the remaining average available water capacity at Ellsworth AFB is approximately 1.04 MGD (378 million gallons per year) and the golf course would only require 250,000 gallons per day during peak irrigation season (i.e., during summer months), it is not expected that the

increase in water demand associated with golf course irrigation would exceed existing available capacity. Short-term, negligible to minor, adverse impacts on sanitary sewer and wastewater systems, liquid fuels, electrical systems, solid waste disposal, and transportation would be expected due to slight increases in demand for these systems. Short-term, negligible to minor, direct, adverse impacts, and long-term, minor, indirect, beneficial impacts on storm drainage systems would be expected due to a potential temporary increase in soil erosion and sediment transport during sheet flow runoff from demolition activities, if proper best management practices (BMPs) are not fully utilized, and a long-term decrease in impervious surfaces and sheet flow runoff into storm water drainage systems, respectively. No impacts on natural gas systems would be expected from the Proposed Action. No impacts on infrastructure and utilities would be expected from an easement being granted on Ellsworth AFB. Short-term, negligible, adverse impacts on water supply, sanitary sewer and wastewater systems, storm drainage systems, liquid fuels, electrical systems, solid waste disposal, and transportation would be expected due to slight increases in demand for these systems during pipeline construction.

Short-term, negligible, direct, and long-term, minor, direct, adverse impacts on water supply would be expected under the WWTP Upgrade Alternative. Water demand would increase slightly during construction of the new process building, sludge cake storage facility, and vehicle equipment storage facility; however, potential increases in water demand associated with construction activities would be temporary and are not anticipated to exceed existing capacity. Upgrades would bring the WWTP in compliance with the more stringent SDSWDS permit requirements, which would result in beneficial impacts on the sanitary sewer and wastewater system. Short-term, negligible, indirect, and long-term, minor, indirect, adverse impacts on storm drainage systems would be expected. Ground disturbance from construction of the new process building, sludge cake storage facility, and vehicle equipment storage facility would temporarily increase the potential for soil erosion and sediment transport during sheet flow runoff. Upon completion of construction activities, the amount of impervious surfaces would increase due to additional buildings associated with the WWTP and storm water permeation into the ground would decrease, thereby permanently increasing storm water runoff.

**Noise.** Short-term, minor, adverse impacts would be expected due to increased noise during demolition activities associated with the Proposed Action. No impacts on the noise environment at Ellsworth AFB would be expected from a pipeline easement being granted; however, construction of the wastewater pipeline would result in short-term, minor, adverse effects on the noise environment. No impacts on the noise environment at Ellsworth AFB would be expected from Ellsworth AFB's wastewater contribution to the regional waste stream.

Short-term, minor, adverse impacts on noise under the WWTP Upgrade Alternative would be expected during construction of the necessary upgrades for the existing WWTP. No long-term impacts on noise would be expected under the WWTP Upgrade Alternative.

**Air Quality.** Short-term, minor, adverse impacts on air quality from demolition and construction emissions and land disturbance would be expected. The Proposed Action would result in minor impacts on regional air quality during demolition activities, primarily from site-disturbing activities and operation of construction equipment. All emissions associated with demolition operations would be temporary in nature and would not be expected to contribute to or affect local or regional attainment status with the National Ambient Air Quality Standards (NAAQS). The Proposed Action would generate particulate matter emissions as fugitive dust from ground-disturbing activities and would have negligible contribution towards the South Dakota statewide greenhouse gas (GHG) inventory. The Proposed Action would generate emissions well below 10 percent of the emissions inventory for the Black Hills-Rapid City Intrastate Air Quality Control Region (AQCR). No impacts on local or regional air quality at Ellsworth AFB would be expected from an easement being granted on Ellsworth AFB. Short-term, minor, adverse impacts on local and regional air quality would be expected from construction of the

sanitary sewer pipeline. No impacts on air quality would be expected from Ellsworth AFB's wastewater contribution to the regional waste stream.

Impacts under the WWTP Upgrade Alternative would be similar in nature but slightly greater than the Proposed Action. Impacts on air quality would result from construction activities associated with upgrading the existing WWTP.

**Safety.** Short-term, negligible to minor, adverse impacts on safety would be expected during demolition of the WWTP; however, no long-term operational safety impacts would be expected. Risk to contractors would be minimal since it is assumed that contractors would be required to establish and maintain demolition safety programs during demolition activities. No impacts on safety would be expected from an easement being granted on Ellsworth AFB; however, short-term, minor, adverse impacts could be expected during construction of the sanitary sewer pipeline. No impacts on safety would be expected from Ellsworth AFB's wastewater contribution to the regional waste stream. Impacts under the WWTP Upgrade Alternative would be similar to those described for the Proposed Action. Short-term impacts could be expected during construction of necessary upgrade components for the existing WWTP.

**Geological Resources.** Short-term, minor, direct, adverse impacts on geological resources would be expected during decommissioning and demolition activities from soil disturbances, compaction of surrounding soils from construction equipment, and increased soil erosion and transfer into storm water runoff. Long-term, indirect, beneficial impacts on geological resources would be expected from decommissioning following demolition activities. The decrease in impervious surfaces associated with removal of structures would be expected to reduce volume and velocity of storm water runoff and associated potential erosion and offsite transport of sediments. Also, because flow into the unnamed tributary would drastically decrease from decommissioning of the WWTP, stream channel erosion occurring within and downstream of the tributary would be expected to decrease. No impacts on geological resources would be expected from an easement being granted on Ellsworth AFB. Short-term, minor, adverse impacts on soils would be expected during construction of the pipeline due to soil disturbances. Long-term, minor, adverse impacts on topography would be expected from pipeline construction due to anticipated mitigation requirements of adding an additional landfill cap over ERP site OU-6, which would raise the elevation of the land in the northern portion of the proposed pipeline corridor. No impacts on geological resources would be expected from Ellsworth AFB's wastewater contribution to the regional waste stream.

The WWTP Upgrade Alternative would be anticipated to have short-term, minor, direct and long-term, minor, indirect, adverse impacts on geology and soils. Construction and demolition activities necessary to upgrade the existing WWTP would disturb soils and increase the potential for elevated rates of erosion and sedimentation, resulting in short-term, minor adverse impacts. Construction activities would entail grading and removal of vegetation, and soil would become compacted under the weight of construction equipment.

**Water Resources.** Short-term, moderate, adverse impacts on water resources could be expected from decommissioning and demolition of the Ellsworth AFB WWTP due to increased storm water runoff during demolition activities and a temporary increase in water use at Ellsworth AFB when the decommissioned units and equipment are washed and decontaminated. A decrease in flow within the channel resulting from cessation of WWTP effluent discharge could have a long-term, negligible to minor, direct, adverse effect due to a localized decrease in groundwater elevations immediately adjacent to the stream channel. However, it is assumed that landowners with wells downstream of Ellsworth AFB are obtaining most of their groundwater from wells drawing from a deeper confined aquifer. Wells in the deep, confined aquifer would not be recharged by streams on the ground's surface. Therefore, no effects on any downstream deep wells are anticipated. Since the State of South Dakota does not issue permits for

shallow wells in the state, it is not known if landowners downstream of the WWTP use shallow wells for agricultural or other purposes. If such shallow wells exist downstream of the WWTP in close proximity to the unnamed tributary of Box Elder Creek, long-term, negligible to minor, adverse impacts on these wells could be expected from a potential drawdown in groundwater levels. Long-term, moderate, indirect, beneficial effects from decommissioning would result from the alteration of water velocity, quantity, and quality within the unnamed tributary currently receiving treated effluent. The cessation in flow from the WWTP to the tributary would likely reduce stream channel erosion and improve the in-stream water quality of the tributary and downstream waters as effluent would no longer be discharged.

No impacts on water resources would be expected from granting the pipeline easement. Short-term, minor, adverse impacts on surface water would be expected from the construction of the sanitary sewer pipeline due to increased soil erosion from exposed soils during storm events and sedimentation within the unnamed tributary of Box Elder Creek. Short-term, minor, adverse impacts on floodplains would be expected from the construction of the sanitary sewer pipeline within the 100-year floodplain of the unnamed tributary of Box Elder Creek. No direct impacts on water resources would be expected from the contribution of Ellsworth AFB's wastewater to the regional waste stream. However, indirect impacts on stream flow and channel morphology could occur as a result of the cessation in discharge of WWTP effluent into the unnamed tributary due to the decrease in water input into the unnamed tributary.

The WWTP Upgrade Alternative would result in short-term, minor, direct, adverse and long-term, beneficial impacts on water resources. Short-term, minor, direct, adverse impacts would be expected during construction of facilities to house the additional equipment necessary to upgrade the existing WWTP. During construction activities, removal of vegetation and construction, demolition, and road construction activities would increase storm water runoff volume and velocity due to the increase in impervious surfaces. Under the WWTP Upgrade Alternative, effluent would continue to flow from Outfall 005 to the unnamed tributary that flows into Box Elder Creek. However increased amounts of ammonia would be removed from the effluent, therefore long-term beneficial impacts would result from the decrease in ammonia present in the water column.

**Biological Resources.** Short-term, negligible, direct, adverse impacts on biological resources would be expected from temporary disturbances to vegetation (e.g., trampling and removal) and wildlife (e.g., noise, demolition activities, and heavy equipment use). No impacts on federally threatened or endangered species would be expected from WWTP decommissioning and demolition activities under the Proposed Action. Two state-listed sensitive species (Swainson's hawk and burrowing owl) and several migratory bird species could potentially occur near the WWTP; however, these species are discouraged in the WWTP and golf course area due to bird/wildlife aircraft strike hazard (BASH) concerns associated with the runway. Therefore, no new impacts from demolition activities on these species would be expected, as their presence is already discouraged. Short-term, negligible, indirect, adverse effects on other migratory bird species that do not pose BASH concerns would be expected due to temporary noise and visual disturbances. Short-term, negligible to minor, indirect, adverse effects on wetlands to the east of and within the Project area could occur from increased erosion, sedimentation, and pollutants entering these wetlands during demolition activities. Short-term, minor, direct, adverse impacts on aquatic and terrestrial wildlife species that use the unnamed tributary of Box Elder Creek as habitat would be expected due to a reduction in the volume of water flowing within the stream. The likely return of the unnamed tributary to an ephemeral or intermittent flow regime would remove this perennial source of water that several species likely use as habitat and could displace some species. As a result of ceasing WWTP effluent discharge into the unnamed tributary, the hydroperiod (i.e., the length of time and portion of year the wetland holds ponded water) of adjoining wetlands could be reduced as a result of the decrease in potential flooding events of the stream, resulting in long-term, negligible, adverse impacts on wetlands. However, this would not be expected to reduce the size or integrity of adjoining wetlands along the unnamed tributary, as groundwater is suspected to be supporting the hydrology of these wetlands.

Long-term, negligible to minor, direct, beneficial effects on vegetation would be expected from the demolition of the WWTP and revegetation with native species. Long-term, minor, indirect, beneficial effects on wildlife (e.g., invertebrates, fish, and amphibians) and wetlands would be expected due to a reduction in ammonia, total suspended solids, chlorine, and other pollutants being discharged into the tributary and downstream waters from the WWTP.

No impacts on vegetation, wildlife, wetlands, and sensitive and protected species would be expected from granting the pipeline easement. Short-term, negligible, adverse impacts on vegetation, wildlife, and sensitive and protected species would be expected from the construction of a sanitary sewer pipeline within the proposed pipeline corridor. Short-term, minor, adverse impacts on wetlands would be expected from the construction of a pipeline due to increased erosion, sedimentation, and inflow of pollutants. In addition, the buried pipeline would likely be required to cross the wetland, resulting in temporary disturbances to the wetland during pipeline construction.

No impacts on vegetation and sensitive and protected species would be expected from the contribution of Ellsworth AFB's wastewater to the regional waste stream; however, long-term, minor, indirect, adverse effects on off-installation wildlife and wetlands could be expected from increased effluent into Box Elder Creek.

Impacts on vegetation and wildlife from the WWTP Upgrade Alternative would be similar to, but greater than, those discussed under demolition activities of the Proposed Action. Short-term, negligible to minor, direct, adverse effects on wildlife would be expected due to disturbances from noise, demolition and construction activities, and heavy equipment use. Long-term, minor, indirect, beneficial effects on wildlife would result from the decrease in ammonia being introduced to the water column due to new NPDES requirements. Because ammonium compounds can decrease dissolved oxygen through chemical reactions, decreasing ammonia would have a beneficial impact on water quality within these wetlands. Impacts on sensitive and protected species from the WWTP Upgrade Alternative would be similar to those discussed under demolition activities of the Proposed Action.

**Cultural Resources.** No adverse impacts on architectural or archaeological cultural resources would be expected from the Proposed Action or the WWTP Upgrade Alternative.

**Socioeconomic Resources and Environmental Justice.** Short-term, minor, direct, beneficial impacts on the construction industry would be expected due to creation of jobs for construction workers. The increase in the payroll tax revenues, purchase of materials, and purchase of goods and services in the area around Ellsworth AFB would result in short-term, negligible, indirect, beneficial impacts on the local economy. No impacts on demographics or environmental justice would be expected. No impacts on socioeconomic resources and environmental justice would be expected from an easement being granted on Ellsworth AFB. Short-term, minor, adverse impacts on recreational users would be expected from the construction of the sanitary sewer pipeline, as they will temporarily be precluded from using the golf course. Short-term, minor, beneficial effects on the construction industry would be expected from the construction of the sanitary sewer pipeline due to the temporary creation of jobs to execute this portion of the Proposed Action. Environmental justice issues would not be expected to result from the construction of the wastewater pipeline, as this action will occur on Ellsworth AFB. No impacts on socioeconomic resources or environmental justice would be expected from Ellsworth AFB's wastewater contribution to the regional waste stream.

Impacts on socioeconomic resources under the WWTP Upgrade Alternative would be similar to the Proposed Action. No impacts on demographics or environmental justice would be expected under the WWTP Upgrade Alternative.

**Hazardous Materials and Wastes.** Short-term, minor, adverse impacts on hazardous materials and waste management would be expected from demolition of the WWTP due to anticipated use of hazardous materials and generation of hazardous wastes during demolition. The existing WWTP might contain asbestos-containing material (ACM), lead-based paint (LBP), and light ballasts, sump pumps, or pad-mounted transformers containing polychlorinated biphenyls (PCBs); therefore, short-term, minor, adverse impacts would be expected due to hazardous waste management requirements, and long-term, minor, beneficial impacts would be expected due to the removal of these substances from Ellsworth AFB. Hazardous materials and wastes would be stored and disposed of in accordance with all applicable Federal, U.S. Air Force (USAF), and state regulations. No impacts on the installation's hazardous waste management program, Pollution Prevention Program, and Environmental Restoration Program (ERP) sites near the Project area (Operable Unit- [OU] 6 and OU-11) would be expected.

No impacts on hazardous materials and wastes would be expected from the granting of the wastewater pipeline easement. Short-term, minor, adverse impacts on the ERP, hazardous materials management, and hazardous wastes would be expected from the construction of the sanitary sewer pipeline. The proposed sanitary sewer pipeline construction would not require the demolition of existing facilities or infrastructure; therefore, no impacts on ACM, LBP, and PCBs would be expected from the construction of the pipeline. Short-term, negligible, adverse impacts on the Pollution Prevention Program at Ellsworth AFB would be expected from the construction of a sanitary sewer pipeline.

Long-term, minor, adverse impacts on hazardous wastes from Ellsworth AFB's wastewater contribution to the regional waste stream would be expected due the generation of an additional volume of hazardous waste in the form of sludge. No impacts on ERP sites, hazardous materials and petroleum products, ACM, LBP, PCBs, and pollution prevention would be expected from Ellsworth AFB's wastewater contribution to the regional waste stream.

Long-term, minor, indirect, adverse effects on hazardous materials or waste management would be expected as a result of the WWTP Upgrade Alternative. The modification and continued operation of the Ellsworth AFB WWTP would result in minor increases in the existing hazardous materials and waste management volumes. Ellsworth AFB would dispose of increasing volumes of hazardous wastes associated with the wastewater treatment process from future increases in wastewater generation.

## **Cumulative Impacts**

Cumulative impacts on environmental resources result from the incremental impact of the Proposed Action when added to other past, present, and reasonably foreseeable future actions. Cumulative impacts would result from individually minor but collectively significant actions taking place over a period of time by various agencies (Federal, state, and local) or individuals. Informed decisionmaking is served by consideration of cumulative impacts resulting from projects that are proposed, under construction, recently completed, or anticipated to be implemented in the reasonably foreseeable future.

Future projects at Ellsworth AFB or in its vicinity that have been identified as contributing to potential cumulative effects on environmental resources include annexation of Ellsworth AFB and associated mixed-use development on the installation, development of military family housing (MFH) units on Ellsworth AFB, and construction of the RWWTP off-installation. Anticipated cumulative adverse effects would be related to environmental impacts from demolition and construction activities (e.g., increased demand of infrastructure and utilities, ground disturbances and soil erosion, sedimentation and increased pollution in waterways). Anticipated cumulative beneficial effects on socioeconomics in the surrounding area would be expected from economic expenditures associated with the RWWTP and MFH actions. No significant cumulative impacts on the environment would be anticipated from the Proposed Action in conjunction with other activities.



**REVISED DRAFT  
ENVIRONMENTAL ASSESSMENT ADDRESSING ACTIVITIES  
ASSOCIATED WITH DEVELOPMENT OF A REGIONAL WASTEWATER TREATMENT PLANT  
ELLSWORTH AFB, SOUTH DAKOTA**

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# 1. Purpose of and Need for the Action

This Environmental Assessment (EA) describes and analyzes the proposal by Ellsworth Air Force Base (AFB) to decommission and demolish their current wastewater treatment plant (WWTP) and grant an easement for construction of a new sanitary sewer pipeline that would connect to an existing sanitary sewer main line. The sanitary sewer pipeline would ultimately connect to a proposed future regional wastewater treatment plant (RWWTP) off-installation, which is proposed to be constructed adjacent to the City of Box Elder's current wastewater treatment lagoon facility southeast of the city along Box Elder Creek. This EA does not evaluate construction of wastewater pipelines outside the Ellsworth AFB installation boundary or the off-installation RWWTP. This EA also does not evaluate the use of existing wastewater pipelines outside the Ellsworth AFB installation boundary. This section presents background information, the purpose of and need for the Proposed Action, the location and mission of Ellsworth AFB, the scope of the environmental review anticipated, and an overview of the organization of this document.

## 1.1 Background

Ellsworth AFB is located in western South Dakota. The installation is approximately 7 miles northeast of Rapid City, South Dakota, and borders the City of Box Elder to the southeast (see **Figure 1-1**). The existing Ellsworth AFB WWTP is in the southeastern corner of the installation. Ellsworth AFB's WWTP consists of a biological treatment system that employs a trickling filter process to achieve secondary treatment levels. The plant uses preliminary, primary, and secondary treatment processes and provides sludge stabilization and sludge dewatering processes. The WWTP was initially designed to treat an average daily wastewater flow of 1.5 million gallons per day (MGD); however, present average daily treated flow is approximately 0.5 MGD.

The WWTP was constructed in 1943, with the most recent modification occurring in 2005 when new screening and flume equipment were added at the Pretreatment Building (Building 3013) (EAFB 2001). The WWTP discharges under a South Dakota Surface Water Discharge System (SDSWDS) (Permit No. SD0000281) from Outfall 005 to an unnamed tributary that flows into Box Elder Creek, which is a tributary to Rapid Creek in the Cheyenne River Basin. Discharged water from the WWTP that flows into the unnamed tributary is used to irrigate Ellsworth AFB's Prairie Ridge Golf Course (EAFB 2001) and is used by local ranchers to the east of Ellsworth AFB to provide water for their livestock.

On February 4, 2009, House Bill Number 1301 was enacted by the legislature of the State of South Dakota, creating the South Dakota Ellsworth Development Authority (EDA) (see **Appendix A**). The South Dakota EDA seeks to address a number of issues concerning the future of the installation and compatible civilian development around Ellsworth AFB. In addition, the creation of the South Dakota EDA allows Ellsworth AFB to work with community leaders and the state to advance a public partnership for an RWWTP that is mutually beneficial for Ellsworth AFB and the City of Box Elder versus a privately owned WWTP facility. Ultimately, the South Dakota EDA would be responsible for construction of the RWWTP and associated infrastructure (State of South Dakota 2009).

## 1.2 Purpose of and Need for the Proposed Action

The purpose of the Proposed Action is to demolish and decommission the existing Ellsworth AFB WWTP and provide an easement for the establishment of a sanitary sewer pipeline on Ellsworth AFB that would connect to a pipeline off-installation that would flow to the proposed future RWWTP. Ellsworth AFB and the City of Box Elder are currently faced with upgrading their individual wastewater treatment facilities to meet more stringent SDSWDS limits imposed by the South Dakota Department of Environment and Natural Resources (SDDENR) that will become effective for Ellsworth AFB on

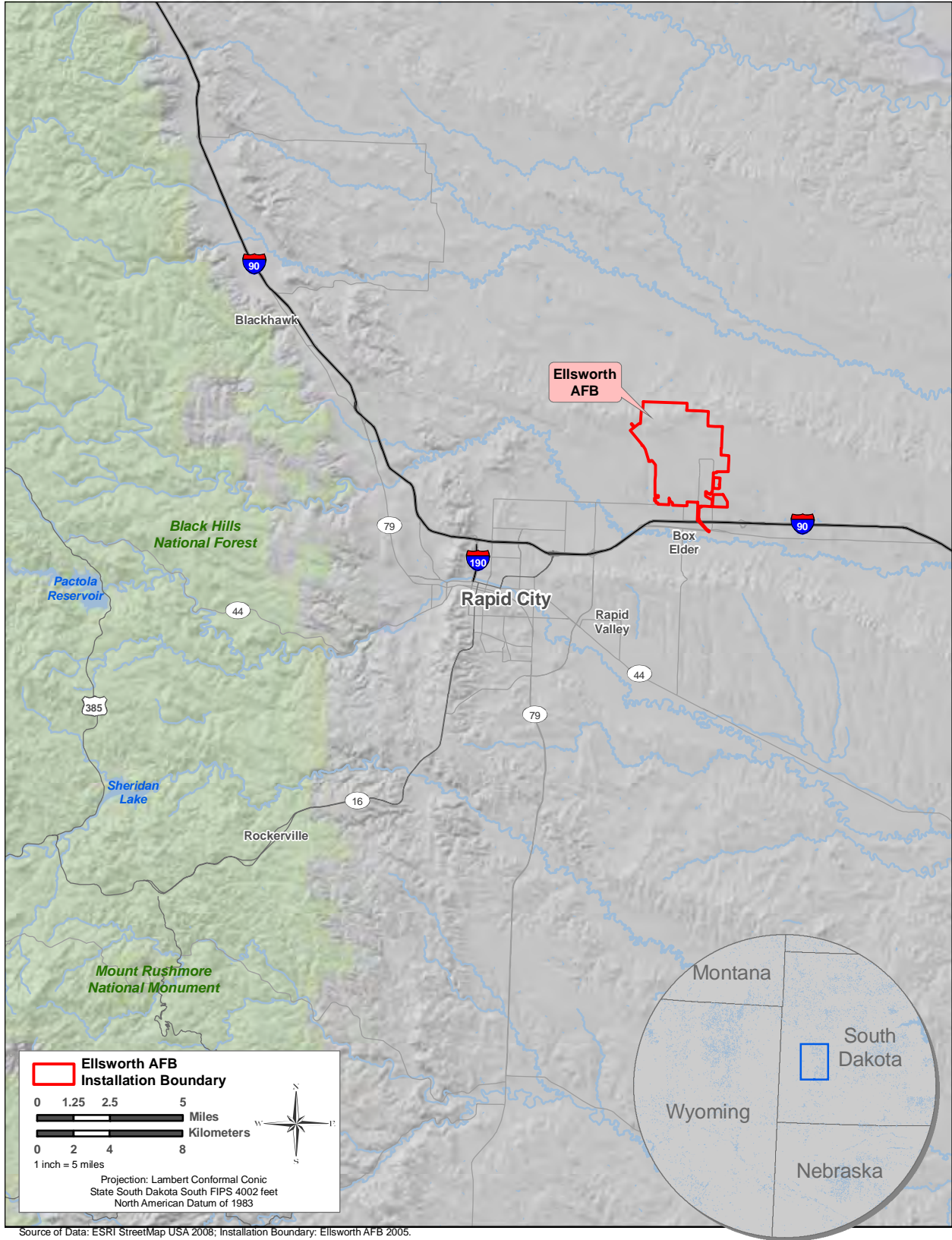


Figure 1-1. Ellsworth AFB and Surrounding Area

October 1, 2014. The feasibility of constructing an RWWTP to support the sewage treatment needs of Ellsworth AFB and the City of Box Elder to meet these standards were evaluated. The engineering feasibility study indicated that it would be more cost-effective for an RWWTP to treat Ellsworth AFB's and City of Box Elder's sewage together versus using individual systems (EAFB 2008a).

The need for the Proposed Action is to provide wastewater treatment capacity for Ellsworth AFB to meet more stringent SDSWDS standards. Ellsworth AFB operates a secondary conventional rock media trickling filtration WWTP. Effective October 1, 2014, Ammonia-N 30-day average and daily maximum limits will be instituted for Ellsworth AFB (see **Section 2.1.1**). The existing WWTP at Ellsworth AFB is not capable of meeting these future ammonia removal requirements within its current operational profile (EAFB 2004a).

The passage of House Bill Number 1301 permitted the creation of the South Dakota EDA, which is authorized to construct a new RWWTP. In addition to providing wastewater treatment for Ellsworth AFB, the new RWWTP would help to serve the adjacent City of Box Elder, which is currently over its capacity for treating wastewater and also must comply with the more stringent SDSWDS standards (Landguth 2009). Box Elder's demand for wastewater treatment is expected to increase because of expected population growth in the region.

### 1.3 Location and Mission

Ellsworth AFB consists of approximately 5,415 acres in Meade and Pennington counties in southwestern South Dakota (see **Figure 1-1**). Ellsworth AFB is the second largest employer in South Dakota and has an estimated annual economic impact of \$300 million. The installation supports 8,673 personnel, of which 458 are nonappropriated fund civilians, 516 are appropriated fund civilians, 3,246 are appropriated fund military, and 4,453 are dependents. According to Fiscal Year (FY) 2008 data, the installation employed approximately 4,200 persons with another 1,360 indirectly employed persons (28 BW 2008).

Ellsworth AFB originated as the Rapid City Army Air Base in January 1942. The installation was renamed Ellsworth AFB in honor of Brigadier General Richard E. Ellsworth, commander of the 28th Strategic Reconnaissance Wing, in 1953. The primary unit initially assigned to the installation was the 28th Bombardment Wing (BMW) flying the B-29 "Super Fortress." In July 1949, the 28 BMW began conversion from B-29s to the B-36 Peacemaker, and in June 1957 the B-36s were replaced with the B-52 Stratofortress. In 1958, all units on the installation came under the command of the Strategic Air Command's (SAC) 821st Strategic Aerospace Division, headquartered at Ellsworth AFB. In addition to its strategic bombardment mission, under SAC, Ellsworth AFB was home to intercontinental ballistic missile squadrons from 1960 until the early 1990s. In January 1987, the installation received its first B-1 bomber to replace the aging B-52s, and the 12th Air Division moved to Ellsworth AFB to provide advanced bomber aircrew training. The 28th BMW became the 28th Bomb Wing (BW) in September 1991 and absorbed all the functions of the 821st. In 1992, the 28th BW was assigned to the newly formed Air Combat Command (ACC) (EAFB 2009a).

### 1.4 Summary of Key Environmental Compliance Requirements

#### 1.4.1 National Environmental Policy Act

The National Environmental Policy Act (NEPA) of 1969 (42 United States Code [U.S.C.] Section 4321-4347) is a Federal statute requiring the identification and analysis of potential environmental impacts of proposed Federal actions before those actions are taken. The intent of NEPA is to help decisionmakers make well-informed decisions based on an understanding of the potential

environmental consequences and take actions to protect, restore, or enhance the environment. NEPA established the Council on Environmental Quality (CEQ) that is charged with the development of implementing regulations and ensuring Federal agency compliance with NEPA. The CEQ regulations mandate that all Federal agencies use a prescribed structured approach to environmental impact analysis. This approach also requires Federal agencies to use interdisciplinary and systematic approach in their decisionmaking process. This process evaluates potential environmental consequences associated with a proposed action and considers alternative courses of action. The process for implementing NEPA is codified in Title 40 Code of Federal Regulations (CFR) Parts 1500–1508, *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act*. The CEQ was established under NEPA to implement and oversee Federal policy in this process. The CEQ regulations specify that an EA be prepared to briefly provide evidence and analysis for determining whether to prepare a Finding of No Significant Impact (FONSI)/Finding of No Practicable Alternative (FONPA), when a FONPA is appropriate (see **Section 1.4.2**), or whether the preparation of an Environmental Impact Statement (EIS) is necessary. The EA can aid in an agency’s compliance with NEPA when an EIS is unnecessary and facilitate preparation of an EIS when one is required. Air Force Policy Directive (AFPD) 32-70, *Environmental Quality*, states that the U.S. Air Force (USAF) will comply with applicable Federal, state, and local environmental laws and regulations, including NEPA. The USAF’s implementing regulation for NEPA is its *Environmental Impact Analysis Process* (EIAP), 32 CFR Part 989, as amended.

#### 1.4.2 Integration of Other Environmental Statutes and Regulations

To comply with NEPA, the planning and decisionmaking process for actions proposed by Federal agencies involves a study of other relevant environmental statutes and regulations. The NEPA process, however, does not replace procedural or substantive requirements of other environmental statutes and regulations. It addresses them collectively in the form of an EA or EIS, which enables the decisionmaker to have a comprehensive view of key environmental issues and requirements associated with the Proposed Action. According to CEQ regulations, the requirements of NEPA must be integrated “with other planning and environmental review procedures required by law or by agency so that all such procedures run concurrently rather than consecutively.”

This EA examines potential effects of the Proposed Action and alternatives on 11 resource areas: land use, infrastructure, noise, air quality, safety, geological resources, water resources, biological resources, cultural resources, socioeconomic resources and environmental justice, and hazardous materials and wastes. These resources were identified as being potentially affected by the Proposed Action and include applicable elements of the human environment that are prompted for review by Executive Order (EO), regulation, or policy.

EO 11990, *Protection of Wetlands*, states that “...each agency, to the extent permitted by law, shall avoid undertaking or providing assistance for new construction located in wetlands unless the head of the agency finds (1) that there is no practicable alternative to such construction, and (2) that the proposed action includes all practicable measures to minimize harm to wetlands which may result from such use.” In addition, Air Force Instruction (AFI) 32-7064, *Integrated Natural Resources Management*, guides the USAF’s process for the protection of wetlands.

EO 11998, *Floodplain Management*, states that “...if an agency has determined to, or proposes to, conduct, support, or allow an action to be located in a floodplain, the agency shall consider alternatives to avoid adverse effects and incompatible development in the floodplains. If the head of the agency finds that the only practicable alternative consistent with the law and with the policy set forth in this Order requires siting in a floodplain, the agency shall, prior to taking action, (i) design or modify its action in order to minimize potential harm to or within the floodplain...and (ii) prepare and circulate a notice containing an explanation of why the action is proposed to be located in the floodplain. Where the only



practicable alternative is to site in a floodplain, a specific process must be followed to comply with EO 11988. This eight-step process is detailed in the Federal Emergency Management Agency (FEMA) document “Further Advice on EO 11988 Floodplain Management.” The eight steps are as follows:

1. Determine whether the action will occur in, or stimulate development in, a floodplain.
2. Receive public review/input of the Proposed Action.
3. Identify and evaluate practicable alternatives to locating in the floodplain.
4. Identify the impacts of the Proposed Action (when it occurs in a floodplain).
5. Minimize threats to life, property, and natural and beneficial floodplain values, and restore and preserve natural and beneficial floodplain values.
6. Reevaluate alternatives in light of any new information that might have become available.
7. Issue findings and a public explanation.
8. Implement the action.

In accordance with EOs 11988 and 11990 and 32 CFR Part 989, a FONPA must accompany the FONSI stating why there are no practicable alternatives to development within the floodplain or construction within a wetland.

The proposed corridor for the sanitary sewer pipeline crosses the unnamed tributary of Box Elder Creek (see **Figure 2-1**). Therefore, development would occur within the 100-year floodplain of the unnamed tributary and construction would occur within the tributary and associated wetland areas when the pipeline is installed. As no practicable alternative to constructing within the floodplain or wetlands has been identified, a FONPA would be issued for this project and would accompany the FONSI. Construction within the unnamed tributary and associated wetlands would also likely require a U.S. Army Corps of Engineers (USACE) Clean Water Act (CWA) Section 404(b) Nationwide Permit (NWP). In addition, when the new sanitary sewer pipeline is ultimately installed, an NWP-12 for utility line construction activities within waters of the United States could also be required. This would depend on how the pipeline would cross the tributary and the area of impact on wetlands or other waters of the United States associated with crossing the unnamed tributary and floodplain. NWP-12 applies to utility line activities that would result in less than 0.5 acres of impacts on wetlands or other waters of the United States. The permitting authority would be determined based on negotiations between the USAF and the South Dakota EDA.

**Section 2.4** identifies all applicable permits, licenses, and consultation requirements potentially required from implementation of the Proposed Action. **Appendix B** contains examples of relevant laws, regulations, and other requirements that are often considered as part of the analysis. Where useful to better understanding, key provisions of the statutes and EOs described in **Appendix B** are discussed in more detail in the text of the EA.

### 1.4.3 Interagency and Intergovernmental Coordination for Environmental Planning and Public Involvement

NEPA requirements help ensure that environmental information is made available to the public during the decisionmaking process and prior to actions being taken. The premise of NEPA is that the quality of Federal decisions will be enhanced if proponents provide information to the public and involve the public in the planning process. The Intergovernmental Coordination Act and EO 12372, *Intergovernmental Review of Federal Programs*, require Federal agencies to cooperate with and consider state and local

views in implementing a Federal proposal. AFI 32-7060, *Interagency and Intergovernmental Coordination for Environmental Planning* (IICEP), requires the USAF to implement the IICEP process, which is used for the purpose of agency coordination and implements scoping requirements.

Through the IICEP process, Ellsworth AFB will notify relevant Federal, state, and local agencies of the Proposed Action and provide them sufficient time to make known their environmental concerns specific to the action. The IICEP process also provides Ellsworth AFB the opportunity to cooperate with and consider state and local views in implementing the Federal proposal. All IICEP material related to this EA is included in **Appendix C**, which will be expanded throughout the EIAP process.

A Notice of Availability for a previous iteration of this Draft EA and Draft FONSI/FONPA was published in the *Rapid City Journal* and *The Plainsman* (see **Appendix C**), and the Draft EA was made available to the public for a 30-day review period in April and May 2011. One agency comment was received during the 30-day review period from the South Dakota Department of Natural Resources. No public comments were received during the 30-day review period. The Draft EA was subsequently revised with additional information and analysis regarding wetlands and water use (see **Sections 3.2 and 3.7**). Another Notice of Availability of the revised Draft EA and Draft FONSI/FONPA has been published in the *Rapid City Journal* and *The Plainsman*, and the Draft EA has been made available to the public for another 30-day review period.

## 1.5 Organization of this Document

This EA is organized into seven sections, plus appendices. **Section 1** provides the purpose of and need for the Proposed Action. **Section 2** contains a description of the Proposed Action, the alternatives, and the No Action Alternative. **Section 3** contains a general description of the environmental and socioeconomic resources and baseline conditions that could potentially be affected by the Proposed Action and alternatives; and presents the analysis of the potential environmental consequences of implementing the Proposed Action and alternatives. **Section 4** includes an analysis of the potential cumulative impacts at Ellsworth AFB and its vicinity. **Section 5** lists the preparers of the document and **Section 6** presents the references used in the preparation of the document.

**Appendix A** contains a copy of the State of South Dakota's House Bill Number 13 providing legislation for creation of the South Dakota EDA. **Appendix B** contains applicable laws, regulations, policies, and planning criteria potentially relevant to NEPA analysis. **Appendix C** includes all IICEP and public review materials. **Appendix D** contains representative photos of the Proposed Action area at Ellsworth AFB. **Appendix E** contains air quality calculations.

## 2. Description of the Proposed Action and Alternatives

This section presents information on Ellsworth AFB's Proposed Action and alternatives. The Proposed Action includes the evaluation of three components for this EA: (1) decommissioning and demolition of the existing WWTP, (2) granting an easement for a sanitary sewer pipeline, and (3) Ellsworth AFB's contribution to the regional wastewater stream (see **Sections 2.2.1, 2.2.2, and 2.2.3** respectively). **Section 2.3** identifies alternatives to the Proposed Action, including the No Action Alternative. Implementation of the Proposed Action, as described in **Section 2.2**, is Ellsworth AFB's Preferred Alternative. Screening criteria used to develop a framework for the Proposed Action and alternatives are presented in **Section 2.1**.

### 2.1 Screening Criteria for Proposed Action and Alternatives

Several criteria were used to develop the Proposed Action and identify alternatives for consideration in the EA, including the following:

- Must meet SDSWDS limits imposed by the SDDENR that will become effective on October 1, 2014, for Ellsworth AFB. Ammonia-N 30-day average limits must not exceed amounts ranging from 2.0 to 5.0 milligrams per liter (mg/L), depending on month and season.
- Must construct a treatment system capable of treating Ellsworth AFB's future (2028) projected flow of 1.5 MGD.
- Must consider the economic feasibility of a separate versus a regional future combined treatment system for Ellsworth AFB and the City of Box Elder.
- Must consider the proximity of potential alternatives to Ellsworth AFB and the feasibility to connect with existing wastewater infrastructure.
- Must evaluate the wastewater treatment options available to use in a future treatment system (EAFB 2008a).

