FINDING OF NO SIGNIFICANT IMPACT

ENVIRONMENTAL ASSESSMENT
819TH RED HORSE FIVE YEAR PLAN

MALMSTROM AIR FORCE BASE, MONTANA

AGENCY: 819th Rapid Engineer Deployable Heavy Operational Repair Squadron Engineers (RED HORSE) Squadron (RHS), Malmstrom Air Force Base (AFB), Montana.

BACKGROUND: The 819th RHS was activated on 8 August 1997 at Malmstrom AFB. The RED HORSE mission requires rapid deployment of personnel and heavy equipment to support contingency construction requirements worldwide. This unique mission provides set up, repair and maintenance of equipment, facilities, and operations, even in the most remote or dangerous environments. Facilities vacated by the 43rd Air Refueling Wing are currently used to house the RHS. However, these facilities are inadequate to support the current mission needs and do not provide sufficient office and storage space. Additionally, approximately 200,000 SF of ramp space is used by the RHS as outside storage for deployable equipment, resulting in accelerated degradation and increased maintenance of the equipment from exposure to the harsh winter climate. The 819th RHS Five Year Plan, hereinafter referred to as the Five Year Plan, identified a plan to resolve a total shortfall of 72,000 SF of required space for the 819th RHS. Since the majority of installation development has occurred on the northwest side of Malmstrom AFB, leaving little space for expansion, not enough space exists to construct all of the facilities outlined in the Five Year Plan in a manner of which will consolidate the location of the RHS.

PROPOSED ACTION: The Five Year Plan proposes to construct new support facilities on the east side of the installation. In addition, some existing RHS facilities on the west side of the base will be expanded to alleviate space shortfalls and provide more efficient use of existing facilities.

SUMMARY OF FINDINGS FOR PROPOSED ACTION:

Noise. Temporary noise impacts will be generated by heavy equipment and vehicles during construction activities. The construction sound level will be below 65 decibels (dB) at the point it reaches any noise sensitive receptors such as adjacent military family housing and the Malmstrom AFB dog kennel. Any elevation in noise will be short-term and, because all proposed construction activities are temporary and land use will not change, no long-term impacts to noise will occur.

Land Use. On the developed western site, no change in land use designation is required. On the less-developed eastern site, the development will convert the land use designation of approximately five acres from open space to an industrial land use type. The industrial use of this site poses no adverse impact to the surrounding land use and is appropriate for consolidating similar land uses in the eastern part of the base.

Air Quality. A short-term, minor increase in emissions, fugitive dust, and particulate matter generated from equipment and vehicles will occur during construction activities. The action will not increase the number of stationary sources at the installation, nor result in an increase in vehicular traffic. Therefore, the overall impact to air resources will be short-term and not significant and a conformity determination is not required.

Report Documentation Page

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I3. SUPPLEMENTARY NOTES

I4. ABSTRACT

This EA analyzes the potential environmental impacts from the proposed and alternative actions at Malmstrom AFB in Great Falls Montana. The Proposed Action supports mission requirements of the 819th RHS. Construction of new facilities and expansion of existing facilities is needed to address the shortfall in space required by the 819th RHS. The purpose of this action is to provide adequate space for the efficient execution of the 819th RHS mission.

I5. SUBJECT TERMS

I6. SECURITY CLASSIFICATION OF:			I7. LIMITATION OF ABSTRACT	I8. NUMBER OF PAGES	I9a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			
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Water Resources. Stormwater runoff from the additional impervious cover on the east side will flow into Pow Wow Pond. Construction will cause short-term impacts to surface water turbidity in the vicinity of the construction area but this will be minimized through implementation of Best Management Practices (BMPs). No wetlands are located within the proposed construction areas. Three wetlands as defined by Executive Order (EO) 11990 are north and downgradient of the Proposed Action. A short-term and long-term minor increase in stormwater runoff from the Proposed Action on the east side would subsequently increase the amount of water entering the EO wetlands. No impact to wetlands west of the flightline would occur from the Proposed Action. No change to the existing stormwater collection system is necessary; the implementation of the plan should have no adverse impacts on wetlands.

Geologic Resources. Water and wind erosion could also occur during construction activities, resulting in minor, short term impacts to surface soils. These impacts will be minimized through the proper implementation of BMPs.

Hazardous Materials and Wastes. Hazardous material brought onto Malmstrom AFB by construction contractors must comply with the base general specifications outlined in the Environmental Protection Section 1360 of the on-base contract requirements. The construction contractor will manage hazardous materials and wastes according to installation, state, and local regulations; therefore, no long-term impacts due to hazardous materials and wastes are anticipated. No active Installation Restoration Program (IRP) sites are located within a mile of the project sites. Thus, no impacts to the IRP sites are anticipated as a result of the action.

Biological Resources. At the developed western project site, no vegetation resources and, therefore, no adverse impacts to vegetation are anticipated in that area. Excavation of soil at the less-developed eastern site will result in loss of vegetative cover at the site; however, much of this site is devoid of vegetation due to past construction or other activities. As a result, direct impacts to vegetation resulting from implementation of the Proposed Action will be minimal. No threatened, endangered or candidate plant or animal species are expected to live in the project area. Since the western developed site has no vegetative cover, no adverse impacts to wildlife are anticipated. At the less-developed eastern project site, activities that remove vegetation and disturb soil may cause habitat loss however, this area is not likely to be particularly productive for wildlife because of the low habitat diversity; therefore, no significant impact is expected. Revegetation of disturbed areas will reduce short-term minor impacts of construction related habitat loss.

Cultural Resources. Buildings 1464 and 160, which are part of the Proposed Action on the west side of the base, are potentially eligible for listing on the National Register of Historic Places (NRHP); however, both facilities have undergone previous additions and modifications. While listing on the NRHP for either facility is not expected, documentation and photography may be required prior to renovations. No impacts to cultural resources are anticipated. However, consultation with the State Historic Preservation Office (SHPO) is ongoing and no construction can take place until SHPO confirms that no impact will result.

Infrastructure and Utilities. Although a long-term minor increase to potable water usage at the eastern and western projects sites is expected, no impact to the current potable water system will result. Facilities on the east side currently use septic systems; however, due to low soil percolation rates, a cistern may be more appropriate for the small wastewater flows generated by the proposed new facilities. Furthermore, no long-term impacts to the sanitary sewer waste are

expected from activities west of the flightline. As a result, no significant impact to the sanitary sewer from the Proposed Action is expected.

A long-term, minor increase in solid waste is anticipated due to additional personnel occupying the east side facilities. However, since the structure is already in place to handle solid waste, no significant impact to solid waste is anticipated from the Proposed Action. Furthermore, construction waste will be handled by the contractor and will not present a significant impact.

Because the current stormwater drainage system can sustain the proposed development and increased outflow from the proposed development site will be reduced by the drainage flow path, the Proposed Action represents only a minor impact to the east base drainage system. In addition, through proper implementation of BMPs, no significant impact to the stormwater system will result from the construction activities.

Since the existing roadway infrastructure is adequate and can support the very minor increase in traffic and localized, short term impacts of construction vehicles, the Proposed Action will have no significant impact on the transportation system. Although implementation of the Proposed Action will result in a long-term, minor increase in electrical and natural gas usage, the Proposed Action will have no significant impact on the electrical and natural gas systems

Socioeconomics and Environmental Justice. No change in population size, housing, or educational requirements is expected. However, a short-term positive impact on regional employment and local economy from the construction activities is anticipated. No disproportionate impacts to environmental justice communities from short-term solid waste and transportation impacts are expected. A short-term, positive impact to employment and economy will be evenly distributed within the region, thereby not disproportionately affecting a single population.

SUMMARY OF FINDINGS FOR NO ACTION ALTERNATIVE: Under the No Action Alternative, the installation would not construct any of the facilities identified in the Five Year Plan. Malmstrom AFB would continue to operate with a facility shortfall. Deployable equipment would continue to be stored outside and would be subject to accelerated degradation and increased maintenance resulting from exposure to the harsh winter climate.

SUMMARY OF CUMULATIVE IMPACTS: The cumulative effects of implementing the Proposed Action, along with other past, present, and future projects in the region were assessed in the attached Environmental Assessment. No significant cumulative effects were identified.

DECISION: Based upon the Environmental Assessment which is attached and incorporated by reference, I find there will be no significant direct, indirect, or cumulative impacts as a result of implementation of the Proposed Action. Accordingly, I find an Environmental Impact Statement is not required and the requirements of the National Environmental Policy Act, regulations promulgated by the President's Council on Environmental Quality, and 32 CFR Part 989 are fulfilled.

Paul W Gydesen — 7 Aug 07

PAUL GYDESEN, Colonel USAF — Date

Vice Commander, 341st Space Wing

Final Environmental Assessment

819th RED HORSE Five Year Plan

Malmstrom Air Force Base
Montana

June 2007

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ACRONYMS AND ABBREVIATIONS

ACC	Air Combat Command
ACM	asbestos-containing material
AFB	Air Force Base
AFI	Air Force Instruction
AICUZ	Air Installation Compatible Use Zone
AIHA	American Industrial Hygiene Association
AQCR	Air Quality Control Region
ARW	Air Refueling Wing
bgs	below ground surface
Bldg.	building
BMP	Best Management Practice
BRAC	Base Realignment and Closure
CAA	Clean Air Act
CAAA	Clean Air Act Amendments
CATM	Combat Arms Training and Maintenance
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	carbon monoxide
CWA	Clean Water Act
dB	decibel
dBA	A-weighted decibel
DoD	Department of Defense
DRMO	Defense Reutilization and Marketing Office
EA	Environmental Assessment
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
EO	Executive Order
EOD	Explosive Ordnance Disposal
ERG	Ecosystem Research Group
ESA	Endangered Species Act
FONSI	Finding of No Significant Impact
FY	Fiscal Year
IRP	Installation Restoration Program
kV	kilovolt
LBP	lead-based paint
LID	Low Impact Development
LF	linear foot
MCF	million cubic feet
MDEQ	Montana Department of Environmental Quality
MDT	Montana Department of Transportation
MGD	million gallons per day
MPDES	Montana Pollutant Discharge Elimination System

ACRONYMS AND ABBREVIATIONS (CONT)

MTNHP	Montana Natural Heritage Program
MVA	megavolt-amperes
MW	megawatt
Mya	million years ago
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NOI	notice of intent
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NSR	New Source Review
O_3	ozone
Ph.	phase
PM_{10}	particulate matter equal to or less than 10 micrometers in aerodynamic diameter
$PM_{2.5}$	particulate matter equal to or less than 2.5 micrometers in aerodynamic diameter
PSD	Prevention of Significant Deterioration
psig	per square inch gauge
PVC	polyvinyl chloride
RCRA	Resource Conservation and Recovery Act
RED HORSE	Rapid Engineer Deployable Heavy Operational Repair Squadron Engineers
RHS	RED HORSE Squadron
ROI	Region of Influence
SAP	satellite accumulation points
SF	square feet
SHPO	State Historic Preservation Office
SO_2	sulfur dioxide
SO_x	sulfur oxides
SMW	Strategic Missile Wing
SPL	sound pressure level
SWPPP	Stormwater Pollution Prevention Plan
tpy	tons per year
TSS	Total Suspended Solids
U.S.	United States
USAF	United States Air Force
USC	United States Code
USCB	United States Census Bureau
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
VOC	volatile organic compound
WSA	Weapons Storage Area
WWII	World War II

EXECUTIVE SUMMARY

The 819th Rapid Engineer Deployable Heavy Operational Repair Squadron Engineers (RED HORSE) Squadron (RHS) was activated on 8 August 1997 at Malmstrom AFB. The RED HORSE mission requires rapid deployment of personnel and heavy equipment to support contingency construction requirements worldwide. This unique mission provides set up, repair and maintenance of equipment, facilities, and operations, even in the most remote or dangerous environments. The 819th RHS has 285 active duty personnel and maintains more than 1,700 tons of equipment.

The 819th RHS occupies facilities that were vacated by a previous air refueling wing. These facilities include 140,000 square feet (SF) of storage and office space, but are inadequate to support the current mission needs with a space shortfall of 72,500 SF. To remedy the space shortfall, the 819th RHS Five Year Plan, hereinafter referred to as the Five Year Plan, identified a plan to resolve the space shortfall. Since the majority of installation development has occurred on the northwest side of Malmstrom AFB, not enough space exists to construct all of the facilities needed. Therefore, the Air Force proposes to implement the Five Year Plan which includes new facility construction on the east side of the base and facility expansion on the west side. Projects include nine construction projects, two renovation projects, and one pavement improvement project.

This Environmental Assessment discusses in detail the potential effects, if any, the Proposed Action would have on the following resources: noise, land use, air quality, water, geology, hazardous materials and wastes, biology, cultural, infrastructure/utilities, socioeconomics and environmental justice. To assess those potential effects, the Environmental Assessment uses, as a basis, the most current information available.

A short-term minor increase in noise levels would occur from construction activities. No long-term increase in noise levels would be anticipated. There would be no change in land use designation for activities west of the flightline. Development east of the flightline would convert the land use designation of approximately five acres from open space to an industrial land use type. This area has been extensively disturbed due to previous activities and surface disturbance; therefore, the industrial use of this area would pose no adverse impact to the surrounding land.

The Proposed Action would occur in Cascade County, Montana, where the air quality is designated as in attainment (for all pollutants) and better than the national standards for several air pollutants. Due to the nature of construction activities and the phasing of the Proposed Action, the impact to air resources would likely be short-term and not significant. No long-term impacts to air quality would be anticipated.

Short-term construction related impacts to surface water quality would occur as a result of the Proposed Action and would be minimized through Best Managements Practices (BMPs). No wetlands are located within the Proposed Action areas. Three wetlands as defined by Executive Order (EO) 11990 are north and down gradient of the Proposed Action. A short-term and long-term minor increase in stormwater runoff from the Proposed Action on the east side would subsequently increase the amount of water entering the EO wetlands. No impact to wetlands west of the flightline would occur from the Proposed Action.

Short-term minor geologic impacts due to construction related wind and water erosion would be minimized through BMPs. The constructor would manage any potential hazardous materials and wastes according to installation, state, and local regulations; therefore, no long-term impacts due to hazardous materials and wastes are anticipated. No active Installation Restoration Program (IRP) sites are located within a mile of the project sites. Thus, no impacts to the IRP sites are anticipated as a result of the action.

West of the flightline, no vegetation resources exist and no adverse impacts to vegetation would be expected in that area. Excavation of soil east of the flightline would result in loss of vegetative cover at the site; however, since much of this site is devoid of vegetation due to past construction or other activities, direct impacts to vegetation resulting from implementation of the Proposed Action would be minimal. No adverse impacts to wildlife species would be anticipated due to construction activities west of the flightline. East of the flightline, disturbance from constructing buildings and parking areas would result in habitat loss. However, revegetation of disturbed areas would reduce the short-term impacts of the habitat loss. No threatened, endangered or candidate plant or animal species are expected to live in the project area.

Buildings 1464 and 160, which are part of the Proposed Action on the west side of the base, are potentially eligible for listing on the National Register of Historic Places (NRHP); however, both facilities have undergone previous additions and modifications. Since listing on the NRHP for either facility is not expected, no impacts to cultural resources would occur. Consultation with the State Historic Preservation Office (SHPO) is ongoing and no construction can take place until SHPO confirms that no impact would result.

Addition of restroom facilities on the eastern and western projects sites would result in a very minor potable water demand increase easily supported by current infrastructure. Therefore, no impact to the current potable water system would result. The addition of a cistern would support the development on the east side. In addition, since the sanitary sewer system on the west side is adequate to support the small additional load, no significant impact to the sanitary sewer from the Proposed Action would be expected. A long-term, minor increase in solid waste would occur due to additional personnel occupying the east side facilities. However, since a program is already in place to handle solid waste, the proposed action would have no significant impact to solid waste management.

The current stormwater drainage system is sufficient to support the proposed development. The Proposed Action would implement BMPs during construction. The Proposed Action would not increase impervious surface. Although the east base actions construct an additional 3.4 acres of impervious surface, Malmstrom will demolish and reseed to grassland 3.4 acres of existing impervious surface to offset the increase. The Proposed Action would consider and implement, as appropriate for the Proposed Actions, LID to attenuate all stormwater impacts to below significance. The demolition offset combined with appropriate LID techniques will result in no increased discharge to Whitmore Ravine. The Proposed Action would not significantly affect the quantity, quality or time of concentration of stormwater currently discharged from Malmstrom Air Force Base.

The existing roadway infrastructure is adequate and can support the very minor increase in traffic and localized, short term impacts of construction vehicles, the Proposed Action would have no significant impact on the transportation system. Although implementation of the Proposed

Action would result in a long-term, minor increase in electrical and natural gas usage, the Proposed Action would have no significant impact on the electrical and natural gas systems.

We published Notice of Availability for the Draft EA and Draft FONSI in the High Plains Warrior in the Great Falls Tribune on 17 May 2007. We made copies of the Draft EA and Draft FONSI available to the public at the City of Great Falls Public Library and Malmstrom AFB Library for comment. We sent copies of the Draft EA and FONSI to the Montana Department of Environmental Quality, Montana State Historic Preservation Office, United States Fish and Wildlife Service, and Great Falls City/County Planning Board. We accepted comments from 17 May 2007 through 17 June 2007. We received no comment on the Draft EA or Draft FONSI.

The Proposed Action would present a short-term, positive impact on regional employment and local economy. No disproportionate impacts to environmental justice communities from short-term solid waste and transportation impacts are anticipated. A short-term, positive impact to employment and economy would be evenly distributed within the region, thereby not disproportionately affecting a single population.

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CHAPTER 1
PURPOSE OF AND NEED FOR ACTION

This chapter has seven parts: an introduction, a statement of the need for action, information on the location of the Proposed Action, identification of the decision to be made, a description of the scope of the environmental assessment (EA), identification of applicable regulatory requirements and introduction to the organization of the document.

1.1 INTRODUCTION

This EA analyzes the potential environmental impacts from the proposed and alternative actions at Malmstrom AFB in Great Falls Montana. The Proposed Action supports mission requirements of the 819th RHS. The structure of this document and the analysis process meets the requirements of the regulatory requirements discussed in Section 1.5.

1.2 PURPOSE OF AND NEED FOR ACTION

Construction of new facilities and expansion of existing facilities is needed to address the shortfall in space required by the 819th RHS. The purpose of this action is to provide adequate space for the efficient execution of the 819th RHS mission.

The 819th Rapid Engineer Deployable Heavy Operational Repair Squadron Engineers (RED HORSE) Squadron (RHS) was activated on 8 August 1997 at Malmstrom Air Force Base (AFB). The RED HORSE mission requires rapid deployment of personnel and heavy equipment to support contingency construction requirements worldwide. This unique mission provides set up, repair and maintenance of equipment, facilities, and operations, even in the most remote or dangerous environments. The 819th RHS has 285 active duty personnel and maintains more than 1,700 tons of equipment.

Air Combat Command (ACC) led a site survey in 1996 seeking quick beddown of the 819th RHS with minimal costs. The solution identified involved bedding down the RHS in facilities vacated by a previous flying mission including three aircraft hangars, one vehicle maintenance facility, and one office building totaling approximately 140,000 SF. The facilities were designed for aircraft operations and present inefficiencies for the 819th RHS during routine and mobility operations. The facilities identified and occupied by RHS leave a shortfall of 51,700 SF of storage space and 9,075 SF of useable office space. Additionally, approximately 200,000 SF of ramp space is used as outside storage for deployable equipment. This equipment is exposed to the harsh winter climate resulting in accelerated degradation and increased maintenance of the equipment.

To remedy the space shortfall, the 819th RED HORSE Squadron Five Year Plan, hereinafter referred to as the Five Year Plan, identified a plan to resolve a total shortfall of 72,500 SF of required space for the 819th RHS. Since the majority of installation development has occurred on the northwest side of Malmstrom AFB, leaving little space for expansion, not enough space exists to construct all of the facilities outlined in the Five Year Plan in a manner which would

consolidate the location of the RHS. Therefore, the Five Year Plan proposes to construct new support facilities on the east side of the installation. In addition, some existing RHS facilities west of the flightline would be expanded to alleviate space shortfalls. The space shortfall will soon be compounded by the 165 person manpower increase expected within the next two years.

1.3 LOCATION OF THE PROPOSED ACTION

Malmstrom AFB is located in the west central part of Montana less than one mile east of the City of Great Falls city limits (see Figure 1-1). The installation, situated in Cascade County south of the Missouri River, encompasses approximately 4,120 acres. The construction projects outlined in the Five Year Plan would be located on the east side of the installation, across the flight line from the most developed portion of the installation and on the northwest side of the base near the runway and the main hangar area (see Figure 1-2).

1.4 DECISION TO BE MADE

This EA evaluates the potential environmental consequences of actions associated with implementation of the Five Year Plan, including construction of multiple facilities. Based on this information, the Air Force will determine whether to implement the Proposed Action or take no action (No Action Alternative). As required by the National Environmental Policy Act (NEPA) and its implementing regulations, preparation of an environmental document must precede final decisions regarding the proposed project, and be available to inform decision-makers of the potential environmental impacts.

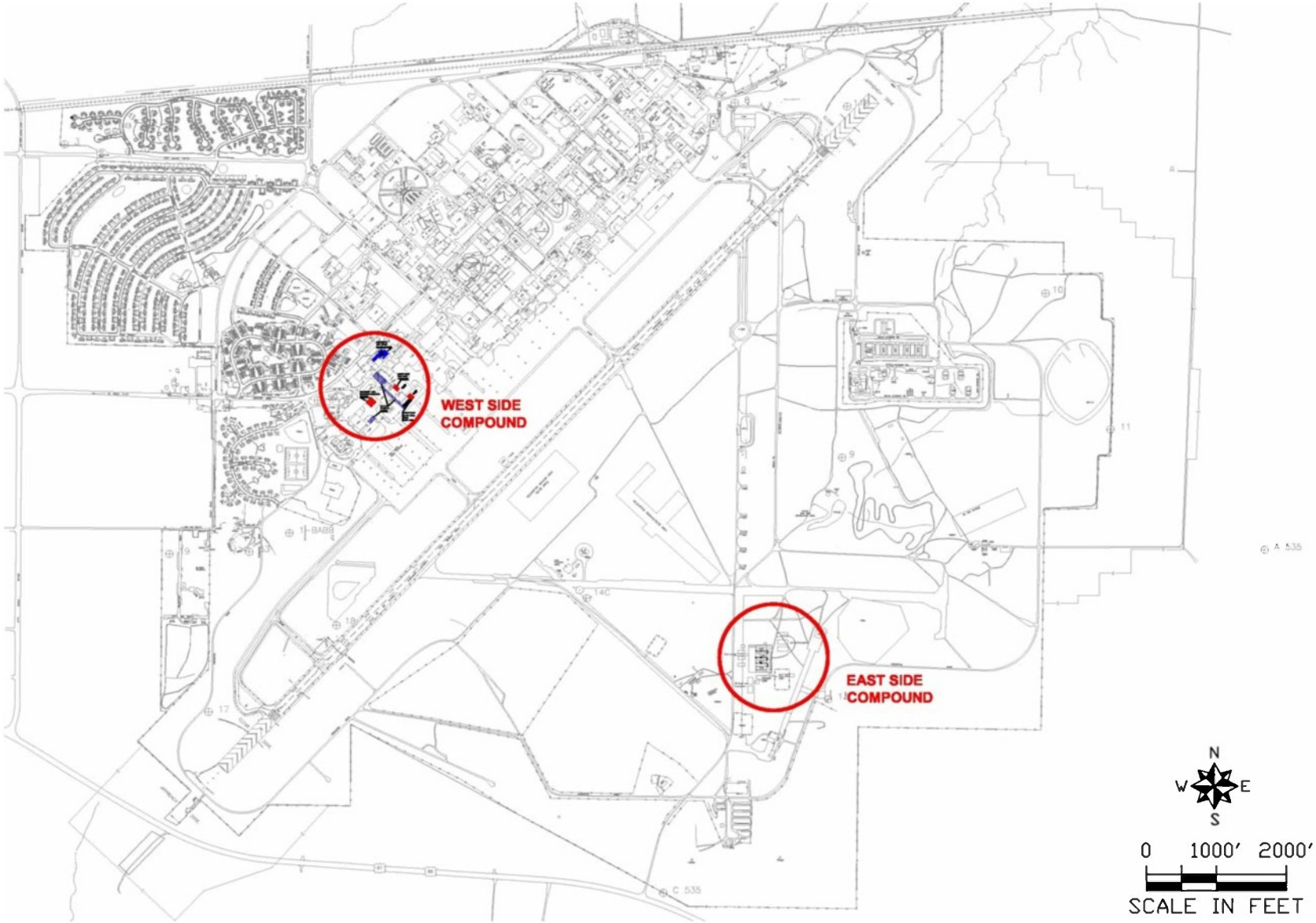
1.5 SCOPE OF THE ENVIRONMENTAL REVIEW

NEPA, as amended, requires federal agencies to consider environmental consequences in their decision-making process. The President's Council on Environmental Quality (CEQ) has issued regulations to implement NEPA that include provisions for both the content and procedural aspects of the required environmental impact analysis. The Air Force Environmental Impact Analysis Process (EIAP) is accomplished through adherence to the procedures set forth in the CEQ regulations (40 Code of Federal Regulations [CFR] Sections 1500-1508) and 32 CFR 989 (EIAP), 15 July 1999, and amended 28 March 2001. These federal regulations establish both the administrative process and substantive scope of the environmental impact evaluation designed to ensure that deciding authorities have a proper understanding of the potential environmental consequences of a contemplated course of action.

This EA identifies, describes, and evaluates the potential environmental impacts that are associated with the construction and alteration of facilities identified in the Five Year Plan, taking into consideration possible cumulative impacts from other actions. The potential environmental effects of taking no action are also described. As appropriate, the affected environment and environmental consequences of the action may be described in terms of a regional overview or a site-specific description. Fiscal year (FY) 2005 or the most current information is used as the baseline condition.

Figure 1-1 Regional Location Map

Figure 1-2 Location of Construction



Based on the analysis of impacts in the EA, a determination on the significance of the impacts will be made in a decision document. If anticipated impacts would be significant, the Air Force would either prepare an Environmental Impact Statement (EIS) or would not implement the proposal. If impacts would not be significant, a Finding of No Significant Impact (FONSI) would be prepared.

The Air Force has announced other independent actions for Malmstrom AFB concurrent with the Proposed Action. The environmental impacts of these other actions, in most cases, have been analyzed in separate NEPA documents. In addition, other actions are planned for the surrounding community (see Section 2.4). This EA addresses the environmental impacts of these other actions only in the context of potential cumulative impacts, if any. A cumulative impact, as defined by the CEQ (40 CFR 1508.7), is the "impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of which agency (federal or nonfederal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."

1.5.1 Resource Areas Addressed in Detail

- Noise
- Land Use
- Air Quality
- Water Resources
  - Surface Water
  - Groundwater
  - Wetlands
- Geologic Resources
- Hazardous Materials and Wastes (including IRP sites)
- Biological Resources
  - Vegetation
  - Wildlife
  - Threatened and Endangered Species
- Cultural Resources
- Utilities and Infrastructure
  - Potable Water
  - Sanitary Sewer
  - Solid Waste
  - Stormwater Drainage
  - Transportation
  - Electricity/Natural Gas
- Socioeconomic Resources and Environmental Justice
  - Population and Employment
  - Economy
  - Environmental Justice

1.5.2 Resource Topics Eliminated from Detailed Analysis

Some resource areas or some aspects of resource areas would not be affected by the proposed or alternative actions. Resource areas that have been eliminated from further study in this document and the rationale for eliminating them are presented below.