### 2.2 Detailed Description of the Proposed Action

#### 2.2.1 Decommissioning/Demolition of the WWTP

Under the Proposed Action, the existing WWTP would be decommissioned and demolished. Decommissioning would begin in early 2014 with flow being sent to the proposed RWWTP in summer 2014. WWTP decommissioning involves disconnecting the influent piping and rerouting it to the new RWWTP; discontinuing effluent outflow; pumping all residual wastewater out of the treatment units; removing and properly disposing of all residual sludge; cleaning or decontaminating all treatment units and equipment; disconnecting utilities (e.g., water and electricity); removing from service petroleum-containing equipment and tanks including generators and transformers; and properly disposing of all residual chemicals, including chlorine, sulfur dioxide, and laboratory analysis chemicals. At no point during decommissioning would flow be untreated before the RWWTP goes online. Demolition involves disassembly and removal of the infrastructure, including treatment units, buildings, and piping. Backfilling, grading, and revegetation would be needed in areas where below-ground structures have been removed. If indicated during the removal process or by historical records or experience, soil and groundwater contamination testing could be required.

To provide context for decommissioning of the WWTP, a description of plant operation and wastewater treatment processes follows. Flow to the current WWTP is through gravity sewers and force mains. The primary sources of wastewater on Ellsworth AFB are the military family housing (MFH) areas, main installation buildings, and flightline areas. Flow enters the WWTP at the Pretreatment Building (Building 3013). Industrial sewage emanates from shops in the flightline area of the installation and flows southeast to the Industrial Waste Treatment Building. The industrial sewer joins the sanitary sewer just ahead of the point where it enters the Pretreatment Building. The sanitary system collects domestic wastewater throughout the installation and flows by gravity with the exception of the three areas that are served by lift stations. All three lift stations are tied in to the plant instrumentation system (EAFB 2001). Treatment consists of oil/water (O/W) separation, screening, comminution, grit removal, primary clarification, a trickling filter, secondary clarification, chlorination, dechlorination, anaerobic digestion, and sludge filter pressing before being discharged to Outfall 005 (EAFB 2002). The current treatment process of wastewater at Ellsworth AFB includes the following:

- **Industrial Pretreatment.** Transported wastewater flows to the Industrial Waste Treatment Building for pretreatment by an O/W separator. Waste oil and the solids are removed from the separator, which are disposed of off-installation by a private contractor. Effluent from the O/W separator is then discharged into the sanitary treatment system along with domestic sewage (EAFB 2002).
- **Primary Treatment.** The primary treatment begins with a mechanical bar screen. The removed screenings are disposed of weekly by a contractor at the Rapid City Landfill. The wastewater is then split and sent through two aerated grit chambers. The grit that settles in the hoppers at the bottoms of the aerated grit chambers is pumped to the grit classifier/washer where heavier materials are separated from the wastewater. The grit is then washed in the grit collection hopper before being augured to the disposal chute where it drops into a dumpster. Grease is also removed in the grit chambers and lifted to the grit dumpster for disposal (EAFB 2002).

The wastewater flows from the grit chambers over rectangular weirs into a collection channel that can route the flow into one of three channels. Flow is then routed to a 9-inch Parshall flume with an ultrasonic level sensor followed by a pH probe, both of which send signals to continuous recorders in the control building (EAFB 2002).

Flow is then sent to one of three primary clarifiers, each with a volume of 162,000 gallons. Wastewater from the clarifiers then flows to the trickling filter. Primary sludge is pumped from the clarifiers to the digesters. Scum from the surface of the clarifiers is pumped back to the Pretreatment Building where it is combined with the incoming wastewater (EAFB 2002).

- **Secondary Treatment.** Primary clarifier effluent enters the trickling filter and is distributed over the rock media by rotating distribution arms. Wastewater trickles down through the media, contacting microorganisms attached to the rock, to an underdrain system. The discharge from the trickling filter then flows through two rectangular secondary clarifiers to the chlorine contact chamber. Wastewater is also pumped from the secondary clarifiers back to the inlet of the trickling filter as recycle water to keep the trickling filter operating during low-flow periods. Sludge from the secondary clarifiers is pumped to the digesters (EAFB 2002).
- **Sludge Stabilization and Dewatering.** A combination of primary and secondary sludge is pumped to anaerobic digesters. After digestion, a belt filter press is used for sludge dewatering. After dewatering the sludge is disposed of in accordance with the Ellsworth AFB sludge only permit (EAFB 2002).
- **Disinfection.** After leaving the secondary clarifiers, the wastewater flows through the two chlorine contact chambers in series to Outfall 005. Discharges from Outfall 005 are continuous and average 700,000 gallons per day (gpd) (EAFB 2002).

The discharge from Outfall 005 flows into an unnamed tributary that crosses the Prairie Ridge Golf Course for approximately 0.5 miles to Outfall 006. Discharges from the unnamed tributary at this point and Outfall 006 flow approximately 3 miles to Box Elder Creek. The unnamed tributaries and Box Elder Creek are classified by the South Dakota Surface Water Quality Standards (SDSWQS), Administrative Rules of South Dakota (ARSD), Chapters 74:51:01 and 74:51:03 (EAFB 2002).

SDDENR established interim ammonia effluent limits until September 30, 2014, and as a result, Ellsworth AFB was issued a new interim discharge permit effective from January 1, 2010, until December 31, 2014. The interim SDSWDS permit limitations for effluent are included in **Table 2-1**. As discussed in **Section 1.2**, effective October 1, 2014, Ammonia-N 30-day average and daily maximum limits will be instituted for Ellsworth AFB (see **Table 2-2**). Ellsworth AFB currently is not capable of meeting these future ammonia-removal requirements that are shown in **Table 2-2**.

**Table 2-1. Current SDSWDS Permit Limitations**

Parameter	Units	30-Day Average	7-Day Average	Daily Maximum
Biochemical Oxygen Demand (5- day)	mg/L	30	45	N/A
Total Suspended Solids	mg/L	30	45	N/A
Oil and Grease	mg/L	N/A	N/A	10.0
Fecal Coliform (May 1 – September 30) <sup>1</sup>	no./100 mL	1,000	N/A	2,000
Total Residual Chlorine <sup>2</sup>	mg/L	N/A	N/A	0.019
The pH of the discharge shall not be less than 6.0 or greater than 9.0 standard units in any sample.				
There shall be no Acute Whole Effluent Toxicity in the discharge, as measured by the WET test.				

Source: SDDENR 2010

Notes:

1. Fecal coliform organisms from May 1 to September 30 shall not exceed a concentration of 1,000 per 100 milliliters as a geometric mean based on a minimum of five samples obtained during separate 24-hour periods for any calendar month. They shall not exceed 2,000 per 100 milliliters in any one sample from May 1 to September 30.
2. SDDENR considers the analytical detection limit for total residue chlorine to be 0.05 mg/L.

Key: mg/L = milligrams per liter

In addition to the permit limitations imposed under SDSWDS, there are sludge requirements that the WWTP must meet. The Ellsworth AFB WWTP has been issued a Sludge Disposal Permit Number SDL-000281 by the SDDENR authorizing the installation to landfill sludge at the Rapid City municipal landfill. This permit contains specific limitations and monitoring, recordkeeping, and reporting requirements (EAFB 2001).

The proposed timeline for the demolition of the existing WWTP following decommissioning has not yet been established. It is assumed that the concrete and other demolition debris would be recycled to the maximum extent possible or sent to a landfill. The various WWTP facilities that would be decommissioned and demolished under the Proposed Action are listed in **Table 2-3**. Ellsworth AFB would not demolish Building 3015, which functions as the O/W separator for industrial flow, as O/W separation would continue to be applied to industrial wastewater prior to leaving the installation. Should soil or groundwater testing during demolition reveal contamination, long-term remediation and monitoring could be required. Any areas backfilled or graded during demolition would be monitored for erosion until vegetation has been reestablished to a satisfactory level on the soil surface.

**Table 2-2. Future SDSWDS Permit Limitations as of October 1, 2014**

Parameter	Units	30-Day Average	7-Day Average	Daily Maximum
Biochemical Oxygen Demand (5-day)	mg/L	30	45	N/A
Total Suspended Solids	mg/L	30	45	N/A
Oil and Grease	mg/L	N/A	N/A	10.0
Escherichia coli (E. coli), (May 1 – September 30) <sup>1</sup>	no./100 mL	630	N/A	1,178
Ammonia-Nitrogen	mg/L		N/A	
January 1 – January 31		4.5		8.0
February 1 – February 29		4.0		10.0
March 1 – March 31		4.0		15.0
April 1 – April 30		4.5		15.0
May 1 – May 31		3.5		15.0
June 1 – June 30		3.0		15.0
July 1 – July 31		2.0		15.0
August 1 – August 31		3.3		20.0
September 1 – September 30		2.5		15.0
October 1 – October 31		3.5		15.0
November 1 – November 30		5.0		15.0
December 1 – December 31		4.0		11.0
Total Residual Chlorine <sup>2</sup>	mg/L	N/A	N/A	0.019
The pH of the discharge shall not be less than 6.0 or greater than 9.0 standard units in any sample.				
There shall be no Acute Whole Effluent Toxicity in the discharge, as measured by the WET test.				

Source: SDDENR 2010

Notes:

1. E. coli organisms from May 1 to September 30 shall not exceed a concentration of 630 per 100 milliliters as a geometric mean based on a minimum of five samples obtained during separate 24-hour periods from any calendar month. They shall not exceed 1,178 per 100 milliliters in any one sample from May 1 to September 30.
2. SDDENR considers the analytical detection limit for total residue chlorine to be 0.05 mg/L.

**Table 2-3. Existing WWTP Facilities to be Demolished under the Proposed Action**

Building Number	Building Function or Process	Square Footage (ft <sup>2</sup> )
3003	Sludge Pits Reinput	13,952
3005	Main Building	1,885
3006	Clarifier Pits	156
3007	Digester Building	5,419
3008	Clarifier, Effluent Strut, Sludge/Scum Pits	1,670
3009	Chlorine Storage Facility	144
3010	Dome-Trickling Filter	12,131
3011	Belt Press Building	890
3013	Pretreatment Facility	2,018
3014	Chlorine and Effluent Sampling Facility	114
<b>Total to be Demolished</b>		<b>38,379</b>

## 2.2.2 Wastewater Pipeline Easement and Construction

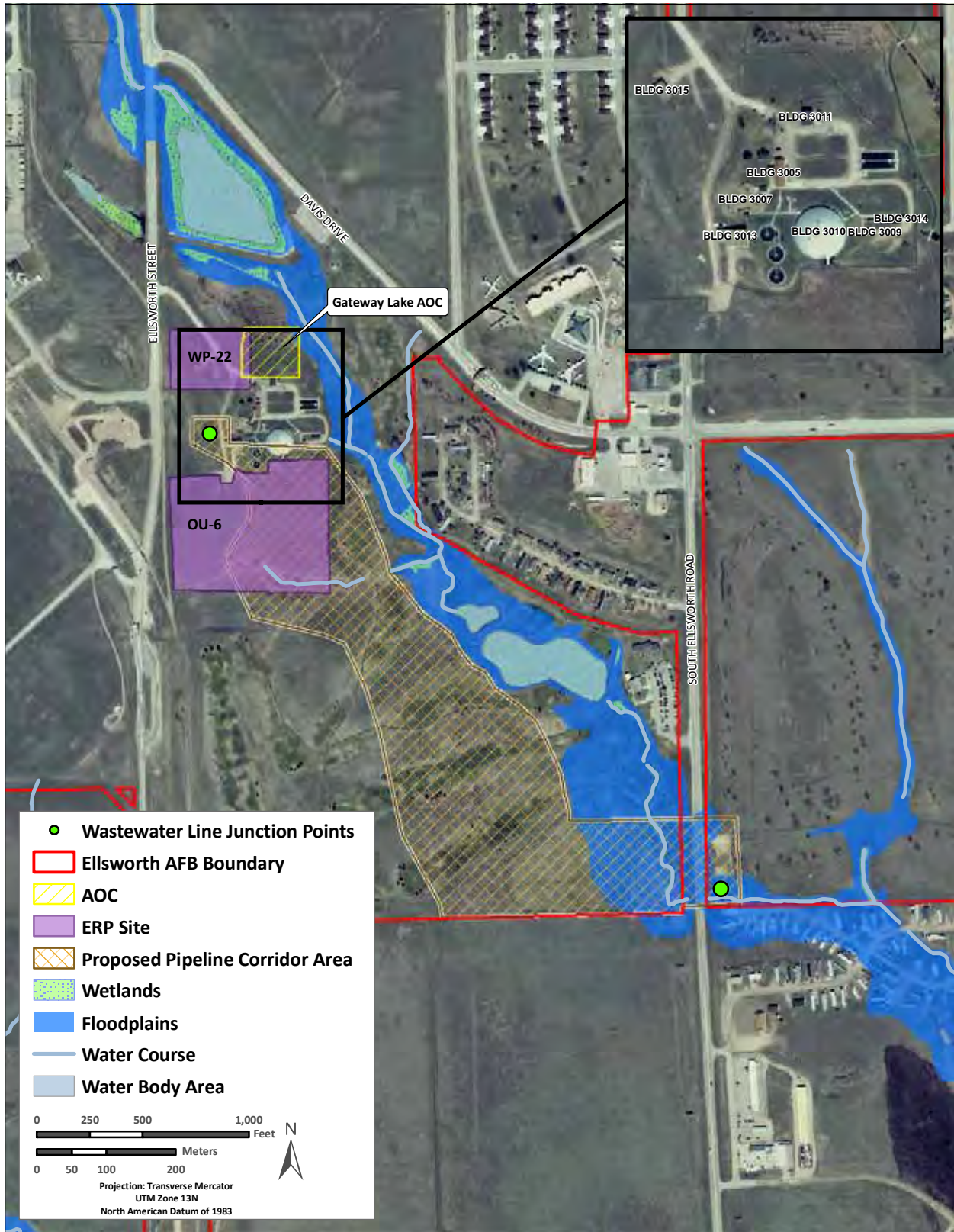
The Proposed Action would include the granting of an easement on Ellsworth AFB to the South Dakota EDA and construction of an 18- to 36-inch sanitary sewer pipeline within this easement to ultimately connect to the proposed RWWTP. The easement would extend from the manhole just upgradient of the existing Ellsworth AFB WWTP across portions of the installation's golf course and potentially across a former landfill (Operable Unit [OU]-6). The easement would begin at wastewater junction point to the west of Building 3013 and travel southeast along the golf course to a wastewater pipeline junction point east of Ellsworth Road (see **Figure 2-1**). The corridor being evaluated for the proposed sewer pipeline is shown in **Figure 2-1** and represents the area that a sanitary sewer pipeline could be routed, depending on siting constraints. Because of the natural topography of this area, the preferred pipeline route would follow natural contours to allow the pipeline to be gravity-fed versus installing a lift station to pump effluent. The proposed corridor is primarily to the west of the floodplain, but the corridor would cross the floodplain and a creek. As discussed in **Section 1.4.2**, potential impacts on wetlands and floodplains require a FONPA. In addition, appropriate permits, mitigation, and BMPs would be required because of the potential impacts on wetlands and the floodplain. For purposes of this EA, it is assumed that the trench and associated temporary disturbances to install the pipeline would be approximately 3,525 feet in length (0.67 miles) and 10 feet in width, for a total of 35,250 square feet (ft<sup>2</sup>) (0.81 acres) of disturbance.

OU-6 is former Landfill No. 5 on Ellsworth AFB, which is an installation Environmental Restoration Program (ERP) site. The Department of Defense (DOD) has developed the ERP program to facilitate thorough investigation and cleanup of contaminated sites on military installations. OU-6 was an active landfill from 1960 to 1980 and it was used primarily to dispose of construction and demolition debris. Some reports indicate that digested sewage sludge, miscellaneous refuse, and possible shop wastes might have been disposed of at this landfill. After closing of the landfill, OU-6 was covered with a cap of clean soil in 1995. Samples are periodically collected from three wells on OU-6. To date, sampling results have not indicated a need to conduct further remedial activities associated with OU-6 (EAFB 2009b). If required, an additional soil fill cap would be placed above the existing landfill cap to provide a buried conduit for the proposed sanitary sewer pipeline.

There are existing utilities and easements in the vicinity of the proposed pipeline corridor that would be considered during establishment of the proposed wastewater pipeline easement. A permanent easement for a high-pressure gas line was granted to Montana-Dakota Utilities in 1951. This easement extends from southwest to northeast across the central portion of the Prairie Ridge Golf Course. An easement for a sanitary sewer line to the Terrace on the Green mobile home park northeast of the golf course carries sanitary waste southeast across the golf course to the wastewater pipeline junction point east of Ellsworth Road. This sanitary sewer line also services a connection from the golf course clubhouse and maintenance facility as a result of a 2006 Memorandum of Understanding (MOU) signed by Ellsworth AFB and the City of Box Elder. This MOU allows the sewage from the installation's golf course to be treated by Box Elder in exchange for Box Elder residents being allowed to use the golf course. There is also an installation-owned water line that extends across the golf course from northwest to southeast and provides potable water to the golf course clubhouse through a connecting line (Hoffman 2009).

## 2.2.3 Ellsworth AFB's Wastewater Contribution to the Regional Waste Stream

The EA will also evaluate Ellsworth AFB's wastewater contribution to the regional wastewater stream. Under the Proposed Action, after completion of the decommissioning process for the existing Ellsworth AFB WWTP, flow from Ellsworth AFB would be sent through a sanitary sewer pipeline to the proposed future RWWTP off-installation. The current and projected wastewater production flows for



Source of Aerial Photography: ESRI Premium Microsoft Virtual Earth Service, 2009; Source of Vector Data: Ellsworth AFB CIP Database

Figure 2-1. Proposed Pipeline Corridor



Ellsworth AFB and the City of Box Elder are described below. The impacts of Ellsworth AFB’s current and future contributions on a regional level will be described in **Section 3** of the EA. The City of Box Elder has undergone recent growth by annexing portions of Ellsworth AFB, which have nearly doubled the size of the city to a population of approximately 9,200 by including the installation’s resident population as residents of Box Elder. This annexation and other future developments by the city have increased the need for the city to expand its current wastewater treatment facilities, which are currently above capacity. The City of Box Elder expects to add approximately 3,130 homes over the next 10 years to the collection system (EAFB 2008a). A summary of the predicted growth, equivalent population, and associated flow associated with the City of Box Elder is provided in **Table 2-4**.

**Table 2-4. City of Box Elder Summary of Future Wastewater Flows**

Parameter	Value	Equivalent Population	Associated Flow (MGD)
Annual Average Daily Flow (MGD)	0.32	NA	NA
Persons per household *	2.9	NA	NA
Current housing inventory	1,700	4,930	0.32
Gallons per day per capita (gpcd)	65	NA	NA
Increase in homes, 0–10 years	3,130	9,077	0.59
Increase in homes, 11–20 years	3,130	9,077	0.59
Future number of homes (year 2028)	7,960	23,084	1.5

Source: EAFB 2008a

Note: \* 2000 Census data

Key: NA = Not applicable

**Table 2-5** summarizes current and estimated future flows for the City of Box Elder and Ellsworth AFB wastewater streams. The period of record used to determine the current City of Box Elder flows is August 2005–July 2007. The period of record used to determine the current Ellsworth AFB flows is October 2008–September 2009. Flows are estimated for 2028, approximately 20 years in the future. The table shows that the average daily wastewater production for Ellsworth AFB is projected to triple from the current flow of 0.5 MGD to about 1.5 MGD by 2028. The combined average daily flow for Ellsworth AFB and the City of Box Elder is expected to increase from 0.82 MGD at present to 3.0 MGD by 2028.

**Table 2-5. Current and Future Wastewater Flows, Box Elder and Ellsworth AFB WWTPs**

Flow Parameter (MGD)	Current Flow			Future Flow (2028)		
	Box Elder	EAFB	Combined	Box Elder	EAFB	Combined
Annual Average Daily Flow	0.32	0.50	0.82	1.5	1.5	3.0
Maximum Monthly Flow	0.43	0.82	1.25	2.1	NA	NA
Maximum Daily Flow	0.64	1.41	2.05	3.0	2.3	5.3

Sources: EAFB 2008a, EAFB 2008b, EAFB 2009c

Key: NA=Not Applicable

## 2.3 Alternatives

Ellsworth AFB identified treatment and infrastructure locations to be considered as potential alternatives to the Proposed Action and the No Action Alternative. These considered alternatives are discussed below.

### 2.3.1 WWTP Upgrade Alternative

This alternative would require certain upgrades to the existing Ellsworth AFB WWTP in order to meet more stringent SDSWDS standards imposed on the installation by October 1, 2014. The associated upgrades include the following to bring the existing WWTP into compliance:

- Activated sludge equipment (e.g., blowers, air diffusers, aeration basins) and a new process building to house the equipment
- New secondary clarification designed for the activated sludge process
- Ultraviolet disinfection to eliminate the hazards associated with chlorine gas handling
- Conversion of the existing anaerobic digesters to aerobic digesters to eliminate ammonia loading associated with effluent recycle
- A new pumphouse
- Addition of sludge cake storage and vehicle equipment storage to address current needs at the facility (EAFB 2004b)
- Demolish existing chlorine building and trickling filter
- Construct service road.

The WWTP Upgrade Alternative would not help the City of Box Elder meet the SDSWDS permit requirements or address issues with its lagoon treatment facility, which is operating over capacity. The WWTP Upgrade Alternative would therefore require the City of Box Elder to expand its own current wastewater treatment facilities. Nonetheless, upgrading the existing Ellsworth AFB WWTP is considered a reasonable alternative and is carried forth for further analysis in this EA.

### 2.3.2 Treatment Alternatives Considered

Ellsworth AFB evaluated a range of alternatives to effectively treat wastewater to meet more stringent SDSWDS standards. These included pumping wastewater to Rapid City for treatment and upgrading existing treatment facilities. In addition, treatment options for use at the proposed RWWTP are also discussed.

***Pumping to the Rapid City WWTP.*** Pumping wastewater to be treated by the Rapid City WWTP was considered, but preliminary feasibility studies indicated that the cost of pumping wastewater would be almost 50 percent greater than any other treatment option. In addition, no easements or agreements are currently in place with Rapid City that would allow this to occur. Therefore, pumping wastewater to Rapid City does not meet the stated selection criteria in **Section 2.1** and is not evaluated in further detail in this EA.

***Separate Sewage Treatment Systems.*** A comparison of separate sewage treatment systems for Ellsworth AFB and the City of Box Elder with a combined system was conducted as part of a feasibility analysis for the RWWTP (EAFB 2008a). Comparing the lifecycle cost of separate facilities with a single RWWTP indicates that an RWWTP is more economical. The cost of constructing and operating an RWWTP was on the order of approximately \$24.5 million, \$8.8 million less than upgrading the existing separate

treatment facilities operated by Ellsworth AFB and the City of Box Elder (EAFB 2008a). In addition, the passage of House Bill Number 1301 permitted the creation of the South Dakota EDA, which is authorized to construct the RWWTP. Nonetheless, upgrading the existing Ellsworth AFB WWTP is considered a reasonable action alternative to the Proposed Action, and this alternative is presented in **Section 2.3.1**.

**RWWTP Treatment Options.** Screening criteria were used to evaluate different treatment options for the RWWTP and after applying those screening criteria to the various treatment options available, three were chosen for further analysis. The three treatment options evaluated included sequencing batch reactors (SBRs), conventional activated sludge (CAS), and integrated fixed-film activated sludge (IFAS) (EAFB 2008a). These three treatment options were then compared to the cost of separate versus combined treatment facilities. The comparison indicated that the CAS process might be slightly more economical than SBRs; however, the cost difference is not significant when considering the accuracy of the cost estimates. IFAS/moving bed bio-reactor (MBBR) was significantly more costly than the other alternatives and was therefore eliminated. SBRs were the best treatment alternative based on the non-cost factors of the prior screening process; therefore, using SBRs is the recommended wastewater treatment process (EAFB 2008a). The treatment process, although not evaluated in this EA, is relevant as it is addressed as part of the discussion of the contribution to regional wastewater streams by Ellsworth AFB in **Section 2.1.3** and analysis in **Section 3**.

### 2.3.3 Pipeline Corridor Alternatives Considered

Two general corridors were considered as easements to be granted to the South Dakota EDA for a sanitary sewer pipeline. The first corridor connects the inflow for the existing Ellsworth AFB WWTP to an existing sewer line corridor at the intersection of Ellsworth Road and the unnamed tributary of Box Elder Creek that flows through the Prairie Ridge Golf Course. A second corridor is along Ellsworth Street (west of the existing WWTP) and follows a former railroad spur that connected Ellsworth AFB with a railroad line in the City of Box Elder south of Interstate 90 (I-90) (see **Figures 1-1** and **2-1**). However, this second route would require construction of a lift station to pump the wastewater up to the elevation of the railroad spur, and this route would be more than twice as long as the route across the golf course. In addition, the golf course route would maximize use of existing sanitary sewer infrastructure already in place and would not require a lift station. For these reasons, the railroad spur route was not considered to be a practicable alternative to the golf course route and is therefore not evaluated in further detail in this EA.

### 2.3.4 The No Action Alternative

CEQ regulations require inclusion of the No Action Alternative. The No Action Alternative serves as a baseline against which the impacts of the Proposed Action and alternatives can be evaluated. Under the No Action Alternative, Ellsworth AFB would not implement the Proposed Action nor would the existing WWTP be upgraded to meet the SDSWDS permit requirements.

Ellsworth AFB would continue to use their existing WWTP to treat wastewater discharge. The existing WWTP would however be unable to meet the more stringent SDSWDS standards for ammonia. The No Action Alternative would likely be an infeasible alternative, as Ellsworth AFB's existing WWTP would not meet future ammonia discharge limit requirements.

## 2.4 Summary of Environmental Impacts and Environmental Protection Measures

**Table 2-6** presents a summary of the environmental impacts that could result from implementation of the Proposed Action and Alternatives as a result of the analysis presented in **Section 3**. **Table 2-7** presents BMPs and environmental protection measures that Ellsworth AFB and their contractors would comply with to minimize or eliminate impacts on environmental resources.

**Table 2-6. Summary of Environmental Impacts**

Environmental Resource	Proposed Action			WWTP Upgrade Alternative	No Action Alternative
	WWTP Decommissioning and Demolition	Wastewater Pipeline Easement and Construction	Contribution to Regional Waste Stream		
<b>Land Use</b>	<ul style="list-style-type: none"> <li>• Short-term, negligible, adverse impacts and long-term, minor, beneficial impacts would be expected.</li> </ul>	<ul style="list-style-type: none"> <li>• No impacts on land use would be expected from granting the easement.</li> <li>• Short-term, minor, adverse impacts on land use would be expected from the construction of the sanitary sewer pipeline.</li> </ul>	<ul style="list-style-type: none"> <li>• No impacts on land use would be expected.</li> </ul>	<ul style="list-style-type: none"> <li>• Short-term, minor, adverse impacts on land use would be expected.</li> </ul>	<ul style="list-style-type: none"> <li>• No impacts on land use would be expected.</li> </ul>
<b>Infrastructure/ Utilities</b>	<ul style="list-style-type: none"> <li>• Short- and long-term, moderate, adverse impacts on water supply would be expected.</li> <li>• Short-term, negligible to minor, adverse impacts on sanitary sewer and wastewater systems, liquid fuels, electrical systems, solid waste disposal, storm drainage systems, and transportation would be expected.</li> <li>• Long-term, beneficial impacts on storm drainage systems would be expected.</li> <li>• No impacts on natural gas systems would be expected.</li> </ul>	<ul style="list-style-type: none"> <li>• No impacts would be expected on water supply, sanitary sewer and wastewater systems, storm drainage system, electrical supply, liquid fuel supply, natural gas supply, solid waste, or transportation from an easement being granted on Ellsworth AFB.</li> <li>• Short-term, negligible, adverse impacts on water supply, sanitary sewer and wastewater systems, storm drainage systems, liquid fuels, electrical systems, solid waste disposal, and transportation would be expected during pipeline construction.</li> </ul>	<ul style="list-style-type: none"> <li>• No impacts would be expected on water supply, sanitary sewer and wastewater systems, storm drainage system, electrical supply, natural gas supply, liquid fuel supply, solid waste, or transportation.</li> </ul>	<ul style="list-style-type: none"> <li>• Short-term, negligible, adverse impacts on water supply, sanitary sewer and wastewater systems, storm drainage systems, electrical supply, and liquid fuels would be expected.</li> <li>• Short-term, minor, adverse impacts on solid waste disposal would be expected.</li> <li>• Short-term, negligible to minor, adverse impacts on transportation would be expected.</li> <li>• Long-term, minor, adverse impacts water supply, storm drainage systems, and electrical supply would be expected.</li> <li>• Long-term, beneficial impacts on sanitary sewer and wastewater systems would be expected.</li> <li>• No impacts on natural gas systems would be expected.</li> </ul>	<ul style="list-style-type: none"> <li>• Long-term, moderate, adverse impacts on the sanitary sewer system would be expected from wastewater effluent not meeting future ammonia limits.</li> </ul>

Environmental Resource	Proposed Action			WWTP Upgrade Alternative	No Action Alternative
	WWTP Decommissioning and Demolition	Wastewater Pipeline Easement and Construction	Contribution to Regional Waste Stream		
<b>Noise</b>	<ul style="list-style-type: none"> <li>Short-term, minor, adverse effects would be expected.</li> </ul>	<ul style="list-style-type: none"> <li>No impacts on the noise environs at Ellsworth AFB would be expected from granting the easement.</li> <li>Short-term, minor, adverse impacts on the noise environs would be expected from construction of the sanitary sewer pipeline.</li> </ul>	<ul style="list-style-type: none"> <li>No impacts on the noise environs at Ellsworth AFB would be expected.</li> </ul>	<ul style="list-style-type: none"> <li>Similar to impacts discussed under WWTP Decommissioning and Demolition.</li> </ul>	<ul style="list-style-type: none"> <li>No impacts on noise would be expected.</li> </ul>
<b>Air Quality</b>	<ul style="list-style-type: none"> <li>Short-term, minor, adverse impacts from construction and demolition emissions and land disturbance would be expected.</li> </ul>	<ul style="list-style-type: none"> <li>No impacts on local or regional air quality at Ellsworth AFB would be expected from granting the easement.</li> <li>Short-term, minor, adverse impacts on air quality would be expected from construction of the sanitary sewer pipeline.</li> </ul>	<ul style="list-style-type: none"> <li>No impacts on local or regional air quality at Ellsworth AFB would be expected.</li> </ul>	<ul style="list-style-type: none"> <li>Short-term, minor, adverse impacts from construction and demolition emissions and land disturbance would be expected.</li> </ul>	<ul style="list-style-type: none"> <li>No impacts on local or regional air quality at Ellsworth AFB would be expected.</li> </ul>
<b>Safety</b>	<ul style="list-style-type: none"> <li>Short-term, negligible to minor, adverse impacts would be expected.</li> </ul>	<ul style="list-style-type: none"> <li>No impacts on safety would be expected from granting the easement.</li> <li>Short-term, minor, adverse impacts on safety would be expected during construction of the sanitary sewer pipeline.</li> </ul>	<ul style="list-style-type: none"> <li>No impacts on safety would be expected.</li> </ul>	<ul style="list-style-type: none"> <li>Short-term, negligible to minor, adverse impacts would be expected.</li> </ul>	<ul style="list-style-type: none"> <li>No impacts on safety would be expected.</li> </ul>
<b>Geological Resources</b>	<ul style="list-style-type: none"> <li>Short-term, minor and long-term, negligible adverse and long-term beneficial impacts on geological resources and soils would be expected.</li> </ul>	<ul style="list-style-type: none"> <li>No impacts on geological resources would be expected from granting the pipeline easement.</li> <li>Short-term, minor, adverse impacts on soils would be expected during construction of the pipeline.</li> <li>Long-term, minor, adverse impacts on topography would be expected during construction.</li> </ul>	<ul style="list-style-type: none"> <li>No impacts on geological resources and soils would be expected.</li> </ul>	<ul style="list-style-type: none"> <li>Short- and long-term, minor, adverse, impacts on geological resources and soils would be expected.</li> </ul>	<ul style="list-style-type: none"> <li>No impacts on geological resources and soils would be expected.</li> </ul>

Environmental Resource	Proposed Action			WWTP Upgrade Alternative	No Action Alternative
	WWTP Decommissioning and Demolition	Wastewater Pipeline Easement and Construction	Contribution to Regional Waste Stream		
Water Resources	<ul style="list-style-type: none"> <li>• Short-term, moderate, adverse and long-term, moderate, beneficial impacts on water resources would be expected from an alteration of water velocity, quantity, and quality on the tributary currently receiving treated effluent.</li> <li>• Long-term, negligible to minor, adverse impacts on groundwater due to a localized decrease in groundwater elevations immediately adjacent to the stream channel.</li> <li>• Long-term, negligible to minor, adverse impacts on potential shallow wells in close proximity to the unnamed tributary of Box Elder Creek downstream of the WWTP due to a potential local drawdown in water levels.</li> </ul>	<ul style="list-style-type: none"> <li>• No impacts would be expected on water resources from granting the pipeline easement.</li> <li>• Short-term, minor, adverse impacts on surface water would be expected from the construction of the sanitary sewer pipeline.</li> <li>• Short-term, minor, adverse impacts on floodplains would be expected from the construction of the sanitary sewer pipeline within the 100-year floodplain of the unnamed tributary of Box Elder Creek.</li> </ul>	<ul style="list-style-type: none"> <li>• No direct impacts would be expected on water resources from the contribution of Ellsworth AFB's wastewater to the regional waste stream. However, indirect impacts from the cessation of the discharge of WWTP effluent into the unnamed tributary (resulting in decreased water flow within and downstream of the unnamed tributary and altered stream channel morphology) would be expected.</li> </ul>	<ul style="list-style-type: none"> <li>• Short-term, minor adverse impacts during construction would be expected.</li> <li>• Long-term beneficial impacts from the decrease in ammonia present in the water column.</li> </ul>	<ul style="list-style-type: none"> <li>• Long-term, minor, adverse impacts on water resources would be expected from an inability to meet new SDSWDS ammonia discharge limits.</li> </ul>

Environmental Resource	Proposed Action			WWTP Upgrade Alternative	No Action Alternative
	WWTP Decommissioning and Demolition	Wastewater Pipeline Easement and Construction	Contribution to Regional Waste Stream		
<b>Biological Resources</b>	<ul style="list-style-type: none"> <li>• Short-term, negligible, direct, adverse impacts and long-term, negligible, indirect, beneficial effects on vegetation would be expected from the decommissioning and demolition of the WWTP.</li> <li>• Short-term, negligible to minor, direct, adverse effects and long-term, minor, indirect, beneficial effects on wildlife would be expected from the decommissioning and demolition of the WWTP.</li> <li>• Long-term, negligible, indirect, adverse effects on wetlands would be expected from the decommissioning and demolition of the WWTP due to a potential decrease in the hydroperiod of these wetlands.</li> <li>• No impacts on sensitive and protective species would be expected.</li> </ul>	<ul style="list-style-type: none"> <li>• No impacts on vegetation, wildlife, wetlands, and sensitive and protected species would be expected from granting the easement.</li> <li>• Short-term, negligible, adverse impacts on vegetation, wildlife, and sensitive and protected species would be expected from the construction of a sanitary sewer pipeline.</li> <li>• Short-term, minor, adverse impacts on wetlands would be expected from the construction of a pipeline.</li> </ul>	<ul style="list-style-type: none"> <li>• No impacts on vegetation and sensitive and protected species would be expected. However, long-term minor adverse effects on off-installation wildlife and wetlands could be impacted from increased effluent into Box Elder Creek.</li> </ul>	<ul style="list-style-type: none"> <li>• Impacts on vegetation and wildlife would be similar to, but greater than, those discussed under WWTP Decommissioning and Demolition.</li> <li>• Impacts on sensitive and protected species and wetlands would be similar to those discussed under WWTP Decommissioning and Demolition.</li> </ul>	<ul style="list-style-type: none"> <li>• Long-term, minor, adverse impacts would be expected from an inability to meet new SDSWDS ammonia discharge limits.</li> </ul>
<b>Cultural Resources</b>	<ul style="list-style-type: none"> <li>• No adverse impacts on architectural or archaeological cultural resources would be expected.</li> </ul>	<ul style="list-style-type: none"> <li>• No adverse impacts on architectural or archaeological cultural resources would be expected.</li> </ul>	<ul style="list-style-type: none"> <li>• No adverse impacts on architectural or archaeological cultural resources would be expected.</li> </ul>	<ul style="list-style-type: none"> <li>• No impacts on cultural resources would be expected.</li> </ul>	<ul style="list-style-type: none"> <li>• No impacts on cultural resources would be expected.</li> </ul>

Environmental Resource	Proposed Action			WWTP Upgrade Alternative	No Action Alternative
	WWTP Decommissioning and Demolition	Wastewater Pipeline Easement and Construction	Contribution to Regional Waste Stream		
<b>Socioeconomic Resources and Environmental Justice</b>	<ul style="list-style-type: none"> <li>• Short-term, minor, direct, beneficial impacts on the construction industry would be expected.</li> <li>• Short-term negligible, indirect, beneficial impacts on the local economy.</li> <li>• No impacts on demographics or environmental justice would be expected.</li> </ul>	<ul style="list-style-type: none"> <li>• No impacts on socioeconomic resources would be expected from granting the easement.</li> <li>• Short-term, minor, adverse impacts on golf course users would be expected from the construction of the pipeline.</li> <li>• Short-term, minor, beneficial effects on the construction industry would be expected from the construction of the pipeline.</li> <li>• No impacts on demographics or environmental justice would be expected from the construction of the pipeline.</li> </ul>	<ul style="list-style-type: none"> <li>• No impacts on socioeconomic resources would be expected.</li> </ul>	<ul style="list-style-type: none"> <li>• Impacts would be similar to those described under WWTP Decommissioning and Demolition.</li> </ul>	<ul style="list-style-type: none"> <li>• No impacts on socioeconomic resources and would be expected.</li> </ul>