1.5.2.1 Airspace and Aircraft Operations

No fixed wing aircraft operations are currently stationed at Malmstrom AFB. A squadron of Huey helicopters operates under the 341st Space Wing Operations Group. Under the Proposed Action and No Action Alternative, no change in the number of aircraft assigned to the installation and no change in the airspace associated with aircraft operations would occur. Therefore, airspace and aircraft operations would not be affected by the proposed or alternative actions.

1.5.2.2 Air Installation Compatible Use Zone (AICUZ)

The Air Force AICUZ program predicts noise exposure by modeling aircraft operations and employing bands of noise exposure. Malmstrom AFB no longer has a fixed wing flying mission and, therefore, the installation's AICUZ study has not been updated since 1994. The Proposed Action and No Action Alternative would not change fixed wing or rotary wing flying operations. Therefore, a new AICUZ study is not required.

1.6 APPLICABLE REGULATORY REQUIREMENTS

This EA is part of the EIAP for the proposed project as set forth in 32 CFR 989, 15 July 1999, and amended 28 March 2001; CEQ regulations; Department of Defense (DoD) Directive 4715.1 *(Environmental Security, 19 March 2005)*; as well as DoD Instruction 4715.9 *(Environmental Planning and Analysis)*.

NEPA, as amended, requires federal agencies to consider, as part of the decision-making process, the environmental consequences of their proposed and alternative actions. The Air Force considers the potential environmental impacts identified during the EIAP in its decision. The following paragraphs describe the permits and regulations that apply or may apply to the proposed and alternative actions.

1.6.1 Permits

It is the constructor's responsibility to ensure permits are identified and obtained from the installation, including local, state, and federal agencies. The constructor would ensure that a Stormwater Pollution Prevention Plan (SWPPP) is completed and approved before initiating construction activities. Because final designs for the Proposed Action would involve the disturbance of more than one acre, a Notice of Intent (NOI) under the Montana Construction General Permit, MTR 100000, would need to be filed with the Montana Department of Environmental Quality (MDEQ), including the creation and implementation of a SWPPP. Also, a construction stormwater permit would be obtained from the MDEQ before any construction activities began.

1.6.2 Other Regulatory Requirements

The EA considers all applicable laws and regulations, including but not limited to the following:

- Clean Air Act (CAA) (42 United States Code [USC] 7401 et seq.)
- Air Force Instruction (AFI) 32-7040, Air Quality Compliance
- Executive Order (EO) 11990, Protection of Wetlands
- Clean Water Act (CWA), (33 USC 1251 et seq.)
- EO 11988, Floodplain Management
- Endangered Species Act (ESA) (16 USC 1531-1542)
- Pollution Prevention Act of 1990 (42 USC 13101 and 13102 et seq.)
- Archaeological Resources Protection Act
- Native American Graves Protection and Repatriation Act of 1991 (25 USC 3001 et seq.)
- EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations

1.7 INTRODUCTION TO THE ORGANIZATION OF THE DOCUMENT

This EA is organized into eight chapters.

Chapter 1 Contains a statement of the purpose of and need for action, the location of the proposed and alternative actions, identification of the decision to be made, a summary of the scope of the environmental review, identification of applicable regulatory requirements, and a description of the organization of the document.

Chapter 2 Describes the No Action alternative, identifies alternatives eliminated from further consideration, provides a detailed description of the Proposed Action, summarizes other actions announced for Malmstrom AFB and the surrounding community, contains a comparison matrix of environmental effects for all alternatives, and identifies the preferred alternative.

Chapter 3 Includes a general description of the current conditions of the resources that could be affected by the proposed or alternative actions.

Chapter 4 Presents an analysis of the environmental consequences of the proposed and alternative actions.

Chapter 5 Provides an analysis of cumulative impacts resulting from the incremental impact of the Proposed Action when added to other past, present, and reasonably foreseeable future actions.

Chapter 6 Contains a list of preparers of this document.

Chapter 7 Provides a list of persons and agencies consulted in the preparation of this EA.

Chapter 8 Includes a list of source documents relevant to the preparation of this EA.

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CHAPTER 2
DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

This chapter has six parts: a description of the No Action Alternative, identification of alternatives eliminated from further consideration, a description of the Proposed Action, identification of other proposed actions planned for Malmstrom AFB and the surrounding community, a comparison of environmental impacts of all alternatives, and identification of the preferred alternative.

2.1 DESCRIPTION OF THE NO ACTION ALTERNATIVE

Under the No Action Alternative, the installation would not construct any of the facilities identified in the Five Year Plan. The 819th RHS would continue to operate in its existing facilities and would continue to use outside storage for equipment.

2.2 ALTERNATIVES ELIMINATED FROM FURTHER CONSIDERATION

Malmstrom AFB considered constructing all proposed facilities on the northwestern portion of the installation; however, not enough space exists in the immediate area to construct all of the proposed facilities in such a manner as to consolidate the location of the RHS.

2.3 DESCRIPTION OF THE PROPOSED ACTION

The Air Force proposes to implement the Five Year Plan, which would include nine construction projects, two renovation projects, and two pavement improvement projects, as indicated in Table 2-1. Table 2-1 also identifies the location of each planned project: developed side (west) or the underdeveloped side (east) of the installation. Figures 2-1 and 2-2 show the activities on the west and east sides of the base respectively which are associated with Proposed Action.

Table 2-1 Proposed Action Construction Projects

Proposed Year (FY)	Project Name	Area (SF)	Location (East/ West)	Project Description and Purpose
2007	Construct Airborne Administrative Facility	7,500	East	The administrative facility supports 24 personnel with surge capacity to 50 personnel. It includes offices, open cubicle space, bathrooms, and conference room.
2007	Renovate Headquarters (Bldg 160) SABER	800	West	The existing facility would be renovated within the confines of the existing footprint.
2007	Construct Airfields Mezzanine (Bldg 1460)	3,000	West	A second floor mezzanine would be installed within the confines of the existing facility. The mezzanine would provide storage for well drilling equipment.

Table 2-1 Proposed Action Construction Projects

Proposed Year (FY)	Project Name	Area (SF)	Location (East/ West)	Project Description and Purpose
2007	Pave East Base Compound (Ph I)	63,500	East	Pave areas to provide equipment parking on paved surfaces and roads. Current unpaved roads and parking areas become very muddy during the rainy season.
2007	Construct Airborne Storage Facility	5,000	East	The facility would be a 50' x 100' pre-engineered building. It includes one office and bathroom and provides storage and facilities to support the increasing airborne program.
2007	Construct Airborne Rappel/Dry Tower	400	East	The facility is 20'x20'x50' and supports parachute drying and rappel training requirements. The parachutes are currently sent to Billings, Montana for drying and maintenance. No occupancy is planned.
2009	Construct Tire Shop Addition – Bldg 1450	3,500	West	A 70'x50' pre-engineered steel addition would be constructed adjacent to building 1450. It would alleviate the vehicle maintenance space shortfalls.
2009	Construct Warehouse I	10,000	East	This 60' x 160' pre-engineered building would provide covered storage for deployable equipment and supplies. No occupancy is planned.
2009	Construct Unit Assembly/Training Facility	10,000	West	This 100'x100' pre-engineered steel building would be constructed for squadron assemblies and to provide additional storage for readiness and mobility items. It includes offices and bathrooms.
2009	Construct Vehicle Parking Shed	10,000	East	This 60'x150' vehicle storage facility would support the airborne RED HORSE mission. It would store 25 pieces of deployable rolling stock equipment. No occupancy is planned.
2009	Construct Warehouse 2	10,000	East	This 60' x 160' pre-engineered building would provide covered storage for deployable equipment and supplies. No occupancy is planned.
2007	Construct Electrical Shop Addition - B1465	7,000	West	A pre-engineered steel building addition would be constructed to alleviate the electrical shop space shortfall.
	Total	**130,700**		

Source: Grady 2006
Table Definitions: Bldg. – building, FY – fiscal year, Ph. – phase,
RED HORSE – Rapid Engineer Deployable Heavy Operational Repair Squadron Engineers
SF – square feet, ' – foot

1

Figure 2-1 West Base Proposed Actions

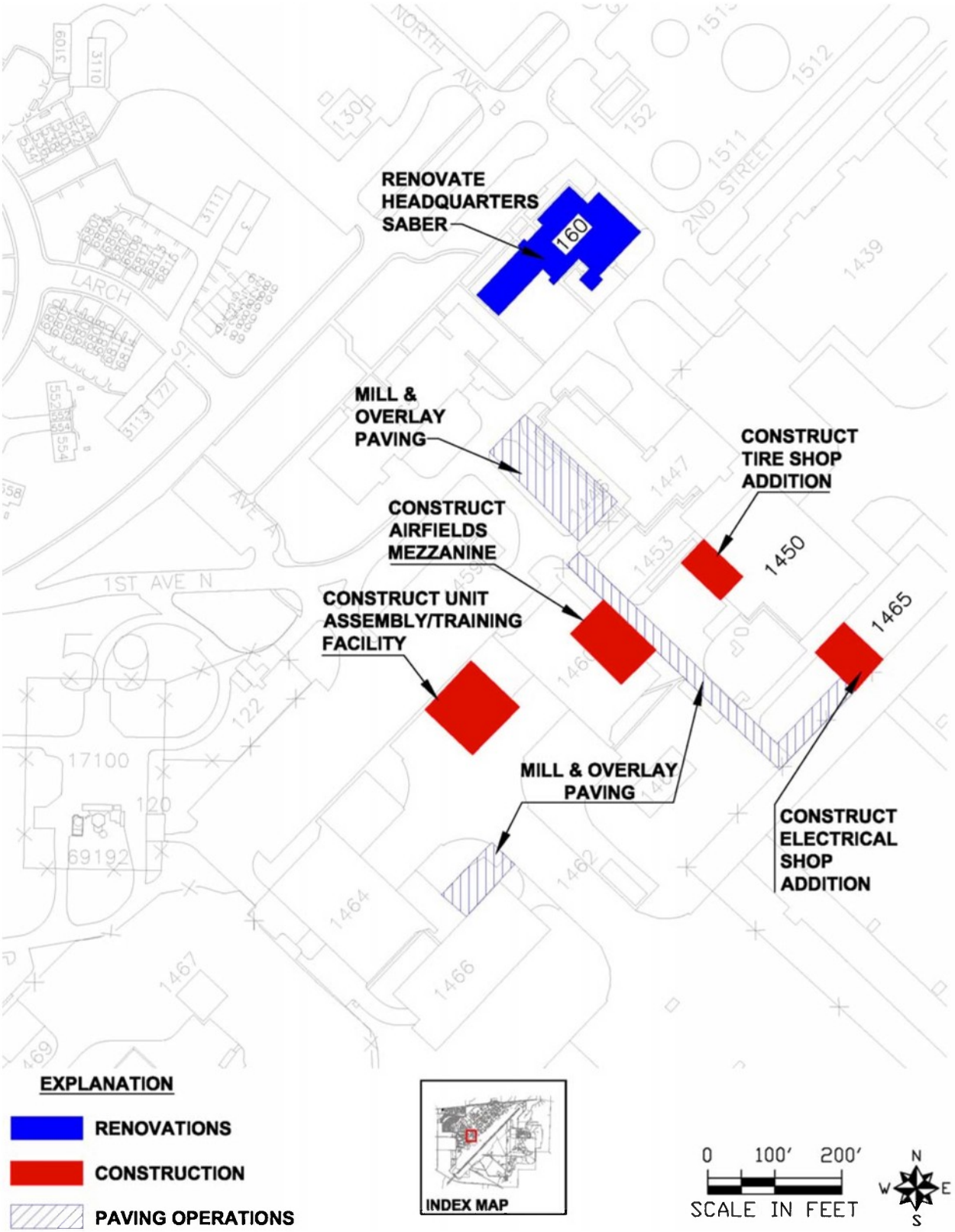
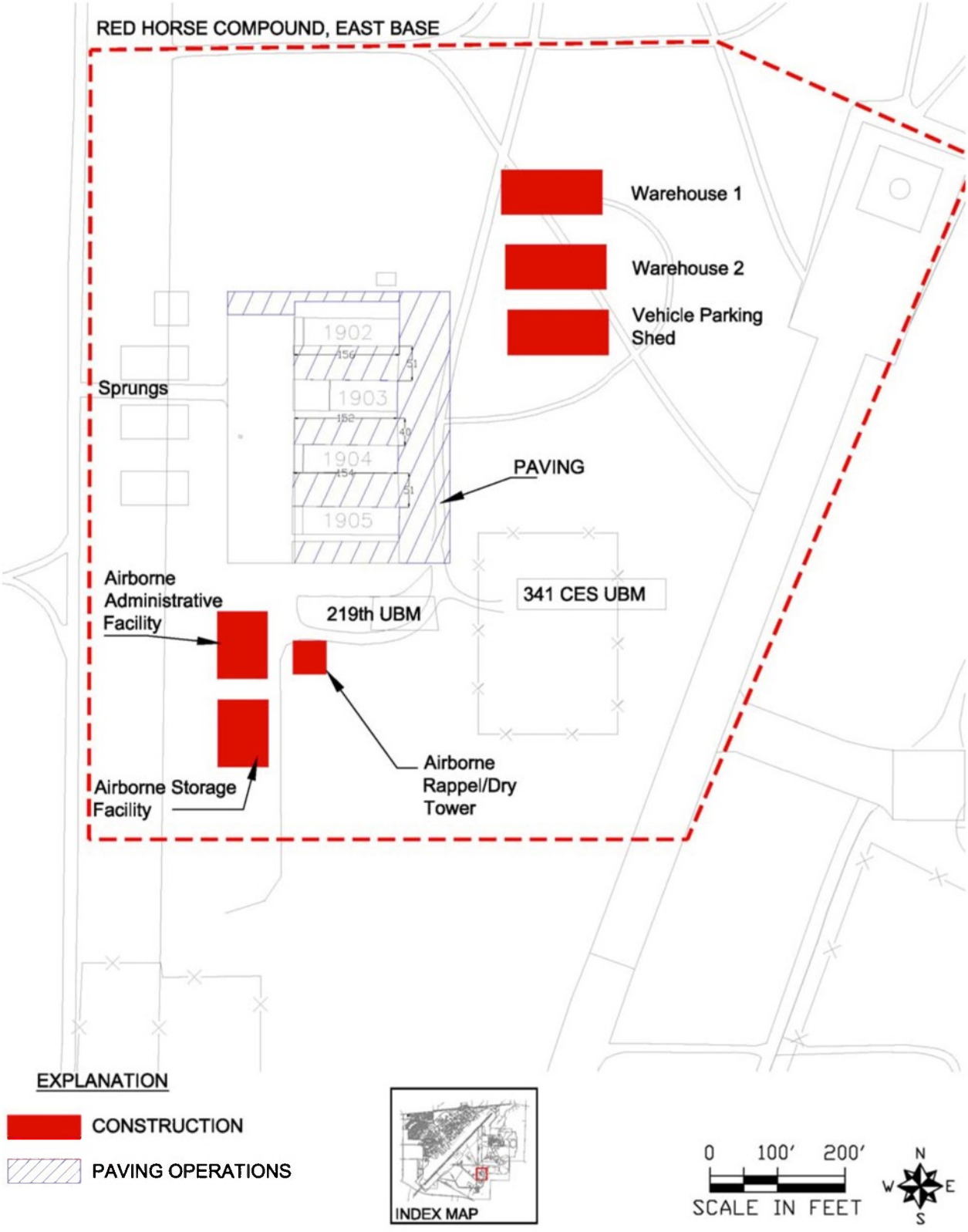


Figure 2-2 East Base Proposed Actions



New construction would include connection to local utilities. Road improvement projects would involve removing existing asphalt, laying new asphalt and paving unpaved roads.

2.4 OTHER ACTIONS ANNOUNCED FOR MALMSTROM AFB AND SURROUNDING COMMUNITY

This EA also considers the effects of cumulative impacts (40 CFR 1508.7) and concurrent actions [40 CFR 1508.25(1)], if any are applicable to the proposed or alternative actions. A cumulative impact, as defined by the CEQ (40 CFR 1508.7), is the "impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of which agency (federal or nonfederal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." Other actions announced for Malmstrom AFB that could occur during the same time period as the proposed or alternative actions include the following:

- Construction of pre-engineered steel warehouse structures and temporary Sprung Structures at the RED HORSE east compound assessed under previous NEPA actions.
- 165 active duty positions would be added to the 819th RHS bringing the manpower total to 450 active duty personnel. The personnel additions are expected within the next two years.
- Construction of an Army Reserve Building at the southeast corner of the eastern portion of the installation is planned. This construction would include 36,000 SF of facilities and 7,000 square yards of pavement and would require paving of the road to the site, as well as utilities extensions.
- Construction of a small Communication Building located north of Building 1846 will include 900 SF of construction.
- Construction of a Propulsion System Rocket Engine Building located west of Building 11664 will include 6,000 SF of construction.
- Construction of a Truck Inspection Station would occur at the south entrance to Malmstrom AFB north of Highway 83 and would be less than 3,000 SF.
- Construction of a Rivet Mile Administrative Facility will be located just north of the horse stables and will include 3,200 SF of construction.
- Expansion of the Weapons Storage Area to the south is still in the design phase.
- Mill and Overlay West Base (Phase IV) 52,500 square feet of existing pavements.
- Renovations to the North and South Gates will add Anti-Terrorism/Force Protection controls and lighting to the existing gates.

In addition, other actions announced for the surrounding community include:

- Construction of a 200 unit housing development outside southwestern edge of Malmstrom AFB.
- Upgrade to city sewer lines.

2.5 COMPARISON OF ALTERNATIVES

Table 2-2 summarizes the impacts of the Proposed Action and the No Action Alternative.

2.6 IDENTIFICATION OF THE PREFERRED ALTERNATIVE

The preferred alternative is the Proposed Action.

Table 2-2 Summary of Environmental Impacts

Resource	Proposed Action Implement 819th RHS Five Year Plan including construction of new facilities.	No Action Alternative No construction occurs.
Noise	Short-term, minor increases in noise levels would be expected from construction activities. No long-term increase in noise levels is anticipated.	No change.
Land Use	No change in land use designation for activities on the west side of the flightline would be required. Development east of the flightline would convert the land use designation from open space to an industrial land use type for approximately five acres. This site has been extensively disturbed due to previous activities and surface disturbance. Therefore, the industrial use of this site poses no adverse impact to the surrounding land use and is appropriate for consolidating similar land uses in the eastern part of the base.	No change.
Air Quality	Short-term, minor increase in emissions from equipment and vehicles from construction activities would result. No long-term impacts are anticipated.	No change.
Water Resources	Short-term, minor impacts to surface water due to construction can be minimized through Best Managements Practices (BMPs). No net, long-term increase in stormwater runoff from Proposed Action. No adverse impacts to surface water, groundwater, or wetlands are expected.	No change.
Geologic Resources	Short-term, minor impacts due to water and wind erosion can be minimized through BMPs.	No change.
Hazardous Materials and Wastes	Constructor would manage hazardous materials and wastes according to installation, state, and local regulations. No long-term impact from hazardous materials and wastes is expected.	No change.
Biological Resources	At the developed western project site, no adverse impacts to vegetation would be expected. Excavation of soil east of the flightline would result in loss of the already limited vegetative cover at the site, and, consequently, direct impacts to vegetation would be minimal. No adverse impacts to wildlife species are anticipated due to construction activities west of the flightline. East of the flightline, disturbance from constructing buildings and parking areas would result in habitat loss. However, revegetation of disturbed areas would mitigate the short-term impacts of the habitat loss No threatened, endangered or candidate plant or animal species are expected to live in the project area.	No change.
Cultural Resources	Buildings 1464 and 160 are potentially eligible for listing on the National Register of Historic Places (NRHP); however, listing on the NRHP for either facility is not expected. No impacts to cultural resources are anticipated.	No change.
Infrastructure and Utilities	No long-term impacts to potable water system are anticipated. A cistern could be installed to hold excess sanitary sewer waste resulting from additional development on the east side of the base, resulting in no long-term impacts. In addition, no long-term impacts to the sanitary sewer waste are expected from activities west of the flightline.	No change.

Resource	Proposed Action Implement 819th RHS Five Year Plan including construction of new facilities.	No Action Alternative No construction occurs.
	Since the collection and management system is already in place to handle solid waste, no significant impact to solid waste is anticipated No adverse impacts to drainage systems at the eastern or western projects sites would occur. The minor increase in traffic and localized, short term impacts of construction vehicles would have no significant impact on the transportation system. Long-term minor increases to electricity and natural gas consumption can be supported by existing systems, resulting in no impact.	
Socioeconomic Resources and Environmental Justice	Short-term positive impact on regional employment and local economy is anticipated. No disproportionate impacts to environmental justice communities from short-term solid waste and transportation impacts are expected. A short-term positive impact to employment and economy would be evenly distributed within the region, thereby not disproportionately affecting a single population.	No change.

CHAPTER 3
AFFECTED ENVIRONMENT

3.1 INTRODUCTION

This section describes the current conditions of the environmental resources, either manmade or natural, that would be affected by implementation of the proposed or alternative actions. Chapter 3.0 serves as a baseline for evaluating the environmental status of the proposed and alternative actions.

3.2 INSTALLATION LOCATION, HISTORY, AND CURRENT MISSION

Malmstrom AFB is located less than one mile east of the City of Great Falls in Cascade County, Montana. The base is approximately 4,120 acres. Interstate 15 and United States (U.S.) Highways 87 and 89 are located near the base (U.S. Air Force [USAF] 2005a).

In 1941, the Lend-Lease Act was passed by Congress. This act allowed the U.S. to provide their allies in World War II (WWII) with supplies (Wikipedia 2006). Supplies to the Soviet Union were routed through Great Falls; however, the volume of supplies was too much for the municipal airport to handle. As a result, Great Falls Army Air Base construction began in the summer of 1942. After WWII ended, the base was primarily used for training air crews. The base was renamed Great Falls AFB when the Air Force became a separate service (USAF 2005a).

Colonel Einer Axel Malmstrom was stationed at Great Falls AFB in February 1954 and served as the 407th Strategic Fighter Wing Vice Commander. Prior to this appointment, he served at other bases in the U.S. and in WWII. He received the Bronze Star for his service in WWII, after spending a year in a German Prisoner of War camp. On 21 August 1954, Colonel Malmstrom was killed in a T-33 aircraft crash just west of the Great Falls airport. The base was renamed on 1 October 1955 in honor of him and was formally dedicated in June 1956 (Malmstrom AFB 2006a).

The 407th Strategic Fighter Wing was the host unit on base from February 1954 until 1 July 1954, when the 4061st Air Refueling Wing (ARW) was activated. On 15 July 1961, the 4061st ARW was deactivated and the 341st Strategic Missile Wing (SMW) became the host unit. The 301st ARW was activated in January 1988 and the 40th Air Division was activated in July 1989. When the Air Force was reorganized in June 1991, the 43rd ARW (previously the 301st ARW) became the host for base operations. The 341st Missile Wing (previously the 341st SMW) was assigned as the host unit on 1 July 1994. On 30 September 1996, the 43rd ARW was relocated elsewhere. The 341st Missile Wing was renamed the 341st Space Wing on 1 October 1997 (USAF 2005a).

Fixed wing flying operations halted in January 1997 as a result of Base Realignment and Closure (BRAC) 1995 decisions. As a result, the base's runway was declared inactive. In 8 August 1997, Malmstrom AFB reactivated the 819th RHS. The 819th RHS is a civil engineering squadron with approximately 285 personnel designed for emergency deployment supporting

military combat and humanitarian operations worldwide. The 819th RHS was the first RED HORSE squadron made up of active duty, Air National Guard, and Air Force Reservists. The Squadron provides repair services to Air Force facilities, utility systems, and aircraft launch and recovery. RED HORSE also sets up and supports weapon system operations in remote locations and adverse environments (Malmstrom AFB 2006b).

Today, Malmstrom AFB is run by the 341st Space Wing, which includes the 341st Operations Group, the 341st Logistics Group, the 341st Support Group, and the 341st Medical Group. In addition to base operation, the 341st Space Wing is responsible for missile and helicopter maintenance. The 819th RHS, Air Force Office of Special Investigations, Civil Air Patrol, and Defense Reutilization and Marketing Office (DRMO) also occupy the base.

3.3 DESCRIPTION OF THE AFFECTED ENVIRONMENT

3.3.1 Noise

Noise is sound that, if loud enough, can induce hearing loss and can be undesirable if it annoys people by interfering with ordinary daily activities, such as communication or sleep. A person's reaction to noise varies according to the duration, type, and characteristics of the source, the distance between the source and receiver; the receiver's sensitivity; the background noise level; and the time of day. When describing sound levels in relation to humans, a weighted sound level is used to characterize the sound levels to which the human ear responds especially well by emphasizing mid-frequencies and de-emphasizing the low and high frequencies. Sound levels weighted in this manner are referred to as A-weighted decibels (dBA).

The Air Force AICUZ program predicts noise exposure by modeling aircraft operations and employing bands of noise exposure. With the exception of UH-1N Helicopters, Malmstrom AFB no longer has a flying mission; therefore, the installation does not currently have an AICUZ program.

Based on a United States Environmental Protection Agency (USEPA) report (1974), the potential for permanent hearing loss arises from direct exposure to noise on a regular, continuing long-term basis (16 hours a day for 40 years) to levels above 70 decibels (dB). Noise associated with the operation of machinery on construction sites is typically short-term, intermittent, and highly localized. The loudest machinery generally produces peak sound pressure levels ranging from 86 to 95 dBA at 50 feet from the source (see Table 3-1). It is important to note that the peak sound pressure level (SPL) range for construction equipment noise does not take into account the ability of sound to be reflected or absorbed by nearby objects, which would further reduce noise levels. Additionally, interior noise levels are typically reduced by 18 to 27 dBA by the noise level reduction properties of the building's construction materials (FAA 1992).

Table 3-1 Peak Sound Pressure Level of Heavy Equipment from a Distance of 50 Feet

Equipment	Noise Generated*
Bulldozer	95 dBA
Flat-bed Truck (18 wheel)	75 dBA
Dump Truck	75 dBA
Concrete Truck	75 dBA
Concrete Finisher	80 dBA
Scraper	94 dBA
Front Loader	94 dBA
Backhoe	92 dBA
Trenching Machine	85 dBA
Grader	91 dBA
Crane	86 dBA

Source: Reagan and Grant 1977 and CERL 1978
* Noise from a single source
dBA = A-weighted Decibel

The primary sources of noise at Malmstrom AFB are from vehicular traffic, helicopter operations, an Explosive Ordnance Disposal (EOD) range, and the concrete crushing operation. With the exception of vehicular traffic, which occurs across the entire installation, these noise sources are located east of the flightline. The concrete crushing operation occurs sporadically throughout the year and for short periods of time. The EOD range emits short-term, high intensity noises resulting from explosives demolition.

A noise-sensitive receptor is commonly defined as the occupants of any facility where a state of quietness is a basis for use, such as a residence, hospital, or church. The only noise-sensitive receptor east of the flightline near the project site is a dog kennel, which is approximately 1,100 feet from the closest proposed construction site. Noise-sensitive receptors located west of the flightline near the project sites include military family housing, tennis courts, and a baseball diamond, located approximately 400 feet, 900 feet, and 800 feet, respectively, from the nearest construction site.

3.3.2 Land Use

The goal of land use planning at Malmstrom AFB is to improve the appearance, quality of life, and functional efficiency of the installation by collocating similar facilities and separating incompatible land uses (USAF 2005a). The base's land use plan also seeks to maintain consistency with the land use planning and goals of the surrounding community (i.e., City of Great Falls and Cascade County). Both Great Falls and Cascade County have recently adopted growth policies that identify goals and objectives for land use, visual or scenic quality, and transportation (Great Falls City Commission 2005, Cascade County Board of Commissioners 2006).