Environmental Resource	Proposed Action			WWTP Upgrade Alternative	No Action Alternative
	WWTP Decommissioning and Demolition	Wastewater Pipeline Easement and Construction	Contribution to Regional Waste Stream		
<b>Hazardous Materials and Wastes</b>	<ul style="list-style-type: none"> <li>• Short-term, minor, adverse and long-term, minor, beneficial impacts on hazardous materials management would be expected.</li> <li>• Short-term, minor, adverse and long-term, minor, beneficial impacts on hazardous wastes would be expected.</li> <li>• No impacts on the installation's hazardous waste management program, Pollution Prevention Program, and ERP sites (OU-6 and OU-11) would be expected.</li> <li>• The existing WWTP might contain ACM, LBP, and light ballasts, sump pumps, or pad-mounted transformers containing PCBs; therefore, there might be short-term, minor, adverse and long-term, minor, beneficial impacts.</li> </ul>	<ul style="list-style-type: none"> <li>• No impacts on hazardous materials and wastes would be expected from granting the pipeline easement.</li> <li>• Short-term, minor, adverse impacts on the ERP, hazardous materials management, and hazardous wastes would be expected from the construction of the pipeline.</li> <li>• No impacts on ACM, LBP, and PCBs would be expected from the construction of the pipeline.</li> <li>• Short-term, negligible, adverse impacts on the Pollution Prevention Program at Ellsworth AFB would be expected from the construction of the pipeline.</li> </ul>	<ul style="list-style-type: none"> <li>• Long-term, minor, adverse impacts on hazardous and petroleum wastes would be expected from additional sludge generation.</li> <li>• No impacts on ERP sites, hazardous materials and petroleum products, ACM, LBP, PCBs, and pollution prevention would be expected.</li> </ul>	<ul style="list-style-type: none"> <li>• Long-term, minor, adverse impacts on hazardous materials or waste management would be expected as a result of the Proposed Action not being implemented.</li> </ul>	<ul style="list-style-type: none"> <li>• No impacts on hazardous materials and wastes would be expected.</li> </ul>

**Table 2-7. Environmental Protection Measures**

<b>Environmental Resource</b>	<b>Environmental Protection Measures</b>
<b>Land Use</b> (see Section 3.1)	<ul style="list-style-type: none"> <li>• Continued adherence to the Air Installation Compatible Use Zone (AICUZ) study and General Plan to ensure compatibility with on- and off-installation land uses.</li> </ul>
<b>Infrastructure and Utilities</b> (see Section 3.2)	<ul style="list-style-type: none"> <li>• Coordination with local utility companies and the Civil Engineering staff at Ellsworth AFB for identification of utility locations prior to implementation of the Proposed Action.</li> <li>• Permits required for trenching and excavation would be obtained prior to commencement of construction or demolition.</li> </ul>
<b>Noise</b> (see Section 3.3)	<ul style="list-style-type: none"> <li>• Noise generation would last only for the duration of construction and demolition activities and would be isolated to normal working hours (i.e., between 7:00 a.m. and 5:00 p.m.).</li> </ul>
<b>Air Quality</b> (see Section 3.4)	<ul style="list-style-type: none"> <li>• Implementation of fugitive dust-control measures (e.g., windbreaks and barriers, control of vehicle access).</li> <li>• Construction and demolition equipment would be properly tuned and maintained prior to and during construction and demolition activities.</li> <li>• Utilization of existing power sources (e.g., power poles) during construction and demolition rather than temporary power generation.</li> </ul>
<b>Safety</b> (see Section 3.5)	<ul style="list-style-type: none"> <li>• Contractors would follow ground safety regulations and workers compensation programs.</li> <li>• Demolition activities would be performed in a manner that does not pose any risk to its workers or installation personnel.</li> <li>• Contractors would be responsible for an industrial hygiene program.</li> <li>• Upon discovery of munitions, unexploded ordinance (UXO), or Chemical Agent Identification Sets (CAISs) during construction or demolition, contractors would cease work in the area and notify the Ellsworth AFB Explosive Ordnance Disposal (EOD) Flight.</li> </ul>
<b>Geological Resources</b> (see Section 3.6)	<ul style="list-style-type: none"> <li>• Implementation of fugitive dust-control measures (e.g., watering).</li> <li>• Implementation of erosion and storm water management practices.</li> <li>• Implementation of standard erosion-control measures (e.g., silt fencing, sediment traps).</li> <li>• Berming along nearby water bodies to decrease the amount of sedimentation in adjacent water bodies.</li> </ul>

Environmental Resource	Environmental Protection Measures
<b>Water Resources</b> (see Section 3.7)	<ul style="list-style-type: none"> <li>• A National Pollutant Discharge Elimination System (NPDES) permit would be obtained as applicable prior to demolition activities.</li> <li>• Development of an erosion-and-sediment-control plan and Storm water Pollution Prevention Plan (SWPPP).</li> <li>• Implementation of standard erosion-control measures (e.g., silt fencing, sediment traps).</li> <li>• Proper housekeeping, retention of debris, demolition equipment maintenance, petroleum and hazardous material storage, and adherence to the Spill Prevention, Control, and Countermeasures (SPCC) Plan in the event of a spill to minimize the introduction of pollutants to surface waters.</li> </ul>
<b>Biological Resources</b> (see Section 3.8)	<ul style="list-style-type: none"> <li>• Revegetation in the Project area upon completion of demolition and construction activities.</li> </ul>
<b>Cultural Resources</b> (see Section 3.9)	<ul style="list-style-type: none"> <li>• If archaeological resources are discovered during implementation of the Proposed Action, the installation Cultural Resource Manager (CRM) would ensure the provisions of the Archeological Resources Protection Act (16 U.S.C. Sections 470aa–470mm) and 32 CFR Part 229 are followed.</li> <li>• If human remains are discovered during implementation of the Proposed Action, the installation CRM would be immediately notified and formal notification, consultation, treatment, and disposition procedures would be followed as outlined in the Integrated Cultural Resources Management Plan (ICRMP).</li> </ul>
<b>Socioeconomic Resources and Environmental Justice</b> (see Section 3.10)	<ul style="list-style-type: none"> <li>• No environmental protection measures have been identified for socioeconomic resources and environmental justice.</li> </ul>
<b>Hazardous Materials and Wastes</b> (see Section 3.11)	<ul style="list-style-type: none"> <li>• Preparation of a health and safety plan by the contractor prior to commencement of construction and demolition activities.</li> <li>• If contamination is encountered, the handling storage, transportation, and disposal activities would be conducted in accordance with appropriate regulations.</li> <li>• Project planning would include protection of ERP infrastructure and avoiding disturbance to ERP site OU-6 (i.e., through use of an added clean fill cap to serve as a conduit for a new pipeline), and a waiver request would be submitted prior to construction or demolition in the vicinity of an ERP site.</li> </ul>

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### 3. Affected Environment and Environmental Consequences

This section provides a characterization of the affected environment and presents an analysis of the potential direct and indirect effects each alternative would have on the affected environment. Cumulative and other effects are discussed in **Section 4**. All potentially relevant resource areas were initially considered in this EA.

The specific criteria used in this section for evaluating potential environmental effects associated with alternatives are presented under each resource area. The significance of an action is measured in terms of its context and intensity. The following elaborates on the nature of characteristics that might relate to various environmental effects.

**Short-term or long-term.** These characteristics are determined on a case-by-case basis and do not refer to any rigid time period. In general, short-term effects are those that would occur only with respect to a particular activity or for a finite period or only during the time required for construction or installation activities. Long-term effects are those that are more likely to be persistent and chronic, such as those caused by operational phases of a project.

**Direct or indirect.** A direct effect is caused by and occurs contemporaneously at or near the location of the action. An indirect effect is caused by a proposed action and might occur later in time or be farther removed in distance but still be a reasonably foreseeable outcome of the action. For example, a direct effect of erosion on a stream might include sediment-laden waters in the vicinity of the action, whereas an indirect impact of the same erosion might lead to lack of spawning and result in lowered reproduction rates of indigenous fish downstream.

**Negligible, minor, moderate, or major.** These relative terms are used to characterize the magnitude or intensity of an impact. Negligible effects are generally those that might be perceptible but are at the lower level of detection. A minor effect is slight, but detectable. A moderate effect is readily apparent. A major effect is one that is severely adverse or exceptionally beneficial.

**Adverse or beneficial.** An adverse effect is one having adverse, unfavorable, or undesirable outcomes on the man-made or natural environment. A beneficial effect is one having positive outcomes on the man-made or natural environment. A single act might result in adverse effects on one environmental resource and beneficial effects on another resource.

**Significance.** Significant effects are those that, in their context and due to their intensity (severity), meet the thresholds for significance set forth in CEQ regulations (40 CFR 1508.27).

**Context.** The context of an effect can be localized or more widespread (e.g., regional).

**Intensity.** The intensity of an effect is determined through consideration of several factors, including whether an alternative might have an adverse impact on the unique characteristics of an area (e.g., historical resources, ecologically critical areas), public health or safety, or endangered or threatened species or designated critical habitat. Effects are also considered in terms of their potential for violation of Federal, state, or local environmental law; their controversial nature; the degree of uncertainty or unknown effects, or unique or unknown risks; if there are precedent-setting effects; and their cumulative effects (see **Section 4**).

## 3.1 Land Use

### 3.1.1 Definition of the Resource

The term “land use” refers to real property classifications that indicate either natural conditions or the types of human activity occurring on a parcel. In many cases, land use descriptions are codified in local zoning laws. There is, however, no nationally recognized convention or uniform terminology for describing land use categories. As a result, the meanings of various land use descriptions, “labels,” and definitions vary among jurisdictions.

Natural conditions of property can be described or categorized as unimproved, undeveloped, conservation or preservation area, and natural or scenic area. There is a wide variety of land use categories resulting from human activity. Descriptive terms often used include residential, commercial, industrial, agricultural, institutional, and recreational.

Two main objectives of land use planning are to ensure orderly growth and compatible uses among adjacent property parcels or areas. Compatibility among land uses fosters the societal interest of obtaining the highest and best uses of real property. Tools supporting land use planning include written master plans/management plans and zoning regulations. In appropriate cases, the locations and extent of proposed actions need to be evaluated for their potential effects on project site and adjacent land uses. The foremost factor affecting a proposed action in terms of land use is its compliance with any applicable land use or zoning regulations. Other relevant factors include matters such as existing land use at the project site, the types of land uses on adjacent properties and their proximity to a proposed action, and the duration of a proposed activity and its “permanence.”

### 3.1.2 Description of Affected Environment

Ellsworth AFB consists of approximately 5,415 acres in Meade and Pennington counties in southwestern South Dakota, 7 miles northeast of Rapid City (see **Figure 1-1**). The City of Box Elder borders the installation to the southeast. A portion of the installation was recently annexed to the City of Box Elder to encourage development activities for the city. The existing Ellsworth AFB WWTP is in the southeastern corner of the installation. For the purposes of this land use analysis, the project vicinity is defined as the WWTP and associated facilities and the proposed pipeline corridor as shown in **Figure 2-1**.

***On-installation.*** Land use patterns on Ellsworth AFB are compatibly arranged to support mission requirements. Ellsworth AFB maintains a residual amount of open space to buffer incompatible uses and to support future installation functions or expanded missions (EAFB 2007a). There are 11 existing land use types at Ellsworth AFB. See **Table 3-1** for these existing land use types and corresponding acreages.

These land use categories on Ellsworth AFB were developed to prevent incompatible siting of facilities and operations. The WWTP is in an industrial area of the installation, while the proposed pipeline corridor, which extends through the golf course, is part of the outdoor recreation land use category (see **Figure 3-1**). To the north of the Project area, current land uses include outdoor recreation and open space. Land uses to the west and south of the Project area are predominantly airfield and airfield pavements. To the east of the Project area, land use is outdoor recreation, which includes portions of the Prairie Ridge Golf Course (EAFB 2007a). South of the Project area is the Ellsworth installation boundary and the City of Box Elder.

**Table 3-1. Land Use Categories at Ellsworth AFB**

Category	Acreage	Percent of Land Use *
Airfield and Airfield Pavements	1,042	19
Aircraft Operations and Maintenance	130	2
Industrial	741	14
Administrative	50	1
Community (Commercial)	45	1
Community (Service)	46	1
Medical	22	1
Housing (accompanied)	588	11
Housing (unaccompanied)	49	1
Outdoor Recreation	293	5
Open Space (including water)	2409	44
<b>Total</b>	<b>5,415</b>	

Source: EAFB 2007a

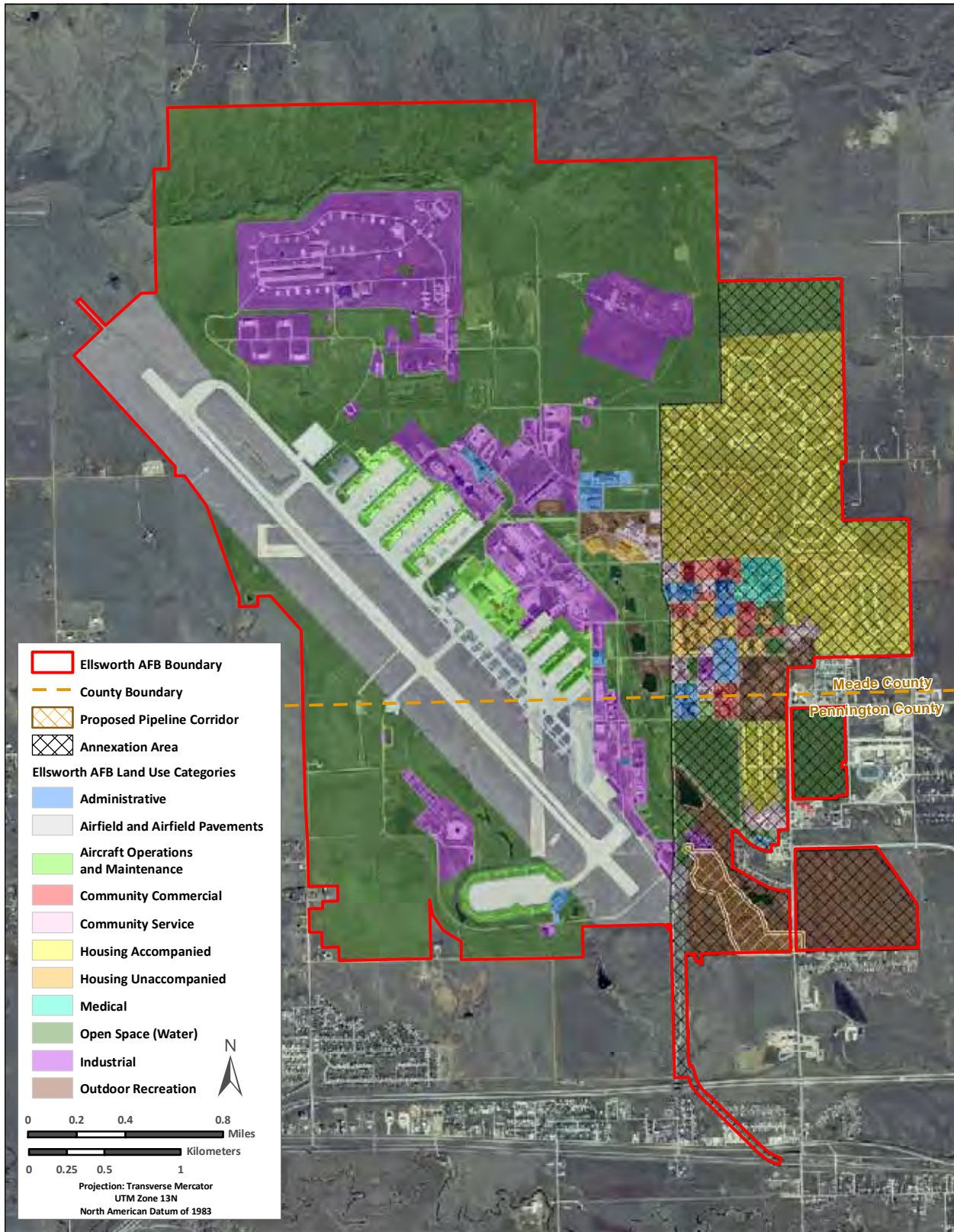
Note: \* Values were rounded up to the closest percent.

DOD has determined that the areas immediately beyond the ends of runway and along the approach and departure flights paths at Ellsworth AFB have significant potential for aircraft accidents (see **Figure 3-2**). Based on this analysis, DOD developed three zones that have high relative potential for accidents, the Clear Zone (CZ), Accident Potential Zone (APZ) I, and APZ II. The CZ, the area closest to the runway end, is the most hazardous. APZ I is an area beyond the CZ that has significant potential for accidents. APZ II is an area beyond APZ I with a lesser, but still significant, potential for accidents. While aircraft accident potential in APZs I and II does not warrant acquisition by the USAF, land use planning and controls are strongly encouraged in these areas for the protection of the public. The Proposed Project Corridor is 1,000 feet southeast of the southern end of the runway and is partially within the CZ and APZ I.

The WWTP and a portion of the proposed pipeline corridor are within the DNL of 80+ noise contour while the remaining portion of the proposed pipeline corridor is within the DNL of 75+ noise contour (see **Section 3.3** for noise).

**Off-installation.** Since the 1940s, growth in several communities, including Box Elder, has increased thereby impacting land use surrounding Ellsworth AFB. Current land use surrounding Ellsworth AFB is mixed. Land use in areas to the west, north, and intermittently to the east of Ellsworth AFB is classified as low-density rural-agricultural. The City of Box Elder is adjacent to Ellsworth AFB, southeast of the installation boundary. Land uses within Box Elder consist of open space/low density uses with residential and commercial uses along major transportation routes.

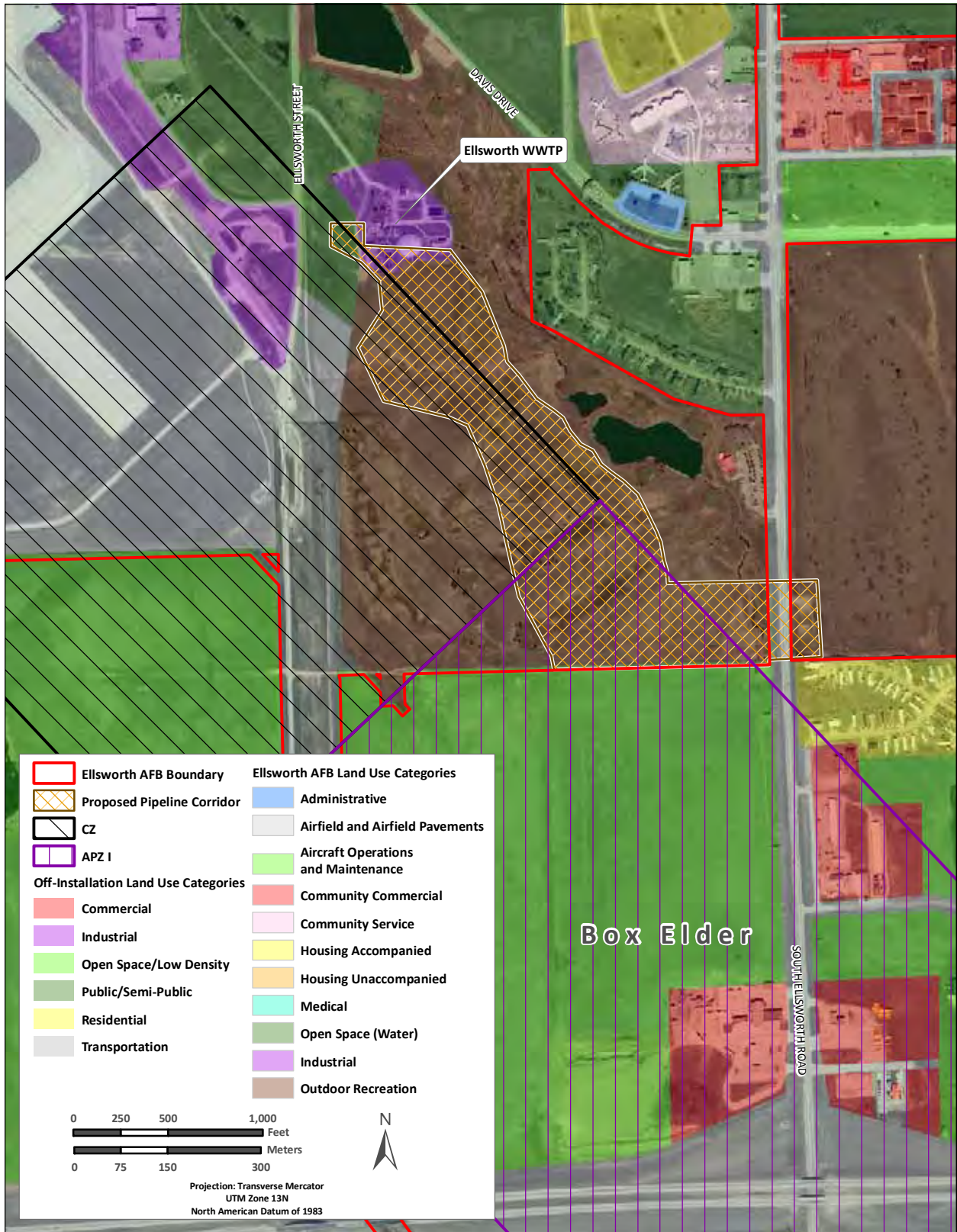
In recent years the City of Box Elder has sought to attract businesses to provide economic opportunities as well as retail and dining options for those living on- and off-installation. Some businesses have declined relocating to the City of Box Elder because population levels in the city were not large enough to meet their requirements. On August 28, 2009, the City of Box Elder annexed the residential areas of Ellsworth AFB. This annexation allowed the City of Box Elder to increase their population and tax revenues in hopes of attracting new businesses (Box Elder undated, Box Elder 2009). **Figure 3-1** shows the annexation boundary.



Source of Aerial Photography: ESRI Premium Microsoft Virtual Earth Service, 2009; Source of Vector Data: Ellsworth AFB CIP Database

**Figure 3-1. Land Use on Ellsworth AFB and Annexation Boundary**





Source of Aerial Photography: ESRI Premium Microsoft Virtual Earth Service, 2009; Source of Vector Data: Ellsworth AFB CIP Database

Figure 3-2. CZ and APZs on Proposed Project Area

In an interest to provide compatible civilian development and future growth near Ellsworth AFB, the State of South Dakota enacted legislation in the form of House Bill 1301 to establish the South Dakota EDA. This bill was introduced by the Governor of South Dakota and became effective on July 1, 2009 (see **Appendix A**).

The *City of Box Elder Comprehensive Plan: Goal and Policies* serves as a guide for policy decisions relating to the physical growth and economic development of Box Elder. The City of Box Elder recognizes the special relationship it has with Ellsworth AFB due the installation's proximity and economic impact upon the city (Box Elder 2002).

Land use for Pennington County is driven by the Pennington County zoning districts, which are published in the *Pennington County Comprehensive Plan* (Pennington County 2003). The Comprehensive Plan proposes a series of objectives to accomplish this goal. The goals applicable to Ellsworth AFB include the following:

- Provide for stable neighborhoods by minimizing adverse effects from conflicting land uses
- Transition between types of land uses, especially between conflicting land uses, shall be orderly and efficient through the use of buffers such as increased setbacks, open space, fencing, and landscaping.

Land use policies and decisionmaking for Meade County are guided by the county's June 2009 Comprehensive Plan (Meade County 2009).

### 3.1.3 Environmental Consequences

#### Evaluation Criteria

The significance of potential land use impacts is based on the level of land use sensitivity in areas affected by a proposed action and compatibility of proposed actions with existing conditions. In general, a land use impact would be significant if any of the following were to happen:

- Be inconsistent or in noncompliance with existing land use plans or policies
- Preclude the viability of existing land use
- Preclude continued use or occupation of an area
- Be incompatible with adjacent land use to the extent that public health or safety is threatened
- Conflict with planning criteria established to ensure the safety and protection of human life and property.

#### 3.1.3.1 Proposed Action

##### Existing Ellsworth AFB WWTP Decommissioning and Demolition

Short-term, negligible, adverse impacts and long-term, minor, beneficial impacts on land use would be expected from decommissioning and demolition of the WWTP. The WWTP is currently in APZ I and few land uses are compatible with the areas associated with the end of runway. Land use of the WWTP would remain industrial through decommissioning of the existing WWTP. Following decommissioning, the facilities associated with the WWTP would be demolished, resulting in short-term, negligible, direct, adverse impacts on land use from the use of demolition equipment in APZ I and the increased presence of construction vehicles related to demolition activities. Long-term, minor, direct, beneficial effects on land

use would be expected if the area currently occupied by the WWTP is returned to open space, thus resulting in fewer uses in APZ I. Currently, there are no plans to redevelop the Ellsworth WWTP site. Land use is restricted in this area because of Air Installation Compatible Use Zone (AICUZ) recommendations; however, another industrial type use would be compatible for this site. Site redevelopment would have to take AICUZ noise zone classifications into consideration.

### Wastewater Pipeline Easement and Construction

Under the Proposed Action an easement would be granted to the South Dakota EDA securing the right-of-way for a sanitary sewer pipeline across portions of OU-6, the Prairie Ridge Golf Course, and a small, unnamed creek east of the existing WWTP. The easement would extend from the wastewater junction point shown in **Figure 2-1** southeast across South Ellsworth Road. The easement would be entirely within Ellsworth AFB except for a small portion that crosses South Ellsworth Road. Analysis of the easement from Ellsworth AFB property to the RWWTP will be covered in separate environmental documentation.

No impacts on land use would be expected from granting an easement to the South Dakota EDA as land use would generally not change from granting this easement. No long-term effects would be expected from granting an easement to the South Dakota EDA as an easement would not be expected to affect current or adjacent land uses.

Short-term, minor, adverse impacts on land use would be expected from the construction of the sanitary sewer pipeline due to the temporary closure of a portion or all of the golf course during pipeline construction. Adverse impacts from the construction of a sanitary sewer pipeline would likely occur only for the duration of construction. No long-term impacts would be expected from pipeline construction.

### Contribution of Ellsworth AFB's Wastewater to the Regional Waste Stream

No impacts on land use would be expected from the contribution of Ellsworth AFB's wastewater to the regional waste stream. Development of an RWWTP is consistent with the goals outlined in an MOU between Ellsworth AFB and the City of Box Elder; therefore no impacts on land use would be expected (EAFB undated).

#### 3.1.3.2 WWTP Upgrade Alternative

Under the WWTP Upgrade Alternative, Ellsworth AFB would upgrade the existing WWTP to meet the SDSWDS permit requirements regarding ammonia. The necessary upgrades would involve construction and demolition of facilities and the addition of a small road. Activities necessary to bring the current WWTP into compliance would not affect current industrial land uses or adjacent land uses which are compatible with the WWTP. However, short-term, minor, adverse impacts on land use would be expected due to an increased presence of construction vehicles and disturbances related to construction activities. The WWTP Upgrade Alternative would not help the City of Box Elder meet the SDSWDS permit requirements or address issues with its lagoon treatment facility, which is operating over capacity. The WWTP Upgrade Alternative would therefore require the City of Box Elder to expand its current wastewater treatment facilities.

#### 3.1.3.3 No Action Alternative

Under the No Action Alternative, Ellsworth AFB would not implement the Proposed Action and would not upgrade the existing WWTP to meet the SDSWDS permit requirements. Ellsworth AFB would continue to use their existing WWTP to treat wastewater discharge. The existing WWTP would, however, be unable to meet the more stringent SDSWDS standards for ammonia and would have to cease

operation at that time, forcing Ellsworth AFB to identify alternative sources for wastewater treatment. No impacts on land use would be expected under the No Action Alternative.

### 3.1.4 Environmental Protection Measures

Land use planning on Ellsworth AFB will continue to be guided by the community of installation-approved plans including the AICUZ study and General Plan. Adherence to these plans will help ensure that growth and organization of Ellsworth AFB is done in a compatible manner with on- and off-installation land uses.

## 3.2 Infrastructure and Utilities

### 3.2.1 Definition of the Resource

Infrastructure consists of the systems and physical structures that enable a population in a specified area to function and includes utility lines. Infrastructure is wholly human-made, with a high correlation between the type and extent of infrastructure and the degree to which an area is characterized as “urban” or developed. The availability of infrastructure and its capacity to support growth are generally regarded as essential to the economic growth of an area. The infrastructure components discussed in this section include water supply, sanitary sewer and wastewater system, storm water drainage, power supply, natural gas supply, fuel supply, solid waste management (i.e., nonhazardous waste), and transportation.

### 3.2.2 Description of Affected Environment

#### Water Supply

Drinking water for Ellsworth AFB is delivered by the Rapid City Water Division via a 16-inch water main. Sources for this water system include three infiltration galleries along the Rapid Creek alluvium, including the Jackson Springs Gallery, Meadowbrook Gallery, and Girl Scouts Gallery. Nine other off-installation wells operated by the Rapid City Water Division draw water from the subsurface Minnelusa and Madison Aquifers. During peak demand summer periods, the city also uses surface water from Rapid Creek, which originates in the Rapid Creek drainage area in the Black Hills west of Rapid City. This source includes the Deerfield and Pactola surface water reservoirs (EAFB 2007a). All of the water supply wells on the installation have been abandoned and are not in service. The average water use at Ellsworth AFB for the past 5 years has been approximately 581,000 gpd (212 million gallons per year [gpy]) (Cleberg 2011). Ellsworth AFB maintains a utility service contract with the Rapid City Water Treatment Plant that outlines the provisions for the treatment and transport of water from the Rapid City municipal system to the 16-inch water supply line owned by Ellsworth AFB. Under the current utility service contract, approximately 1.6 MGD (590 million gpy) are allotted to Ellsworth AFB (Cleberg 2011). Therefore, Ellsworth AFB has remaining available water capacity of approximately 1.04 MGD (378 million gpy). The water distribution system at Ellsworth AFB is composed of more than 66 miles of piping. The installation’s water storage capacity is 3.8 million gallons, which equates to 2.5 days of water usage. The 28th Medical Group Bio-Environmental Engineering Flight is responsible for on-installation monitoring of the potable water distribution system. There are 22 on-installation monitoring points that are sampled at the rate of 11 points each month. Samples have historically been within limits (EAFB 2008c).

There are several operational and abandoned water lines in the vicinity of the Proposed Project Corridor (see **Figure 3-3**). Operational water lines are to the north, east, west, and northwest of the Proposed Project Corridor. There are several operational water lines in the northern portion of the Proposed Project Corridor and one northwestern-southeastern directional operating water line that runs through the central

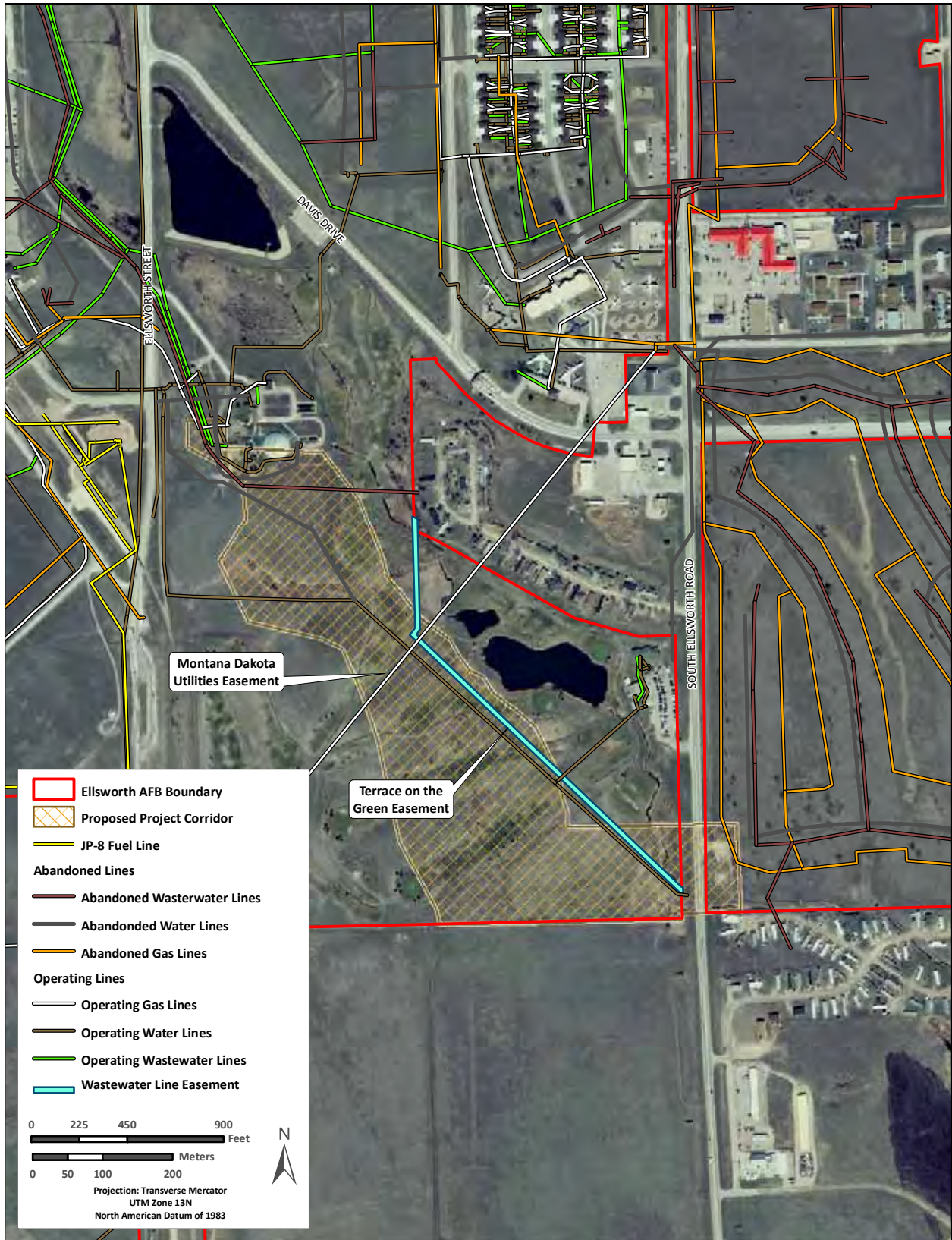


Figure 3-3. Locations of Existing Utility Lines in the Vicinity of the Proposed Project Corridor

portion of the Proposed Project Corridor. Abandoned water lines are to the north, northeast, east, and northwest of the Proposed Project Corridor and in the north-central portion of the Proposed Project Corridor.

Local ranchers to the east of Ellsworth AFB use water for their livestock from the unnamed tributary that receives effluent flow from the WWTP.

### Sanitary Sewer and Wastewater System

The sanitary sewer system at Ellsworth AFB is composed of a system of collection piping, seven lift stations, and a WWTP. The collection piping comprises a total of 28 miles of piping (EAFB 2008c). There are several operational wastewater and abandoned lines in the vicinity of the Proposed Project Corridor. Operational wastewater lines are to the north, east, and northwest of the Proposed Project Corridor. There is an easement to the Terrace on the Green mobile home park for a northwestern-southeastern directional operating wastewater line that runs along the eastern portion of the Proposed Project Corridor. Abandoned wastewater lines are to the north, northeast, east, southeast, and northwest of the Proposed Project Corridor and in the northern portion of the Proposed Project Corridor (see **Figure 3-3**).

The existing Ellsworth AFB WWTP has several components including an O/W separator, primary clarifiers, secondary clarifiers, chlorine contact chambers, a dechlorination basin, anaerobic sludge digesters, ancillary equipment (e.g., pipes, pumps), utilities (e.g., electrical, potable water), a pretreatment building, a laboratory, an office, and a sludge dewatering building. The WWTP uses several chemicals including chlorine, sulfur dioxide (SO<sub>2</sub>), sludge flocculation polymer, sample preservatives (i.e., acids and bases), and sample buffer solutions and reagents (see representative photos in **Appendix D**) (EAFB 2001).

The average and maximum daily flows of the WWTP are 0.5 and 1.41 MGD, respectively. The average biochemical oxygen demand (BOD) and total suspended solids (TSS) loadings for the WWTP, which were calculated based on influent data from the WWTP from October 2000 through August 2003, are 920 pounds per day (ppd) and 1,200 ppd, respectively (EAFB 2008a). These loadings are somewhat lower than those for typical domestic wastewater, which is likely due to the industrial activities that take place at Ellsworth AFB. The industrial activities potentially contribute pollutants to the wastewater, which include aqueous film-forming foam used in aircraft hangars for fire suppression; heavy metals from vehicle and aircraft maintenance; oil, grease, and toxic hydrocarbon compounds from petroleum spills; cleaners; acids; soaps; floor maintenance products; chlorine from seasonal drainage of swimming pool water; and permethrin from washing uniforms in insecticides. Implementation of an industrial wastewater program at Ellsworth AFB has minimized discharges of these pollutants to the sanitary sewer system (Miller 2009, Styles 2009). In the past 20 years, a major fuel spill has not reached the WWTP at Ellsworth AFB, and permethrin levels have been sampled every 8 days for the past several years with only one recorded spike of permethrin in wastewater (Styles 2010).

**City of Box Elder.** The major treatment processes of the existing Box Elder WWTP and their associated units include a mechanically cleaned bar screen for pretreatment; a four-cell stabilization pond system, which includes aeration equipment, one 5-acre primary cell, cell No. 2 (13 acres), cell No. 3 (7 acres), and cell No. 4 (2.7 acres); and a 35-acre flood-type irrigation system for wastewater disposal. Effluent from the stabilization ponds is either discharged to Box Elder Creek through Outfall No. 001 or routed to the irrigation system. Overflow from the irrigation system to Box Elder Creek is not authorized under the current NPDES permit (Permit No. SD0025186); however, in the event it occurred, it would enter Box Elder Creek and would be designated as Outfall No. 002. The average daily flow for the existing Box

Elder WWTP is 0.32 MGD. The maximum daily and monthly flow is 0.64 MGD and 0.43 MGD, respectively (EAFB 2008a).

### **Storm Drainage System**

The storm drainage system at Ellsworth AFB consists of a network of swales, ditches, streams, lakes, and covered piping. Storm water from this system drains north or south through discharge points to Elk Creek or Box Elder Creek, respectively (EAFB 2008c). Storm water from the industrial areas of Ellsworth AFB drain into seven watersheds, four of which drain into unnamed tributaries of Box Elder Creek and three of which drain into unnamed tributaries of Elk Creek (EAFB 2008d). Detention ponds were created along some of the unnamed tributaries to collect surface water runoff and decrease the rate of discharge into the creeks to reduce flooding (EAFB 2008c).

Ellsworth AFB maintains a South Dakota Surface Water Discharge (SWD) Permit (No. SD-0000281) with SDDENR for storm water discharges. There are 10 outfalls at Ellsworth AFB, 4 of which (Nos. 004 and 008–010) are no longer used and not included in the SWD permit. Outfall Nos. 001–003 and 006 discharge to unnamed tributaries of Box Elder Creek and Outfall No. 007 discharges to an unnamed tributary of Elk Creek (EAFB 2002). Outfall No. 005 discharges treated wastewater effluent from the WWTP to Outfall No. 006. The outfalls are further described in **Section 3.7.2**. Ellsworth AFB also maintains a Storm Water Pollution Prevention Plan (SWPPP), which documents existing storm water management practices, ensures compliance with the conditions of the SWD permit, and provides guidance for minimizing the potential for storm water pollution (EAFB 2009d).

### **Electrical System**

Ellsworth AFB purchases power from Western Area Power Administration (WAPA) and Black Hills Power and Light (BHPL) Company of Rapid City. WAPA provides the main power and BHPL provides the emergency backup supply. Power is delivered to Ellsworth AFB through two 115-kilovolt (kV) distribution lines. The electrical system includes two 25-Megavolt-Ampere transformers that are capable of providing electricity to the entire installation. There are 10 primary distribution lines, 9 of which are operational and 1 is reserve. The primary distribution lines feed two secondary substations and transformers by more than 70 miles of three-phase primary cable. More than 175 miles of secondary cable transfer power to approximately 2,100 facilities at Ellsworth AFB. The electrical system is a mesh network that allows each primary distribution line to switch to at least one other distribution line (EAFB 2008c).

In addition to primary power, Ellsworth AFB has backup systems to support priority facilities with redundant power for mission-critical loads during catastrophic power outages. The Power Production Shop at Ellsworth AFB provides and maintains 45 diesel-powered Real Property-Installed Equipment (stationary) generators and 21 diesel-powered Equipment Authorized Inventory Data (portable) generators. The capacities of the generators range from 4 to 600 kilowatts (EAFB 2008c).

### **Natural Gas System**

The natural gas distribution system at Ellsworth AFB is composed of 44 miles of underground piping. Approximately 88 percent of the natural gas piping is made of polyethylene, which is a lightweight plastic that is resistant to chemicals and moisture. Ellsworth AFB receives natural gas from Montana Dakota Utilities. Natural gas is transported to the installation through a 12-inch, 45-pound-force per square inch (psi) line north of Taxiway F (EAFB 2008c).

There is an easement to Montana Dakota Utilities for a northeast-southwest directional operating natural gas line that runs through the central portion of the Proposed Project Corridor. In addition, there are several abandoned natural gas lines to the east, northeast, northwest, and west of the Proposed Project Corridor (see **Figure 3-3**).

### Liquid Fuel Supply

The liquid fuel system at Ellsworth AFB is composed of three modified Type I Pumphouses and one Type III Hydrant Refueling System. The three Type I Pumphouses are on the south ramp and the Type III Hydrant Refueling System is an integral part of the Consolidated Aircraft Servicing System at the North Dock area. There are also two bulk storage areas (Areas C and D) that receive fuel from Rapid City through a 6-inch commercial underground pipeline, immediately west of the Proposed Project Corridor, or by commercial tank trucks (see **Figure 3-3**). JP-8 is received at the installation through the pipeline at a rate of approximately 580 gallons per minute. Area C is composed of a 6-inch commercial receipt pipeline, receiving filter/separator station, two 20,000-gallon underground storage tanks (USTs), and transfer and receipt pumps for jet fuel. Area D is composed of two aboveground storage tanks (ASTs) with capacities of 35,000 gallons and 55,000 gallons, receiving filter/separator station, and an off-loading and fill stand pumphouse with issue filter/separators. A 6-inch transfer line interconnects Area C Type I Pumphouses with Area D. For ground transfer of fuels, there are three 10,000-gallon fuel transfer trucks (one for mobility gasoline [MOGAS] and two for diesel) with receiving and issue pumps and meters (EAFB 2008c).

The military vehicle service station is composed of two 12,000-gallon tanks (one MOGAS with one double dispenser and one diesel with two double dispensers). The Aerospace Ground Equipment service station is composed of one 20,000-gallon (Jet Propellant 8 [JP-8]) tank with two single dispensers and two JP-8 tanks (10,000 gallons and 6,000 gallons), each with a single dispenser (EAFB 2008c). Additional ASTs in the vicinity of the project site are discussed in **Section 3.11.2**.

### Solid Waste

All solid waste at Ellsworth AFB is collected and transported off-installation by a contractor. The contractor collects refuse, recyclables, and yard waste. Solid waste and recyclables are collected curbside in the MFH areas and in dumpsters throughout the installation. In addition, a central Recycling Center (Building 9050) on Centennial Drive is available for the disposal of tires, wood waste, yard waste, recyclables, appliances, and bulky solid waste items that are otherwise too large for curbside pickup (EAFB 2008c, EAFB 2005a). The Recycling Center is run by the solid waste collection contractor and augments the current solid waste collection services. Refuse, recyclables, and yard waste are taken off-installation to the Rapid City Sanitary Landfill, Rapid City Municipal Recycling Facility, and Rapid City Composting Facility, respectively. Spent fire fighting foam and deicing fluid are collected in a 70,000-gallon underground storage tank and recycled at the Rapid City Composting Facility. Construction rubble and petroleum-contaminated soil were previously disposed of in landfills at Ellsworth AFB; however, those landfills have since been closed (EAFB 2008c). Ellsworth AFB operates a recycling program that implements AFI 32-7042, *Solid and Hazardous Waste Compliance*; AFI 32-7080, *Pollution Prevention Program*; and the Ellsworth AFB Solid Waste Management Plan (EAFB 2005a).

### Transportation

Primary access to Ellsworth AFB is served by Highway 90, an east-west directional highway south of the installation. Highway 90 is one of the primary arterials serving the Rapid City area. There are several secondary arterials within the Ellsworth AFB boundary. Secondary roadways surrounding the proposed



Project area include Davis Street to the north and northeast, North Ellsworth Road to the east and southeast, and Ellsworth Street to the west and northwest (EAFB 2006a).

### 3.2.3 Environmental Consequences

#### Evaluation Criteria

The analysis to determine potential impacts on infrastructure and infrastructure systems considers primarily whether a proposed action would exceed capacity or place unreasonable demand on a specific utility.

Sustainable design measures would be incorporated where practicable to reduce demand. The construction contractor would coordinate with the Civil Engineering staff at Ellsworth AFB and local utility companies prior to commencement of any construction or demolition activities to determine the utility locations, such as sewer, telephone, fuel, electric, water lines, or any other underground installations that could be encountered during excavation and trenching activities. Any permits required for excavation and trenching would be obtained prior to the commencement of construction or demolition activities.

#### 3.2.3.1 Proposed Action

##### Existing Ellsworth AFB WWTP Decommissioning and Demolition

**Water Supply.** Short- and long-term, moderate, direct, adverse impacts on water supply would be expected. Water demand would increase slightly during the decommissioning and demolition phases of the Proposed Action when the decommissioned units and equipment are washed and decontaminated; however, potential increases in water demand associated with decommissioning and demolition activities would be temporary and are not anticipated to exceed existing capacity. After decommissioning and demolition of the existing WWTP is completed, flow in the unnamed tributary that currently receives effluent from the WWTP would cease flowing year-round and return to a natural hydrologic scheme. Water would flow in the unnamed tributary only in response to precipitation events. Farmers downstream of the Ellsworth AFB WWTP currently use the unnamed tributary as a source for their water supply for livestock. Cessation of the WWTP effluent flow in the unnamed tributary would reduce the availability of this water supply source to these farmers. As a result, these farmers could be required to obtain water for their livestock from another source, most likely from the Rapid City Water Division.

In addition, the Ellsworth AFB Prairie Ridge Golf Course is currently irrigated with water from a reservoir pond along the unnamed stream adjacent to the golf course. The reservoir is replenished by effluent from the installation's WWTP. Cessation of the WWTP flow to the golf course pond would reduce the amount of water available in the reservoir available for irrigation supply. During peak irrigation season, use of the existing water source for golf course irrigation would likely increase the installation's potable water demand by approximately 250,000 gpd, as it is anticipated that the water required for irrigating the golf course would be obtained through Ellsworth AFB's potable water supply. Under its current contract, Ellsworth AFB is allotted 1.6 MGD (590 million gpy) of potable water. Since the remaining available water capacity at Ellsworth AFB is approximately 1.04 MGD (378 million gpy) and the golf course would only require 250,000 gpd during peak irrigation season (i.e., during summer months), it is not expected that the increase in potable water demand associated with golf course irrigation would exceed existing available capacity.

**Sanitary Sewer and Wastewater System.** Short-term, negligible, direct, adverse impacts on the sanitary sewer and wastewater system would be expected. There would be a slight increase in wastewater due to

decommissioning and demolition activities associated with the Proposed Action when the decommissioned units and equipment are washed and decontaminated. Potential increases in wastewater associated with decommissioning and demolition activities would be temporary and are not anticipated to exceed existing capacity. The sanitary sewer and wastewater system would be operable during the decommissioning and demolition process. No long-term, adverse, direct or indirect impacts on sanitary sewer and wastewater systems would be expected.

**Storm Drainage System.** Short-term, negligible to minor, direct, adverse, and long-term, minor, indirect, beneficial impacts on storm drainage systems would be expected. Ground disturbance from demolition activities would temporarily increase the potential for soil erosion and sediment transport during sheet flow runoff if proper BMPs are not fully utilized. Upon completion of demolition activities, the amount of impervious surfaces would decrease due to fewer buildings and structures associated with the WWTP and storm water permeation into the ground would increase, thereby permanently decreasing sheet flow runoff into the storm water drainage system. No long-term, adverse, direct or indirect impacts on storm drainage systems would be expected.

**Electrical System.** Short-term, minor, direct, adverse impacts on the electrical system would be expected. Electricity demand would increase slightly during the decommissioning and demolition phases of the Proposed Action to support decommissioning and demolition activities; however, potential increases in electricity demand associated with demolition activities would be temporary and are not anticipated to exceed existing capacity. No long-term, adverse, direct or indirect impacts would be expected.

**Natural Gas System.** No impacts on natural gas systems would be expected. Decommissioning and demolition activities associated with the Proposed Action would not require the use of natural gas.

**Liquid Fuel Supply.** Short-term, negligible, direct, adverse impacts on liquid fuels would be expected. During decommissioning and demolition, petroleum-based products would be used for demolition equipment and vehicles. Fuel would be provided to demolition equipment and vehicles by Ellsworth AFB under the terms of the construction contract. Portable fuel storage and distribution systems would be used at the project site during decommissioning and demolition activities. The increase in fuel demand during the duration of the Proposed Action would be temporary and is not anticipated to exceed existing capacity. Therefore, no long-term impacts on liquid fuels would be expected.

**Solid Waste.** Short-term, minor, direct, adverse impacts on solid waste disposal would be expected. Any increases in municipal solid wastes associated with the demolition phases of the Proposed Action would be minimal, temporary in nature, and would be disposed of in accordance with relevant Federal, state, and local regulations. **Table 3-2** summarizes the estimate of debris that could potentially be generated from demolition activities. Demolition materials would be recycled or reused to the greatest extent possible. Demolition debris that could not be recycled or reused would be taken off-installation to an approved landfill within the vicinity of Ellsworth AFB.

**Transportation.** Short-term, negligible to minor, direct, adverse impacts on transportation would be expected. Potential increases in regional traffic volume in the vicinity of Ellsworth AFB due to demolition vehicles and commuting contractor employees associated with the decommissioning and demolition activities would be temporary. A temporary parking lot for demolition vehicles would be used during the Proposed Action; therefore, there would be no impacts on parking at Ellsworth AFB. Appropriate signage would be in place for demolition traffic. No long-term, adverse, direct or indirect impacts on transportation would be expected.

**Table 3-2. Estimate of Debris Generated from Demolition Activities**

<b>Building Number</b>	<b>Building Function or Process</b>	<b>Square Footage (ft<sup>2</sup>)</b>	<b>Total Debris (tons)*</b>
3003	Sludge Pits Reinput	13,952	1,102
3005	Main Building	1,885	149
3006	Clarifier Pits	156	12
3007	Digester Building	5,419	428
3008	Clarifier, Effluent Strut, Sludge/Scum Pits	1,670	132
3009	Chlorine storage facility	144	11
3010	Dome-Trickling Filter	12,131	958
3011	Belt Press Building	890	70
3013	Pretreatment facility	2,018	159
3014	Chlorine and Effluent sampling facility	114	9
<b>Total</b>		<b>38,379 ft<sup>2</sup></b>	<b>3,032 tons</b>

Note: \* The estimated total debris was calculated using a generation factor of 158 lb/ft<sup>2</sup>, which is the average generation rate of nonresidential construction and demolition debris documented by the USEPA in the *Estimated 2003 Building-Related Construction and Demolition Materials Amounts* (USEPA 2003).

### Wastewater Pipeline Easement and Construction

**Water Supply.** No impacts on water supply would be expected from the granting of a pipeline easement. Short-term, negligible, adverse impacts on water supply could be expected. Water demand could increase slightly to support the general construction of a sanitary sewer pipeline; however, potential increases in water demand associated with general construction activities would be temporary.

**Sanitary Sewer and Wastewater System.** No impacts on sanitary sewer and wastewater systems would be expected from the granting of a pipeline easement or construction of the proposed sanitary sewer pipeline within the proposed pipeline corridor.

**Storm Drainage System.** No impacts on the storm drainage system would be expected from the granting of a pipeline easement. Short-term, negligible, adverse impacts on the storm drainage system could be expected. Ground disturbance from the construction of a sanitary sewer pipeline could temporarily increase the potential for soil erosion and sediment transport during sheet flow runoff.

**Electrical System.** No impacts on the electrical system would be expected from the granting of a pipeline easement. Short-term, negligible, adverse impacts on the electrical system could be expected. Electricity demand would increase slightly to support construction of a sanitary sewer pipeline; however, potential increases in electricity demand associated with construction activities would be temporary.

**Natural Gas System.** The granting of a pipeline easement and construction of a sanitary sewer pipeline would not require the use of natural gas; therefore, no impacts on the natural gas system would be expected.

**Liquid Fuel Supply.** No impacts on liquid fuel supply would be expected from the granting of a pipeline easement. Short-term, negligible, adverse impacts on liquid fuels could be expected from use of petroleum-based products for construction equipment and vehicles. Fuel would be provided to

construction equipment and vehicles by Ellsworth AFB under the terms of the construction contract. Portable fuel storage and distribution systems would be used at the project site during construction activities.

**Solid Waste.** No impacts on solid waste management would be expected from the granting of a pipeline easement. Short-term and long-term, negligible, adverse impacts on solid waste disposal could be expected from increases in municipal waste due to construction activities.

**Transportation.** No impacts on transportation would be expected from the granting of a pipeline easement. Short-term, negligible, adverse impacts on transportation could be expected from possible increases in regional traffic volume in the vicinity of Ellsworth AFB due to construction vehicles and commuting contractor employees associated with the construction.

### Contribution of Ellsworth AFB's Wastewater to the Regional Waste Stream

The proposed RWWTP would be off-installation on approximately 10 acres of land, west of the stabilization pond system at the existing City of Box Elder WWTP. The proposed RWWTP would be composed of several components including headworks, batch reactor process buildings, a post-equalization tank, a waste-activated sludge tank, an ultraviolet disinfection unit, aerated sludge storage tanks, sludge dewatering units, ancillary equipment (e.g., pipes, pumps), utilities (e.g., electrical, potable water), and administrative buildings. The proposed RWWTP would use several chemicals such as oxidant, alkali, polymer, acid, caustic, carbon source (nutrient), coagulant, sample preservatives (i.e., acids and bases), and sample buffer solutions and reagents (EAFB 2008a).

The City of Box Elder's population is predicted to increase by more than 6,000 residential homes (more than 18,000 people) over the next 20 years (EAFB 2008a). **Table 2-4** in **Section 2** summarized the current and estimated future flows for the City of Box Elder and Ellsworth AFB wastewater streams. The table shows that the average daily wastewater production for Ellsworth AFB is projected to triple from the current flow of 0.5 MGD to about 1.5 MGD by 2028. The combined average daily flow for Ellsworth AFB and the City of Box Elder is expected to increase from 0.82 MGD at present, to 3.0 MGD by 2028. **Table 3-3** summarizes the current and future pollutant loadings anticipated for the year 2028. The BOD and TSS loadings for the current Ellsworth AFB wastewater stream were calculated using data which yielded the following average influent values in terms of concentration:

- BOD: 155 mg/L
- TSS: 210 mg/L.

No impacts would be expected on water supply, the sanitary sewer and wastewater system, the storm drainage system, electrical supply, natural gas supply, liquid fuel supply, solid waste, or transportation from Ellsworth AFB's wastewater contribution to the regional waste stream. After flow from the Ellsworth AFB WWTP would be diverted to the new RWWTP, the water levels of Box Elder Creek would initially remain at its current levels. There might be a slight increase in water availability downstream of the RWWTP outfall, as there would be less water withdrawal and infiltration from the unnamed tributary to Box Elder Creek that currently receives the Ellsworth AFB WWTP discharge. Future flows in Box Elder Creek could increase if the on-installation population generating wastewater increases, thereby increasing RWWTP effluent flow to Box Elder Creek.

**Table 3-3. Current and Future Pollutant Loadings for the City of Box Elder and Ellsworth AFB**

Parameter (ppd)	Current			Future (2028)		
	City of Box Elder	Ellsworth AFB <sup>a</sup>	Combined	City of Box Elder <sup>b</sup>	Ellsworth AFB	Combined
Average 5-Day BOD Load	N/A	920	N/A	3,924	2,300 <sup>c</sup>	6,224
Maximum Monthly BOD Load	N/A	N/A	N/A	4,473	N/A	N/A
Average TSS Load	N/A	1,200	N/A	4,617	N/A	N/A
Maximum Monthly TSS Load	N/A	N/A	N/A	6,002	N/A	N/A

Sources: EAFB 2008a, EAFB 2008b, EAFB 2009c

Notes:

- a. This is based on influent data for Ellsworth WWTP from October 2000 through August 2003.
- b. This is not based on actual data, but is based on recommended standards for wastewater treatment plant design (EAFB 2008a).
- c. This is an estimate and is not based on actual data.

Pollutant loading data for the City of Box Elder wastewater were not available. The RWWTP feasibility study assumed for planning purposes that the City of Box Elder wastewater currently has, and will have, the following influent pollutant loadings, which are typical of domestic wastewater (EAFB 2008a):

- BOD: 0.17 ppd per capita (310 mg/L) at the current wastewater generation rate of 65 gpcd
- TSS: 0.20 ppd per capita (370 mg/L) at the current wastewater generation rate of 65 gpcd.

### 3.2.3.2 WWTP Upgrade Alternative

Under the WWTP Upgrade Alternative, Ellsworth AFB would upgrade the existing WWTP to meet the SDSWDS permit requirements. The necessary upgrades would involve construction and demolition of facilities and the addition of a small road. Upgrades would result in the following impacts on infrastructure:

**Water Supply.** Short-term, negligible, direct, and long-term, minor, direct, adverse impacts on water supply would be expected. Water demand would increase slightly during construction of the new process building, sludge cake storage facility, and vehicle equipment storage facility; however, potential increases in water demand associated with construction activities would be temporary and are not anticipated to exceed existing capacity. Water demand would increase slightly as a result of additional WWTP infrastructure and treatment processes; however, potential long-term increases in water demand would be minor and not anticipated to exceed existing capacity.

**Sanitary Sewer and Wastewater System.** Short-term, negligible, direct, adverse, and long-term, minor, direct, beneficial impacts on sanitary sewer and wastewater systems would be expected. There would be a slight increase in wastewater due to construction of the new process building, sludge cake storage facility, and vehicle equipment storage facility. Potential increases in wastewater associated with construction activities would be temporary and are not anticipated to exceed existing capacity. Upgrades associated with the WWTP Upgrade Alternative would bring the WWTP in compliance with the more stringent SDSWDS permit requirements for ammonia, which would result in beneficial impacts on the sanitary sewer and wastewater system. However, similar beneficial effects would occur from

construction of the RWWTP. No long-term, adverse, direct or indirect impacts on sanitary sewer and wastewater systems would be expected. Impacts related to effluent are discussed in **Section 3.7.3**.

**Storm Drainage System.** Short-term, negligible, indirect, and long-term, minor, indirect, adverse impacts on storm drainage systems would be expected. Ground disturbance from construction of the new process building, sludge cake storage facility, and vehicle equipment storage facility would temporarily increase the potential for soil erosion and sediment transport during sheet flow runoff. Upon completion of construction activities, the amount of impervious surfaces would increase due to additional buildings associated with the WWTP and storm water permeation into the ground would decrease, thereby permanently increasing storm water runoff. Impacts related to effluent are discussed in **Section 3.7.3**.

**Electrical System.** Short-term, negligible, and long-term, minor, direct, adverse impacts on electrical supply would be expected. Electricity demand would increase slightly during construction of the new process building, sludge cake storage facility, and vehicle equipment storage facility; however, potential increases in electricity demand associated with construction activities would be temporary and are not anticipated to exceed existing capacity. Electricity demand would increase slightly as a result of additional WWTP infrastructure and treatment processes; however, potential long-term increases in electricity demand would be minor and not anticipated to exceed existing capacity.

**Natural Gas System.** No impacts on natural gas systems would be expected. Upgrades associated with the WWTP Upgrade Alternative would not require the use of natural gas.

**Liquid Fuel Supply.** Short-term, negligible, indirect, adverse impacts on liquid fuels would be expected. During construction of the new process building, sludge cake storage facility, and vehicle equipment storage facility, petroleum-based products would be used for construction equipment and vehicles. Fuel would be provided to construction equipment and vehicles by Ellsworth AFB under the terms of the construction contract. Portable fuel storage and distribution systems would be used at the project site during construction activities. The increase in fuel demand during the construction of the new process building, sludge cake storage facility, and vehicle equipment storage facility would be temporary and is not anticipated to exceed existing capacity. Therefore, no long-term impacts on liquid fuels would be expected.

**Solid Waste.** Short-term, minor, direct, adverse impacts on solid waste disposal would be expected. Any increases in municipal solid wastes associated with the Ellsworth AFB WWTP upgrades would be minimal, temporary in nature, and would be disposed of in accordance with relevant Federal, state, and local regulations.

**Transportation.** Short-term, negligible to minor, indirect, adverse impacts on transportation would be expected. Potential increases in regional traffic volume in the vicinity of Ellsworth AFB due to construction vehicles and commuting contractor employees associated with the construction of the new process building, sludge cake storage facility, and vehicle equipment storage facility would be temporary. A temporary parking lot for construction vehicles would be used during the construction activities; therefore, there would be no impacts on parking at Ellsworth AFB. Appropriate signage would be in place for construction traffic. No long-term, adverse, direct or indirect impacts on transportation would be expected.

### 3.2.3.3 No Action Alternative

Under the No Action Alternative, Ellsworth AFB would not implement the Proposed Action and would not upgrade the existing WWTP to meet the 2014 SDSWDS permit requirements. Ellsworth AFB would continue to use their existing WWTP to treat wastewater discharge. The existing WWTP would,

however, be unable to meet the more stringent SDSWDS standards for ammonia and would have to cease operation at that time, forcing Ellsworth AFB to identify alternative sources for wastewater treatment. The No Action Alternative would result in long-term, moderate, adverse impacts on the sanitary sewer system from Ellsworth AFB being required to identify alternative sources for treating wastewater treatment following expiration of their current WWTP SDSWDS permit.

### 3.2.4 Environmental Protection Measures

As part of the Proposed Action, the contractor would coordinate with local utility companies and the Civil Engineering staff at Ellsworth AFB prior to commencement of any construction or demolition activities to determine the estimated location of utility installations, such as sewer, telephone, fuel, electric, water lines, or any other underground installations that reasonably can be expected to be encountered during excavation and trenching activities associated with the Proposed Action. Any permits required for excavation and trenching would be obtained prior to the commencement of construction or demolition activities.

## 3.3 Noise

### 3.3.1 Definition of the Resource

Sound is defined as a particular auditory effect produced by a given source, for example the sound of rain on a rooftop. Sound is measured with instruments that record instantaneous sound levels in decibels. A-weighted decibel (dBA) is used to characterize sound levels (measured in dBA) that can be sensed by the human ear. “A-weighted” denotes the adjustment of the frequency range to what the average human ear can sense when experiencing an audible event.

Noise and sound share the same physical aspects, but noise is considered a disturbance while sound is defined as an auditory effect. Noise is defined as any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, or is otherwise annoying. Noise can be intermittent or continuous, steady or impulsive, and can involve any number of sources and frequencies. It can be readily identifiable or generally nondescript. Human response to increased sound levels varies according to the source type, characteristics of the sound source, distance between source and receptor, receptor sensitivity, and time of day. How an individual responds to the sound source will determine if the sound is viewed as music to one’s ears or as annoying noise. Affected receptors are specific (e.g., schools, churches, or hospitals) or broad (e.g., nature preserves or designated districts) areas in which occasional or persistent sensitivity to noise above ambient levels exists.

**Noise Metrics and Regulations.** Sound levels, resulting from multiple single events, are used to characterize community noise effects from aircraft or vehicle activity and are measured in day-night average sound level (DNL). The DNL noise metric incorporates a “penalty” for evening and nighttime noise events to account for increased annoyance. DNL is the energy-averaged sound level measured over a 24-hour period, with a 10-dBA penalty assigned to noise events occurring between 10:00 p.m. and 7:00 a.m. DNL values are obtained by averaging single event values for a given 24-hour period. DNL is the preferred sound level metric used to characterize noise impacts of the Federal Aviation Administration (FAA), U.S. Department of Housing and Urban Development (HUD), U.S. Environmental Protection Agency (USEPA), and DOD for modeling airport environments.

DNL is the metric recognized by the U.S. government for measuring noise and its impacts on humans. According to the USAF, the FAA, and the HUD criteria, residential units and other noise-sensitive land uses are “clearly unacceptable” in areas where the noise exposure exceeds a DNL of 75 dBA, “normally unacceptable” in regions exposed to noise between 65 dBA and 75 dBA, and “normally acceptable” in

areas exposed to noise of 65 dBA or under. The Federal Interagency Committee on Noise developed land use compatibility guidelines for noise in terms of DNL sound levels (FICON 1992). For outdoor activities, the USEPA recommends a DNL sound level of 55 dBA as the sound level below which there is no reason to suspect that the general population would be at risk from any of the effects of noise (USEPA 1974).

Noise levels vary depending on the population density and proximity to land uses such as parks, schools, or industrial facilities. As shown on **Table 3-4**, noise levels in a suburban residential area are at a DNL of about 55 dBA, which increases to 60 dBA for an urban residential area, and to 80 dBA in the downtown section of a city (FHWA 1980).

**Table 3-4. Typical Outdoor Noise Levels**

<b>DNL (dBA)</b>	<b>Location</b>
50	Residential area in a small town or quiet suburban area
55	Suburban residential area
60	Urban residential area
65	Noisy urban residential area
70	Very noisy urban residential area
80	City noise (downtown of major metropolitan area)
88	3rd floor apartment in a major city next to a freeway

Source: FHWA 1980

Most people are exposed to sound levels of a DNL of 50 to 55 dBA or higher on a daily basis. Studies specifically conducted to determine noise effects on various human activities show that about 90 percent of the population is not significantly bothered by outdoor sound levels below 65 dBA (FICON 1992). Studies of community annoyance in response to numerous types of environmental noise show that DNL correlates well with effect assessments and that there is a consistent relationship between DNL and the level of annoyance.

**Demolition Sound Levels.** Building demolition work can cause an increase in sound that is well above the ambient level. A variety of sounds are emitted from graders, loaders, trucks, generators, and other work activities and processes. **Table 3-5** lists noise levels associated with common types of demolition equipment. Construction equipment usually exceeds the ambient sound levels by 20 to 25 dBA in an urban environment and up to 30 to 35 dBA in a quiet suburban area.

**Table 3-5. Predicted Noise Levels for Demolition and Construction Equipment**

<b>Equipment</b>	<b>Predicted Noise Level at 50 Feet</b>
Bulldozer	80 dBA
Dump Truck	83–94 dBA
Backhoe	72–93 dBA
Front-End Loaders	72–82 dBA
Generators	71–80 dBA

Source: USEPA 1971



### 3.3.2 Description of Affected Environment

**Ambient Noise Environment.** The ambient noise environment at Ellsworth AFB is affected mainly by installation aircraft operations and vehicles. Noise from aircraft operations dominates the ambient environment throughout Ellsworth AFB as a result of operations performed by the 28 BW. The noise contour for the DNL of 65 to 80+ dBA noise zones from aircraft operations at Ellsworth AFB extends along the runways to the northwest and southeast, and encompasses the existing WWTP proposed for demolition (EAFB 2008e). Vehicles also contribute to the ambient noise environment. Roadways around the vicinity of the project and Ellsworth AFB include I-90 south of the installation, Davis Street, Ellsworth Street, South Ellsworth Road, Ellsworth Road, Commercial Gate Drive, and the local roadway network on the installation.

### 3.3.3 Environmental Consequences

#### Evaluation Criteria

Noise impact analyses typically evaluate potential changes to the existing noise environment that would result from implementation of a proposed action. Potential changes in the acoustical environment can be beneficial (i.e., if they reduce the number of sensitive receptors exposed to unacceptable noise levels or reduce the ambient sound level), negligible (i.e., if the total number of sensitive receptors to unacceptable noise levels is essentially unchanged), or adverse (i.e., if they result in increased sound exposure to unacceptable noise levels or ultimately increase the ambient sound level). Projected noise effects were evaluated qualitatively for the alternatives considered.

#### 3.3.3.1 Proposed Action

##### Existing Ellsworth AFB WWTP Decommissioning and Demolition

Noise from demolition activities varies depending on the type of demolition equipment being used, the area that the action would occur in, and the distance from the noise source. To predict how demolition activities would impact adjacent populations, noise from demolition activities were estimated using equations to calculate approximate cumulative noise from construction equipment and the noise levels at noise sensitive receptors. For example, as shown in **Table 3-5**, demolition usually involves several types of equipment (e.g., bulldozers and loaders) that can be used simultaneously. Under the Proposed Action, the cumulative noise from the demolition equipment, during the busiest day, was estimated to determine the total impact of noise from demolition activities at a given distance. Examples of expected cumulative demolition noise during daytime hours at specified distances are shown in **Table 3-6**. These sound levels were predicted for 100, 200, 400, 800, and 1,200 feet from the source of the noise.

**Table 3-6. Predicted Noise Levels from Demolition and Construction Activities**

Distance from Noise Source	Predicted Noise Level
100 feet	84 dBA
200 feet	78 dBA
400 feet	72 dBA
800 feet	66 dBA
1,200 feet	62 dBA

The existing WWTP falls within the 80+ dBA noise contour from aircraft operations at Ellsworth AFB. The Proposed Project Corridor is also partially within the 80+ dBA noise contour. Since multiple single noise events create the cumulative DNL value, the actual sound levels that a person hears within the area of the 80+ dBA noise contour fluctuates throughout a 24-hour period. Consequently, populations within and adjacent to the WWTP are accustomed to fluctuations of noise levels in the 70 to 90 dBA range. Noise generation would last only for the duration of demolition activities and would be isolated to normal working hours (i.e., between 7:00 a.m. and 5:00 p.m.). Consequently, demolition activities at Ellsworth AFB would result in short-term, minor, adverse effects on the noise environment (see **Section 3.1.3.1** for a discussion of land use related impacts).

### Wastewater Pipeline Easement and Construction

Granting of an easement would not have an impact on the noise environs at Ellsworth AFB. Construction activities related to construction of a sanitary sewer pipeline would likely result in impacts similar to those discussed under Decommissioning and Demolition. Predicted noise levels from pipeline construction activities would be similar to those shown in **Table 3-6**. The Proposed Project Corridor is partially within the 80+ dBA noise contour. Similarly to the populations within and adjacent to the WWTP, the populations within the Proposed Project Corridor are accustomed to fluctuations of noise levels in the 70 to 90 dBA range. Noise generation would last only for the duration of construction activities and would be isolated to normal working hours (i.e., between 7:00 a.m. and 5:00 p.m.). Consequently, construction of the wastewater pipeline would result in short-term, minor, adverse effects on the noise environment.

### Contribution of Ellsworth AFB's Wastewater to the Regional Waste Stream

This portion of the Proposed Action would not have an effect on the noise environs in the Proposed Project Corridor or on Ellsworth AFB.

#### 3.3.3.2 WWTP Upgrade Alternative

Under the WWTP Upgrade Alternative, Ellsworth AFB would upgrade the existing WWTP to meet the SDSWDS permit requirements for ammonia discharge. The necessary upgrades would involve construction and demolition of facilities and the addition of a small road.

There would be an increase in construction activities in connection with the upgrades of the existing WWTP. The noise generated by the construction activities would be similar in nature to the demolition noise described for the decommissioning and demolition activities.

Since the WWTP falls within the noise contours from aircraft operations at Ellsworth AFB the work area under the WWTP Upgrade Alternative falls within the 80+ dBA noise contour. The expected noise impacts would be similar to those described in **Section 3.3.3.1**. Consequently, construction activities at Ellsworth AFB would result in impacts on the noise environment; however, these impacts would be expected to be less than significant.

#### 3.3.3.3 No Action Alternative

No impacts on noise would be expected under the No Action Alternative.

### 3.3.4 Environmental Protection Measures

Noise generation would last only for the duration of construction and demolition activities and would be isolated to normal working hours (i.e., between 7:00 a.m. and 5:00 p.m.).

## 3.4 Air Quality

### 3.4.1 Definition of the Resource

In accordance with Federal Clean Air Act (CAA) requirements, the air quality in a given region or area is measured by the concentration of various pollutants in the atmosphere. The measurements of these “criteria pollutants” in ambient air are expressed in units of parts per million (ppm), milligrams per cubic meter ( $\text{mg}/\text{m}^3$ ), or micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ). The air quality in a region is a result not only of the types and quantities of atmospheric pollutants and pollutant sources in an area, but also surface topography, the size of the topological “air basin,” and the prevailing meteorological conditions.

The CAA directed the USEPA to develop, implement, and enforce strong environmental regulations that would ensure clean and healthy ambient air quality. To protect public health and welfare, USEPA developed numerical concentration-based standards, or National Ambient Air Quality Standards (NAAQS), for pollutants that have been determined to impact human health and the environment. USEPA established both primary and secondary NAAQS under the provisions of the CAA. NAAQS are currently established for six criteria air pollutants: ozone ( $\text{O}_3$ ), carbon monoxide (CO), nitrogen dioxide ( $\text{NO}_2$ ),  $\text{SO}_2$ , respirable particulate matter (including particulate matter equal to or less than 10 microns in diameter [ $\text{PM}_{10}$ ] and particulate matter equal to or less than 2.5 microns in diameter [ $\text{PM}_{2.5}$ ]), and lead (Pb). The primary NAAQS represent maximum levels of background air pollution that are considered safe, with an adequate margin of safety to protect public health. Secondary NAAQS represent the maximum pollutant concentration necessary to protect vegetation, crops, and other public resources along with maintaining visibility standards. **Table 3-7** presents the primary and secondary USEPA NAAQS.

Although  $\text{O}_3$  is considered a criteria air pollutant and is measurable in the atmosphere, it is not often considered a regulated air pollutant when calculating emissions because  $\text{O}_3$  is typically not emitted directly from most emissions sources. Ozone is formed in the atmosphere by photochemical reactions involving sunlight and previously emitted pollutants or “ $\text{O}_3$  precursors.” These  $\text{O}_3$  precursors consist primarily of nitrogen oxides ( $\text{NO}_x$ ) and volatile organic compounds (VOCs) that are directly emitted from a wide range of emissions sources. For this reason, regulatory agencies attempt to limit atmospheric  $\text{O}_3$  concentrations by controlling VOC pollutants (also identified as reactive organic gases) and  $\text{NO}_2$ .

As authorized by the CAA, USEPA has delegated responsibility for ensuring compliance with NAAQS to the states and local agencies. As such, each state must develop air pollutant control programs and promulgate regulations and rules that focus on meeting NAAQS and maintaining healthy ambient air quality levels. These programs are detailed in State Implementation Plans (SIPs) that must be developed by each state or local regulatory agency and approved by USEPA. A SIP is a compilation of regulations, strategies, schedules, and enforcement actions designed to move the state into compliance with all NAAQS. Any changes to the compliance schedule or plan (e.g., new regulations, emissions budgets, controls) must be incorporated into the SIP and approved by USEPA.

In 1997, USEPA initiated work on new General Conformity rules and guidance to reflect the new 8-hour  $\text{O}_3$ ,  $\text{PM}_{2.5}$ , and regional haze standards that were promulgated in that year. The 1-hour  $\text{O}_3$  standard will no longer apply to an area 1 year after the effective date of the designation of that area for the 8-hour  $\text{O}_3$

**Table 3-7. National and State Ambient Air Quality Standards**

Pollutant	Averaging Time	Primary Standard		Secondary Standard
		Federal	State	
CO	8-hour <sup>(1)</sup>	9 ppm (10 mg/m <sup>3</sup> )	Same	None
	1-hour <sup>(1)</sup>	35 ppm (40 mg/m <sup>3</sup> )	Same	None
Pb	Quarterly average	1.5 µg/m <sup>3</sup>	Same	Same as Primary
	Rolling 3-Month Average	0.15 µg/m <sup>3</sup> <sup>(2)</sup>	--	Same as Primary
NO <sub>2</sub>	Annual Arithmetic Mean	53 ppb <sup>(3)</sup>	Same	Same as Primary
	1-hour	100 ppb <sup>(4)</sup>	--	None
PM <sub>10</sub>	Annual Arithmetic Mean	--	--	Same as Primary
	24-hour <sup>(5)</sup>	150 µg/m <sup>3</sup>	Same	Same as Primary
PM <sub>2.5</sub>	Annual Arithmetic Mean <sup>(6)</sup>	15 µg/m <sup>3</sup>	Same	Same as Primary
	24-hour <sup>(7)</sup>	35 µg/m <sup>3</sup>	Same	Same as Primary
O <sub>3</sub>	8-hour <sup>(8)</sup>	0.075 ppm (2008 Standard)	0.080 ppm	Same as Primary
	8-hour <sup>(9)</sup>	0.08 ppm (1997 Standard)		Same as Primary
	1-hour <sup>(10)</sup>	0.12 ppm	--	Same as Primary
SO <sub>2</sub>	Annual Arithmetic Mean	0.03 ppm	Same	0.5 ppm (3-hour) <sup>(11)</sup>
	24-hour <sup>(1)</sup>	0.14 ppm	Same	0.5 ppm (3-hour) <sup>(11)</sup>
	1-hour	75 ppb <sup>(11)</sup>	Same	None

Sources: USEPA 2010, SDDENR 2009

Notes: Parenthetical values are approximate equivalent concentrations.