Land use on Malmstrom AFB includes developed areas in the northwestern portion of the installation and open space and weapons storage in the eastern portion (Table 3-2, Figure 3-1). The inactive airfield, located in the southeastern portion of the installation, is the dominant land

use on the installation. Light industrial activities occupy former aircraft operations and maintenance facilities adjacent to the airfield. Other land uses in the cantonment area are generally located to the west of the airfield. Housing is primarily located in the northwestern portion of the installation. East of the primary residential area are community services, commercial developments, and administrative buildings. Recreation facilities are scattered throughout the base, but are located primarily in the areas adjacent to the family housing area and south of the weapons storage area on the east side of the base.

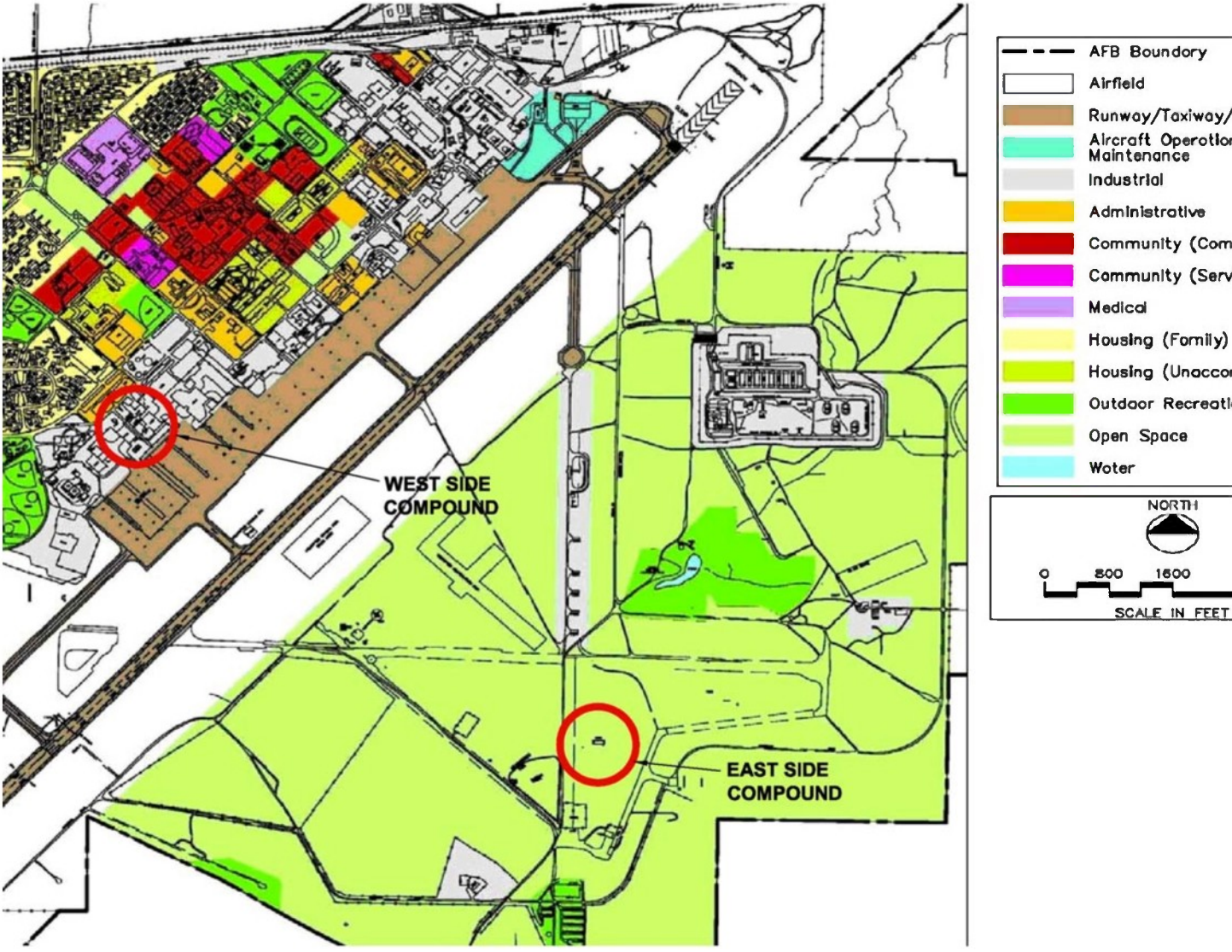
Table 3-2 Land Use Types and Definitions, Malmstrom Air Force Base, 2005

Land Use	Map Color	Typical Facilities and Features
Administrative	Orange	Personnel, headquarters, legal and other support activities
Aircraft Operations	Turquoise	Aircraft maintenance hangars and docks, control towers, flight training facilities, and maintenance flight operations buildings
Airfield	Brown/White	Runways, taxiways, aircraft parking aprons; associated clearance and safety zones
Community	Red/Magenta	Commissary, base exchange, service stations; transient or lodging facilities, clubs, chapels, and library
Housing	Ocher/Yellow	Unaccompanied quarters; family housing
Industrial	Gray	Utility systems, building maintenance facilities, base support supply warehouse
Medical	Purple	Medical centers, hospitals and clinics
Open Space	Light Green	Buffer areas, out lease areas
Outdoor Recreation	Green	Swimming pools, tennis courts, and other active recreation facilities
Water	Blue	Ponds, lakes

Source: USAF 2005a

The east side of Malmstrom AFB is mostly open space with a few industrial uses. The Weapons Storage Area (WSA) is located 4,000 feet north of the eastern proposed construction site. A RED HORSE storage area currently exists in the proposed construction area. A Combat Arms Training and Maintenance (CATM) Facility (firearms shooting range) lies 3,500 feet northeast of the proposed construction site, and a security police dog kennel occupies the southern portion of the east base. Outdoor recreational areas on the east side include the Pow Wow recreational area, the horse stables, and an archery range. According to the Malmstrom AFB General Plan, nearly the entire project area in the less-developed eastern portion of the base is classified as open space. However, some existing RED HORSE storage facilities are present at the site. Currently, approximately 200 people work on the east side of Malmstrom AFB (USAF 2005a).

Figure 3-1 Existing Land Use



City and county zoning of areas near Malmstrom AFB are depicted on city and county zoning maps (Cascade County Planning Department 2005, Great Falls City Planning Department 2006). The areas to the north, south, and east of the base are mostly zoned agricultural, while land immediately to the west consists of a combination of residential, commercial, industrial, and agricultural zoning.

Cascade County's Growth Policy acknowledges the importance of Malmstrom AFB to the local economy. In order to facilitate potential future flying missions at Malmstrom AFB, the Growth Policy identifies specific plans to protect "the runway's Accident Potential Zones" from encroachment by any non-compatible land uses as described in the 1994 Malmstrom AFB AICUZ Study (USAF 1994). Future development in identified Accident Prone Zones would be governed by the compatible land use policies specified in the 1994 Malmstrom AFB AICUZ Study.

3.3.3 Air Quality

3.3.3.1 Air Quality Standards and Regulations

The USEPA has established primary and secondary National Ambient Air Quality Standards (NAAQS) under the Clean Air Act Amendments of 1990 (CAAA). The CAAA also set emission limits for certain air pollutants from specific sources, determined new source performance standards based on best demonstrated technologies, and established national emission standards for hazardous air pollutants.

The CAAA specifies two sets of standards—primary and secondary—for each regulated air pollutant. Primary standards define levels of air quality necessary to protect public health, including the health of sensitive populations such as people with asthma, children, and the elderly. Secondary standards define levels of air quality necessary to protect against decreased visibility and damage to animals, crops, vegetation, and buildings. Federal air quality standards are currently established for six pollutants (known as criteria pollutants), including carbon monoxide (CO), nitrogen oxides (NO_x), ozone (O_3), sulfur oxides (SO_x, commonly measured as sulfur dioxide [SO_2]), lead, and particulate matter (typically measured in two measurements, one which is equal to or less than 10 micrometers in aerodynamic diameter [PM_{10}] and one which is equal to or less than 2.5 micrometers in aerodynamic diameter [$PM_{2.5}$]). Although O_3 is considered a criteria pollutant and is measurable in the atmosphere, it is often not considered a pollutant when reporting emissions from specific sources. O_3 is rarely emitted directly from emissions sources; rather it is formed via atmospheric reactions between sunlight and its precursors – NO_x and volatile organic compounds (VOCs) – that are directly emitted from various sources. Thus, emissions of NO_x and VOCs are monitored to control the formation of ground level O_3.

Under the CAAA, a federally enforceable Title V Permit may be issued to air pollution sources by permitting authorities after the source has begun to operate. The purpose of Title V permits is to reduce violations of air pollution laws and improve enforcement of those laws. These permits record in one document all of the air pollution control requirements that apply to the source. This permit gives members of the public, regulators, and the source a clear picture of what the facility is required to do to keep its air pollution under the legal limits. The permits also require

the source to make regular reports on how emission of pollution is tracked and what controls are in place to limit emissions. The permit adds monitoring, testing, and/or record keeping requirements, where necessary to ensure that the source complies with its emission limits or other pollution control requirements. Every year the source must certify whether or not it has met the air pollution requirements in its Title V permit.

The USEPA classifies the air quality within an Air Quality Control Region (AQCR) according to whether the region meets federal primary and secondary air quality standards. An AQCR or portion of an AQCR may be classified as attainment, nonattainment, or unclassified with regard to the air quality standards for each of the criteria pollutants. "Attainment" describes a condition in which standards for one or more of the six pollutants are being met in an area. The area is considered an attainment area only for those criteria pollutants for which the NAAQS are being met. "Nonattainment" describes a condition in which standards for one or more of the six pollutants are not being met in an area. "Unclassified" indicates that air quality in the area cannot be classified and the area is treated as attainment. An area may have all three classifications for different criteria pollutants.

3.3.3.2 Regional Air Quality

According to the 2005 General Plan, Malmstrom AFB is located within the Great Falls Intrastate AQCR (AQCR #131) (USAF 2005a). In 1980, a portion of this AQCR, the 10th Avenue South corridor, was designated non-attainment for CO. In 1991, a Federal Register notice listed the AQCR as not classified nonattainment; however, the redesignation required a new emission inventory and development of a maintenance plan. In 2000, a 1996 emission inventory was submitted to the USEPA to serve as an attainment inventory. Also in 2000, a Maintenance Plan was created which mandated participation in the Federal Motor Vehicle Emission Control Program through 2012 to ensure continued maintenance of the CO NAAQS within the AQCR. Currently, the Great Falls Intrastate AQCR is in attainment for CO; however, the Cascade County CO Limited Maintenance Plan, as part of the State of Montana Air Quality Control Implementation Plan, requires continued monitoring through 2012 (Montana 2000). Because Malmstrom AFB is located within the Great Falls Intrastate AQCR, it must also comply with these maintenance plans.

3.3.3.3 Malmstrom AFB Air Quality

Malmstrom AFB was issued a Montana Air Quality Permit on 28 March 2003 which stated that a natural gas fired boiler would be replaced with two smaller heat input capacity units and emissions from the new units would be less than the de minimus threshold of 15 tons per year (tpy). The permit also stated that Malmstrom AFB would install an emergency diesel generator which would produce emissions less than the de minimus threshold. As a result, these new sources could operate without a permit. The permitted equipment at Malmstrom AFB includes three heating plant boilers, a classified document incinerator, two aboveground fuel storage tanks, and the two heat input capacity boilers mentioned above. The greatest stationary sources of emissions at the installation are the three heating plant boilers (USAF 2003). In 2004 Malmstrom AFB was issued a new Montana Air Quality Permit which modified the 2003 permit. The modified permit accounted for proposed changes to the operation of two of the heating plant boilers (MDEQ 2006). Potential emissions resulting from the 2004 modifications to the permit

were below the New Source Review (NSR)/Prevention of Significant Deterioration (PSD) threshold for all pollutants; therefore, the permit action was not subject to NSR/PSD review (MDEQ 2006).

Malmstrom AFB was issued a Title V Operating Permit in 2000, with multiple amendments issued since then. The most current amendment was issued in July 2006. This permit covers the three heating plant boilers and two emergency/backup diesel generators. The amendment issued in 2005 removed the Classified Documents Incinerator from the permit and the Waste Oil Burner from the list of insignificant emitting units (MDEQ 2006). This Title V permit was renewed on 15 December 2006 (Merchant 2006).

Malmstrom AFB is not subject to PSD permits because the installation's NO_x emissions are limited by their permit for that pollutant. Currently, the Heat Plant at the installation emits approximately 30 percent of the limit allowed by the NO_x permit (USAF 2002).

3.3.4 Water Resources

3.3.4.1 Surface Water

Malmstrom AFB is located on a 10 square mile plateau in the Sun River Watershed. The Whitmore Ravine, located immediately north of the base boundary, is the closest natural waterway to the base. Water flows from the base into the Whitmore Ravine via five outfall points and eventually to the Missouri River. The Missouri River is located approximately 1.7 miles north of the base and is the source of potable water to the base. Since Malmstrom AFB is located on a high plateau, it is located approximately 100 feet above the 100-year floodplain of the Missouri River (USAF 2005a).

The only significant surface water body present on Malmstrom AFB is the man-made Pow Wow Pond, located in Pow Wow Park, on the east side of the base, north of the proposed Five Year Plan area and south of the WSA. Pow Wow Pond was constructed as a recreation area, as well as a detention pond to control stormwater drainage on the east side of the base (USAF 2005a). The stormwater drainage channels exiting Pow Wow Pond are considered surface waters; however, no base flow exists.