1. a. Not to be exceeded more than once per year.
2. Final rule signed 15 October 2008.
3. The official level of the annual NO<sub>2</sub> standard is 0.053 ppm, equal to 53 ppb, which is shown here for the purpose of cleaner comparison to the 1-hour standard.
4. To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 100 ppb (effective 22 January 2010).
5. Not to be exceeded more than once per year on average over 3 years.
6. To attain this standard, the 3-year average of the weighted annual mean PM<sub>2.5</sub> concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m<sup>3</sup>.
7. To attain this standard, the 3-year average of the weighted annual of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m<sup>3</sup> (effective 17 December 2006).
8. To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm (effective 27 May 2008).
9. a. To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.  
b. The 1997 standard, and the implementation rules for that standard, will remain in place for implementation purposes as USEPA undertakes rulemaking to address the transition from the 1997 ozone standard to the 2008 ozone standard.  
c. USEPA is in the process of reconsidering these standards (set in March 2008).
10. a. USEPA revoked the 1-hour ozone standard in all areas, although some areas have continuing obligations under that standard (anti-backsliding).  
b. The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is ≤ 1.
11. Final rule signed on 2 June 2010. To attain this standard, the 3-year average of the 99th percentile of daily maximum 1-hour average at each monitor within an area must not exceed 75 ppb.

Key: ppm = parts per million; mg/m<sup>3</sup> = milligrams per cubic meter; µg/m<sup>3</sup> = micrograms per cubic meter

NAAQS. The effective designation date for most areas was June 15, 2004. USEPA designated PM<sub>2.5</sub> nonattainment areas in December 2004, and finalized the PM<sub>2.5</sub> implementation rule in January 2005. No county in the state of South Dakota was identified as being nonattainment for the PM<sub>2.5</sub> standard.

On 22 September 2009, the USEPA issued a final rule for mandatory greenhouse gas (GHG) reporting from large GHG emissions sources in the United States. The purpose of the rule is to collect comprehensive and accurate data on carbon dioxide (CO<sub>2</sub>) and other GHG emissions that can be used to inform future policy decisions. In general, the threshold for reporting is 25,000 metric tons or more of CO<sub>2</sub> equivalent per year. The first emissions report is due in 2011 for 2010 emissions. Although GHGs are not currently regulated under the CAA, the USEPA has clearly indicated that GHG emissions and climate change are issues that need to be considered in future planning. GHGs are produced by the burning of fossil fuels and through industrial and biological processes.

Title V of the CAA Amendments of 1990 requires states and local agencies to permit major stationary sources. A major stationary source is a facility (i.e., plant, installation, or activity) that has the potential to emit more than 100 tons per year (tpy) of any one criteria air pollutant, 10 tpy of a hazardous air pollutant (HAP), or 25 tpy of any combination of HAPs.

Federal Prevention of Significant Deterioration (PSD) regulations also define air pollutant emissions from proposed major stationary sources or modifications to be “significant” if (1) a proposed project is within 10 kilometers of any Class I area, and (2) regulated pollutant emissions would cause an increase in the 24-hour average concentration of any regulated pollutant in the Class I area of 1 µg/m<sup>3</sup> or more [40 CFR 52.21(b)(23)(iii)]. PSD regulations also define ambient air increments, limiting the allowable increases to any area’s baseline air contaminant concentrations, based on the area’s designation as Class I, II, or III [40 CFR 52.21(c)]. Because Ellsworth AFB is not within 10 kilometers of a Class I area, PSD regulations do not apply and are not discussed further in this EA.

### 3.4.2 Description of Affected Environment

Ellsworth AFB is in Meade and Pennington counties and the City of Box Elder is in Pennington County. Meade and Pennington counties are within the Black Hills-Rapid City Intrastate (BHRCI) Air Quality Control Region (AQCR). The BHRCI AQCR consists of the counties of Butte, Custer, Fall River, Lawrence, Meade, and Pennington, South Dakota. As defined in 40 CFR 81.342, Meade and Pennington counties are designated as attainment/unclassifiable for all criteria pollutants (USEPA 2002a).

The most recent emissions inventories for Meade and Pennington counties and the BHRCI AQCR are shown in **Table 3-8**. Meade and Pennington counties are considered the local area of influence, and the BHRCI AQCR is considered the regional area of influence for the air quality analysis.

**Table 3-8. Local and Regional Air Emissions Inventory for the Proposed Action (2002)**

	NO <sub>x</sub> (tpy)	VOC (tpy)	CO (tpy)	SO <sub>2</sub> (tpy)	PM <sub>10</sub> (tpy)	PM <sub>2.5</sub> (tpy)
Meade County, SD	1,546	1,360	9,680	136	5,069	787
Pennington County, SD	9,559	5,799	40,433	2,738	8,409	1,802
BHRCI AQCR	15,082	9,923	68,289	3,295	22,883	4,248

Source: USEPA 2002b

The U.S. Department of Energy, Energy Information Administration (DOE/EIA), estimates that in 2005 gross CO<sub>2</sub> emissions in South Dakota were 14.4 million metric tons (DOE/EIA 2005).

SDDENR regulates air quality for the State of South Dakota. Ellsworth AFB is classified as a synthetic minor with SDDENR (SDDENR 2007). As required by SDDENR, Ellsworth AFB calculates annual criteria pollutant emissions from stationary sources and provides this information to SDDENR. There are various sources on-installation that emit criteria pollutants and HAPs, including generators, boilers, hot water heaters, fuel storage tanks, gasoline service stations, surface coating/paint booths, and miscellaneous chemical usage.

### 3.4.3 Environmental Consequences

#### Evaluation Criteria

The environmental consequences to local and regional air quality conditions near a proposed Federal action are determined based upon the increases in regulated pollutant emissions relative to existing conditions and ambient air quality. Specifically, the impact in NAAQS “attainment” areas would be considered significant if the net increases in pollutant emissions from the Federal action would result in any one of the following scenarios:

- Cause or contribute to a violation of any national or state ambient air quality standard
- Expose sensitive receptors to substantially increased pollutant concentrations
- Represent an increase of 10 percent or more in an affected AQCR emissions inventory
- Exceed any Evaluation Criteria established by a SIP or permit limitations.

#### 3.4.3.1 Proposed Action

##### Existing Ellsworth AFB WWTP Decommissioning and Demolition

Short-term, minor, direct, adverse impacts would be expected from construction and demolition emissions and land disturbance. The Proposed Action would result in minor impacts on regional air quality during demolition activities, primarily from site-disturbing activities and operation of construction equipment. Appropriate fugitive dust-control measures would be employed during demolition activities to suppress emissions. All emissions associated with demolition operations would be temporary in nature. It is not expected that emissions from the Proposed Action would contribute to or affect local or regional attainment status with the NAAQS. Emissions from the Proposed Action are summarized in **Table 3-9**. Emissions estimation spreadsheets and summary of the methodology used are included in **Appendix C**.

The Proposed Action would generate particulate matter emissions as fugitive dust from ground-disturbing activities. Appropriate fugitive dust-control measures would be employed during construction activities to suppress emissions. Emissions of all criteria pollutants would result from demolition activities, combustion of fuels from on-road haul trucks transporting materials, and construction commuter emissions.

Fugitive dust emissions would be greatest during initial site preparation activities and would vary from day to day depending on the demolition phase, level of activity, and prevailing weather conditions. The quantity of uncontrolled fugitive dust emissions from a construction site is proportional to the area of land being worked and the level of activity. Fugitive dust emissions for various demolition activities were calculated using emissions factors and assumptions published in USEPA AP-42. These estimates assume that the project duration is 12 months or 240 working days for demolition. Emission calculations and methodology used are included in **Appendix E**.

**Table 3-9. Estimated Air Emissions Resulting from the Proposed Action**

Activity	NO <sub>x</sub> tpy	VOC tpy	CO tpy	SO <sub>2</sub> tpy	PM <sub>10</sub> tpy	PM <sub>2.5</sub> tpy	CO <sub>2</sub> tpy
Combustion	0.454	0.027	0.179	0.009	0.027	0.027	52.975
Fugitive Dust	--	--	--	--	2.107	0.118	--
Haul Truck On-Road	0.003	0.002	0.008	0.000	0.003	0.001	0.655
Construction Worker Commuter	0.110	0.110	0.992	0.001	0.010	0.007	131.482
<b>Total Proposed Action Emissions</b>	<b>0.567</b>	<b>0.139</b>	<b>1.178</b>	<b>0.011</b>	<b>2.148</b>	<b>0.245</b>	<b>185.111</b>
Percent of BHRCI Inventory	0.004	0.001	0.002	< 0.001	0.009	0.006	0.001*

Note: \* Percent of State of South Dakota CO<sub>2</sub> emissions.

The Energy Information Administration estimates that in 2008 gross CO<sub>2</sub> emissions in South Dakota were 14.9 million metric tons (DOE/EIA 2010). Approximately 168 metric tons of CO<sub>2</sub> were estimated to be emitted by the Proposed Action, which is approximately 0.001 percent of the South Dakota statewide CO<sub>2</sub> emissions. Therefore, the Proposed Action would have negligible contribution towards the South Dakota statewide GHG inventory. CO<sub>2</sub> emission estimates are included in **Appendix E**.

Since Ellsworth AFB is in attainment for all criteria pollutants, General Conformity Rule requirements are not applicable. The Proposed Action would generate emissions well below 10 percent of the emissions inventory for the BHRCI AQCR and the emissions would be short-term. Therefore, the demolition activities associated with the Proposed Action would not have significant impacts on air quality at Ellsworth AFB or on regional or local air quality. **Appendix E** includes the air emissions estimation spreadsheets and methodology.

### Wastewater Pipeline Easement and Construction

The granting of an easement to the South Dakota EDA to construct a pipeline from Ellsworth AFB to the proposed future RWWTP would have no adverse impact on local or regional air quality. Construction activities related to construction of a sanitary sewer pipeline would result in impacts similar to those discussed under Decommissioning and Demolition. **Table 3-9** includes estimated emissions from pipeline construction activities.

### Contribution of Ellsworth AFB's Wastewater to the Regional Waste Stream

The future contributions of Ellsworth AFB's wastewater to the proposed RWWTP would not involve any construction or other ground-disturbing activities. Therefore, future contributions to the RWWTP would have no adverse impact on local or regional air quality.

#### 3.4.3.2 WWTP Upgrade Alternative

Under the WWTP Upgrade Alternative, Ellsworth AFB would upgrade the existing WWTP to meet the 2014 SDSWDS permit requirements. The necessary upgrades would involve construction and demolition of facilities and the addition of a small road.

Short-term, minor, direct, adverse impacts would be expected from construction and demolition emissions and land disturbance. The WWTP Upgrade Alternative would result in minor impacts on regional air

quality during construction and demolition activities, primarily from site-disturbing activities and operation of construction equipment. Appropriate fugitive dust-control measures would be employed during construction and demolition activities to suppress emissions. All emissions associated with construction and demolition operations would be temporary in nature. It is not expected that emissions from the WWTP Upgrade Alternative would contribute to or affect local or regional attainment status with the NAAQS. Emissions from the WWTP Upgrade Alternative are summarized in **Table 3-10**. Emissions estimation spreadsheets and summary of the methodology used are included in **Appendix C**.

**Table 3-10. Estimated Air Emissions Resulting from the WWTP Upgrade Alternative**

Activity	NO <sub>x</sub> tpy	VOC tpy	CO tpy	SO <sub>2</sub> tpy	PM <sub>10</sub> tpy	PM <sub>2.5</sub> tpy	CO <sub>2</sub> tpy
Construction Combustion	5.028	0.547	2.206	0.382	0.359	0.348	570.338
Construction Fugitive Dust	--	--	--	--	1.274	0.125	--
Haul Truck On-Road	0.003	0.002	0.008	0.000	0.003	0.001	0.671
Construction Commuter	0.110	0.110	0.992	0.001	0.010	0.007	131.482
<b>Total Proposed Action Emissions</b>	<b>5.141</b>	<b>0.659</b>	<b>3.205</b>	<b>0.383</b>	<b>1.646</b>	<b>0.481</b>	<b>702.491</b>
Percent of BHRCI Inventory	0.034	0.007	0.005	0.012	0.007	0.011	0.004*

Note: \* Percent of State of South Dakota CO<sub>2</sub> emissions.

The construction project would generate particulate matter emissions as fugitive dust from ground-disturbing activities. Appropriate fugitive dust-control measures would be employed during construction activities to suppress emissions. Emissions of all criteria pollutants would result from construction and demolition activities; combustion of fuels from on-road haul trucks transporting materials, and construction commuter emissions.

Fugitive dust emissions would be greatest during initial site preparation activities and would vary from day to day depending on the construction phase, level of activity, and prevailing weather conditions. The quantity of uncontrolled fugitive dust emissions from a construction site is proportional to the area of land being worked and the level of construction activity. Fugitive dust emissions for various construction activities were calculated using emissions factors and assumptions published in USEPA AP-42. These estimates assume that the project duration is 12 months or 240 working days for construction. Emissions calculations and methodology used are included in **Appendix E**.

The Energy Information Administration estimates that in 2008 gross CO<sub>2</sub> emissions in South Dakota were 14.8 million metric tons (DOE/EIA 2010). Approximately 638 metric tons of CO<sub>2</sub> were estimated to be emitted by the WWTP Upgrade Alternative, which is approximately 0.004 percent of the South Dakota statewide CO<sub>2</sub> emissions. Therefore, the WWTP Upgrade Alternative would have negligible contribution towards the South Dakota statewide GHG inventory. CO<sub>2</sub> emission estimates are included in **Appendix E**.

Since Ellsworth AFB is in attainment for all criteria pollutants, General Conformity Rule requirements are not applicable. The WWTP Upgrade Alternative would generate emissions well below 10 percent of the emissions inventory for the BHRCI AQCR and the emissions would be short-term. Therefore, the construction and demolition activities associated with the WWTP Upgrade Alternative would not have significant impacts on air quality at Ellsworth AFB or on regional or local air quality.



### 3.4.3.3 No Action Alternative

No impacts on air quality would be expected under the No Action Alternative.

### 3.4.4 Environmental Protection Measures

Contractors would be required to implement fugitive dust-control measures, such as wind breaks and barriers, frequent water applications, application of soil additives, control of vehicle access, vehicle speed restrictions, covering of piles, use of gravel at site exit points, washing of equipment at the end of each work day and prior to site removal, and work stoppage. All construction and demolition equipment would be properly tuned and maintained prior to and for the duration of the Proposed Action. In addition, construction and demolition equipment and vehicles would reduce idling times to 5 minutes or less when possible. The Proposed Action would utilize existing power sources (e.g., power poles) or clean fuel generators rather than temporary power generators.

## 3.5 Safety

### 3.5.1 Definition of the Resource

A safe environment is one in which the potential for death, serious bodily injury or illness, or property damage is eliminated or reduced as much as possible. Human health and safety addresses workers' health and safety during burning, demolition, and construction activities, and public safety during burning, demolition, and construction activities and subsequent operations of those facilities.

Safety and accident hazards can often be identified and reduced or eliminated. Necessary elements for an accident-prone situation or environment include the presence of the hazard itself together with the exposed (and possibly susceptible) population. The degree of exposure depends primarily on the proximity of the hazard to the population. Activities that can be hazardous include transportation, maintenance and repair activities, and the creation of extremely noisy environments. The proper operation, maintenance, and repair of vehicles and equipment carry important safety implications. Any facility or human-use area with potential explosive or other rapid oxidation process creates unsafe environments for nearby populations. Extremely noisy environments can also mask verbal or mechanical warning signals such as sirens, bells, or horns.

AFI 91-202, *USAF Mishap Prevention Program*, implements AFD 91-2, *Safety Programs*. It establishes mishap prevention program requirements (including the BASH Program), assigns responsibilities for program elements, and contains program management information. This instruction applies to all USAF personnel. AFI 91-301, *Air Force Occupational and Environmental Safety, Fire Protection, and Health (AFOSH) Program*, implements AFD 91-3, *Occupational Safety and Health*, by outlining the AFOSH Program. The purpose of the AFOSH Program is to minimize loss of USAF resources and to protect USAF personnel from occupational deaths, injuries, or illnesses by managing risks. In conjunction with the USAF Mishap Prevention Program, these standards ensure all USAF workplaces meet Federal safety and health requirements. EIA 32 CFR 989.27, *Occupational Safety and Health*, requires an assessment of direct and indirect impacts of proposed actions on the safety and health of USAF employees and others at a work site.

### 3.5.2 Description of Affected Environment

It is assumed that all applicable standards, such as those required by the Occupational Safety and Health Administration (OSHA), are strictly followed at Ellsworth AFB, and installation personnel are regularly

briefed on hazards and safety concerns existing in their particular workplace. All contractors performing demolition and construction activities are responsible for following ground safety and OSHA regulations and are required to conduct construction activities in a manner that does not pose any risk to workers or personnel. Industrial hygiene programs address exposure to hazardous materials, use of personal protective equipment, and use and availability of Material Safety Data Sheets. Industrial hygiene is the responsibility of contractors, as applicable. Contractor responsibilities are to review potentially hazardous workplaces; to monitor exposure to workplace chemical (e.g., asbestos, lead, hazardous material), physical (e.g., noise propagation), and biological (e.g., infectious waste) agents; to recommend and evaluate controls (e.g., ventilation, respirators) to ensure personnel are properly protected or unexposed; and to ensure a medical surveillance program is in place to perform occupational health physicals for those workers subject to any accidental chemical exposures or engaged in hazardous waste work.

Explosive safety clearance zones must be established around facilities used for the storage, handling, or maintenance of munitions. Air Force Manual 91-201, *Explosives Safety Standards*, establishes the size of the clearance zones based on quantity-distance (QD) criteria or the category and weight of the explosives contained within the facility. There are Explosive Safety Zones on Ellsworth AFB. These zones have been integrated into one large zone that essentially encompasses the east and west sides of the active runway, the bomber alert area, the Munitions Storage Area (MSA) in the northern portion of the installation, and the small arms training range and supporting ammunition storage area east of the MSA (EAFB 2008c). There are no Explosive Safety Zones within the proposed project site.

DOD analysis has determined that the areas immediately beyond the ends of runway and along the approach and departure flights paths at Ellsworth AFB have significant potential for aircraft accidents. Based on this analysis, DOD developed three zones that have high relative potential for accidents, the CZ, APZ I, and the APZ II. The CZ, the area closest to the runway end, is the most hazardous. APZ I is an area beyond the CZ that has significant potential for accidents. APZ II is an area beyond APZ I with a lesser, but still significant, potential for accidents. While aircraft accident potential in APZs I and II does not warrant acquisition by the USAF, land use planning and controls are strongly encouraged in these areas for the protection of the public. Ellsworth AFB's CZ encompasses an area 3,000 feet wide by 3,000 feet long. APZ I is 3,000 feet wide by 5,000 feet long and APZ II is 3,000 feet wide by 7,000 feet long (EAFB 2008e). The proposed project is 1,000 feet southeast of the southern end of the runway and within APZ I.

There are two Electromagnetic Radiation Safety Zones (ERSZs) on Ellsworth AFB. One of the ERSZs is within the northern Airfield CZs and one is within the southern Airfield CZs. Both of the ERSZs at Ellsworth AFB are restricted (EAFB 2008c). The proposed project is not within an ERSZ.

Range sites on Ellsworth AFB contain various munitions and unexploded ordnance (UXO). Most of the munitions, UXO, and CAISs on the surface have been removed. However, munitions, UXO, and CAISs still can be found below the ground surface. The proposed project is not within range sites; therefore, there is an extremely low potential for encountering munitions and UXO at the proposed project site (EAFB 2007c).

### 3.5.3 Environmental Consequences

#### Evaluation Criteria

If implementation of any alternative were to substantially increase risks associated with the safety of personnel, contractors, or the contractor residences, or substantially hinder the ability to respond to an emergency, it would represent a significant impact on safety. Impacts were assessed based on the potential effects of project activities on Ellsworth AFB operations and personnel.

### 3.5.3.1 Proposed Action

#### Existing Ellsworth AFB WWTP Decommissioning and Demolition

Short-term, negligible to minor, direct, adverse impacts would be expected during demolition of the WWTP; however, no long-term operational safety impacts would be expected. Risk to contractors would be minimal since it is assumed that contractors would be required to establish and maintain demolition safety programs during demolition activities. Adherence to these established safety programs would help to reduce any potential demolition safety risks associated with the Proposed Action. Work areas surrounding demolition activities would be fenced and appropriate signs posted to further reduce safety risks. Because there are no known range sites within the existing WWTP and public access to the WWTP would be restricted, no impacts associated with fire hazards or public safety would be expected. If inadvertent discovery of munitions or UXO occurs during demolition activities, the contractor would be required to immediately stop work in the area, personnel would move away from the site, and the Ellsworth AFB Explosive Ordnance Disposal Flight would be contacted. Though the Proposed Project Corridor is within APZ I, no impacts on public safety would be expected from APZ I, as land use would not change in the Proposed Project Corridor.

#### Wastewater Pipeline Easement and Construction

No impacts on safety would be expected from an easement being granted on Ellsworth AFB. Short-term, minor, adverse impacts could be expected during construction of the sanitary sewer pipeline; however, no long-term operational safety impacts would be expected. Risk to contractors would be minimal since contractors would be required to establish and maintain construction safety programs during pipeline construction activities. It is assumed that construction work areas would be fenced and appropriate signs posted to further reduce safety risks.

#### Contribution of Ellsworth AFB's Wastewater to the Regional Waste Stream

No impacts on safety would be expected from the contribution of Ellsworth AFB's wastewater to the regional waste stream.

### 3.5.3.2 WWTP Upgrade Alternative

Under the WWTP Upgrade Alternative, Ellsworth AFB would upgrade the existing WWTP to meet the 2014 SDSWDS permit requirements. The necessary upgrades would involve construction and demolition of facilities and the addition of a small road. Short-term, negligible to minor, direct, adverse impacts would be expected during construction and demolition activities, however no long-term operational safety impacts would be expected. Risk to contractors would be minimal since contractors would be required to establish and maintain construction safety programs. Adherence to these established safety programs would help to reduce any potential construction safety risks associated with the WWTP Upgrade Alternative.

Work areas surrounding construction activities would be fenced and appropriate signs posted to further reduce safety risks. Because there are no known range sites within the existing WWTP at Ellsworth AFB and public access to the WWTP would be restricted, no impacts associated with fire hazards or public safety would be expected. If inadvertent discovery of munitions or UXO occurs during construction of the new process building, sludge cake storage facility, or vehicle equipment storage facility, the contractor would be required to immediately stop work in the area, personnel would move away from the site, and the Ellsworth AFB Explosive Ordnance Disposal Flight would be contacted.

### 3.5.3.3 No Action Alternative

No impacts on safety would be expected under the No Action Alternative.

### 3.5.4 Environmental Protection Measures

All contractors performing demolition activities at Ellsworth AFB are responsible for following ground safety regulations and worker compensation programs. In addition, all contractors are required to perform demolition activities in a manner that does not pose any risk to its workers or installation personnel. An industrial hygiene program addresses exposure to hazardous materials, use of personal protective equipment, and the availability of Material Safety Data Sheets. Industrial hygiene is the responsibility of contractors, as applicable.

If any suspected military munitions, UXO, or CAIS-related material is found during construction and demolition activities, work would stop in the area, personnel would move away from the site, and the Ellsworth AFB EOD Flight would be contacted.

## 3.6 Geological Resources

### 3.6.1 Definition of the Resource

Geological resources consist of this Earth's surface and subsurface materials. Within a given physiographic province, these resources typically are described in terms of topography and physiography, geology, soils, and, where applicable, geologic hazards and paleontology.

Topography and physiography pertain to the general shape and arrangement of a land surface, including its height and the position of its natural and human-made features.

Geology is the study of the Earth's composition and provides information on the structure and configuration of surface and subsurface features. Such information derives from field analysis based on observations of the surface and borings to identify subsurface composition.

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

### 3.6.2 Description of Affected Environment

**Geology.** Ellsworth AFB is within the Great Plains province displaying nearly level areas, called benches or tables. This flat-lying land is reflective of the mature stage of erosion of the province and more than 500 million years of tectonic stability. The plains are composed of marine and stream sediments deposited during the Mesozoic Era (60 to 255 million years before present) when a shallow sea covered the region. The flat plains are interrupted by conspicuous buttes, which are isolated flat-topped hills with steep slopes that are capped with erosion-resistant rock. Buttes are primarily formed from erosion of sedimentary rocks underlying the erosion-resistant cap rock (USGS undated). Generally, the Great Plains slope gently to the east from the western border of the Black Hills towards the Missouri River. The Black Hills and adjoining areas were formed during tectonic uplift.

Ellsworth AFB is situated in the Kennedy Basin, consisting of a series of thick beds of sandstone, limestone, and shale, overlying crystalline basement rocks. These are overlain by deposits of limestone, sandstone, and dolomite, several of which include known aquifers. A band of marine shale with intermittent sandstone and limestone beds, more than 1,000 feet in thickness, extends to the surface at the installation. The uppermost of these deposits is the Pierre Shale, which forms the bedrock surface at the installation, and is present from depths of 40 feet below ground surface (bgs) to surface outcroppings. Unconsolidated materials including colluvial and alluvial deposits and residual material overlay the Pierre Shale on the installation (EAFB 2005b).

**Topography.** The topography of Ellsworth AFB is level to gently sloping, with the exception of the northernmost section of the installation that descends abruptly northward to a valley floor. The remainder of the installation slopes southward towards Box Elder Creek. Elevations of the installation range from 3,380 feet above mean sea level (msl) in the north to 3,080 feet above msl in the south. Elevations within the site of the Proposed Action range from approximately 3,110 to 3,150 feet above msl, with elevations sloping to the southeast (EAFB 2005b).

**Soils.** The soils mapped over the vast majority of the installation include loams and clay loams of the Nunn series. The Nunn series consists of very deep, well-drained soils that formed in loess and mixed alluvium. Runoff is negligible to low and permeability is moderately slow to slow. Nunn soils are on terraces or alluvial fans and in drainageways. Slopes range from 0 to 25 percent. Additionally, Onita clay loams, Kyle clay, and Lohmiller silty clay compose a minor portion of the soils within the Site. Onita clay loams are very deep, moderately well- to well-drained soils with moderately slow to slow permeability that formed in local alluvium mainly on footslopes. These soils generally occur along swales and drainageways on the installation. Slopes range from 0 to 4 percent. The Kyle series consists of very deep and well-drained soils formed in sediments weathered from clay shale on uplands and colluvial fans. Permeability is very slow. Gilgai microrelief, which consists of small mounds and depressions formed from shrinking and swelling of the soil, is in most areas. The Lohmiller series consists of very deep, well-drained soils formed in alluvium on bottom lands. Permeability is slow or moderately slow (NRCS 2011).

Approximately 97 percent of the soils at the site of the proposed wastewater pipeline easement are composed of Nunn loams with 6 to 12 percent slopes, and the remaining 3 percent in the northeastern extent is composed of Lohmiller silty clay with 0 to 3 percent slopes. Approximately 82 percent of the soil within the pipeline easement corridor is a Nunn loam with 6 to 12 percent slopes. Soils present in minor amounts include the Zigweid-Nihill complex with 6 to 15 percent slopes in the western portion of the site, the Nunn-Urban Land Complex with 0 to 3 percent slopes, and the Lohmiller silty clay with 0 to 3 percent slopes (NRCS 2011). The Lohmiller silty clay contains a hydric component known as the Herdcamp series. This series is indicative of a water table present at 0 to 1 feet bgs.

The Nunn loam (6 to 12 percent slopes) is considered to be a farmland of statewide importance. However, because this land is not currently available as farmland and this area is not available for future agricultural use, it would not meet the criteria for farmland of statewide importance.

### 3.6.3 Environmental Consequences

#### Evaluation Criteria

Protection of unique geological features, minimization of soil/sediment erosion, and the siting of facilities in relation to potential geologic hazards are considered when evaluating potential effects of a proposed action on geological resources. Generally, adverse effects can be avoided or minimized if proper

construction techniques, erosion-control measures, and structural engineering design are incorporated into project development.

Effects on geological resources were assessed by evaluating the following:

- Potential to destroy unique geological features
- Potential for soil erosion
- Proximity to or impact on geologic hazards (such as locating a Proposed Action in a seismic zone)
- Potential to affect soil or geological structures that control groundwater quality or groundwater availability
- Alteration of soil structure or function.

### 3.6.3.1 Proposed Action

#### Existing Ellsworth AFB WWTP Decommissioning and Demolition

Short-term, minor, direct, adverse and long-term, negligible, indirect, beneficial impacts on geologic resources and soils would be expected from implementing the Proposed Action. Short-term, minor adverse impacts would be anticipated to occur on soils during decommissioning and demolition activities as soil would be disturbed. Compaction of surrounding soils could occur under the weight of construction equipment. Soil erosion and transfer in storm water runoff could result because of compaction of soil due to vehicle use, foot traffic, removal of vegetation, and grading activities. Adverse impacts would be minimized with implementation of BMPs, including wetting of soils, and implementation of erosion and storm water management practices to contain soil and runoff onsite. Berming along nearby water bodies would decrease the amount of potential sedimentation in adjacent water bodies. Wetting of soils would occur on a daily basis as needed to prevent erosion and generation of dust (see discussion on Air Quality, **Section 3.4.3.1**).

Long-term, indirect, beneficial impacts from decommissioning would be expected on geology and soils following demolition activities. Once vegetation has reestablished after demolition activities have ceased, erosion and sedimentation rates would be expected to decrease. The decrease in impervious surfaces associated with removal of structures would be expected to reduce volume and velocity of storm water runoff and associated potential erosion and offsite transport of sediments. Also, because flow into the tributary from Outfall 005 would drastically decrease, stream channel erosion occurring within and downstream of the tributary would be expected to decrease. Please see **Section 3.7** for a discussion on water resources.

#### Wastewater Pipeline Easement and Construction

No impacts would be expected on geology and soils from granting the pipeline easement. Short-term, minor, adverse impacts on soils would be expected during construction of the pipeline due to soil disturbances. Compaction of surrounding soils could occur under the weight of construction equipment. No effects on soils from compaction would be expected in the northern portion of the proposed pipeline corridor in ERP site OU-6 because the existing top layer of soils are composed of highly compacted fill material (i.e., clay soils) that serve as the landfill cap. Soil erosion and transfer in storm water runoff could result because of compaction of soil due to vehicle use, foot traffic, removal of vegetation, and grading activities. Adverse impacts would be minimized with implementation of BMPs, including wetting of soils, and implementation of erosion and storm water management practices to contain soil and

runoff onsite. Berming along nearby water bodies would decrease the amount of potential sedimentation in adjacent water bodies. Wetting of soils would occur on a daily basis as needed to prevent erosion and generation of dust (also see **Section 3.4**).

Long-term, minor, adverse impacts on topography would be expected from pipeline construction due to anticipated mitigation requirements of adding an additional landfill cap to protect the integrity of the existing 3-foot cap on ERP site OU-6. This additional landfill cap would raise the elevation of the land in the northern portion of the proposed pipeline corridor (i.e., OU-6), thereby altering topography within the corridor.

### **Contribution of Ellsworth AFB's Wastewater to the Regional Waste Stream**

No impacts would be expected on geology and soils from the contribution of Ellsworth AFB's wastewater to the regional waste stream.

#### **3.6.3.2 WWTP Upgrade Alternative**

Under the WWTP Upgrade Alternative, Ellsworth AFB would upgrade the existing WWTP to meet the 2014 SDSWDS permit requirements. The necessary upgrades would involve construction and demolition of facilities and the addition of a small road.

The WWTP Upgrade Alternative would be anticipated to have short-term, minor, direct and long-term, minor, indirect, adverse impacts on geology and soils. Construction and demolition activities necessary to upgrade the existing WWTP would disturb soils and increase the potential for elevated rates of erosion and sedimentation, resulting in short-term, minor, adverse impacts. Construction activities would entail grading and removal of vegetation, and soil would become compacted under the weight of construction equipment. Compaction of soil could decrease storm water infiltration rates and alter flow patterns. Construction of buildings, additions, and roads, and clearing of vegetation would increase impervious surfaces and therefore increase volume and velocity of storm water runoff and associated soil erosion and sedimentation rates. Soil erosion and sediment production would be minimized for all construction operations as a result of following an approved sediment-and-erosion-control plan.

Soil productivity would decline in disturbed areas and be eliminated in those areas within the footprint of building structures, and roadways. Loss of soil structure due to compaction from foot and vehicle traffic could result in changes in drainage patterns. Soil erosion- and sediment-control measures would be included in site plans to minimize long-term erosion and sediment production.

The proposed site for the WWTP upgrades was analyzed for engineering limitations for building and road construction. Construction, demolition, and road construction would occur in Nunn loam soils with 6 to 12 percent slopes. This soil is rated as very limited to building construction because of shrink-swell potential, slope, and depth to saturation. The proposed road to the Processing House is rated as very limited due to low strength, shrink-swell, and frost action. Therefore, site-specific soil surveys should be conducted prior to the initiation of construction activities to determine that any necessary design considerations address soil limitations.

#### **3.6.3.3 No Action Alternative**

No impacts on geological resources and soils would be expected under the No Action Alternative.

### 3.6.4 Environmental Protection Measures

Fugitive dust from demolition activities would be minimized by BMPs such as watering and implementation of erosion and storm water management practices to contain soil and runoff onsite, thereby reducing the total amount of soil exposed. Standard erosion-control means (e.g., silt fencing, sediment traps, application of water sprays, and revegetation at disturbed areas) would also reduce environmental consequences related to those activities. Berming along nearby water bodies would decrease the amount of potential sedimentation in adjacent water bodies.

## 3.7 Water Resources

### 3.7.1 Definition of the Resource

Water resources include groundwater, surface water, and floodplains. Evaluation of water resources examines the quantity and quality of the resource and its demand for various purposes. Groundwater consists of subsurface hydrologic resources. It is an essential resource that functions to recharge surface water and is often used for potable water consumption, agricultural irrigation, and industrial applications. Groundwater typically can be described in terms of its depth from the surface, aquifer or well capacity, water quality, surrounding geologic composition, and recharge rate.

Surface water resources generally consist of wetlands, lakes, rivers, and streams. Wetlands are discussed in **Section 3.8**. Surface water is important for its contributions to the economic, ecological, recreational, and human health of a community or locale. The CWA (33 U.S.C. 1251 et seq., as amended) establishes Federal limits, through the National Pollutant Discharge Elimination System (NPDES), on the amounts of specific pollutants that are discharged to surface waters in order to restore and maintain the chemical, physical, and biological integrity of the water. The NPDES program regulates the discharge of point (end of pipe) and nonpoint sources (storm water) of water pollution. Section 404 of the CWA regulates the discharge of dredge or fill material into waters of the United States, which includes wetlands. Waters of the United States are defined within the CWA, as amended, and jurisdiction is addressed by the USEPA and the USACE. These agencies assert jurisdiction over (1) traditional navigable waters, (2) wetlands adjacent to navigable waters, (3) nonnavigable tributaries of traditional navigable waters that are relatively permanent where the tributaries typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months), and (4) wetlands that directly abut such tributaries.

The USEPA issued a Final Rule for the CWA concerning technology-based Effluent Limitations Guidelines and New Source Performance Standards for the Construction and Development point source category. All NPDES storm water permits issued by the USEPA or states must incorporate requirements established in the Final Rule. This Rule became effective February 1, 2010, and will be phased in over 4 years. All new construction sites are required to meet the non-numeric effluent limitations and to design, install, and maintain effective erosion and sedimentation controls, including the following:

- Control storm water volume and velocity to minimize erosion
- Control storm water discharges including both peak flow rates and total storm water volume
- Minimize the amount of soil exposed during construction activities
- Minimize the disturbance of steep slopes
- Minimize sediment discharges from the site using controls that address factors such as the amount, frequency, intensity, and duration of precipitation; the nature of resulting storm water



runoff; and soil characteristics, including the range of soil particle sizes expected to be present on the site

- Provide and maintain natural buffers around surface waters, direct storm water to vegetated areas to increase sediment removal, and maximize storm water infiltration where feasible
- Minimize erosion at outlets, downstream channels, and stream banks
- Minimize soil compaction and preserve topsoil where feasible.

In addition, construction site owners and operators that disturb 1 or more acres of land are required to use BMPs to ensure that soil disturbed during construction activities does not pollute nearby water bodies.

Section 438 of the Energy Independence and Security Act (EISA) (42 U.S.C. Section 17094) establishes into law new storm water design requirements for Federal construction projects that disturb a footprint greater than 5,000 ft<sup>2</sup> of land. EISA Section 438 requirements are independent of storm water requirements under the CWA. The project footprint consists of all horizontal hard surfaces and disturbed areas associated with the project development. Under these requirements, predevelopment site hydrology must be maintained or restored to the maximum extent technically feasible with respect to temperature, rate, volume, and duration of flow. Predevelopment hydrology shall be modeled or calculated using recognized tools and must include site-specific factors such as soil type, ground cover, and ground slope. Site design shall incorporate storm water retention and reuse technologies such as bioretention areas, permeable pavements, cisterns/recycling, and green roofs to the maximum extent technically feasible. Post-construction analyses shall be conducted to evaluate the effectiveness of the as-built storm water reduction features. As stated in a DOD memorandum dated January 19, 2010, these regulations will be incorporated into applicable DOD Unified Facilities Criteria within 6 months (DOD 2010). Additional guidance is provided in the USEPA's *Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act*.