3.3.4.2 Groundwater

Both shallow and deep groundwaters are present on Malmstrom AFB. The shallow groundwater can be found at depths between 3 feet and 20 feet below ground surface (bgs). Due to the large amount of disturbance from construction on base, the shallow ground water is discontinuous and would not be a good source for the water supply. In addition to the shallow groundwater, two deep aquifers are located beneath Malmstrom AFB. The Kootenai aquifer is situated approximately 150 to 200 feet bgs and the Madison Swift aquifer is located approximately 450 to 500 feet bgs (USAF 2005a).

3.3.4.3 Wetlands

The objective of the *Clean Water Act* is to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters." This act, in conjunction with other acts such as the

Federal Agriculture Improvement and Reform Act, the *North American Wetlands Conservation Act*, and the *Endangered Species Act,* as well as EO 11990 helps identify and protect wetlands. EO 11990 requires all federal agencies to "take action to minimize the destruction, loss or degradation of wetlands and enhance the natural and beneficial values of wetlands." EO 11990 further states that federal agencies on federal lands and federally funded projects shall not build new construction in wetlands unless no other practical option is available.

Wetlands are defined as lands where saturation with water is the dominant factor in determining the nature of soil development and the types of plant and animal communities living in the soil and on its surface. Figure 3-2 shows the sites on Malmstrom AFB meeting none, some, or all of the wetland criteria. As stated in the *Federal Manual for Identifying and Delineating Jurisdictional Wetlands,* wetlands are areas that contain:

1) Hydrophytic vegetation - plants that grow in water or on soils that are periodically deficient in oxygen due to inundation of water;

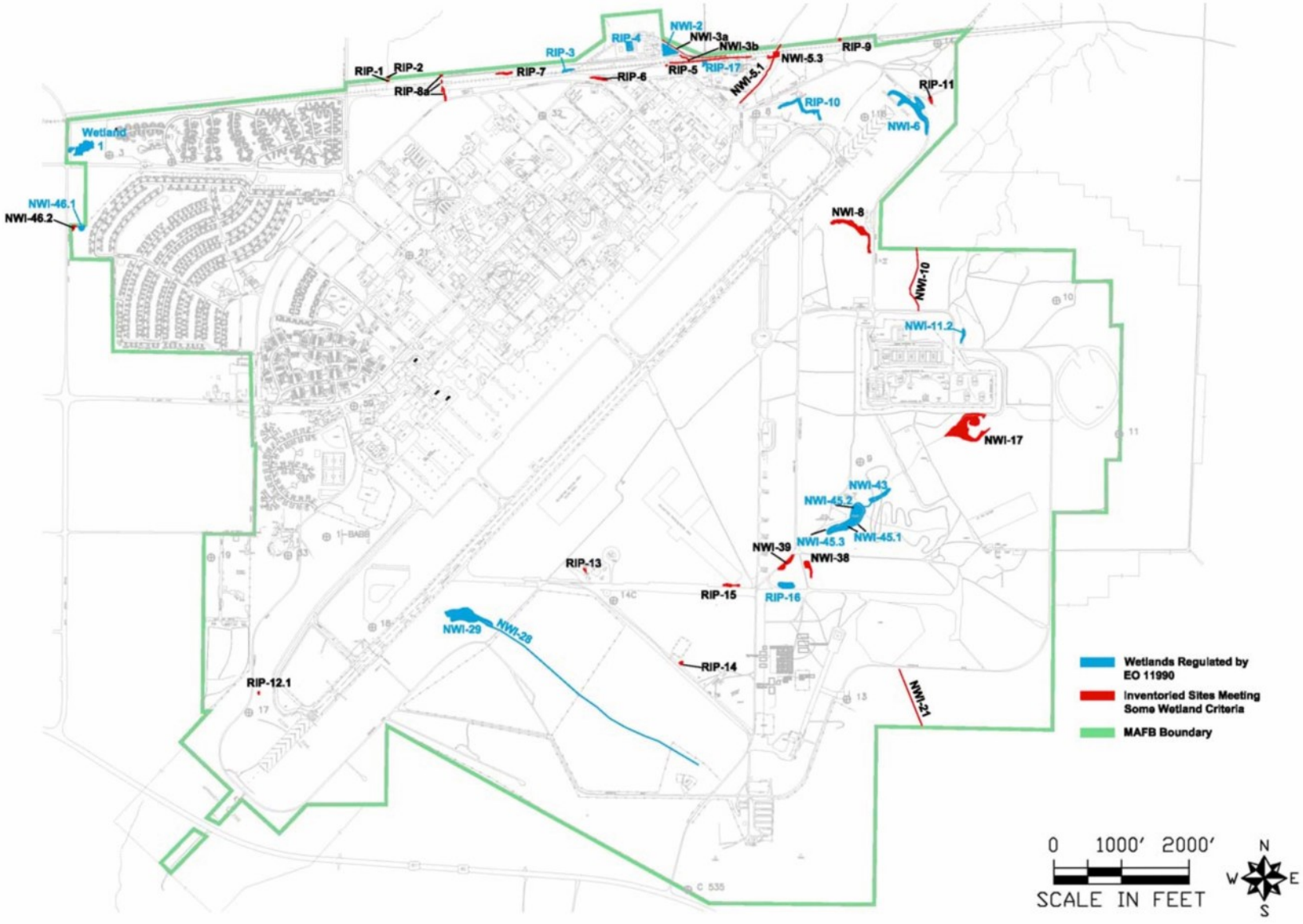
2) Hydric soils – soils that are saturated, ponded, or flooded for a period of time where anaerobic conditions are created; and

3) Wetland hydrology – permanent or periodic inundation or soil saturation to the surface that occur at least seasonally.

In 2006, a wetland inventory was performed at Malmstrom AFB. The study concluded that all of the wetlands located on the base are in the Palustrine System and most of the wetlands are manmade (ERG 2006). Wetlands in the Palustrine System include "all nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens" (Cowardin, et al. 1979). These wetlands are traditionally marshes, swamps, bogs, fens, and prairies.

No jurisdictional wetlands, which are regulated by the Clean Water Act, are located on Malmstrom AFB. However, fourteen EO Wetlands, which are regulated by EO 11990, are present on the base. Figure 3-2 delineates the sites that meet some of the criteria, as well as those wetlands that are considered EO wetlands. EO wetland RIP-16 is a 0.36 acre wetland located approximately 470 feet north of the Proposed Action on the east side of the base. EO Wetlands NWI-45 and NWI-43 are 0.51 and 0.04 acre wetlands located approximately 1300 feet and 1850 feet north and northeast, respectively, of the Proposed Action area on the east side of the base. NWI-45 surrounds Pow Wow Pond and NWI-43 is northwest of Pow Wow Pond. All three wetlands are located down gradient of the Proposed Area (ERG 2006).

Figure 3-2 Wetlands



3.3.5 Geological Resources

Geological resources evaluated in this EA include geology, seismicity and soils. Great Falls, Montana is located in the geologic region of the United States called the Great Plains Province. The geology is dominated by massive regional uplift followed by stream cutting and, finally, the advance and retreat of glaciers.

The majority of the soil on Malmstrom AFB, covering approximately 75 percent of the base, consists of Lawther Series silty clays and sandy loam. The No. 53 Dooley Series, which includes sandy loam, sandy-clay loam, clay loam, and clay, is the predominant soil type in the northwestern area of base (USAF 2005a). The Five Year Plan areas on both the east and west sides of the base are located within Lawther Series areas and consist of Lawther silty clay. This soil is classified in Hydrologic Group D, which has a very slow infiltration rate when it is thoroughly wet (USDA 1982).

Malmstrom AFB is underlain by a gentle fold or anticline known as the Sweetgrass Arch. This feature, formed in the subsurface igneous rock (likely granite) swelled in the deep bedrock subsurface. The axis of the anticline trends from the Great Falls area northwest into Alberta, Canada. The stratigraphic units that are part of the Sweetgrass Arch in the vicinity of Malmstrom AFB include the Eagle, Telegraph Creek, Marias River, Blackleaf and Kootenai Formations. These formations are sandstones, siltstones, mudstones and limestones typical of shallow inland sea deposits (MBMG 2002).

The uplift of the western portion of the continent that occurred five million years ago (Mya) changed the 30 million years of depositional environment of the region to a system of rivers cutting into these accumulated deposits. The new river system moved large quantities of sediment to the northeast to present day Hudson Bay in Canada.

Evidence of the abandoned channel of the Missouri River's northward channel, the Shonkin Sag, is located north of the Highwood Mountains near Great Falls. The majority of the present day Missouri River from Great Falls to Kansas City follows along the southern extent of the continental glacier (Trimble 1980). The Sweetgrass Arch units are overlain by the glacial and windblown material deposited as the glaciers retreated for the final time in the late Quaternary (MBMG 2002).

The occurrence of geologic hazards in the study area is low. No active faults are near the project area or Malmstrom AFB and the proposed construction sites do not include significant areas of steep slopes.

The Soil Survey of Cascade County Area, Montana indicates that Malmstrom AFB sits primarily on Quaternary deposits, which consist of the silty clay Pleistocene till of the Lawther horizon and the sandy loam Holocene eolian of the Dooley horizon (USDA 1982). Other soils on base include sandy loams, loamy sands, and alluvial silty clay loams. Due to the presence of the silts, clays and loams as surface cover, the base is not highly subject to wind and water erosion.

A geotechnical investigation conducted on the base summarized the following three soil types encountered at the surface and near subsurface (USAF 2004):

- Sandy, lean clay was encountered directly below the topsoil and organics or at the surface in eight of the eleven soil borings. The sandy, lean clay may represent site grading fill or a disturbed layer. The thickness of sandy, lean clay averaged nearly 2.5 feet. The natural moisture content measured an average of 11 percent.

- Clayey sand or silty sand was observed in five of the borings. Three occurrences were directly below the topsoil layer or surficial sandy, lean clay while two were observed interbeds within the fat clay and high-plasticity, lean clay soils.

- Fat clay and/or high-plasticity, lean clay was encountered in each boring generally below the surficial sandy, lean clay (in eight borings), the silty/clayey sands (in two borings) or directly at the surface (in one boring). This material is slightly to moderately compressible as indicated by consolidation test results. These figures also show that the samples exhibit slight to moderate expansion upon inundation at a surcharge pressure of 1,000 pounds per square foot.

3.3.6 Hazardous Materials and Wastes

The Resource Conservation and Recovery Act (RCRA) established statutory requirements that serve as the basis of the hazardous waste regulations. These regulations are found in 40 CFR 260-279. Corresponding state regulations identifying and listing hazardous wastes and standards applicable to generators of hazardous wastes are issued by the Montana Department of Environment and Hazardous Waste Management Regulations (Administrative Rules of Montana Title 16, Chapter 44). Hazardous chemicals and materials are defined in 29 CFR 1900.1200. Legal requirements regarding emergency planning and reporting of hazardous and toxic chemicals are noted in the Emergency Planning and Community Right to Know Act.

Hazardous materials are used throughout Malmstrom AFB (USAF 2005a). These materials must be safely and properly managed from the point of generation, to the point when the waste is no longer hazardous either through disposal, reuse, or recycling. Hazardous wastes are recorded and processed through the DRMO. After the use or generation of any hazardous materials on the installation, the materials are accumulated at one of the 21 on-base satellite accumulation points (SAP). The SAPs are not RCRA permitted storage facilities because each location accumulates less than 55-gallons of hazardous waste. Periodically, the materials are collected from the SAPs and moved to the 90-day Hazardous Waste Storage Area to be analyzed, identified and prepared for shipment. Finally the hazardous waste is transferred to the on-base Permitted Hazardous Waste Storage Facility to be picked up for off-site disposal by contactors managed by the DRMO. The hazardous waste is disposed of at an off-site facility permitted to properly manage the identified waste type. These procedures are outlined in the Hazardous Waste Management Plan (USAF 2006a).

The base also maintains a Hazardous Material Emergency Response Plan which outlines procedures to ensure proper management of hazardous material releases including personnel training, notification and response action.

Asbestos-containing materials (ACM) and lead-based paint (LBP) were prohibited from use as construction materials in the 1970's. Many existing structures were constructed prior to the

1970s. Malmstrom AFB continues to conduct ACM and LBP surveys on facilities proposed for renovation, expansion, or demolition.

The Air Force's IRP involves environmental restoration activities stemming from release of hazardous substances, pollutants, contaminants, or solid wastes. On base, 25 locations are designated as IRP sites. The sites are in various stages of restoration with the majority identified as low risk sites. Malmstrom AFB is not on the National Priorities List and there is no Federal Facilities Agreement (USAF 2005a).

3.3.7 Biological Resources

Biological resources of the region provide economic, social, cultural, and environmental value. The plants, animals, and land in the vicinity of Malmstrom AFB are important for biological productivity and landscape continuity. Management direction for biological resources on Malmstrom AFB is provided by the Integrated Natural Resource Plan (USAF 2001a), the Malmstrom AFB General Plan (USAF 2005a), and the Malmstrom AFB Fish and Wildlife Management Plan (USAF 1996).

3.3.7.1 Vegetation

Great Falls and Malmstrom AFB are within the Montana Glaciated Plains Ecological Subsection of the Northern Great Plains (Neser et al. 1997). The potential natural vegetation for this area is grama-needlegrass-wheatgrass, which includes blue grama (*Bouteloua gracilis*), bluebunch wheatgrass (*Agropyron spicatum*), and needle-and-thread grass (*Stipa comata*). This region lies in the rain shadow east of the Rocky Mountains. The climate of the Great Plains grasslands is a semiarid continental regime with annual precipitation at Great Falls of 15.2 inches (USAF 2001a).