Floodplains are areas of low-level ground present along rivers, stream channels, or coastal waters that are subject to periodic or infrequent inundation due to rain or melting snow. Floodplain ecosystem functions include natural moderation of floods, flood storage and conveyance, groundwater recharge, nutrient cycling, water quality maintenance, and habitat for a diversity of plants and animals. Flood potential is evaluated by FEMA, which defines the 100-year floodplain as an area within which there is a 1 percent chance of inundation by a flood event in a given year. EO 11988, *Floodplain Management*, directs Federal agencies to avoid siting within floodplains unless the agency determines that there is no practicable alternative. Where the only practicable alternative is to site in a floodplain, a specific eight-step process must be followed to comply with EO 11988 (see **Section 1.4.2**). This eight-step process is detailed in the FEMA document "Further Advice on EO 11988 Floodplain Management." In addition, a FONPA is required for each individual project that affects a floodplain.

### 3.7.2 Description of Affected Environment

**Groundwater.** Groundwater occurs under confined and unconfined conditions at Ellsworth AFB. The installation is underlain by three confined aquifers and one shallow unconfined aquifer. The uppermost confined aquifer is the Inyan Kara Aquifer, confined by beds of Upper Cretaceous strata above and Permian-Jurassic strata below. This aquifer occurs in permeable sandstone within the Fall River and Lakota formations. The Inyan Kara Aquifer supplies a large portion of the domestic water supply for Rapid City. The Minnelusa Aquifer lies below the Inyan Kara Aquifer and is confined by Permian-Jurassic strata above and Pennsylvanian confining beds below. Recharge for this limestone aquifer lies west of the installation among the foothills between Rapid City and the Black Hills. The upper portion of this aquifer is the most heavily used in the communities near Ellsworth AFB. The

deepest confined aquifer that underlies the installation is the Madison Aquifer, which is beneath Lower Pennsylvanian confining strata. This aquifer is a limestone deposit and has the most dependable water quality of any of the regional confined aquifers (EAFB 2005b). The shallow unconfined aquifer consists of the weathered/fractured zone of the Pierre Shale and the overlying unconsolidated deposits. Groundwater ranges from 20 to 60 feet bgs, and the flow direction and velocity of groundwater varies across the installation (EAFB 2008c).

Drinking water for Ellsworth AFB is delivered by the Rapid City Water Division via a 16-inch water main. Sources for this water system include three infiltration galleries along the Rapid Creek alluvium, including the Jackson Springs Gallery, Meadowbrook Gallery, and Girl Scouts Gallery. Nine other off-installation wells operated by the Rapid City Water Division draw water from the subsurface Minnelusa and Madison Aquifers. During peak demand summer periods, the city also uses surface water from Rapid Creek, which originates in the Rapid Creek drainage area in the Black Hills west of Rapid City. This source includes the Deerfield and Pactola surface water reservoirs (EAFB 2007a). Ellsworth AFB previously used groundwater wells as a source of potable water; however, these wells have since been abandoned. The 28th Medical Group Bio-Environmental Engineering Flight is responsible for on-installation monitoring of the potable water distribution system. There are 22 on-installation monitoring points that are sampled at the rate of 11 points each month. Samples have historically been within limits (EAFB 2008c).

As discussed in **Section 3.6.2**, soils along the unnamed tributary of Box Elder Creek contain inclusions of the Herdcamp soils, which have a water table that fluctuates between depths of 0 to 1 foot bgs. Therefore, groundwater is suspected to be present near the ground surface and support the hydrology of wetlands along the unnamed tributary of Box Elder Creek (EAFB 2011). Since the State of South Dakota does not issue permits for shallow wells in the state, it is not known if any landowners downstream of the WWTP have shallow wells in the vicinity of the unnamed tributary (State of South Dakota 2011).

**Surface Water.** Ellsworth AFB lies within the Missouri River Basin. A natural divide in the northern portion of the installation directs overland flow either north or south. The northern portion of Ellsworth AFB is drained by seven unnamed ephemeral drainages (i.e., flow only during and immediately after precipitation) that discharge into Elk Creek, a perennial stream (i.e., continuous flow year-round) approximately 5 miles to the northeast. Surface drainage from four drainages in the southern portion of Ellsworth AFB flows generally south-southeast via retention ponds (including a series of four relatively large man-made lakes), ditches, storm sewers, and ephemeral streams. Surface runoff from industrial areas on Ellsworth AFB drains five watersheds through outfalls, which are permitted by the SDDENR SDSWDS permit number SD-0000281. Four of the permitted storm water outfalls discharge into unnamed tributaries of Box Elder Creek, which then flow into Box Elder Creek, a perennial stream about 1 mile south of the installation boundary. The fifth permitted storm water outfall discharges into an unnamed tributary of Elk Creek north of the installation. Both Elk and Box Elder Creeks eventually flow into the Cheyenne River. **Figure 3-4** depicts surface water features near the site of the Proposed Action. Both the unnamed tributary of Box Elder Creek and Box Elder Creek itself appear to be hydrologically influenced by groundwater, other tributaries and drainage ditches, and effluent from the WWTP outfall (EAFB 2011).

The WWTP discharges treated effluent into the unnamed tributary of Box Elder Creek through Outfall 005. This unnamed tributary was historically ephemeral or intermittent, and has not historically flowed year-round (USGS 1953). However, once the WWTP began to discharge into the unnamed tributary in 1943, flow became perennial downstream of Outfall 005. Discharges from this outfall are continuous and average 0.5 MGD (EAFB 2008b, EAFB 2009e). Sampling of the effluent occurs in



Source of Aerial Photography: ESRI Premium Microsoft Virtual Earth Service, 2009; Source of Vector Data: Ellsworth AFB CIP Database

Figure 3-4. Surface Water Resources near the Proposed Project Site

accordance with the SDSWDS permit, and no violations of water quality standards have occurred (EAFB 2008c). Of the total WWTP discharge, approximately 250,000 gallons of the treated effluent is used for irrigation during the golf season, with the remainder being discharged off-installation through Outfall 006 downstream of the golf course (28 BW 2006). Due to the fluctuation in irrigation rates, the daily downstream discharge likely averages from 0.25 MGD to 0.5 MGD, depending on the season.

The Prairie Ridge Golf Course is below the convergence of two perennial streams, one from the base of Gateway Lake (to the northeast of the WWTP) and the other from the WWTP, creating the unnamed tributary to Box Elder Creek. Two ponds are present adjacent to fairway holes 4 and 9, and jurisdictional wetlands are also present (see **Section 3.8** for a discussion on wetlands). The tributary carrying treated effluent flows into the 2.7-acre Golf Course Lake, the larger of the two golf course ponds, which is used for golf course irrigation (28 BW 2006, EAFB 2008c). Discharge from Golf Course Lake is conveyed through Outfall 006 along the southern installation boundary. The majority of the flow from this outfall comes from Outfall 005 unless there is a major storm event or heavy snowmelt. According to the 2006 *Final Golf Course Environmental Management Plan* for the Prairie Ridge Golf Course, discharge from Outfall 006 is periodically visually monitored for oil sheen, turbidity, algal growth, and solids by golf course personnel (EAFB 2002, 28 BW 2006). The installation maintains clean storm water runoff by adhering to the SWPPP, and *Industrial Waste Management Plan* (EAFB 2008c).

Water bodies present at and adjacent to the golf course have the potential to receive inputs of pesticide, herbicide, and slow-release fertilizer from course maintenance activities. Vegetated buffers are maintained around water bodies on the golf course, and water features are regularly monitored for the presence of algae, soil erosion, excessive aquatic plant growth, fish kills, and sedimentation. Ponds are periodically dredged to remove accumulated silt and restore previous water volume. All water feature maintenance activities are coordinated with the natural resources manager at Ellsworth AFB (28 BW 2006).

South Dakota Water License Permit Number 406-2 indicates that there is one private landowner with a water right to Ellsworth AFB's WWTP effluent (State of South Dakota 1968). This permit, submitted on November 2, 1954, and approved on September 23, 1968, granted use of 4.5 cubic feet per second of return flows from Ellsworth AFB within the unnamed tributary. In addition, an earthen dam was constructed to store effluent for the purposes of irrigation and livestock watering. Attachment A of the permit states that Ellsworth AFB has no obligation under the permit to continually provide effluent flow from the WWTP. Attachment A of the permit also states that diversion of the effluent into the impoundment could only occur if water flowed at a rate of at least 1 cubic foot per second within the portion of Box Elder Creek just downstream of its confluence with the water course from which the diversions are made (i.e., the unnamed tributary of Box Elder Creek) (South Dakota 1968).

**Floodplains.** According to a 1996 floodplain study, 262 acres of Ellsworth AFB property are within a 100-year floodplain (28 BW 2006). A 100-year floodplain is adjacent to the WWTP (EAFB 2007b). The southeastern corner of the Proposed Project Corridor crosses the floodplain. Approximately 22 acres of the Prairie Ridge Golf Course are within 100-year floodplains (28 BW 2006). The northern limit of the Box Elder Creek floodplain is approximately 50 feet south of the southern installation boundary. Flooding along this creek has severe impacts on the community of Box Elder and Ellsworth AFB (EAFB 2005b).

### 3.7.3 Environmental Consequences

#### Evaluation Criteria

Evaluation criteria for effects on water resources are based on water availability, quality, and use; existence of floodplains; and associated regulations. A proposed action would have significant effects on water resources if it were to do one or more of the following:

- Substantially reduce water availability or supply to existing users
- Create or contribute to overdraft of groundwater basins
- Exceed safe annual yield of water supply sources
- Cause a violation of water quality standards or increase the magnitude or frequency of an existing water quality violation
- Endanger public health by creating or worsening health hazard conditions
- Threaten or damage unique hydrologic characteristics
- Violate established laws or regulations adopted to protect water resources.

The potential effect of flood hazards on a proposed action is important if such an action occurs in an area with a high probability of flooding.

#### 3.7.3.1 Proposed Action

##### Existing Ellsworth AFB WWTP Decommissioning and Demolition

Short-term, moderate, direct, adverse impacts could occur as a result of increased surface water runoff and sedimentation due to ground disturbances from the removal of the WWTP facility. The NPDES storm water program requires construction site operators engaged in clearing, grading, and excavating activities that would disturb 1 acre or more to obtain coverage under an NPDES permit for their storm water discharges. Although the area of facilities to be demolished under the Proposed Action is less than 1 acre (0.88 acres), it is likely that the Proposed Action would disturb 1 acre or greater due to associated disturbances around these facilities and demolition staging areas. Therefore, an NPDES construction storm water permit would be obtained for the demolition of the WWTP. In addition, if it is determined that the demolition of the WWTP would disturb 1 acre or more, Ellsworth AFB would also be subject to the CWA Final Rule regarding non-numeric effluent limitations, as described in **Section 3.7.1**. The implementation of sediment- and erosion-control BMPs would minimize the adverse effects from ground disturbances associated with the Proposed Action (see **Section 3.7.4**). No wastewater or other fluids would be discharged from the site during decommissioning and demolition.

Ellsworth AFB would be subject to the new storm water design requirements of Section 438 of the EISA that require Federal construction projects that disturb 5,000 ft<sup>2</sup> or more of land to maintain or restore predevelopment site hydrology to the maximum extent technically feasible with respect to temperature, rate, volume, and duration of flow. The demolition of the existing WWTP would disturb approximately 38,379 ft<sup>2</sup> and, therefore, would require implementation of the storm water design requirements of Section 438 of the EISA.

Short-term, minor, adverse effects on water resources would be expected from the temporary increase in water use at Ellsworth AFB when the decommissioned units and equipment are washed and decontaminated. However, this is unlikely to reduce water availability or supply to existing users as the

water use allotment for Ellsworth AFB is not exceeded or close to being exceeded (see **Section 3.2.3**). Decommissioning and demolishing the WWTP would be anticipated not to exceed the safe annual yield of water supply.

Long-term, moderate, indirect, beneficial effects from decommissioning would result in an alteration of water velocity, quantity, and quality on the tributary currently receiving treated effluent. The tributary would likely revert back to an intermittent or ephemeral stream, flowing primarily in response to storm events or heavy snowmelt. This reduction in flow would additionally reduce stream channel erosion, as less water would be available and flowing at a rate less adequate to remove and carry sediment, and pooling within the unnamed tributary would likely occur. The cessation of the Ellsworth WWTP discharge is likely to improve the in-stream water quality of the tributary and downstream waters as wastewater pollutants would no longer be discharged. However, it is possible that dissolved oxygen in the tributary would decrease slightly as there would be less mixing between the atmosphere and water interface at the outfall. Total dissolved solids within the tributary would also decline, as solids are present within the effluent. Because there would be less total dissolved solids and less erosion expected to occur from the decreased flow, the contribution of sediment to the Golf Course Lake and other downstream receiving water bodies would decrease. Erosion and sedimentation rates would further decrease as vegetation becomes established at the site of WWTP removal. Due to the reduction in sedimentation, the frequency of dredging activities within the golf course ponds could decline. Adverse impacts from the removal of this water source could be expected on biological resources that depend on perennial flow within the unnamed tributary (see **Section 3.8.3**).

The golf course is currently irrigated with water from the golf course pond, which is constantly replenished by the WWTP effluent (28 BW 2006). Cessation of the WWTP flow would likely make the golf course pond unavailable for irrigation supply, and establishing a new source would be necessary. Ellsworth AFB is considering using “purple pipe,” reclaimed wastewater lines, which would replace the golf course pond supply. However, use of “purple pipe” would require piping irrigation water uphill. If reclaimed wastewater lines are not installed, the golf course would likely irrigate with potable water from the installation’s current water supply. During the peak irrigation season, this would increase the installation’s potable water demand by approximately 250,000 gpd (28 BW 2006) and place an additional burden on the current water sources.

The potential additional demand on water supply would be 250,000 gpd during peak golf season, if this source is determined to be suitable for golf course irrigation. It is not expected that the increased requirement will exceed the existing water supply capacity (see **Section 3.2**).

The unnamed tributary likely has some effect on the groundwater elevation in the shallow unconfined aquifer immediately adjacent to the channel as a result of effluent discharge to the stream and downward migration of some of that discharge below the stream channel bottom. Therefore, a decrease in flow within the channel resulting from cessation of WWTP effluent discharge could have a long-term, negligible to minor, direct, adverse effect due to a localized decrease in groundwater elevations immediately adjacent to the stream channel. However, it is assumed that landowners with wells downstream of Ellsworth AFB are obtaining most of their groundwater from wells drawing from a deeper confined aquifer. Wells in the deep, confined aquifer would not be recharged by streams on the ground’s surface. Therefore, no effects on any downstream deep wells are anticipated. Since the State of South Dakota does not issue permits for shallow wells in the state, it is not known if landowners downstream of the WWTP use shallow wells for agricultural or other purposes. If such shallow wells exist downstream of the WWTP in close proximity to the unnamed tributary of Box Elder Creek, long-term, negligible to minor, adverse impacts on these wells could be expected from a potential drawdown in groundwater levels.

## Wastewater Pipeline Easement and Construction

No impacts on water resources would be expected from the granting of the pipeline easement. Short-term, minor to moderate, adverse impacts on surface water would be expected from the construction of the sanitary sewer pipeline due to increased soil erosion from exposed soils during storm events and sedimentation within the unnamed tributary of Box Elder Creek. The trench to install the pipeline and associated disturbances would total approximately 35,250 ft<sup>2</sup> (0.81 acres) in disturbance. Ellsworth AFB would be subject to the new storm water design requirements of Section 438 of the EISA that require Federal construction projects that disturb 5,000 ft<sup>2</sup> or more of land to maintain or restore predevelopment site hydrology to the maximum extent technically feasible with respect to temperature, rate, volume, and duration of flow. The excavation of the wastewater pipeline trench would disturb approximately 38,379 ft<sup>2</sup> and, therefore, would require implementation of the storm water design requirements of Section 438 of the EISA. Environmental protection measures, as discussed in **Section 3.7.4**, would be implemented in order to minimize adverse impacts on surface water quality.

Short-term, minor, adverse impacts on floodplains would be expected from the construction of the sanitary sewer pipeline. The proposed pipeline corridor crosses the unnamed tributary of Box Elder Creek (see **Figure 2-1**). Therefore, development would occur within the 100-year floodplain of the unnamed tributary and construction would occur within the tributary and associated wetland areas when the pipeline is installed and a FONPA will be issued. Per EO 11998, *Floodplain Management*, adverse effects and incompatible development should be avoided to minimize harm to floodplains. Environmental protection measures, as discussed in **Section 3.7.4**, would be implemented in order to minimize adverse impacts on the floodplain. Since the sanitary sewer pipeline would be buried below the ground surface, no increase in impervious surfaces would occur and no long-term impacts on floodplains would be expected.

Construction within the unnamed tributary and associated wetlands would likely require a USACE CWA Section 404(b) NWP. In addition, an NWP-12 for utility line construction activities within waters of the United States could also be required. This would depend on how the pipeline would cross the tributary and the area of impact on wetlands or other waters of the United States associated with crossing the unnamed tributary and floodplain. NWP-12 applies to utility line activities that would result in less than 0.5 acres of impacts on wetlands or other waters of the United States. The permitting authority would be determined based on negotiations between the USAF and the South Dakota EDA.

## Contribution of Ellsworth AFB's Wastewater to the Regional Waste Stream

No direct effects on water resources would be expected from the contribution of Ellsworth AFB's wastewater stream to the regional stream. However, indirect impacts on stream flow and channel morphology could occur as a result of the cessation in discharge of WWTP effluent into the unnamed tributary due to the decrease in water input into the unnamed tributary. **Section 3.2.3.1** provides additional discussion on impacts from the contribution of Ellsworth AFB's wastewater to the regional waste stream.

### 3.7.3.2 WWTP Upgrade Alternative

Under the WWTP Upgrade Alternative, Ellsworth AFB would upgrade the existing WWTP to meet the 2014 SDSWDS permit requirements. The necessary upgrades would involve construction and demolition of facilities and the addition of a small road.

The WWTP Upgrade Alternative would result in short-term, minor, direct, adverse and long-term, beneficial impacts on water resources. Short-term, minor, direct, adverse impacts would be expected

during construction of facilities to house the additional equipment necessary to upgrade to the IFAS system. During construction activities, removal of vegetation and construction, demolition, and road construction activities would increase storm water runoff volume and velocity due to the increase in impervious surfaces. This runoff has the potential to transport sediments and pollutants and impact surface water quality of the receiving water body. However, adherence to the erosion-and-sediment-control plan and SWPPP would prevent surface water degradation. Adherence to BMPs, proper engineering practices, and applicable codes and ordinances would reduce storm water runoff-related impacts to a level of insignificance.

There would be no increase in the amount of potable water needed to operate the equipment necessary to support IFAS treatment of wastewater.

Under the WWTP Upgrade Alternative, effluent would continue to flow from Outfall 005 to the unnamed tributary that flows into Box Elder Creek. However increased amounts of ammonia would be removed from the effluent; therefore, long-term beneficial impacts would result from the decrease in ammonia present in the water column. Because ammonium compounds can decrease the dissolved oxygen content in water through chemical reactions, decreasing ammonia would have a beneficial impact on water quality. The continued discharge of effluent into Outfall 005 would otherwise not be expected to result in any adverse impacts on water resources.

### 3.7.3.3 No Action Alternative

Impacts on water resources under the No Action Alternative would be long-term, minor, and adverse from an inability to meet new SDSWDS ammonia discharge limits.

## 3.7.4 Environmental Protection Measures

An NPDES construction storm water permit would be obtained as applicable for the demolition of the WWTP. An erosion-and-sediment-control plan and SWPPP would be developed for the Proposed Action to minimize soil erosion and surface water degradation. BMPs would be developed as part of the SWPPP to manage storm water both during and after construction. Standard erosion-control measures (e.g., silt fencing, sediment traps, application of water sprays, and restabilization and revegetation of disturbed areas) would minimize environmental impacts on surface water. Berming along nearby water bodies would decrease the amount of potential sedimentation in adjacent water bodies. Proper housekeeping, retention of debris within the site boundaries, demolition equipment maintenance, petroleum and hazardous material storage, and adherence to the installation's SPCC Plan in the event of a spill would minimize introduction of pollutants to surface waters.

## 3.8 Biological Resources

### 3.8.1 Definition of the Resource

Biological resources include native or naturalized plants and animals and the habitats (e.g., wetlands, forests, and grasslands) in which they exist. Protected and sensitive biological resources include federally listed (endangered or threatened), proposed, and candidate species designated by the U.S. Fish and Wildlife Service (USFWS). Federal species of concern are not protected by law; however, these species could become listed, and therefore are given consideration when addressing biological resource impacts of an action. Sensitive habitats include those areas designated by the USFWS as critical habitat protected by the Endangered Species Act (ESA) and sensitive ecological areas as designated by state or Federal rulings. Sensitive habitats also include wetlands, plant communities that are unusual or of limited distribution, and important seasonal use areas for wildlife (e.g., migration routes, breeding areas, crucial



summer and winter habitats). Biological resources also include wetlands. Wetlands are important natural systems and habitats because of the diverse biological and hydrologic functions they perform. These functions include water quality improvement, groundwater recharge and discharge, pollution mitigation, nutrient cycling, unique plant and wildlife habitat provision, storm water attenuation and storage, sediment detention, and erosion protection. Wetlands are protected as a subset of the waters of the United States under Section 404 of the CWA. The term “waters of the United States” has a broad meaning under the CWA and incorporates deepwater aquatic habitats and special aquatic habitats (including wetlands). The USACE defines wetlands as “those areas that are inundated or saturated with ground or surface water at a frequency and duration to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated conditions. Wetlands generally include swamps, marshes, bogs, and similar areas” (33 CFR Part 329).

### 3.8.2 Description of Affected Environment

**Vegetation.** The National Hierarchical Framework of Ecological Units, adopted by the U.S. Forest Service in 1993, places Ellsworth AFB in the Northwestern Great Plains section of the Temperate Steppe division (USFS 1994). Currently, the majority of land on Ellsworth AFB is disturbed or improved, dominated by native Kentucky bluegrass (*Poa pratensis*) interspersed with hairy crabgrass (*Digitaria sanguinalis*), common broad-leaved plants including field bindweed (*Convolvulus arvensis*) and common dandelion (*Taraxacum officinale*), and several native and exotic ornamental species. Most of these grassy areas are maintained at a height of 7 to 14 inches, as recommended in Ellsworth AFB’s Integrated Natural Resources Management Plan. Natural areas on the installation are covered in remnant mixed-grass prairie habitat with species such as western wheatgrass (*Pascopyrum smithii*), wheatgrass (*Agropyron cristatum*), and green needle-grass (*Stipa viridula*) (EAFB 2005b).

A small area of riparian habitat occurs on the installation along tributaries and impoundments. Dominant species found in the riparian habitat include eastern cottonwood (*Populus deltoides*), sandbar willow (*Salix exigua*), narrowleaf cattail (*Typha angustifolia*), and sedges (*Carex* spp.) (EAFB 2005b). Riparian trees surround the lakes, including eastern red cedar (*Juniperus virginiana*), green ash (*Fraxinus pennsylvanica*), eastern cottonwood, and sandbar willow. These trees flourish due to their proximity to water and represent the major tree stands on the installation (EAFB 2008c).

The Project area is primarily composed of turfgrasses associated with the golf course, including nonnative perennial ryegrass (*Lolium perenne*) and native Kentucky bluegrass, and, to a lesser extent, nonnative creeping bentgrass (*Agrostis stolonifera*). Ornamental trees are positioned throughout the golf course. Groves of conifers and eastern cottonwood are situated along the drainage that crosses the southeastern portion of the Project area (28 BW 2006).

**Wildlife.** Wildlife that naturally occurs in the region of Ellsworth AFB includes many species of birds, reptiles, amphibians, and mammals that are characteristic of the Great Plains. Common wildlife species that occur near Ellsworth AFB are typical of semi-developed grassland areas. The most suitable wildlife habitat on the installation is restricted to the remnant mixed-grass prairie or riparian areas on the installation.

Common bird species on the installation include mallard (*Anas platyrhynchos*), red-tailed hawk (*Buteo jamaicensis*), killdeer (*Charadrius vociferus*), greater yellow legs (*Tringa melanoleuca*), mourning dove (*Zenaida macroura*), barn swallow (*Hirundo rustica*), and common grackle (*Quiscalus quiscula*). Common reptiles and amphibians on the installation include snapping turtle (*Chelydra serpentina*), bullsnake (*Pituophis melanoleucus*), prairie rattlesnake (*Crotalus viridis*), Blanchard’s cricket frog (*Acris crepitans*), and bullfrog (*Rana catesbeiana*). Common mammals include mule deer (*Odocoileus hemionus*), white-tailed deer (*O. virginianus*), coyote (*Canis latrans*), red fox (*Vulpes vulpes*), whitetail

jackrabbit (*Lepus townsendii*), striped skunk (*Mephitis mephitis*), raccoon (*Procyon lotor*), black-tailed prairie dog (*Cynomys ludovicianus*), and big brown bat (*Eptesicus fuscus*) (EAFB 2005b).

The Prairie Ridge Golf Course, partially within the Project area, has an active pest control program to address occasional pests, including prairie dogs. Prairie dogs can provide food sources to raptors and their burrows attract burrowing owls (*Athene cunicularia*) that use unoccupied holes for shelter and nesting, causing increased BASH risk and damage to infrastructure (EAFB 2005b).

**Sensitive and Protected Species.** There are no known resident federally or state-listed threatened or endangered species on Ellsworth AFB. One study with relevance to threatened and endangered species, *Biological Survey of Ellsworth Air Force Base, South Dakota* (EAFB 2005b), was conducted on the installation in 1994. Three bird species and one mammal species were found on Ellsworth AFB that are classified as sensitive species by the South Dakota Natural Heritage Program (EAFB 2005b, SDNHP 2008). These are rare species requiring special attention; however, their populations do not warrant listing on the Federal or state threatened or endangered species lists. These species are burrowing owl, Swainson's hawk (*Buteo swainsoni*), loggerhead shrike (*Lanius ludovicianus*), and silver-haired bat (*Lasionycteris noctivagans*) (EAFB 2005b). According to Ellsworth AFB's General Plan, there are currently two species on Ellsworth AFB that are considered sensitive and warrant special attention: the Swainson's hawk and the burrowing owl (EAFB 2008c). Per the General Plan, although these sensitive species are relatively secure, special care should be taken during new construction to ensure minimal disturbance to habitats (EAFB 2008c). Habitat for these sensitive species does occur in the proposed project corridor, however measures are taken to actively discourage and monitor for these species due to BASH concerns.

Due to the installation's proximity to the Central Flyway, a north-south regional migratory bird route, migratory birds are a concern on Ellsworth AFB, particularly during the spring migratory period. The numerous bodies of water around the airfield create attractive nesting grounds for migratory birds. The presence of rain and concrete surface are also huge attractions to gulls during this time of year (EAFB 2008c). Due to BASH concerns, Ellsworth AFB has a "zero tolerance" policy for gulls and nesting geese, meaning these birds are dispatched when they are observed on installation, and a "low tolerance" policy for ducks, hawks, and eagles. Avian nesting habitat for these species develops primarily in riparian areas on or near the installation (EAFB 2008c).

**Wetlands.** A *Natural Resources and Database Mapping and Wetland Database and Mapping Report* was finalized in January 2003 for Ellsworth AFB (EAFB 2008c). This report updated the 1994 wetland delineation (EAFB 1994) performed for Ellsworth AFB. According to the 2003 update, there are approximately 44.6 acres of jurisdictional wetlands on Ellsworth AFB. These areas include drainage channels to Box Elder Creek, scattered impoundments that include four man-made lakes, and swales (EAFB 2008c). The majority of these wetlands occur in five geographic regions of the installation, including the main installation drainage, fire training area drainage, alert apron drainage, west boundary drainage, and MSA drainage. Wetlands on miscellaneous impoundments and swales on the installation were also identified (EAFB 1994).

Jurisdictional wetlands were delineated along the main installation drainage including areas along Gateway, Bandit, and Heritage lakes. Jurisdictional wetlands within the Project area occur within the section of the main installation drainage that crosses the southeasternmost portion of the Project area. Additional wetlands occur along the main installation drainage and impoundments adjacent to the eastern side of the Project area. This drainage receives overland flow, discharge from the WWTP, and water from several culverts. Dominant vegetation in wetlands along this drainage include broadleaf cattail (*Typha latifolia*), softstem bulrush (*Scirpus validus*), creeping spikerush (*Eleocharis palustris*), and woolly sedge (*Carex lanuginosa*). Two impoundments on the golf course were created by diverting and

damming the main installation channel. Although these impoundments do support wetlands, they are considered atypical (EAFB 1994, EAFB 2005b).

At the time of the 1994 delineation, all the wetlands were considered jurisdictional; however, on January 9, 2001, the Supreme Court issued the Solid Waste Agency of Northern Cook County (SWANCC) decision, which determined that isolated, nonnavigable, intrastate waters are no longer protected by the CWA if use by migratory birds is the sole basis for Federal jurisdiction. Therefore, because of the SWANCC decision some of these isolated wetlands might no longer be considered jurisdictional (EAFB 2005b). A discussion of waters of the United States, which are also protected under the CWA, is included in **Section 3.7**.

A wetland investigation of the unnamed tributary of Box Elder Creek and Box Elder Creek was conducted in October 2011 to determine the extent of wetlands and other waters of the United States downstream of Ellsworth AFB's WWTP (EAFB 2011). The investigation focused on a 200-foot-wide riparian study corridor extending from Outfall 005 at the WWTP on the unnamed tributary of Box Elder Creek, 6.8 miles downstream to the site of the proposed future RWWTP on Box Elder Creek. Due to access restrictions on private lands, only wetlands on 2 of 12 parcels that overlap the corridor could be field delineated: the Prairie Ridge Golf Course on Ellsworth AFB and an approximately 236-acre parcel of land owned by the South Dakota EDA, approximately 1.4 miles southeast of the golf course. Potential wetlands within the remainder of the corridor were interpreted using available information including aerial photographs, topographic maps, and soil maps (EAFB 2011).

Based on the field investigation, there are 16.62 acres of potentially jurisdictional wetlands and other waters of the United States on the Ellsworth AFB Prairie Ridge Golf Course and the South Dakota EDA parcel portions of the study corridor. Eight potentially jurisdictional palustrine emergent wetlands (Wetlands A through H), composing 11.67 acres, were delineated on the Ellsworth AFB Prairie Ridge Golf Course and South Dakota EDA parcel portions of the study corridor. Two palustrine unconsolidated bottom habitats, Ponds A and B, occur on the Prairie Ridge Golf Course and consist of 3.15 acres. The unnamed tributary of Box Elder Creek consists of approximately 1.80 acres on the Prairie Ridge Golf Course and South Dakota EDA parcels. The desktop aerial interpretation analysis determined that there are approximately 63 acres of potentially jurisdictional wetlands and other waters of the United States identified on the inaccessible properties located within the remaining portions of the study corridor. This area includes approximately 51 acres of palustrine emergent wetland habitats and 12 acres of other waters of the United States (i.e., unnamed tributary of Box Elder Creek and Box Elder Creek). In total, approximately 79 acres of wetlands and other waters of the United States are estimated to occur within the study corridor (EAFB 2011).

According to the NRCS soil survey of the study area, delineated and interpreted palustrine emergent wetlands within the study corridor contain soils (e.g., Lohmiller silty clays and Owanka clay loams) with hydric soil components in the Herdcamp series that are hydrologically driven by groundwater (i.e., the groundwater table is within 0 to 1 foot of the surface). The Lohmiller, Owanka, and Herdcamp series are prevalent in Pennington County in association with both intermittent and perennial stream terraces and floodplains (NRCS 2011).

### 3.8.3 Environmental Consequences

#### Evaluation Criteria

Biological resources are evaluated in terms of compliance with Section 7 of the ESA and related laws and authorities. Emphasis is placed on species with legal, commercial, recreational, ecological, or scientific importance. The level of impact on biological resources is based on (1) the importance (e.g., legal,

commercial, recreational, ecological, or scientific) of the resource, (2) the proportion of the resource that would be affected relative to its occurrence in the region, (3) the sensitivity of the resource to the proposed activities, and (4) the duration of ecological ramifications. Impacts on biological resources are considered significant if species or habitats of high concern are adversely affected over relatively large areas, or disturbances cause reductions in population size or distribution of a species of special concern. A habitat perspective is used to provide a framework for analysis of general classes of effects (i.e., removal of critical habitat, noise, human disturbance).

Determination of the significance of wetland impacts is based on (1) the function and value of the wetland, (2) the proportion of the wetland that would be affected relative to the occurrence of similar wetlands in the region, (3) the sensitivity of the wetland to proposed activities, and (4) the duration of ecological ramifications. Impacts on wetland resources are considered significant if high-value wetlands would be adversely affected.

As a requirement under the ESA, Federal agencies must provide documentation that ensures that agency actions do not adversely affect the existence of any threatened or endangered species. The ESA requires that all Federal agencies avoid “taking” threatened or endangered species (which includes jeopardizing threatened or endangered species habitat). Section 7 of the ESA establishes a consultation process with the USFWS that ends with USFWS concurrence or a determination of the risk of jeopardy from a Federal agency project.

### 3.8.3.1 Proposed Action

#### Existing Ellsworth AFB WWTP Decommissioning and Demolition

**Vegetation.** The Proposed Action would be expected to have short-term, negligible, direct, adverse impacts on vegetation surrounding the existing WWTP. The vegetation surrounding the WWTP is modified, landscaped, and mowed regularly. Vegetation is primarily composed of native and nonnative grasses and various broad-leaved weeds. As there have been no observations made of any unique native vegetative species occurring within this area, impacts on vegetation are expected to be negligible from the temporary disturbances from demolition activities (e.g., trampling and removal). This vegetation would be expected to regenerate once demolition activities have ceased; therefore, no long-term, adverse impacts would be expected.

Long-term, negligible, indirect, beneficial effects on vegetation would also be expected from the Proposed Action. Once the WWTP has been demolished, the site would be revegetated with native vegetation. Therefore, a larger proportion of native vegetation cover within the Project area could result from the Proposed Action.

**Wildlife.** The Proposed Action would have short-term, negligible, direct, adverse impacts on wildlife due to disturbances from noise, demolition activities, and heavy equipment use. Most wildlife species in the construction vicinity would be expected to quickly recover once the demolition noise and disturbances have ceased. In addition, the demolition area would be relatively small in size and is in a partially developed area where disturbances are common. Most of the area surrounding the WWTP and within the Project area is regularly mowed and provides marginal habitat for most wildlife species. Species likely to use the area include those species typical of developed areas, such as deer, raccoon, rabbits, mourning dove, common grackle, and killdeer. High noise events could cause wildlife to engage in escape or avoidance behaviors, resulting in short-term, negligible, adverse impacts. Wildlife would be anticipated to return once demolition activities have ceased for the day or demolition period; therefore, no long-term, adverse impacts on wildlife would be expected from demolition of the WWTP.

Wildlife within the Project area is expected to be habituated to noise disturbances due to aircraft. The majority of the Project area is within the 80 to 85 dBA noise zone. This noise level is created by the runway that is just east of the WWTP. The southeastern portion of the Project area falls within the 75 to 80 dBA noise zone. Wildlife accustomed to this sound intensity would not be expected to be significantly impacted from noise generated from heavy equipment and demolition activities. The Sound Exposure Level (SEL), a measure of the total sound exposure of an event compressed into a 1-second time interval providing a measure of the total sound energy of a single event, from aircraft experienced within the Project area is estimated to reach levels of 118 dB SEL. As shown in **Table 3-5**, predicted noise levels at 50 feet from the source of demolition equipment (e.g., bulldozers, dump truck, back hoe, front-end loaders, and generators) would range from 71 to 94 dBA. The level of noise that is regularly experienced within the Project area, in addition to the fact that wildlife species are generally discouraged from the Project area and harassed due to BASH concerns, suggests that wildlife species in the Project area are adapted to frequent noise and disturbances and would be negligibly impacted by the Proposed Action.

Short-term, minor, direct, adverse impacts on aquatic and terrestrial wildlife species that use the unnamed tributary of Box Elder Creek as habitat would be expected due to a reduction in the volume of water flowing within the stream after the WWTP is decommissioned. The likely return of the unnamed tributary to an ephemeral or intermittent flow regime would remove this perennial source of water that several species (e.g., invertebrates, fish, amphibians, waterfowl) likely use as habitat. The modification of this permanent source of flowing water to intermittently flowing water would likely displace some wildlife species.

On the other hand, long-term, minor, indirect, beneficial effects on invertebrates and amphibians that use the unnamed tributary of Box Elder Creek, impoundments, and wetlands east of the Project area would be expected from the decommissioning of the WWTP. Decommissioning of the WWTP would discontinue effluent outflow to this drainage, thereby reducing the amount of ammonia, TSS, chlorine, and other pollutants being discharged into the tributary and downstream waters. Dissolved oxygen levels and water quality would be anticipated to improve, resulting in long-term, beneficial effects on wildlife.

***Sensitive and Protected Species.*** There are no known resident federally or state-listed threatened or endangered species on Ellsworth AFB; therefore, no impacts on threatened or endangered species would be expected from WWTP decommissioning and demolition activities under the Proposed Action. The Swainson's hawk and burrowing owl are two sensitive species, as listed by the South Dakota Natural Heritage Program, which could potentially occur near the WWTP (EAFB 2008c). However, although the Ellsworth AFB General Plan calls for consideration and protection of these two species on the installation, these species are discouraged in the WWTP and golf course area due to BASH concerns of the runway. The Prairie Ridge Golf Course has an active pest control program to address occasional pests such as prairie dogs, which can attract raptors and burrowing owls (EAFB 2005b). Ellsworth AFB also has a "low tolerance" policy for several species, including hawks. Therefore no new impacts from demolition activities on these species would be expected, as their presence is already discouraged. Many migratory bird species, particularly gulls, hawks, geese, and ducks, are also actively discouraged from the Prairie Ridge Golf Course due to BASH concerns. Therefore, no new impacts on these migratory bird species would be expected, as their presence is also discouraged. Short-term, negligible, indirect, adverse impacts on other migratory bird species would be expected due to temporary noise and visual disturbances, as discussed for wildlife.