Most native vegetation within the boundaries of the base and adjacent areas has been replaced with exotic and weedy species over the past 60 years due to site development and other disturbance. Most open fields on the east and southeast portion of the base have been plowed and planted with introduced grasses including crested wheatgrass (*Agropyron cristatum*), Kentucky bluegrass (*Poa pratensis*), and intermediate wheatgrass (Agropyron intermedium). Bare ground requirements, and regular mowing of installation grasses conducted as part of the hay lease and Bird Aircraft Strike Hazard requirements have contributed to the present composition of range vegetation found on Malmstrom AFB (USAF 2001a). Weedy forbs that have invaded the area include bracteate verbena (*Verbena bracteata*) and summer cypress (*Kochia scoparius*) (BioSystems Analysis, Inc. 1994). Volunteer alfalfa (*Medicago sativa*) was observed at the less-developed eastern site during a site visit (31 October 2006). Some native grass species have recolonized sites to a small degree (BioSystems Analysis, Inc. 1994).

Three Montana Category 1 noxious weed species, Canada thistle (*Cirsium arvense*), field bindweed (*Convolvolus arvensis*), and spotted knapweed (*Centaurea maculosa*), have been found on base (BioSystems Analysis, Inc. 1994). The recommended management criteria for Category 1 weed species include public awareness and education, containment and suppression of existing infestations and prevention of new infestations (Montana Weed Management Task Force 2005). Noxious weeds are managed at Malmstrom AFB according to an existing noxious weed management plan (Lucas 2006a).

3.3.7.2 Wildlife

Effective wildlife habitat at Malmstrom AFB is limited by the relatively small size of the base and large proportion of land used for buildings, runways, and other base facilities (USAF 2001a). The perimeter fence tends to exclude larger mammals from the base. Common mammals known or likely to be found in the area include the white-tailed jackrabbit (*Lepus townsendii*), mountain cottontail (*Sylvilagus nuttalli*), masked shrew (*Sorex cinereus*), meadow vole (*Microtus pennsylvanicus*), deer mouse (*Peromyscus maniculatus*), house mouse (*Mus musculus*), Richardson's ground squirrel (*Spermophilus richardsoni*), red fox (*Vulpes vulpes*), coyote (*Canis latrans*), badger (*Taxidea taxus*), striped skunk (*Mephitis mephitis*), and long-tailed weasel (*mustela freneta*) (Foresman 2001, Montana Natural Heritage Program [MTNHP] 2006a, USAF 2001a). White-tailed deer, mule deer, and pronghorn may be found within the northern and eastern boundaries of the installation (USAF 2001a). Several species of bats, such as the big brown bat (*Eptesicus fuscus*) and the little brown bat (*Myotis lucificus*) may roost in trees or buildings on the base and forage over the area (Foresman 2001).

Birds inhabiting the general vicinity of Malmstrom AFB include a variety of songbirds, shorebirds, raptors, and waterfowl. The Montana Natural Heritage Program Point Observation Database contains species observation records that appear to be from survey points on the east side of the base. Species reported on the base include: the American robin (*Turdus migratorius*), barn swallow (*Hirundo rustica*), Brewer's blackbird (*Euphagus cyanocephalus*), brown-headed cowbird (*Molothrus ater*), California gull (*Larus californicus*), cliff swallow (*Petrochelidon pyrrhonota*), common nighthawk (*Chordeiles minor*), grasshopper sparrow (*Ammodramus savannarum*), great blue heron (*Ardea herodias*), horned lark (*Eremophila alpestris*), killdeer (*Charadrius vociferous*), mourning dove (*Zenaida macroura*), northern harrier (*Circus cyaneus*), northern rough-winged swallow (*Stelgidopteryx serripennis*), red-winged blackbird (*Agelaius phoeniceus*), western meadowlark (*Sturnella neglecta*), and yellow-headed blackbird (*Xanthocephalus xanthocephalus*) (MTNHP 2006a). In addition to these species, several generalist bird species that are common in human dominated environments would be expected. These species include the European starling (*Sturnus vulgaris*), the house sparrow (*Passer domesticus*), the rock dove (*Columba livia*), and the black-billed magpie (*Pica hudsonia*). Many more bird species have potential to live in the area either by breeding or transient.

A pair of Swainson's hawks nested in the northwest portion of the base and produced one fledgling (Lucas 2006b). A waterfowl survey indicated that some limited waterfowl may live and reproduce on the base, or on lands immediately adjacent to the base (USAF 1996, cited in USAF 2001b). The mallard (*Anas platyrhynchos*), northern pintail (*Anas acuta*), and shoveler (*Anas clypeata*) have been observed in the wetlands at Malmstrom AFB (USAF 2001b).

Several species of amphibians and reptiles have been reported at Malmstrom AFB or surrounding area. Species include the northern leopard frog (*Rana pipiens*), the tiger salamander (*Ambystoma tigrinum*), and painted turtle (*Chrysemys picta*) (MTNHP 2006a). Other species that may live in the area include the plains spadefoot (*Spea bombifrons*), Great Plains toad (*Bufo cognatus*), boreal chorus frog (*Pseudacris maculate*), eastern racer (*Coluber constrictor*), gopher snake (*Pituophis catenifer*), terrestrial garter snake (*Thamnophis elegans*), and common garter snake (*Thamnophis sirtalis*) (Werner et al. 2004).

The base has one small man-made pond, Pow Wow pond, located on the east side of the base which is capable of supporting a fishery. The one-acre pond is stocked annually with rainbow trout (*Oncorhynchus mykiss*) by the Montana Department of Fish, Wildlife, and Parks. A survey and habitat assessment of Pow Wow pond in July 2001 by the U.S. Fish and Wildlife Service found rainbow trout, virile crayfish (*Orconectes virilis*), fathead minnow (*Pimephales promelas*), and goldfish (*Carassius auratus*) in the pond (MTNHP 2006a, USAF 2001a). A small pond located adjacent to the heating plant was also surveyed in 2001 by the U.S. Fish and Wildlife Service, and goldfish of various sizes were found in the pond (USAF 2001a).

Wildlife habitat at the project-specific sites is very limited. The developed western side is devoid of vegetation and consists of the runway, concrete pads, existing buildings and storage facilities. Artificial structures may provide nesting habitat for some bird species and bats. On the less-developed eastern side of the base, much of the area is devoid of vegetation due to past construction and current activities and consists of bare ground or graveled surfaces.

3.3.7.3 Threatened and Endangered Species

The U.S. Fish and Wildlife Service identified two currently listed species that are expected to live in Cascade County; the bald eagle (*Haliaeetus leucocephalus*) and the Canada lynx (*Felis lynx*), both of which are threatened (U.S. Fish and Wildlife Service [USFWS] 2006). The bald eagle is currently proposed for de-listing. There are no candidate animal species and no threatened, endangered, or candidate plant species expected to be found on Malmstrom AFB or in Cascade County, Montana (USFWS 2006).

The Canada lynx occupy boreal forest habitat, with large woody debris, and suitable habitat for the primary prey (snowshoe hare) present (usually above 5,400 feet elevation east of the Continental Divide). No suitable habitat exists for lynx on or near Malmstrom AFB and the Great Falls area. Bald eagles require nesting and perching trees near water with primary prey species (fish and waterfowl) present. Bald eagles nest and forage along the Missouri River. The nearest known bald eagle nest site is along the Missouri River, approximately 11 miles southeast of Malmstrom AFB (MTNHP 2006b). Transient bald eagles occasionally fly over Malmstrom AFB (Lucas 2006b). However, no suitable foraging or nesting habitat is located on the base.

Montana Species of Concern

The Montana Species of Concern are native Montana plants and animals that are considered to be "at risk" due to declining population trends, threats to their habitats, and/or restricted distribution. Designation of a species as a Montana Species of Concern is not a statutory or regulatory classification. Instead, these designations provide a basis for resource managers and decision-makers to direct limited resources to priority data collection needs and address conservation needs proactively (MTNHP 2006c, MTNHP & MFWP 2006). Information on the known occurrences of species of special concern in the vicinity of the project was obtained from the Montana Natural Heritage Program (MTNHP 2006a, 2006b). Absence of records for a given area should not be interpreted as absence of the species from the area. Surveys generally provide information on species occurrence, not species absence.

Five vascular plant species of concern have been documented within five miles of Malmstrom AFB, all of which are from historic records dating from the late 1800s. All five species are

associated with wetlands or surface water. There is not record of the presence or lack of these species on Malmstrom AFB.

- Dwarf woolly-heads (*Psilocarphus brevissimus*) – occurs in the drying mud of ponds and other vernally wet soil in the valleys and on the plains.
- Chaffweed (*Centunculus minimus*) – occurs in vernally wet, sparsely vegetated soil around ponds and along rivers and streams in the valleys and on the plains.
- Guadalupe Water-nymph (*Najas guadalupensis*) – found submerged in shallow, fresh waters of oxbow sloughs, ponds, and reservoirs in valleys.
- Many-headed Sedge (*Carex sychnocephala*) – occurs in moist soil of meadows along streams and ponds in the valleys and on the plains.
- Roundleaf Water-hyssop (*Bacopa rotundifolia*) – found on muddy shores of ponds and streams in the valleys and on the plains.

Element occurrence records (e.g., population, documented breeding site, or other important habitat necessary for survival) for three animals species of concern were identified within five miles of Malmstrom AFB; the Swainson's hawk, Sprague's pitit (*Anthus spragueii*), and grasshopper sparrow. The Sprague's pipit is closely associated with extensive tracts of native shortgrass prairie and nests on the ground. This species is sensitive to mowing of cultivated grasses and intensive livestock grazing (Dobkin 1994). Potential habitat on Malmstrom AFB for Sprague's pipit is probably limited. The Swainson's hawk is reported to have nested on Malmstrom AFB and successfully raised one fledgling. The Swainson's hawk is found in open habitats, where nesting is associated with isolated patches of primarily deciduous trees. Primary threats to Swainson's hawk include contamination with organochlorine pesticides, PCBs, and mercury. The total numbers of Swainson's hawk have been increasing in Montana (Dobkin 1994).

While grasshopper sparrows have been reported on the base, it is unknown if the birds were breeding on the base. However, suitable nesting habitat for grasshopper sparrows is present. Grasshopper sparrows inhabit grasslands of all sorts of areas, including native prairie, early successional stages of abandoned agricultural fields and agricultural stubble fields and hayfields. Grasshopper sparrows nest on the ground. Consequently, nests in cultivated grasslands and hayfields suffer high losses through mowing. Nesting is also negatively affected by intense livestock grazing (Dobkin 1994).

The Leopard frog is a species of concern that has been reported at Pow Wow Pond (MTNHP 2006a). No information on the population status of leopard frogs at Malmstrom AFB is available. Habitats for leopard frog include low elevation and valley bottom ponds, spillway ponds, beaver ponds, stock reservoirs, lakes, creeks, pools in intermittent streams, warm water springs, potholes, and marshes. Dispersing juveniles in spring may travel up to five miles (Werner et al. 2004).

3.3.8 Cultural Resources

Cultural Resources include historic facilities and districts as well as prehistoric or historic archaeological findings important to a culture, subculture, or community. Malmstrom AFB's

cultural resources pertain to the history of the Cold War era and limited prehistoric archaeological sites.

The majority of facilities identified as eligible or potentially eligible for listing on the NRHP stem from the Cold War era. A material and culture inventory was conducted in 1996 by Malmstrom AFB to identify resources relevant to the Cold War mission and history of Malmstrom AFB. The results of the Cold War report identified Missile facilities Alpha-01 and Alpha-06 as currently eligible for listing on the NRHP. Buildings 250, 300, 1700, and 1708 were identified as potentially eligible. Buildings 500, 1460, 1464, 1705, and 1710 may warrant nomination however additional background research is needed. In addition to these facilities, Building 160, the current RED HORSE headquarters facility, is identified as a potentially historic facility (USAF, 2004). To date, the base has not pursued listing any facilities. Many of the facilities identified above have undergone multiple renovations and the original historic features of the facility have been diminished (Lucas 2006c).

An archaeological survey of Malmstrom AFB was conducted in 1994. The report indicates one small lithic scatter (prehistoric archaeological site) is located on the southeast corner of the base near the equestrian stables. The area is approximately 2,300 feet from the eastern proposed construction site. The area poses limited to no potential for deep buried archaeological remains. The Lewis and Clark expedition route allegedly extends across Malmstrom AFB; however, no archaeological evidence has been discovered to validate this claim. None of the base property has been recommended for addition to the 7,700 acre noncontiguous national landmark recognizing the portage route of the 1804 expedition (USAF 2005a).

3.3.9 Infrastructure and Utilities

The following section describes conditions of infrastructure and utilities relevant to the affected environment, including potable water, sanitary sewer, drainage, transportation, electricity, and natural gas. Figure 3-2 provides an overview of the potable water, sanitary sewer, electricity, and natural gas mains relevant to the affected environment.

3.3.9.1 Potable Water

Water is supplied to the installation by the City of Great Falls. The principal source of potable water for the City of Great Falls and Malmstrom AFB is the Missouri River which is located 1.7 miles north of the base. Two 12-inch mains supply two storage tanks with capacities of 600,000 and 1,100,000 gallons. Water is distributed to the base with a pump station in Building 152. In addition, three elevated storage tanks are located on the base. One storage tank that holds 500,000 gallons is located east of Building 152 and one storage tank, which holds 250,000 gallons, is located south of the Central Heat Plant. A 200,000-gallon elevated storage tank is located just north of the WSA, which supplies a deluge fire protection system to the WSA. The original potable water piping was cast iron, but the base is in the process of replacing these pipes with polyvinyl chloride (PVC), as is feasible (USAF 2005a). The existing potable water system on the east side of Malmstrom AFB consists of a 6-inch to 8-inch main loop and several long, dead end laterals. The existing system is fully capable of handling the current potable water flow demand (USAF 2006b).

3.3.9.2 Sanitary Sewer

The majority of Malmstrom AFB's wastewater (everything from the west side) is transferred to the City of Great Falls' treatment plant via a 10-inch force main. The base has a single 1.5 million gallons per day (MGD) lift station which pumps wastewater through this main. The original pipes were made of vitrified clay or concrete, but most of these older pipes have been replaced with PVC, so that less water infiltration and inflow enters the pipes. Currently, sanitary sewage from the base comprises approximately ten percent of the inflow to the City of Great Falls treatment system and the infrastructure in place on the base is only being used at 50 percent capacity (during peak times), which allows room for expansion of the sanitary sewer system. Presently, the wastewater generated on the east side of the base goes to septic systems (USAF 2006b).