***Wetlands.*** Results gathered during the October 2011 investigation of wetlands downstream from the existing Ellsworth AFB WWTP indicate that, although flow within unnamed tributary of Box Elder Creek would be greatly reduced as a result of the decommissioning of the WWTP, wetland habitats identified along the unnamed tributary of Box Elder Creek would likely maintain their hydrologic integrity and function due to groundwater influence (EAFB 2011). As a result of ceasing WWTP effluent discharge

into the unnamed tributary, the hydroperiod (i.e., the length of time and portion of year the wetland holds ponded water) of adjoining wetlands could be reduced as a result of the decrease in potential flooding events of the stream, resulting in long-term, negligible, adverse impacts on wetlands. However, this would not be expected to reduce the size or integrity of adjoining wetlands along the unnamed tributary, as groundwater is suspected to be supporting the hydrology of these wetlands.

On the other hand, long-term, minor, indirect, beneficial effects on water quality within the wetlands would be expected from decommissioning of the WWTP, due to the decrease in ammonia, TSS, chlorine, and other pollutants being discharged to the water column from the WWTP. Because ammonium compounds and nutrients can decrease dissolved oxygen and other water quality parameters through chemical and biological reactions, decreasing these inputs would have a beneficial impact on water quality within the wetlands.

Short-term, negligible to minor, indirect, adverse impacts on wetlands to the east of and within the Project area could occur from increased erosion, sedimentation, and pollutants entering these wetlands during demolition activities. However, adherence to an erosion-and-sediment-control plan and SWPPP should prevent surface water degradation. Assuming appropriate BMPs are implemented during demolition activities, no significant adverse impacts on receiving wetlands would be expected. In the event of a spill or leak of fuel or other construction-related products, there could be adverse impacts on wetland surface water quality. All fuels and other potentially hazardous materials would be contained and stored appropriately. In the event of a spill, procedures outlined in Ellsworth AFB's SPCC Plan would be followed to quickly contain and clean up a spill (see **Sections 3.11** for a discussion on hazardous materials and wastes).

### Wastewater Pipeline Easement and Construction

**Vegetation.** No impacts on vegetation would be expected from the granting of an easement to the South Dakota EDA. Short-term, negligible, adverse impacts on vegetation would be expected from the construction of the sanitary sewer pipeline due to temporary vegetation removal and trampling. The majority of vegetation that would be disturbed would be turfgrasses associated with the golf course. The groves of conifers and eastern cottonwood situated along the unnamed tributary to Box Elder Creek could also be impacted. Disturbed sites would be revegetated once construction activities are complete; therefore, no long-term impacts on vegetation would be expected.

**Wildlife.** No impacts on wildlife would be expected from the granting of an easement to the South Dakota EDA. Short-term, negligible, adverse impacts on wildlife would be expected from the construction of the sanitary sewer pipeline due to temporary habitat removal and disturbances from noise and heavy construction equipment. Temporary adverse impacts on wildlife would be similar to those discussed under demolition activities of the Proposed Action.

**Sensitive and Protected Species.** No impacts on sensitive and protected species would be expected from the granting of an easement to the South Dakota EDA. Anticipated adverse impacts from the construction of the pipeline would be negligible, as the sensitive species on Ellsworth AFB and migratory bird species are already discouraged.

**Wetlands.** No impacts on wetlands would be expected from the granting of an easement to the South Dakota EDA. Short-term, minor, adverse impacts on wetlands would be expected from the construction of a pipeline due to increased erosion, sedimentation, and inflow of pollutants. In addition, the buried pipeline would likely be required to cross the wetland, resulting in temporary disturbances to the wetland during pipeline construction. A FONPA will be issued for the proposed crossing of wetlands within the proposed pipeline corridor. All required permits would be obtained prior to commencing construction

activities, and the wetland would be restored following construction activities. Environmental protection measures, discussed in **Section 3.8.4**, would be implemented in order to minimize adverse impacts on wetlands.

### Contribution of Ellsworth AFB's Wastewater to the Regional Waste Stream

**Vegetation.** No impacts on vegetation would be expected from the contribution of Ellsworth AFB's wastewater to the regional waste stream.

**Wildlife.** No direct impacts on wildlife would be expected from the contribution of Ellsworth AFB's wastewater to the regional waste stream. Long-term, minor, indirect, adverse impacts on off-installation wildlife could occur from increased effluent from Ellsworth AFB into Box Elder Creek. Increased wastewater from Ellsworth AFB to the proposed RWWTP outfall into Box Elder Creek would be expected to introduce increased levels of water pollutants (e.g., ammonia, total suspended solids, chlorine), thus indirectly affecting wildlife species within Box Elder Creek due to decreased dissolved oxygen levels and water quality.

**Sensitive and Protected Species.** No impacts on sensitive and protected species would be expected from the contribution of Ellsworth AFB's wastewater to the regional waste stream.

**Wetlands.** No impacts on wetlands on Ellsworth AFB would be expected from the contribution of Ellsworth AFB's wastewater to the regional waste stream. However, impacts on off-installation wetlands that might occur downstream of the proposed RWWTP along Box Elder Creek could be expected from additional surface water input into those wetlands, a portion of which would be from Ellsworth AFB. Wetlands could be beneficially or adversely affected from increased surface water input, which is not known at this time. Long-term, minor, adverse impacts on wetlands that occur along Box Elder Creek could result from increased water pollutants (e.g., TSS, ammonia, chlorine) from Ellsworth AFB's wastewater contribution to Box Elder Creek.

### 3.8.3.2 WWTP Upgrade Alternative

Under the WWTP Upgrade Alternative, Ellsworth AFB would upgrade the existing WWTP to meet the 2014 SDSWDS permit requirements. The necessary upgrades would involve construction and demolition of facilities and the addition of a small road.

**Vegetation.** Impacts on vegetation from the WWTP Upgrade Alternative would be similar to, but greater than, those discussed under demolition activities of the Proposed Action. Construction activities would cause short-term, negligible, direct, adverse impacts on vegetation due to trampling and temporary removal of vegetation. Long-term, negligible, direct, adverse impacts on vegetation would be expected from the construction of new buildings, demolition, and a road for upgrading the WWTP due to the permanent removal of vegetation for these improvements.

**Wildlife.** Impacts on wildlife from the WWTP Upgrade Alternative would be similar to, but greater than, those discussed under demolition activities of the Proposed Action. Short-term, negligible to minor, direct, adverse impacts on wildlife would be expected due to disturbances from noise, demolition and construction activities, and heavy equipment use.

Long-term, minor, indirect, beneficial effects on wildlife would result from the decrease in ammonia being introduced to the water column due to new NPDES requirements. Because ammonium compounds can decrease dissolved oxygen within the water column, decreasing levels of ammonia would have a

beneficial impact on invertebrates, fish, and amphibians within the main installation drainage, impoundments, and wetlands east of, and within, the Project area.

**Sensitive and Protected Species.** Impacts on sensitive and protected species from the WWTP Upgrade Alternative would be similar to those discussed under demolition activities of the Proposed Action. No impacts on federally or state-listed threatened or endangered species would be expected from the WWTP Upgrade Alternative. The Swainson's hawk and burrowing owl are two sensitive species, as listed by the South Dakota Natural Heritage Program, which could potentially occur near the WWTP (EAFB 2008c). However, although the Ellsworth AFB General Plan calls for consideration and protection of these two species on the installation, these species are discouraged in the WWTP area due to BASH concerns. In addition, many migratory bird species, particularly gulls, hawks, geese, and ducks, are also actively discouraged from the Prairie Ridge Golf Course and surrounding area near the runway due to BASH concerns. Therefore, no new impacts on these migratory bird species would be expected from the WWTP Upgrade Alternative as their presence is also discouraged. Short-term and long-term, negligible, adverse impacts on other migratory bird species would be expected due to temporary disturbances and permanent removal of habitat, respectively.

**Wetlands.** Impacts on wetlands from the WWTP Upgrade Alternative would be similar to those discussed under demolition activities of the Proposed Action. Short-term, negligible to minor, indirect, adverse impacts on wetlands east of and within the Project area could occur from increased erosion, sedimentation, and pollutants to these wetlands during construction activities. However, adherence to BMPs outlined in the erosion-and-sediment-control plan and SWPPP should prevent surface water degradation.

Long-term, indirect, beneficial impacts on wetlands would result from the decrease in ammonia present in the water column due to new NPDES requirements. Because ammonium compounds can decrease dissolved oxygen through chemical reactions, decreasing ammonia would have a beneficial impact on water quality within these wetlands.

### 3.8.3.3 No Action Alternative

Impacts on biological resources under the No Action Alternative would be long-term, minor, and adverse from an inability to meet new SDSWDS ammonia discharge limits.

## 3.8.4 Environmental Protection Measures

An erosion-and-sediment-control plan and SWPPP would be developed for the Proposed Action to minimize soil erosion and surface water degradation. BMPs would be developed as part of the SWPPP to manage storm water both during and after construction. Standard erosion-control measures (e.g., silt fencing, sediment traps, application of water sprays, and restabilization and revegetation of disturbed areas) would minimize environmental impacts on wetlands. Berming along nearby water bodies would decrease the amount of potential sedimentation in adjacent wetlands. After demolition and construction activities have ceased, the Project area would be revegetated with native species.

## 3.9 Cultural Resources

### 3.9.1 Definition of the Resource

Cultural resources include a variety of heritage or cultural-related resources that are considered under certain Federal laws, regulations, EOs, and other requirements. Typically, cultural resources are divided into *archaeological resources* (prehistoric or historical sites where human activity has left physical



evidence of activities but no standing structures remain) or *architectural resources* (buildings or other structures or groups of structures of historic, technological, or aesthetic significance), and *traditional cultural properties* (TCPs).

Architectural resources include standing buildings, bridges, and other structures. Generally, architectural resources not less than 50 years old qualify for nomination to the National Register of Historic Places (NRHP). More recent structures, such as Cold War-era resources, could warrant protection if they have the potential to gain significance in the future or if they meet exceptional significance criteria relevant to the Cold War Era historical context.

*Traditional cultural properties or sacred sites* are a special category of cultural resources. These site types can encompass archaeological resources, structures, neighborhoods, prominent topographic features, habitat, plants, animals, and minerals that native people consider essential for the preservation of traditional culture. A traditional cultural property contains an intangible cultural element that is linked to a specific geographic location.

The evaluation and consultation processes promulgated in Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA) requires assessment of an undertaking's potential impact on historic properties within the project's Area of Potential Effect (APE) on federally managed properties. The APE is defined as the geographic area(s) "within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist." Section 110 of the NHPA requires Federal land-holding agencies to inventory all cultural resources on properties under their jurisdiction irrespective of potential future impacts.

As part of the EA process, NEPA requires an assessment of potential impacts on cultural resources and aspects of the "human environment," which is defined as "the natural and physical (built) environment and the relationship of people with that environment" (40 CFR 1508.14). Under Section 106 of the NHPA, Federal agencies are required to conduct an assessment of the potential impact of an undertaking on historic properties that are within the proposed project's APE, which is defined as the geographic area(s) "within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist." The Federal agency official is charged with providing the Advisory Council on Historic Preservation (ACHP) an opportunity to comment in accordance with its regulations, 36 CFR Part 800. Under Section 110 of the NHPA, Federal agencies are required to locate and inventory all resources under their purview that are recommended as eligible for inclusion in the NRHP on owned, leased, or managed property. In accordance with EO 12372, *Intergovernmental Review of Federal Programs*, determinations regarding the potential effects of an undertaking on historic properties are presented to the State Historic Preservation Officer (SHPO). Cultural resources not evaluated for NRHP eligibility are considered eligible for compliance purposes until such evaluation has been completed and a formal determination of eligibility is made.

### 3.9.2 Description of Affected Environment

Ellsworth AFB originated as the Rapid City Army Air Base in 1942. In 1953, the installation was renamed Ellsworth AFB in honor of Brigadier General Richard E. Ellsworth, commander of the 28th Strategic Reconnaissance Wing. Ellsworth AFB played a significant role in America's World War II military efforts and was an important Strategic Air Command facility throughout the Cold War years. The installation retains historic resources significant for their association with each of these periods (EAFB 2005c).

Ellsworth AFB encompasses the former Rushmore Air Force Station (RAFS), which was operated by the Atomic Energy Commission (EAFB 2008f). As a unit of the Strategic Air Command, the installation

continued to host long-range bomber aircraft. From the early 1960s until the early 1990s, the installation was the host unit for a group of 150 Minuteman intercontinental ballistic missiles; these were later upgraded to Minuteman II. As Cold War tensions ebbed in the early 1990s, the installation's alert functions and missile programs were decommissioned (EAFB 2007d).

Cultural resource site records are maintained by the South Dakota SHPO and the South Dakota State Archeological Research Center. Prior to 1994, no records existed of historic or prehistoric sites on Ellsworth AFB. In 1994, Dakota Research Services performed a comprehensive archaeological survey at the installation, covering all significant tracts of undisturbed land within the installation boundaries; both pedestrian survey and soil auger testing were conducted (EAFB 2007d). The survey identified no significant archaeological sites on Ellsworth AFB.

The results of the archaeological surveys of Ellsworth AFB indicate no Native American Graves Protection and Repatriation Act-related items are known or are likely to be encountered on-installation. The installation CRM provided notice of this finding to federally recognized tribes in the area (EAFB 2005c). No sensitive American Indian resources or TCPs have been identified or are likely to be found on-installation.

Most of the installation's original 1942 structures were demolished in the 1960s and 1970s, and few World War II-era buildings remain. The installation was once composed primarily of temporary buildings, nearly all of which have been demolished. Only a few of the original permanent buildings are still standing and, of these, even fewer retain historic integrity.

An architectural survey was conducted at Ellsworth AFB in August 2006 as part of the 2007 ICRMP update (EAFB 2007d). The field work consisted of verifying physical location, appearance, and characteristics of 119 previously surveyed structures, and 20 new structures (not previously surveyed) that were at least 45 years old. The report from this survey, finalized in February 2007, validated previous NRHP eligibility for 4 World War II- and 3 Cold War-era buildings and recommended individual eligibility status for an additional 14 Cold War-era buildings. None of the buildings within this proposed project APE were found to be eligible. Building 3005 was originally listed as eligible in a 1997 architectural survey, but considerable interior and exterior modifications to the structure made it ineligible according to the 2007 survey (EAFB 2007e).

The Ellsworth AFB Cultural Resources Manager (CRM) determined that the archaeological survey of the installation is complete per Section 110 (a) (2) of the NHPA. Since no significant archaeological properties exist on-installation, further archaeological investigations are unnecessary (EAFB 2007d).

### **3.9.3 Environmental Consequences**

#### **Evaluation Criteria**

Analysis of the potential impacts and adverse effects on cultural resources associated with proposed actions on Federal property includes the assessment of both direct and indirect impacts on cultural resources. Adverse effects could include physically altering, damaging, or destroying a cultural resource. These can also include altering a characteristic that contributes to a resource's NRHP eligibility or introducing visual or audible elements out of character with or affecting the original setting of the resource. The intentional or benign neglect of a cultural resource that results in its full or partial destruction could also be an adverse effect. Adverse effects associated with indirect impacts might include the cumulative effects of the intensified use of an area in which a cultural resource is located resulting from construction or project-related improvement of the area, including improvements to transportation corridors in the vicinity that provide for or indirectly lead to increased access to the area.

### 3.9.3.1 Proposed Action

#### Existing Ellsworth AFB WWTP Decommissioning and Demolition

No effects on architectural or archaeological cultural resources would be expected from the decommissioning and demolition of the WWTP. Demolition involves disassembly and removal of the infrastructure, including treatment units, buildings, and piping. Backfilling, grading and revegetation are required in areas where below-ground structures are removed. There are no current plans to demolish Building 3015 under the Proposed Action. The ten associated WWTP facilities that would be decommissioned and demolished under the Proposed Action are listed in **Table 2-2**.

The WWTP was constructed in 1943; the most recent modification occurred in 2005 when new screening and flume equipment were added to the Pretreatment Facility (Building 3013) (EAFB 2001). Several buildings at Ellsworth AFB have been evaluated as eligible for NRHP listing within three military historic contexts: World War II (1941–1945), the Cold War (1946–1989), and post-Cold War (1990–present). The ten buildings proposed for demolition and removal are not among the significant historic properties on-installation. None of the associated WWTP facilities or infrastructure is considered eligible for NRHP listing (EAFB 2007d, EAFB 2007e).

Based on previous survey and subsurface testing results, the likelihood of encountering any significant archaeological resources within the APE is extremely low. The Section 106 guidelines established in the Ellsworth AFB ICRMP apply (EAFB 2007d).

#### Wastewater Pipeline Easement and Construction

No effects on architectural or archaeological cultural resources would be expected from the granting of a pipeline easement at Ellsworth AFB.

No historic buildings or structures are present within the proposed easement. Based on previous survey and subsurface testing results, the likelihood of encountering any significant archaeological resources within the APE of the easement is extremely low. The proposed construction of a sanitary sewer pipeline would have no adverse effect on architectural or archaeological cultural resources. The Section 106 guidelines established in the Ellsworth AFB ICRMP apply (EAFB 2007d).

#### Contribution of Ellsworth AFB's Wastewater to the Regional Waste Stream

No impacts on architectural or archaeological cultural resources from contribution of Ellsworth AFB's wastewater to the regional waste stream would be expected.

### 3.9.3.2 WWTP Upgrade Alternative

Under the WWTP Upgrade Alternative, Ellsworth AFB would upgrade the existing WWTP to meet the 2014 SDSWDS permit requirements. The necessary upgrades would involve construction and demolition of facilities and the addition of a small road. No impacts would be expected on cultural resources from implementation of the WWTP Upgrade Alternative. None of the associated WWTP facilities or infrastructure is considered eligible for NRHP listing and, based on previous survey and subsurface testing results, the likelihood of encountering any significant archaeological resources within the APE is extremely low.

### 3.9.3.3 No Action Alternative

No impacts on cultural resources would be expected under the No Action Alternative.

### 3.9.4 Environmental Protection Measures

In the unlikely event that archaeological resources are discovered during implementation of the Proposed Action, the Ellsworth AFB CRM would ensure the provisions of the Archaeological Resources Protection Act (16 U.S.C. Sections 470aa to 470mm) and 32 CFR Part 229 are followed. These provisions include protection of any such site from unauthorized damage or vandalism and controlling access to the site. The Base Civil Engineer would stop all demolition in the vicinity of the resource and immediately notify higher headquarters, the SHPO, and appropriate tribal CRMs. The installation CRM would develop an action plan to stabilize and avoid the resources or arrange for the recovery of data through archaeological investigation in consultation with these parties and the demolition team. In the unlikely event that human remains are inadvertently or accidentally discovered during the Proposed Action, the installation CRM would be immediately notified and formal notification, consultation, treatment, and disposition procedures would be followed as outlined in the ICRMP.

## 3.10 Socioeconomic Resources and Environmental Justice

### 3.10.1 Definition of the Resource

**Socioeconomics.** Socioeconomics is the relationship between economies and social elements such as population levels and economic activity. Factors that describe the socioeconomic environment represent a composite of several interrelated and nonrelated attributes. There are several factors that can be used as indicators of economic conditions for a geographic area, such as demographics, median household income, unemployment rates, percentage of families living below the poverty level, employment, and housing data. Data on employment can identify gross numbers of employees, employment by industry or trade, and unemployment trends. Data on personal income in a region can be used to compare the before and after effects of any jobs created or lost as a result of a proposed action. Data on industrial, commercial, and other sectors of the economy provide baseline information about the economic health of a region.

**Environmental Justice.** EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, pertains to environmental justice issues and relates to various socioeconomic groups and the disproportionate effects that could be imposed on them. This EO requires that Federal agencies' actions substantially affecting human health or the environment do not exclude persons, deny persons benefits, or subject persons to discrimination because of their race, color, or national origin. The EO was enacted to ensure the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Consideration of environmental justice concerns includes race, ethnicity, and the poverty status of populations in the vicinity of a proposed action.

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

### 3.10.2 Description of Affected Environment

For the purpose of evaluating baseline socioeconomic conditions, data from three geographic areas will be analyzed: (1) place level data from the City of Box Elder, (2) county level data from Meade and

Pennington counties, and (3) state level data from South Dakota. A place is designated by the U.S. Census Bureau as either a legally bounded incorporated town or an area that is composed of a concentration of population that is unincorporated, but locally identified by a name.

**Demographic Characteristics.** The population in the State of South Dakota grew 8.5 percent from 1990 to 2000 and 6.5 percent from 2000 to 2008. From 1990 to 2000 Pennington County’s population increased 8.9 percent, similar to the State of South Dakota, but from 2000 to 2008 the population in Pennington County grew 11.3 percent, nearly double that of the State of South Dakota during the same time period. Growth in Meade County was robust from 1990 to 2000 at 10.9 percent but from 2000 to 2008 a 1.1 percent decrease in population occurred (U.S. Census Bureau 1990, U.S. Census Bureau 2000, U.S. Census Bureau 2008a). Box Elder experienced 6.0 percent growth from 1990 to 2000, slightly less than the State of South Dakota. From 2000 to 2008 Box Elder experienced a 23.8 percent increase in population. **Table 3-11** contains more detailed demographic data (U.S. Census Bureau 1990, U.S. Census Bureau 2000, U.S. Census Bureau 2008a, U.S. Census Bureau 2008b).

**Table 3-11. Population Growth from 1990 to 2008**

Geographic Area	Population			Percent Change in Population	
	1990	2000	2008	1990 to 2000	2000 to 2008
City of Box Elder	2,680	2,841	3,517	6.0%	23.8%
Meade County	21,878	24,253	23,989	10.9%	-1.1%
Pennington County	81,343	88,565	98,533	8.9%	11.3%
South Dakota	696,004	754,844	804,194	8.5%	6.5%

Sources: U.S. Census Bureau 1990, 2000, 2008a, 2008b

**Ellsworth AFB.** Ellsworth AFB is the second largest employer in South Dakota, second only to Avera McKennan Hospital in Sioux Falls and has an estimated annual economic impact of \$300 million. The installation supports 8,673 personnel, of which 458 are nonappropriated fund civilians, 516 are appropriated fund civilians, 3,246 are active-duty military members, and 4,453 are dependents. The nonappropriated personnel are employed by the Ellsworth Morale and Recreation fund. The funding for these positions is not appropriated by Congress, but is generated by activities (e.g., childcare facilities and recreational facilities) and grants from the Army and Air Force Exchange Service. According to FY 2008 data, the installation directly employed approximately 4,200 persons. Total payroll for Ellsworth AFB is approximately \$163 million and total direct expenditures were an additional \$95 million. There are another 1,360 persons indirectly employed as a result of Ellsworth AFB resulting in approximately \$43 million in wages for those indirectly employed (EAFB 2006b).

**Employment Characteristics.** **Table 3-12** contains employment data by industry. The largest industry is the educational, health, and social services industry representing 21.1 percent of those employed in Box Elder, 20.3 percent of those employed in Meade County, and 21.8 percent in Pennington County. The second and third largest industries in these locales are the retail trade industry and the arts, entertainment, recreation, accommodation, and food services industry. The area around Ellsworth AFB has similar employment trends as compared to the State of South Dakota, which has a slightly higher percentage of employees working in the manufacturing job industry when compared to the area around Ellsworth AFB.

**Table 3-12. Overview of Employment by Industry, 2000**

	<b>City of Box Elder</b>	<b>Meade County</b>	<b>Pennington County</b>	<b>South Dakota</b>
In armed forces	3.6%	8.4%	1.8%	0.6%
Agriculture, forestry, fishing and hunting, and mining	2.0%	7.7%	2.3%	8.1%
Construction	7.5%	7.2%	7.4%	6.3%
Manufacturing	10.0%	7.3%	9.2%	11.1%
Wholesale trade	2.1%	2.3%	3.1%	3.3%
Retail trade	14.3%	14.2%	14.3%	12%
Transportation and warehousing, and utilities	3.8%	7.1%	4.2%	4.7%
Information	1.4%	1.6%	2.2%	2.1%
Finance, insurance, real estate, and rental and leasing	4.8%	6.1%	7.4%	7.4%
Professional, scientific, management, administrative, and waste management services	6.0%	4.0%	6.8%	5.0%
Educational, health, and social services	21.1%	20.3%	21.8%	22.0%
Arts, entertainment, recreation, accommodation, and food services	13.2%	9.5%	10.2%	8.3%
Other services (except public administration)	6.5%	6.0%	6.0%	5.1%
Public administration	7.4%	6.8%	5.1%	4.8%

Source: U.S. Census Bureau 2000

**Environmental Justice and Children’s Environmental Health and Safety Risks.** Minority and low-income populations were characterized for the City of Box Elder, Meade County, Pennington County, and South Dakota, **Table 3-13**. The American Indian and Alaskan Native population is high throughout the four geographic areas ranging from 2.0 percent to 8.3 percent compared to the United States average of 0.9 percent. There is also a higher percentage of African American and Hispanic populations in the City of Box Elder when compared to South Dakota percentages. Box Elder also had 15.9 percent of individuals and 13 percent of families living below the poverty level in 2000. The median annual household income in the City of Box Elder is \$11,000 less than the South Dakota median income (U.S. Census Bureau 2000).

### 3.10.3 Environmental Consequences

#### Evaluation Criteria

**Socioeconomics.** This section addresses the potential for direct and indirect impacts the Proposed Action could have on local or regional socioeconomics. Impacts on local or regional socioeconomics are evaluated according to their potential to stimulate the economy through the purchase of goods or services and increases in employment. Similarly, impacts are evaluated to determine if overstimulation of the economy (e.g., housing availability is inadequate to accommodate increases in permanently based workforce) could occur as a result of the Proposed Action.

**Table 3-13. Race, Ethnicity, and Poverty Characteristics**

	<b>City of Box Elder</b>	<b>Meade County</b>	<b>Pennington County</b>	<b>South Dakota</b>
White	83.4%	86.7%	92.7%	88.7%
Black or African American	2.3%	0.9%	1.5%	0.6%
American Indian and Alaska Native	5.6%	8.1%	2.0%	8.3%
Asian	2.1%	0.9%	0.6%	0.6%
Native Pacific Islander	0.1%	0.1%	0.1%	0%
Two or More Races	0.7%	0.7%	0.6%	0.5%
Hispanic or Latino	5.8%	2.7%	2.5%	1.3%
Individuals below poverty level	15.9%	9.4%	11.5%	13.2%
Families below poverty level	13.0%	7.9%	8.6%	9.3%
Median Household Income	\$32,344	\$36,992	\$37,485	\$43,237

Source: U.S. Census Bureau 2000

***Environmental Justice and Children’s Environmental Health and Safety Risks.*** Ethnicity and poverty data are examined for the City of Box Elder, Meade County, Pennington County, and South Dakota to determine if a low-income or minority population could be disproportionately affected by the Proposed Action. As discussed in **Section 3.10.2**, minority populations within the City of Box Elder are higher than the other geographic areas.

### 3.10.3.1 Proposed Action

#### Existing Ellsworth AFB WWTP Decommissioning and Demolition

The decommissioning and demolishing of the existing WWTP on Ellsworth AFB would result in the creation of jobs as construction workers would be needed to execute this portion of the Proposed Action. This job creation would result in short-term, minor, direct, beneficial impacts on the construction industry. The increase in the payroll tax revenues, purchase of materials, and purchase of goods and services in the area around Ellsworth AFB would result in short-term, negligible, indirect, beneficial impacts on the local economy. The number of jobs created would not be expected to outstrip the local supply of construction workers, as there are approximately 4,100 construction workers in Meade and Pennington counties. Impacts on demographics would not be expected, as the demolition of the existing WWTP should not require construction workers from outside of the surrounding area to relocate for the decommissioning and the demolition of the WWTP. Environmental justice issues would not be expected to result from the decommissioning and demolition of the existing WWTP as this action will occur on Ellsworth AFB.

#### Wastewater Pipeline Easement and Construction

The granting of a sewer pipeline easement to the South Dakota EDA would not result in impacts on socioeconomics or environmental justice. Short-term, minor, adverse impacts would be expected from the construction of the sanitary sewer pipeline, as golfers temporarily would be precluded from using the golf course. Short-term, minor, beneficial effects on the construction industry would be expected from the construction of the sanitary sewer pipeline due to the temporary creation of jobs to execute this portion of the Proposed Action. The increase in the payroll tax revenues, purchase of materials, and

purchase of goods and services in the area around Ellsworth AFB would result in short-term, negligible, indirect, beneficial impacts on the local economy. The number of jobs created would not be expected to outstrip the local supply of construction workers, as there are approximately 4,100 construction workers in Meade and Pennington counties. Impacts on demographics would not be expected, as the construction of the wastewater pipeline would not require construction workers from outside of the surrounding area to relocate for the Proposed Action. Environmental justice issues would not be expected to result from the construction of the wastewater pipeline, as this action would occur entirely on Ellsworth AFB.

### **Contribution of Ellsworth AFB's Wastewater to the Regional Waste Stream**

The flow of wastewater from Ellsworth AFB to the RWWTP would not result in impacts on socioeconomics as the demographics or the employment characteristics of the area would not be altered as a result of Ellsworth AFB's wastewater contribution to the regional waste stream. Environmental justice issues would not be anticipated as the area around where the RWWTP would be constructed is primarily agricultural and has very low population levels.

#### **3.10.3.2 WWTP Upgrade Alternative**

Under the WWTP Upgrade Alternative, Ellsworth AFB would upgrade the existing WWTP to meet the 2014 SDSWDS permit requirements. The necessary upgrades would involve construction and demolition of facilities and the addition of a small road. Short-term, minor, beneficial effects on socioeconomic resources would be expected. Instead of increases in employment resulting from the demand for construction workers for the decommissioning and demolition of the existing WWTP, there would be a demand for construction workers to install the necessary infrastructure to continue maintenance on the Ellsworth AFB WWTP. Off-installation minority and low-income populations, limited in size and proximity to the installation, would not be affected by the relatively small-scale construction associated with the WWTP Upgrade Alternative. Therefore, consideration of environmental justice impacts will not be studied in detail.

#### **3.10.3.3 No Action Alternative**

No impacts on socioeconomic resources would be expected under the No Action Alternative.

### **3.10.4 Environmental Protection Measures**

No environmental protection measures have been identified for socioeconomic resources and environmental justice.

## **3.11 Hazardous Materials and Wastes**

### **3.11.1 Definition of the Resource**

Hazardous materials are defined by 49 CFR 171.8 as "hazardous substances, hazardous wastes, marine pollutants, elevated temperature materials, materials designated as hazardous in the Hazardous Materials Table (49 CFR 172.101), and materials that meet the defining criteria for hazard classes and divisions" in 49 CFR Part 173. Transportation of hazardous materials is regulated by the U.S. Department of Transportation regulations within 49 CFR Parts 105–180.

Hazardous wastes are defined by the Resource Conservation and Recovery Act (RCRA) at 42 U.S.C. §6903(5), as amended by the Hazardous and Solid Waste Amendments, as "a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious



characteristics may (A) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (B) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed.” Certain types of hazardous wastes are subject to special management provisions intended to ease the management burden and facilitate the recycling of such materials. These are called universal wastes and their associated regulatory requirements are specified in 40 CFR Part 273. Four types of waste are currently covered under the universal waste regulations: hazardous waste batteries, hazardous waste pesticides that are either recalled or collected in waste pesticide collection programs, hazardous waste thermostats, and hazardous waste lamps.

Special hazards are those substances that might pose a risk to human health and are addressed separately from other hazardous substances. Special hazards include asbestos-containing material (ACM), polychlorinated biphenyls (PCBs), and lead-based paint (LBP). USEPA is given authority to regulate these special hazard substances by the Toxic Substances Control Act (TSCA) Title 15 U.S.C. Chapter 53. TSCA Subchapter I identifies PCBs, Subchapter II handles ACMs, and Subchapter IV discusses LBP. USEPA has established regulations regarding asbestos abatement and worker safety under 40 CFR Part 763 with additional regulation concerning emissions (40 CFR Part 61). Whether from lead abatement or other activities, depending on the quantity or concentration, the disposal of the LBP waste is potentially regulated by the RCRA at 40 CFR Part 260. The disposal of PCBs is addressed in 40 CFR Parts 750 and 761. The presence of special hazards or controls over them might affect, or be affected by, a proposed action. Information on special hazards describing their locations, quantities, and condition assists in determining the significance of a proposed action.

DOD has developed the ERP, intended to facilitate thorough investigation and cleanup of contaminated sites on military installations. Through the ERP, DOD evaluates and cleans up sites where hazardous wastes have been spilled or released to the environment. Description of ERP activities provides a useful gauge of the condition of soils, water resources, and other resources that might be affected by contaminants. It also aids in identification of properties and their usefulness for given purposes (e.g., activities dependent on groundwater usage might be restricted until remediation of a groundwater contaminant plume has been completed).

For the USAF, AFPD 32-70, *Environmental Quality*, and the AFI 32-7000 series incorporate the requirements of all Federal regulations and other AFIs and DOD Directives for the management of hazardous materials, hazardous wastes, and special hazards.

### 3.11.2 Description of Affected Environment

***Hazardous Materials and Petroleum Products.*** AFI 32-7086, Hazardous Materials Management, establishes procedures and standards that govern management of hazardous materials throughout the USAF. It applies to all USAF personnel who authorize, procure, issue, use, or dispose of hazardous materials, and to those who manage, monitor, or track any of those activities. As part of the Hazardous Waste Management Plan, Ellsworth AFB has established a hazardous materials pharmacy, also known as the HAZMART, in accordance with AFI 32-7086. The HAZMART ensures that only the smallest quantities of hazardous materials necessary to accomplish the mission are purchased and used. The HAZMART tracks the acquisition and use of these materials through the Environmental Management System. To accomplish the goals of the Environmental Management System, Ellsworth AFB has established the Environmental Leadership Counsel; a collaborative team composed of senior Ellsworth AFB leaders who assign personnel to the Cross Functional Teams to collectively implement the Pollution Prevention Plan (EAFB 2005d).

The Ellsworth AFB WWTP contains hazardous materials (hydrogen sulfide, liquid-gas chlorine, sulfur dioxide, and various corrosive polymers) and petroleum products. One AST is associated with Building 3005 at the WWTP. Tank 3005-2 (which had replaced Tank 3005-1) is a 491-gallon diesel storage tank connected to a 100 kilowatt (kW) emergency generator (EAFB 2008c).

**Hazardous and Petroleum Wastes.** Ellsworth AFB maintains a Hazardous Waste Management Plan (EAFB 2005d) as directed by AFI 32-7042, Solid and Hazardous Waste Compliance. This plan prescribes the roles and responsibilities of all members of Ellsworth AFB with respect to the waste stream inventory, waste analysis plan, hazardous waste management procedures, training, emergency response, and pollution prevention. The plan establishes the procedures to comply with applicable Federal, state, and local standards for solid waste and hazardous waste management. Ellsworth AFB is a large-quantity hazardous waste generator (Handler Identification). Building 1908 is the RCRA Part B Permitted Hazardous Waste Storage Facility (USEPA 1971).

The Ellsworth AFB WWTP contains hazardous wastes such as waste oil. One underground storage tank is associated with Building 3015 (O/W separator), which is part of the WWTP. Tank 3015-1 is a 1,000-gallon tank that stores used oil from the O/W separator (EAFB 2008g). Another former O/W separator at Building 1709, northwest of the WWTP near the runway, was removed (EAFB 2008b). There are several other USTs associated with JP-8 and other aircraft activities that are west of the proposed project area.

**Environmental Restoration Program.** The Defense Environmental Restoration Program (DERP) was formally established by Congress in 1986 to provide for the cleanup of DOD property at active installations, Base Realignment and Closure installations, and formerly used defense sites throughout the United States and its territories. The three restoration programs under the DERP are the Installation Restoration Program (IRP), Military Munitions Response Program (MMRP), and Building Demolition/Debris Removal (BD/DR). The IRP requires each installation to identify, investigate, and clean up contaminated sites. The MMRP addresses nonoperational military ranges and other sites that are suspected or known to contain UXO, discarded military munitions, or munitions constituents. BD/DR involves the demolition and removal of unsafe buildings and structures. Eligible ERP sites include those contaminated by past defense activities that require cleanup under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendment and Reauthorization Act (SARA), and certain corrective actions required by RCRA. Non-ERP sites are remediated under the Compliance-Related Cleanup Program. There is one ERP site within the proposed Project area (OU-6). In addition to the one active ERP site, there is one closed ERP site (Waste Pond-[WP] 22) and one Area of Concern (AOC), a former incinerator ash disposal site near Gateway Lake, in the immediate vicinity of the proposed Project area; see **Figure 2-1**.

OU-6 (ERP site LF-06 or Landfill 5) is south of the WWTP. From 1960 to 1980, demolition debris and hardfill materials were placed in the landfill along with miscellaneous refuse, dried sewage sludge, and possibly shop wastes. OU-6 has been tested, and capped, and groundwater long-term monitoring (LTM) has been in place since 1996. OU-6 was deleted from the National Priorities List in December 2006. Contamination in groundwater from this site is addressed in OU-11 (EAFB 2007c). The groundwater component of all ERP OUs at Ellsworth AFB was consolidated into OU-11 in 2005 in order to expedite partial site deletions and possible redevelopment of these areas, as long as the integrity of the remedy is maintained. *In situ* biodechlorination to remediate the groundwater contamination is in use approximately 1.1 miles north of the Ellsworth AFB WWTP. Contaminated groundwater is pumped out of the ground and treated to meet South Dakota drinking water standards. The treated water is then discharged to a local drainage, rerouted to the Ellsworth AFB WWTP, or re-injected into the ground (EAFB 2007c).

An LTM sampling event associated with ongoing groundwater monitoring in April 2009 included collection of groundwater samples for analysis of VOCs at three monitoring wells within or near OU-6. No contaminants were found above respective South Dakota Groundwater Standards. In addition, a landfill cover inspection at OU-6 revealed that the 3-foot landfill cover is in good condition with no issues that require correction (EAFB 2009b).

WP-22 consists of former portions of the existing Ellsworth AFB WWTP that were operated at Ellsworth AFB between 1948 and 1972. The wastewater treatment facility formerly consisted of a two-step chemical and physical treatment of effluent from the flight line shops and pump houses. The first step consisted of adding ferric sulfate to the incoming effluent causing the coagulation of petroleum-based products. The remaining fluid portion would then be treated with lime to balance the pH of the liquid before releasing it to the natural drainage pathways surrounding the wastewater treatment facility. The coagulated sludge would be periodically removed and placed in the sludge drying beds east of the facility for dewatering. The dried sludge would then be collected and moved to an installation landfill for disposal. An initial remedial investigation was conducted in 1995 resulting in a remedial action plan issued in 1997. Upon completion of the remedial action and subsequent 5 years of monitoring, the site was closed in 2005 (EAFB 2007c); therefore, no impacts related to WP-22 would be expected and this issue is not discussed further in this EA.

The Gateway Lake AOC was identified in a preconstruction geotechnical investigation conducted in 2002. Subsequent historical research revealed that this area was a historic ravine that was used as a disposal area for ash from a nearby incinerator. A remedial investigation was conducted to determine the extent of the waste disposal area and the characteristics of the waste. The electro-magnetic survey revealed a total waste disposal area of approximately 0.33 acres and the associated sampling indicated a thickness between 6 and 7.5 feet. Laboratory analysis of the ash bed samples determined the material did not qualify as a RCRA hazardous waste and could be disposed of as municipal waste. The ash bed was removed in 2007 (EAFB 2007f, EAFB 2006c). Therefore, no impacts would be expected related to the Gateway Lake AOC and this issue is not discussed further in this EA.

**Asbestos-Containing Material.** Asbestos is regulated by USEPA under the CAA, TSCA, and CERCLA. USEPA has established that any material containing more than 1 percent asbestos by weight is considered an ACM. Friable ACM is any material containing more than 1 percent asbestos, and that, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure. Nonfriable ACM is any ACM that does not meet the criteria for friable ACM.

AFI 32-1052, Facilities Asbestos Management, provides the direction for asbestos management at USAF installations. It requires installations to develop an asbestos management plan for the purpose of maintaining a permanent record of the status and condition of ACM in installation facilities, and documenting asbestos management efforts. In addition, the instruction requires installations to develop an asbestos operating plan detailing how the installation accomplishes asbestos-related projects.

In a survey conducted in 1994, several buildings and structures on the installation were found to contain ACMs. The buildings associated with the Ellsworth AFB WWTP were not included as a part of the 1994 survey (EAFB 1995). The Ellsworth AFB WWTP was constructed in 1943; therefore, despite the lack of an asbestos survey, it is assumed that the WWTP contains ACMs.

**Lead-Based Paint.** The Residential LBP Hazard Reduction Act of 1992, Subtitle B, Section 408 (commonly called Title X) regulates the use and disposal of LBP on Federal facilities. Federal agencies are required to comply with applicable Federal, state, and local laws relating to LBP activities and hazards. The Federal government banned the use of most LBP in 1978. Therefore, it is assumed that all

structures constructed prior to 1978 could contain LBP. The Ellsworth AFB WWTP has not been surveyed for LBP; however, it was constructed in 1943 and therefore could contain LBP.

**Polychlorinated Biphenyls.** PCBs are a group of chemical mixtures used as insulators in electrical equipment such as transformers and fluorescent light ballasts. Federal regulations govern items containing 50 to 499 ppm PCBs. Chemicals classified as PCBs were widely manufactured and used in the United States throughout the 1950s and 1960s. PCB-containing oil is typically found in older electrical transformers and light fixtures (ballasts). Transformers containing greater than 500 ppm PCBs, between 50 and 500 ppm PCBs, and less than 50 ppm PCB are considered PCB, PCB-contaminated, and non-PCB, respectively.

A survey for PCBs has not been conducted at the Ellsworth AFB WWTP. The fluorescent light ballasts in the buildings, sump pumps at the three lift stations, and any pad-mounted transformers near the WWTP might contain PCBs. Some PCB transformers on the installation were removed in the 1990s. Other items that might contain PCBs include capacitors and surge protectors.

**Pollution Prevention.** AFI 32-7080, Pollution Prevention Program, implements the regulatory mandates in the Emergency Planning and Community Right-to-Know Act, Pollution Prevention Act of 1990; EO 12873, Federal Acquisition, Recycling, and Waste Prevention; and EO 12902, Energy Efficiency and Water Conservation at Federal Facilities. AFI 32-7080 prescribes the establishment of Pollution Prevention Management Plans, which have management and minimization strategies for ozone-depleting substances (ODSs), USEPA's 17 industrial toxics, hazardous wastes, municipal solid wastes, affirmative procurement of environmentally friendly products, energy conservation, and air and water pollutant reduction. Ellsworth AFB fulfills this requirement with the following plans.

- Pollution Prevention Management Action Plan (EAFB 2006d)
- Environmental Restoration Program (EAFB 2007c)
- Hazardous Waste Management Plan (EAFB 2005d).

### 3.11.3 Environmental Consequences

#### Evaluation Criteria

Impacts would be considered significant if a proposed action resulted in worker, resident, or visitor exposure to hazardous materials, or if the action generated quantities of these materials beyond the capability of current management procedures. Impacts on hazardous materials management would be considered significant if the Federal action resulted in noncompliance with applicable Federal and SDDENR regulations, or increased the amounts generated or procured beyond current Ellsworth AFB waste management procedures and capacities. Impacts on ERP sites would be considered significant if the Federal action disturbed (or created) contaminated sites resulting in adverse impacts on human health or the environment.

#### 3.11.3.1 Proposed Action

##### Existing Ellsworth AFB WWTP Decommissioning and Demolition

**Hazardous Materials and Petroleum Products.** Short-term, minor, direct, adverse and long-term, minor, direct, beneficial effects on hazardous materials management would be expected as a result of decommissioning and demolition of the Ellsworth AFB WWTP. Hazardous materials and petroleum products would be encountered during the decommissioning and demolition of the existing WWTP resulting in short-term, adverse effects. During the decommissioning process, all hazardous materials

would be removed and properly disposed of offsite, and the ASTs on the site would be reused elsewhere or properly closed and disposed of offsite in accordance with Federal, state, and USAF regulations. The removal of these hazardous materials would result in long-term, minor, beneficial effects. It is anticipated that the quantity of hazardous materials and petroleum products encountered during demolition activities would be minimal.

Contractors would be responsible for the management of hazardous materials and petroleum product usage, which would be handled in accordance with Federal, state, and USAF regulations. Contractors must report the use of hazardous materials to the HAZMART, including pertinent information (e.g., Material Safety Data Sheets). If a material that is less hazardous can be used, the HAZMART should make these recommendations. Use of the HAZMART would also ensure that ODSs are not available for use. Use of ODSs in such products as refrigerants, aerosols, and fire suppression systems is not permitted by the DOD without a formal request by waiver.

**Hazardous and Petroleum Waste.** Short-term, minor, direct, adverse effects on hazardous wastes would occur as a result of the decommissioning and demolition of the WWTP. It is anticipated that the quantity of hazardous wastes generated from the proposed decommissioning and demolition activities would be negligible resulting in short-term effects.

No effects on the installation's hazardous waste management program would be expected from the demolition activities. Any residual sludge or waste oil encountered during the demolition of the WWTP facilities would be treated and disposed of by a certified contractor. Hazardous waste disposal and demolition contractors would be responsible for the disposal of hazardous wastes in accordance with Federal and state laws and regulations, as well as the installation's Hazardous Waste Management Plan. BMPs would be followed to ensure that contamination from a spill would not occur. If, however, a spill would occur, the SPCC Plan outlines the appropriate measures for spill situations (EAFB 2005d).

**Environmental Restoration Program.** No effects on ERP site OU-6 would be expected. ERP site OU-6 is south of the WWTP and it is not expected that the demolition activities would disturb OU-6. The proposed area of effect for the demolition activities does not overlap with the boundary of this ERP site. OU-11 would not be affected by the Proposed Action.

**Asbestos-Containing Materials.** The existing WWTP might contain ACMs; therefore, short-term, minor, direct, adverse and long-term, minor, indirect, beneficial effects on ACMs would be expected. In accordance with the Asbestos Management Plan, sampling for ACMs would occur prior to demolition and would be disposed of at a hazardous waste disposal facility. Sampling, removal, and disposal of any ACMs would be short-term in duration and would result in less than significant effects. Any identified asbestos would be separated from the remainder of the demolition materials as required and remediated in accordance with Federal, state, and USAF regulations (EAFB 2005d). Removal of ACM would result in long-term, minor, beneficial effects.

**Lead-Based Paint.** The existing WWTP might contain LBP; therefore, short-term, minor, direct, adverse and long-term, minor, indirect, beneficial effects on LBP would be expected. In accordance with the LBP Management Plan, sampling for LBP would occur prior to demolition and would be disposed of at a hazardous waste disposal facility. Sampling, removal, and disposal of any LBP would be short-term in duration and would result in less than significant effects. Any identified LBP would be separated from the remainder of the demolition materials as required and remediated in accordance with Federal, state, and USAF regulations (EAFB 2005d). Removal of LBP would result in long-term, minor, beneficial effects.

**Polychlorinated Biphenyls.** The existing WWTP might contain light ballasts or sump pumps; therefore, short-term, minor, direct, adverse effects on PCBs would be expected. The light fixtures within the buildings and sump pumps in the three lift stations would be removed prior to demolition and sampled for PCBs. Pad-mounted transformers would also be sampled for PCBs prior to removal or alteration of the utility. If any PCB-containing materials are identified, they would be handled in accordance with Federal and state regulations and the installation's Hazardous Waste Management Plan and be disposed of at a hazardous waste disposal facility (EAFB 2005d). Sampling, removal, and disposal of any PCBs would be short-term in duration and would result in less than significant effects.

**Pollution Prevention.** Negligible effects on the Pollution Prevention Program at Ellsworth AFB would be expected from implementation of the Proposed Action. Most demolition practices do not call for the use of large quantities of hazardous materials; however, an incremental increase would be expected from the use of construction equipment during this time. The Pollution Prevention Program and associated plans at Ellsworth AFB would accommodate the Proposed Action. Adherence to these plans, in particular the SPCC Plan, would reduce adverse effects resulting from the Proposed Action. BMPs used at construction sites would minimize effects on the natural environment.

### Wastewater Pipeline Easement and Construction

**Environmental Restoration Program.** No effects on ERP site OU-6 would be expected from the granting of a pipeline easement to the South Dakota EDA; however, short-term, minor, adverse impacts on the ERP could be expected from construction of the wastewater pipeline. Potential impacts on OU-6 from the construction of the sanitary sewer pipeline could be prevented by adding an additional landfill cap to protect the integrity of the existing 3-foot cap on OU-6.

**Hazardous Materials and Petroleum Products.** No impacts on hazardous materials and petroleum products would occur as a result of the granting of an easement to the South Dakota EDA. Short-term, minor, direct, adverse impacts on hazardous materials management would be expected as a result of the construction of a sanitary sewer pipeline within the proposed pipeline corridor. Hazardous materials and petroleum products would be used during construction activities. It is anticipated that the quantity of hazardous materials and petroleum products used during construction activities would be minimal.

Contractors would be responsible for the management of hazardous materials and petroleum product usage, which would be handled in accordance with Federal, state, and USAF regulations. Contractors must report the use of hazardous materials to the HAZMART, including pertinent information (e.g., Material Safety Data Sheets). If a material that is less hazardous can be used, the HAZMART should make these recommendations. Use of the HAZMART would also ensure that ODSs are not available for use. Use of ODSs in such products as refrigerants, aerosols, and fire suppression systems is not permitted by the DOD without a formal request by waiver.

**Hazardous and Petroleum Waste.** No impacts on hazardous wastes would occur as a result of the granting of an easement to the South Dakota EDA. Short-term, minor, direct, adverse effects on hazardous wastes would occur as a result of construction of the wastewater pipeline. It is anticipated that the quantity of hazardous wastes generated from the proposed construction activities would be minimal.

No effects on the installation's hazardous waste management program would be expected from the construction activities. Hazardous waste disposal and construction contractors would be responsible for the disposal of hazardous wastes in accordance with Federal and state laws and regulations, and the installation's Hazardous Waste Management Plan. BMPs would be followed to ensure that contamination from a spill would not occur. If, however, a spill would occur, the SPCC Plan outlines the appropriate measures for spill situations (EAFB 2005d).

**Asbestos-Containing Materials, Lead-Based Paint, and Polychlorinated Biphenyls.** The proposed sanitary sewer pipeline construction would not require the demolition of existing facilities or infrastructure; therefore, these resources would not be affected by the proposed wastewater pipeline easement and construction at Ellsworth AFB.

**Pollution Prevention.** No impacts on Ellsworth AFB's Pollution Prevention Program would occur as a result of the granting of an easement to the South Dakota EDA. Short-term, negligible, adverse effects on the Pollution Prevention Program at Ellsworth AFB would be expected from the construction of a sanitary sewer pipeline. A minimal increase in the use of hazardous materials and petroleum products would be expected from the use of construction equipment during this time. Adherence to Federal, state, and USAF pollution prevention laws and regulations, and the implementation of pollution prevention BMPs during construction, would minimize effects from construction activities on the natural environment.

### Contribution of Ellsworth AFB's Wastewater to the Regional Waste Stream

**Hazardous and Petroleum Waste.** Long-term, minor, direct, adverse effects on hazardous and petroleum wastes from Ellsworth AFB's wastewater contribution to the regional waste stream would be expected. The wastewater contribution of Ellsworth AFB to the regional waste stream would generate an additional volume of hazardous waste in the form of sludge. Ellsworth AFB is expecting a three-fold increase in the average daily volume of wastewater generated at the installation over the next 20 years (EAFB 2008a). It is anticipated that the RWWTP would have the capacity and means for disposing of the additional volume of hazardous waste created by Ellsworth AFB's contribution.

**Hazardous Materials and Petroleum Products, Environmental Restoration Program, Asbestos-Containing Materials, Lead-Based Paint, Polychlorinated Biphenyls, and Pollution Prevention.** These resources would not be affected by Ellsworth AFB's wastewater contribution to the regional waste stream.

#### 3.11.3.2 WWTP Upgrade Alternative

Under the WWTP Upgrade Alternative, Ellsworth AFB would upgrade the existing WWTP to meet the 2014 SDSWDS permit requirements. The necessary upgrades would involve construction and demolition of facilities and the addition of a small road.

Long-term, minor, indirect, adverse effects on hazardous materials or waste management would be expected as a result of the WWTP Upgrade Alternative. The modification and continued operation of the Ellsworth AFB WWTP would result in minor increases in the existing hazardous materials and waste management volumes. Ellsworth AFB would dispose of increasing volumes of hazardous wastes associated with the wastewater treatment process from future increases in wastewater generation.

#### 3.11.3.3 No Action Alternative

No impacts on hazardous materials and wastes would be expected under the No Action Alternative.

#### 3.11.4 Environmental Protection Measures

Although there is a low likelihood for construction workers to be exposed to contamination from ERP sites during construction or demolition, it is recommended that a health and safety plan be prepared by the contractor in accordance with OSHA requirements prior to commencement of construction or demolition activities proximate to ERP sites. Should contamination be encountered, handling, storage, transportation, and disposal activities would be conducted in accordance with applicable Federal, state,

and local regulations; AFIs; and Ellsworth AFB programs and procedures. Project planning would include protection of ERP infrastructure such as monitoring wells, treatment systems, and conveyance pipes to avoid disruption of clean-up activities. A clean fill cap could be added to serve as a conduit for a new pipeline. Prior to the start of any construction involving an ERP site, a waiver request must be submitted to Headquarters (HQ) ACC and Air Force Center for Engineering and the Environment (AFCEE) for approval.



## 4. Cumulative and Other Adverse Impacts

### 4.1 Cumulative Effects Analysis

CEQ regulations stipulate that the cumulative effects analysis in an EA should consider the potential environmental effects resulting from “the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions” (40 CFR 1508.7). CEQ guidance in considering cumulative effects affirms this requirement, stating that the first steps in assessing cumulative effects involves defining the scope of the other actions and their interrelationship with a proposed action. The scope must consider other projects that coincide with the location and timetable of a proposed action and other actions. Cumulative effects analyses must also evaluate the nature of interactions among these actions.

To identify cumulative effects, the analysis needs to address two fundamental questions:

1. Does a relationship exist such that affected resource areas of the Proposed Action or alternatives might interact with the affected resource areas of past, present, or reasonably foreseeable actions?
2. If such a relationship exists, then does an EA or EIS reveal any potentially significant impacts not identified when the Proposed Action is considered alone?

The scope of the cumulative effects analysis involves both timeframe and geographic extent in which effects could be expected to occur, as well as a description of what resources could potentially be cumulatively affected.

#### 4.1.1 Projects Identified for Cumulative Effects

**Annexation of Ellsworth AFB.** In recent years the City of Box Elder has sought to attract businesses to provide economic opportunities and retail and dining options for those living on- and off-installation. Some businesses have declined relocating to the City of Box Elder because population levels in the city were not large enough to meet their requirements. On August 28, 2009, the City of Box Elder annexed the residential areas of Ellsworth AFB. This annexation allowed the City of Box Elder to increase their population and tax revenues in hopes of attracting new businesses (Box Elder undated, Box Elder 2009). The City of Box Elder plans to redevelop, through an agreement with the South Dakota EDA, the former MFH areas of Skyway and Renel Heights into mixed-use developments. Additional changes are also planned for the City of Box Elder in areas south of the installation boundary that are within the APZs associated with the aircraft operations. These changes include potentially relocating the temporary mobile homes east of the golf course area and relocating homes south of the installation to more compatible areas, as these housing areas are within the 75 to 79+ noise zone as indicated in Ellsworth AFB’s AICUZ study.

**Military Family Housing.** The USAF operates and maintains approximately 104,000 MFH units at its installations throughout the United States. More than 38 percent of all units do not meet current modern standards and require either major improvement or replacement. At most installations the demand for adequate on-installation housing exceeds supply. Ellsworth AFB has USAF-owned MFH units in two neighborhoods. These neighborhoods (and their number of MFH units) are Rushmore Heights (183) and Prairie View (100). Both neighborhoods have been renovated within the past 5 years. In addition to the existing occupied neighborhoods, the project footprint includes three additional parcels being considered for housing development. The Black Hills Estates housing area, which contained 500 occupied housing units, was demolished in 2008. HQ ACC proposes to convey 283 MFH units, lease 3 parcels, and

transfer responsibility for providing housing and ancillary supporting facilities at Ellsworth AFB to the Project Owner.

**RWWTP.** The South Dakota EDA is proposing to construct an RWWTP to serve Ellsworth AFB and the City of Box Elder. Ellsworth AFB and the City of Box Elder are currently faced with upgrading their individual WWTPs to meet more stringent SDSWDS limits imposed by the SDDENR. An engineering feasibility study indicated that it would be more cost effective for an RWWTP to treat Ellsworth AFB's and City of Box Elder's sewage together versus using individual systems (EAFB 2008a). In addition, surrounding communities have a growing need for an RWWTP to provide a means for economic growth and to prevent nitrogen contamination in groundwater from private subsurface disposal systems. Box Elder's demand for wastewater treatment is expected to increase because of expected population growth in the region. The proposed RWWTP would be constructed directly adjacent to the current lagoon wastewater treatment facility in Box Elder. It is assumed that the South Dakota EDA would acquire any core trunk lines that would deliver effluent to the RWWTP.

#### 4.1.2 Cumulative Effects

Cumulative effects of implementing the Proposed Action and the projects identified for potential cumulative effects are presented in **Table 4-1**. No significant adverse cumulative effects were identified in the cumulative effects analysis.

### 4.2 Unavoidable Adverse Impacts

Unavoidable adverse impacts would result from implementation of the Proposed Action. None of these impacts would be significant.

**Geological Resources.** Under the Proposed Action, demolition and pipeline construction activities, such as excavating, would result in some minor soil disturbance. Implementation of BMPs during demolition and construction would limit environmental consequences resulting from these activities. Standard erosion-control means would also reduce environmental consequences related to these characteristics. Although unavoidable, impacts on soils at the installation are not considered significant.

**Hazardous Wastes and Materials.** Products containing hazardous materials would be used during the proposed demolition of the WWTP and construction of the sanitary sewer pipeline. Contractors would be responsible for the management of hazardous materials, which would be handled in accordance with Federal and state regulations. Contractors must report use of hazardous materials. Contractors would also be responsible for the disposal of hazardous wastes in accordance with Federal and state laws and regulations, as well as the Hazardous Waste Management Plan. The potential for construction accidents or spills during fuel handling are unavoidable risks associated with the Proposed Action.

**Energy Resources.** The Proposed Action would require the use of fossil fuels, a nonrenewable natural resource, for demolition and pipeline construction activities. The use of nonrenewable resources in demolition and construction activities would be unavoidable. Relatively small amounts of energy resources would be committed to the Proposed Action and are not considered significant.

In addition, the Proposed Action and projects identified would be expected to result in long-term, beneficial cumulative effects. The construction of an RWWTP and the upgrade and expansion of the sanitary sewer system on- and off- installation would be expected to have beneficial, cumulative effects on sanitary sewer and wastewater systems. The conveyance of MFH would result in utility system upgrades for several MFH units, which would allow for more efficient energy use and would be expected to have beneficial, cumulative effects on power supply and natural gas supply.

**Table 4-1. Cumulative Effects Summary**

Resource Area	Past Actions	Current Background Activities	Proposed Action	Known Future Actions	Cumulative Effects
<b>Land Use</b>	Ellsworth AFB has been used as a military installation at its current location since the 1940s. Surrounding area of Box Elder has developed but remains mostly rural.	Current land use at proposed site is Outdoor Recreation and surrounding land use types include open space, outdoor recreation, airfield and airfield pavements, and family housing.	Short-term, negligible, adverse impacts and long-term minor beneficial impacts would be expected from decommissioning and demolition of the WWTP. No impacts would be expected from granting an easement as land use would be compatible with existing uses. Short-term, minor, adverse impacts on land use would be expected from the construction of the sanitary sewer pipeline. No impacts from Ellsworth's contribution to the regional waste stream would be expected.	Long-term, beneficial effects from annexation would be expected, as incompatible uses in APZs would be relocated to more compatible areas. Short-term adverse effects during construction of MFH units from use of construction equipment and possible short-term disruption of adjacent land uses.	No land use changes on Ellsworth AFB would be expected from future actions. Current land uses would remain compatible with adjacent uses. Off-installation construction of an RWWTP would not affect land use on Ellsworth AFB. Short-term disruption of land use off-installation from construction of a sanitary sewer pipeline would be expected. No significant adverse cumulative effects are expected.
<b>Infrastructure and Utilities</b>	Infrastructure and utilities (including transportation networks) have been well-developed on Ellsworth AFB and in the surrounding urban area.	Most of the utilities and infrastructure systems are in good working condition, supporting the Ellsworth AFB population. However, Ellsworth AFB continues to improve utility and infrastructure systems, as needed.	Short- and long-term, moderate, adverse impacts on water supply would be expected from demolition activities. Short-term, negligible to minor, adverse impacts on sanitary sewer and wastewater systems, liquid fuels, electrical systems, solid waste disposal, storm drainage systems, and transportation would be expected from demolition activities. Long-term, beneficial impacts on storm drainage systems would be expected from demolition activities. No impacts on natural gas systems would be expected. Short-term, negligible, adverse impacts on water supply, sanitary sewer and wastewater systems, storm drainage systems, liquid fuels, electrical systems, solid waste disposal, and transportation would be expected during pipeline construction. No impacts on infrastructure and utilities would be expected from Ellsworth AFB's contribution to the regional wastewater stream.	Short-term, negligible to minor, adverse effects on infrastructure and utilities (including transportation) during construction and demolition activities. Long-term, negligible to minor, adverse effects on infrastructure and utilities (including transportation) from an increase in demand resulting from an increase in personnel. However, the increased demands would not be significant because utility systems would be upgraded, as needed, to meet increased demands. Increases in storm water runoff from increased impermeable surfaces would be offset by the subsequent demolition and removal of aged infrastructure and impermeable surfaces.	Short-term, adverse effects ranging from negligible to minor could occur during construction and demolition activities. Long-term, adverse cumulative effects ranging from negligible to moderate could occur upon completion of the projects due to increases in demand. Long-term, beneficial effects would be expected from upgrading and expanding aged or inefficient utilities and infrastructure.

Resource Area	Past Actions	Current Background Activities	Proposed Action	Known Future Actions	Cumulative Effects
<b>Noise</b>	Ambient sound environment has been dominated by activities common to a military installation and aircraft operations.	Ambient sound environment is affected mainly by aircraft operations and vehicle traffic. Noise levels are comparable to a noisy urban residential area.	Short-term, minor, adverse effects on the noise environs would be expected from demolition activities and construction of the pipeline. No impacts on the noise environs would be expected from granting of an easement or from Ellsworth AFB's contribution to the regional waste stream.	Short-term, minor, adverse effects are expected from construction activities related to MFH and an RWWTP.	The noise environment would continue to be comparable to a noisy military aircraft area. No significant adverse cumulative effects expected.
<b>Air Quality</b>	Ellsworth AFB is within the BHRCI AQCR. Meade and Pennington counties are designated as attainment/unclassifiable for all criteria pollutants.	Air emissions include criteria pollutants and HAP from vehicles and buildings.	Short-term, minor, direct, adverse impacts would be expected from demolition and pipeline construction emissions and land disturbance. No air quality impacts from granting an easement or Ellsworth AFB's contribution to the regional waste stream would be expected.	Short-term, adverse effects would be expected from construction activities. No long-term effects on air quality would be expected.	Air emissions associated with MFH construction, construction associated with annexation activities, and construction of an RWWTP, would not be expected to result in violations of NAAQS or noticeably degrade ambient air quality. No significant adverse cumulative effects expected.
<b>Safety</b>	Past renovation, demolition, and construction activities have resulted in short-term construction safety risks.	Non-airfield development constrained in CZs and APZs. Explosive Safety Zones, ranges, and ERSZs constrained for safety reasons.	Short-term, negligible to minor, adverse effects from construction safety risks during demolition and new construction would be expected. No impacts from granting an easement or from Ellsworth AFB's contribution to the regional waste stream would be expected.	Continued renovation, demolition, and new construction could cause temporary safety risks.	Construction safety risks would cease beyond completion of demolition and construction. No long-term or significant effects would be expected.
<b>Geological Resources</b>	Past activities have modified soils.	Demolition of MFH units has resulted in disturbance.	Short-term, negligible to minor, adverse effects would be expected from demolition activities and pipeline construction. No impacts from granting an easement or from Ellsworth AFB's contribution to the regional waste stream would be expected.	Short-term, adverse effects are expected from construction activities. Long-term, adverse effects on soils are expected from increased impervious surfaces associated with MFH units, development of annexed areas, and construction of an RWWTP.	Soils on Ellsworth AFB are intensely modified by previous development activities. Future actions would further disturb soils. No significant adverse cumulative effects expected.

Resource Area	Past Actions	Current Background Activities	Proposed Action	Known Future Actions	Cumulative Effects
<p><b>Water Resources</b></p>	<p>The WWTP began to discharge into the unnamed tributary in 1943. At that time, flow in the tributary became perennial. Development of Ellsworth AFB has increased impervious surfaces and storm water flow to the various tributaries and impoundments on the installation.</p>	<p>The Prairie Ridge Golf Course exists at the convergence of two perennial streams, one from the base of Gateway Lake (to the northeast of the WWTP) and the other from the WWTP, creating the unnamed tributary to Box Elder Creek. Flow in this tributary is perennial due to effluent from the WWTP. No violations of water quality standards have occurred within the effluent discharged to the unnamed tributary.</p>	<p>Short- and long-term, moderate impacts on water resources would be expected from decommissioning and demolition of the Ellsworth AFB WWTP. Long-term, negligible to minor, adverse impacts on groundwater due to a localized decrease in groundwater elevations immediately adjacent to the stream channel. Long-term, negligible to minor, adverse impacts on potential shallow wells in close proximity to the unnamed tributary of Box Elder Creek downstream of the WWTP due to a potential local drawdown in water levels.</p> <p>Long-term effects from decommissioning would be expected from an alteration of water velocity, quantity, and quality on the tributary currently receiving treated effluent. No impacts would be expected on water resources from granting the pipeline easement. Short-term, minor, adverse impacts on surface water and floodplains would be expected from the construction of the sanitary sewer pipeline.</p> <p>No direct impacts would be expected on water resources from the contribution of Ellsworth AFB's wastewater to the regional waste stream. However, long-term, indirect, adverse impacts from the cessation of the discharge of WWTP effluent into the unnamed tributary (resulting in decreased water flow within and downstream of the unnamed tributary) would be expected.</p>	<p>Short-term, adverse effects would be expected from construction activities due to increased storm water runoff, soil erosion, and sedimentation within nearby waterways.</p> <p>Long-term, adverse effects would be expected from creation of additional impervious surfaces upstream of the WWTP in the MFH areas.</p> <p>Long-term, adverse effects on hydrology and water quality in Box Elder Creek from effluent of the RWWTP. Adverse effects could include increased turbidity, channel bank erosion, and an increase in water pollutants (e.g., ammonia, TSS, chlorine). Long-term, adverse effects on water resources could be expected from increased wastewater being piped to the RWWTP from the addition of more than 1,000 people. Long-term, adverse effects on water quality would be expected from the addition of pollutants (e.g., ammonia, TSS, chlorine) in effluent to Box Elder Creek.</p>	<p>Cumulative effects on water quality would be expected from the Proposed Action in combination with various proposed construction projects on- and off-installation. Construction and demolition projects would be expected to increase sedimentation and TSS within Box Elder Creek and its unnamed tributary crossing the project area. Additionally, the increased effluent from Ellsworth AFB would be anticipated to increase pollutants such as TSS, nutrients, and chlorine. However, the implementation of proper BMPs during construction and storm water management after construction would minimize adverse impacts on water quality and cumulative effects are not anticipated to be significant.</p>

Resource Area	Past Actions	Current Background Activities	Proposed Action	Known Future Actions	Cumulative Effects
<p><b>Biological Resources</b></p>	<p>Ellsworth AFB is a largely developed installation.</p>	<p>The majority of land on Ellsworth AFB is disturbed or improved. Wildlife species on-installation are relatively adapted to living in an urban environment with frequent noise and visual disturbances. There are approximately 45 acres of jurisdictional wetlands on Ellsworth AFB. Jurisdictional wetlands are within the project area. Additional wetlands occur along the main installation drainage and impoundments adjacent to the eastern side of the project area. This drainage receives overland flow, discharge from the WWTP, and water from several culverts.</p>	<p>Short-term, negligible, direct, adverse impacts and long-term, negligible, indirect, beneficial effects on vegetation would be expected from the decommissioning and demolition of the WWTP. Short-term, negligible to minor, direct, adverse effects and long-term, minor, indirect, beneficial effects on aquatic and terrestrial wildlife would be expected from the decommissioning and demolition of the WWTP.</p> <p>Long-term, negligible, indirect, adverse effects on wetlands would be expected from the decommissioning and demolition of the WWTP due to a potential decrease in the hydroperiod of these wetlands.</p> <p>No impacts on vegetation, wildlife, wetlands, or sensitive and protected species would be expected from granting the easement. Short-term, negligible, adverse impacts on vegetation, wildlife, and sensitive and protected species would be expected from the construction of the sanitary sewer pipeline. Short-term, minor, adverse impacts on wetlands would be expected from the construction of the pipeline.</p> <p>No impacts on vegetation and sensitive and protected species would be expected from Ellsworth AFB's contribution to the regional wastewater stream. However, long-term, minor, adverse effects on off-installation wildlife and wetlands could be expected from increased effluent into Box Elder Creek.</p>	<p>Short- and long-term adverse effects on vegetation and wildlife could occur from construction activities and loss of habitat in the former MFH Skyway and Renel Heights and current MFH area. Increased impervious surfaces near the main installation drainage could result in long-term, adverse effects on wetlands. Similar effects could be expected from activities associated with the RWWTP.</p> <p>Long-term, adverse effects on wildlife and wetlands could be expected from increased effluent into Box Elder Creek due to a decrease in water quality. Wetlands along Box Elder Creek downstream of the proposed RWWTP could be beneficially or adversely affected from increased surface water input.</p> <p>Long-term, adverse effects on wildlife would be expected from the addition of more than 1,000 people to the installation due to increased disturbances (e.g., traffic) on the installation.</p>	<p>Various impacts from noise and visual disturbances on wildlife from demolition and pipeline construction activities under the Proposed Action and other on- and off-installation construction projects would be intermittent and short-term. Therefore, no significant cumulative impacts from short-term disturbances would be expected.</p>

Resource Area	Past Actions	Current Background Activities	Proposed Action	Known Future Actions	Cumulative Effects
<b>Cultural Resources</b>	Ellsworth AFB became operational in 1942. Most of the 1942 structures were demolished in the 1960s and 1970s.	Four World War II- and three Cold War-era buildings were recommended for individual eligibility status for an additional 14 Cold War-era buildings. None of the buildings within this proposed project APE were found to be eligible. No significant archaeological properties exist on Ellsworth AFB.	No effects on architectural or archaeological cultural resources would be expected from decommissioning and demolition of the existing WWTP, granting of an easement, construction of the sanitary sewer pipeline, or Ellsworth AFB's contribution to the regional waste stream.	No effects would be expected from conveying three parcels and constructing MFH units. Future development of Skyway and Renel Heights would not impact cultural resources.	Because no significant archaeological properties exist on-installation and there are few significant historic properties on-installation, no significant adverse cumulative effects are expected.
<b>Socioeconomic Resources and Environmental Justice</b>	Ellsworth AFB has been a large employer and economic base in the area.	The top employment industry in the surrounding area is the educational, health, and social services industry.	Short-term, minor, beneficial effects would be expected from demolition and construction activities and associated personnel expenditures. No impacts on demographics or environmental justice would be expected from the Proposed Action.	Short-term, minor, beneficial effects are expected from construction expenditures related to MFH and the RWWTP.	Economic expenditures associated with the RWWTP and MFH actions would cumulatively have beneficial socioeconomic effects in the surrounding area. No significant adverse cumulative effects are expected.
<b>Hazardous Materials and Wastes</b>	Hazardous wastes and materials, ACM, LBP, pesticides, ASTs and USTs, compliance-related clean-up sites, ERP sites, ordnance, and MMRP sites occur at Ellsworth AFB as a result of historic use as a military installation.	Hazardous wastes and materials, ACM, LBP, pesticides, ASTs and USTs, compliance-related clean-up sites, ERP sites, ordnance, and MMRP sites are managed in accordance with USAF and other applicable Federal regulations.	Short-term, minor, adverse effects during demolition activities. Demolition would require use of small quantities of hazardous materials. Demolition of older buildings could uncover ACM and LBP. Short-term, minor, adverse impacts on the ERP, hazardous materials management, and hazardous wastes would be expected from the construction of the pipeline. No impacts on ACM, LBP, and PCBs would be expected from the construction of the pipeline. Short-term, negligible, adverse impacts on the Pollution Prevention Program at Ellsworth AFB would be expected from the construction of the pipeline. No impacts on hazardous materials and wastes from granting an easement or from Ellsworth AFB's contribution to the regional waste stream would be expected.	Short-term, minor, adverse effects on hazardous materials management could be expected from the use and storage of hazardous materials during construction of the MFH units and mixed-use development in the former MFH areas.	Cumulatively, use of hazardous materials and generation of solid waste would increase with all proposed actions. Handling and disposal of hazardous materials and wastes would be in accordance with USAF and other applicable Federal regulations. No significant adverse cumulative effects are expected.

### 4.3 Compatibility of the Proposed Action and Alternatives with the Objectives of Federal, Regional, State, and Local Land Use Plans, Policies, and Controls

Impacts as a result of the Proposed Action would occur within the boundaries of the installation. Construction of a sanitary sewer pipeline would cross under Ellsworth Road, but would only be expected to result in temporary effects on transportation. The Proposed Action would not conflict with any applicable off-installation land use ordinances or designated CZs. Development of an RWWTP is consistent with the goals outlined in an MOU between Ellsworth AFB and the City of Box Elder; therefore, no impacts on land use plans would be expected (EAFB undated).

### 4.4 Relationship Between Short-term Use and Long-term Productivity

Short-term uses of the biophysical components of the human environment include direct impacts, usually related to construction activities that occur over a period of less than 5 years. Long-term uses of the human environment include those impacts that occur over a period of more than 5 years, including permanent resource loss.

This EA identifies potential short-term adverse effects on the natural environment as a result of demolition and construction activities. These potential adverse effects include noise emissions, air emissions, soil erosion, and storm water runoff into surface water. Decommissioning and demolishing the WWTP would be expected to increase the long-term productivity of the site by returning it to open space and allowing for a more compatible land in the APZ.

### 4.5 Irreversible and Irretrievable Commitments of Resources

An irreversible or irretrievable commitment of resources refers to impacts on or losses to resources that cannot be reversed or recovered, even after an activity has ended and facilities have been decommissioned. A commitment of resources is related to use or destruction of nonrenewable resources, and effects that such a loss will have on future generations. For example, if prime farmland is developed there would be a permanent loss of agricultural productivity. Demolition of the existing WWTP involves the irreversible and irretrievable commitment of material resources and energy, land resources, landfill space, and human resources. The impacts on these resources would be permanent.

**Energy Resources.** Energy resources used for the Proposed Action would be irretrievably lost. These include petroleum-based products (e.g., gasoline and diesel) and electricity. During demolition, gasoline and diesel fuel would be used for the operation of construction vehicles. Consumption of these energy resources would not place a significant demand on their availability in the region. Therefore, no significant impacts would be expected.

**Landfill Space.** The generation of demolition debris and subsequent disposal of that debris in a landfill would be an irretrievable adverse impact. Construction contractors would be expected to recycle debris to the maximum extent practicable. If a greater percentage is recycled, then irretrievable impacts on landfills would be reduced. Any waste that is generated by the Proposed Action that is disposed of in a landfill would be considered an irretrievable loss of that landfill space.

**Human Resources.** The use of human resources for demolition is considered an irretrievable loss only in that it would preclude such personnel from engaging in other work activities. However, the use of human resources for the Proposed Action represents employment opportunities, and is considered beneficial.



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