3.3.9.3 Solid Waste

At Malmstrom AFB, the solid waste program is managed by the Environmental Flight (341 CES/CEV). Current handling, storage, and collection practices for solid waste at Malmstrom AFB are outlined in the Solid Waste Management Plan (USAF 2005c). This plan also identifies techniques to minimize the amount of solid waste discarded in landfills and increase the percentage of solid waste recycled.

Malmstrom AFB's solid waste is currently collected in dumpsters and roll-off boxes, which are periodically emptied or retrieved. Removal of the solid waste is contracted to the City of Great Falls waste removal service and is hauled off the base to a commercial landfill. Demolition and construction waste are handled by the individual constructor (USAF 2005a).

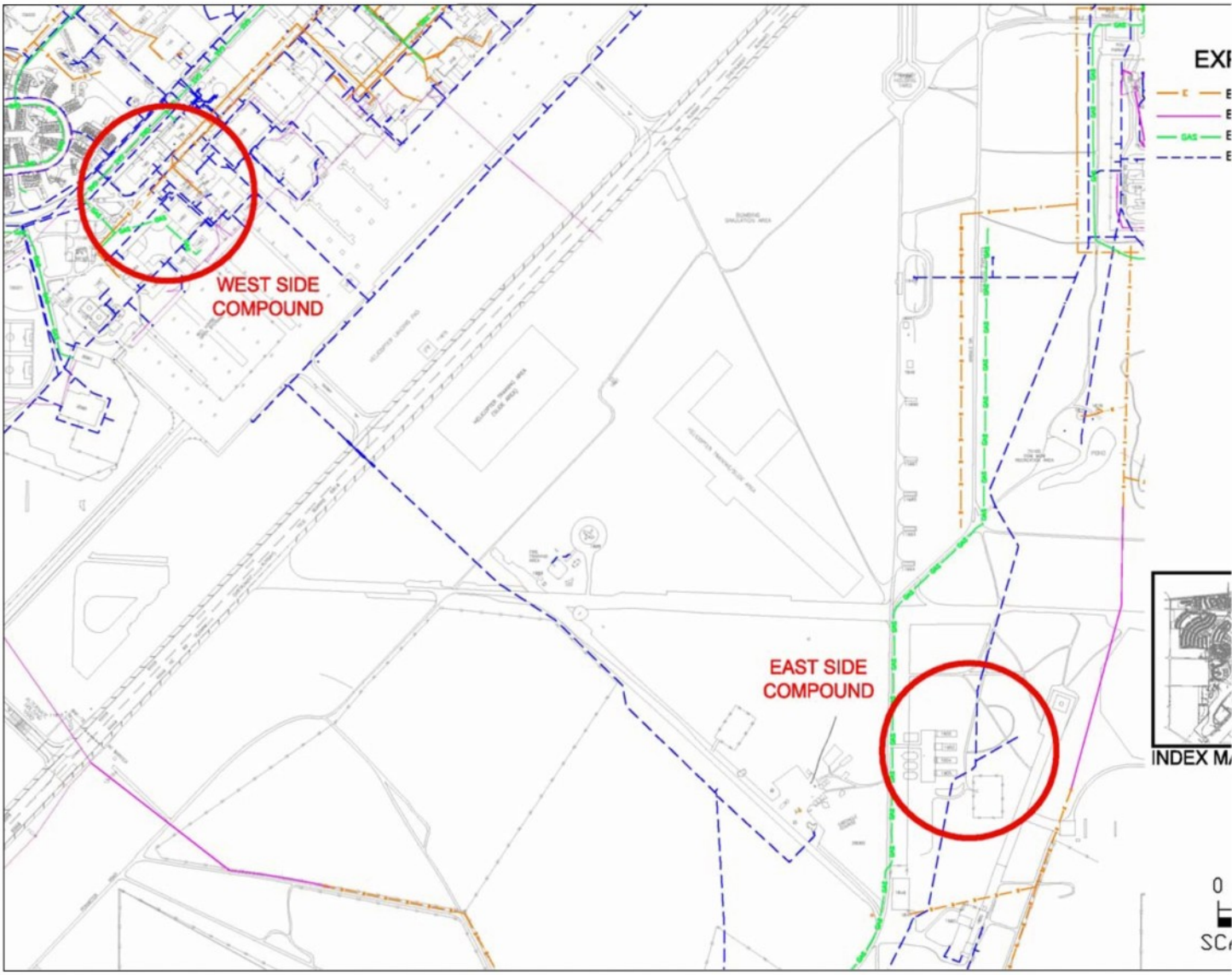
In order to reduce the amount of waste entering the landfill, Malmstrom AFB has instituted a recycling program. The Central Recycling Facility is located in Building 230, which collects white, computer, and mixed papers; newspaper; cardboard; clear and brown glass; aluminum; plastics; steel; and used petroleum products. This program also includes curbside pickup in the residential areas of the base. The used oils that are collected are stored in twelve storage tanks on base. All recyclables are removed from the base by a private constructor. In addition to the regular recycling program, a mulch recycling program has also been established. The mulch that is generated from scrap wood is made available to residents of the base (USAF 2005a).

No active landfills are currently located on base. However, two inactive landfills, one northeast of the WSA, which was in use from 1942 to 1950, and one at the northeast end of the runway east of Perimeter Road, which was used from 1950 to 1978, are listed as IRP sites. Solid and industrial wastes, including construction debris and fill dirt were disposed of in the older landfill. The more recent landfill, which is classified as a Class II landfill, contains domestic waste, industrial wastes, munitions, waste oil, antifreeze, and battery acid (USAF 2005a).

3.3.9.4 Stormwater Drainage

Malmstrom AFB is located on a plateau that drains to the Missouri River. The base covers a total of 3,260 acres, approximately 662 acres of which is impervious area (buildings and pavement). A total of nine drainage areas are located on the base, combining to exit Malmstrom

Figure 3-3 Existing Utilities



AFB at six discharge points (outfalls) (see Figure 3-3). Drainage Areas 1 through 6, drain northerly and exit the Base at five outfalls, flowing into the west, center and east branches of Whitmore Ravine and eventually discharging into the Missouri River (USAF 2005a). Information on the drainage areas is located in Table 3-3. The proposed actions lie within drainage area 1 on the west side of the base and drainage area 6 on the east side. Drainage area 6 flow merges with drainage area 5.

Drainage area 1 includes the southwest end of the runway, the south end of the aircraft-parking apron, most of the old aircraft maintenance shops and hangars, the south end of the petroleum storage and pumping facility, the truck and tractor maintenance garage, and the majority of the underground ramp hydrant refueling system. The stormwater runoff is transferred from this area through underground storm sewer pipes, gutters, and grass-lined ditches to a 1,000 linear foot (LF) concrete ditch and partly grass-lined ditch. The water from this drainage area flows into the western branch of the Whitmore Ravine and to the Missouri River.

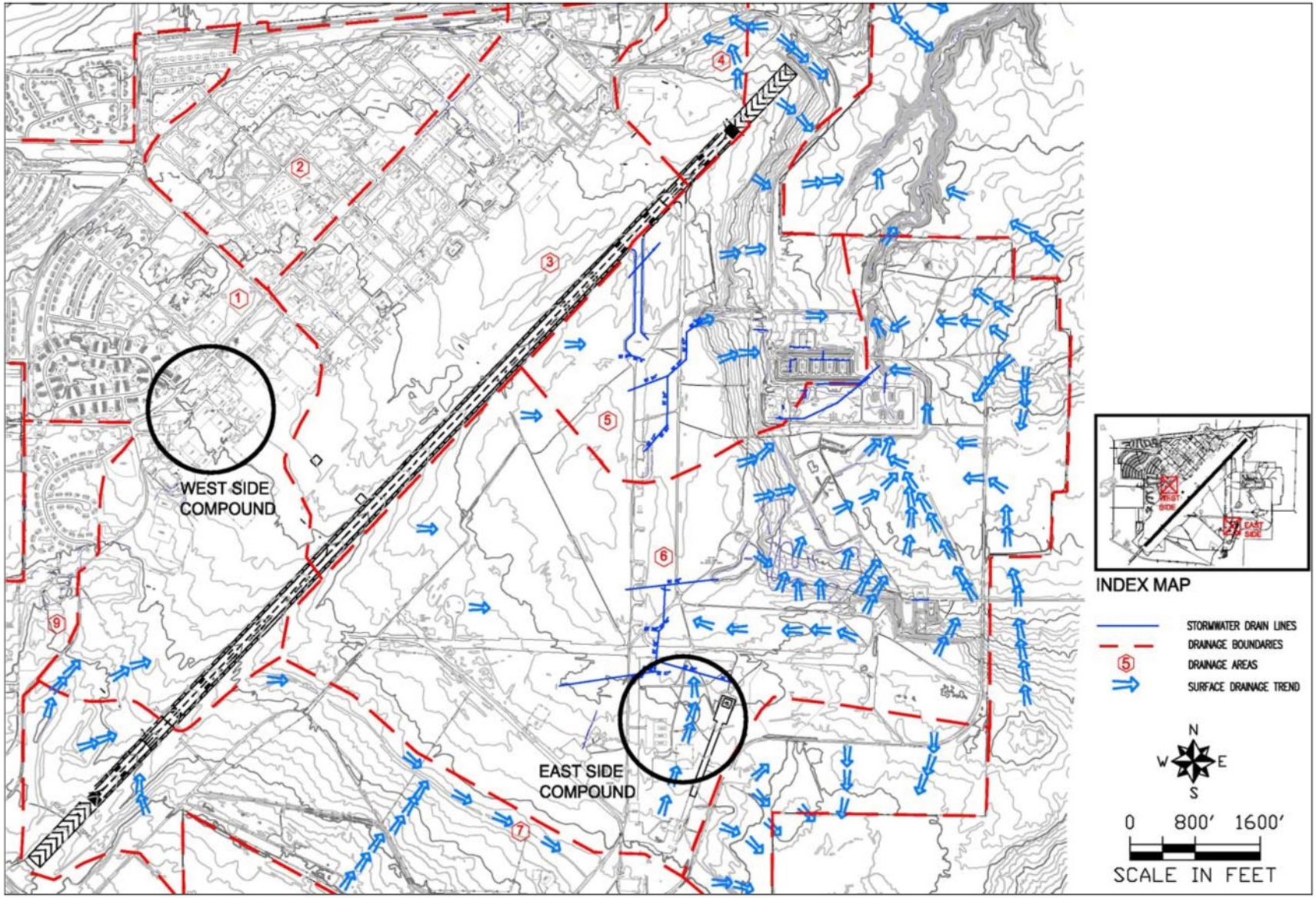
Drainage Areas 5 and 6 include runoff from the WSA, an inactive landfill, the missile handling facility, the combat arms firing range, an inactive landfill, Pow Wow Pond, a new fire training area, and a small missile maintenance facility. Stormwater in this area permeates the ground or collects in natural and man-made retention areas within the drainage area, which exits the drainage basin via a coulee north of the WSA. Drainage Areas 5 and 6 have approximately 1,000 feet of subsurface storm drains. Runoff from Drainage Areas 5 and 6 flows into the east branch of Whitmore Ravine, which drains into the Missouri River (USAF 2005).

Table 3-3 Malmstrom AFB Drainage Areas

Drainage Area	Total Area (Acre)	Impervious Surface (Acre)	Pervious Surface (Acre)	Runoff Coefficient
One	655.5	249.1	406.4	0.60
Two	213.6	76.6	137	0.60
Three	391.7	179.2	212.5	0.60
Four	74.5	13.1	61.4	0.50
Five	275.7	28.7	247.	0.46
Six	851.5	77.4	774.1	0.50
Seven	598.4	42.5	555.9	0.46
Eight	40	5.3	34.7	0.47
Nine	144.1	22.2	121.9	.048

Stormwater is discharged from the base in accordance with a Montana Pollution Discharge Elimination System (MPDES) General Discharge Permit for Stormwater Associated with Industrial Activity issued by the MDEQ. Precipitation that falls or melts in the study area is managed in accordance with the Malmstrom AFB SWPPP. The SWPPP also mandates that construction discharges and industrial discharges be managed through BMPs, as appropriate (USAF 2005).

Figure 3-4 Stormwater Drainage



According to the SWPPP, total suspended solids (TSS), oils and grease from construction and industrial activities are the contaminants of concern for Drainage Basins 5 and 6.

3.3.9.5 Transportation

Access to Malmstrom AFB is provided from U.S. Highway 87/89, east of Interstate 15 via the Main Gate located on 2nd Avenue North and the Commercial Gate (North Gate) on 10th Avenue North (see Figure 3-4). Second Avenue North becomes Goddard Avenue which serves as the main thoroughfare. Tenth Avenue North becomes 72nd Street North and intersects Goddard Avenue. Both entrance routes connect to 57th Street North (Northeast Bypass - Montana Department of Transportation [MDT] Route 5205). Peak traffic hours are between 6:45 am to 7:30 am and 4:30 pm to 5:00 pm (Stordahl 2003, Cited in USAF 2005).

Daily average traffic counts (vehicles per day) were monitored periodically by the City of Great Falls and the MDT. Traffic volumes were moderate in the vicinity of Malmstrom AFB access routes (Great Falls City Planning Department 2006). Recent daily average traffic counts near Malmstrom AFB were:

- 11,040 vehicles per day (2005) just west of the intersection of 10th Avenue South and 57th Street,
- 9,436 vehicles per day (2004) on 57th Street just south of 2nd Avenue North,
- 9,219 vehicles per day (2005) on 2nd Avenue North, just east of 57th Street,
- 5,960 vehicles per day (2005) on U.S. 89, just east of 57th Street, and
- 4,561 vehicles per day (2005) on 10th Avenue North (north entry road to Malmstrom AFB, just inside the base).

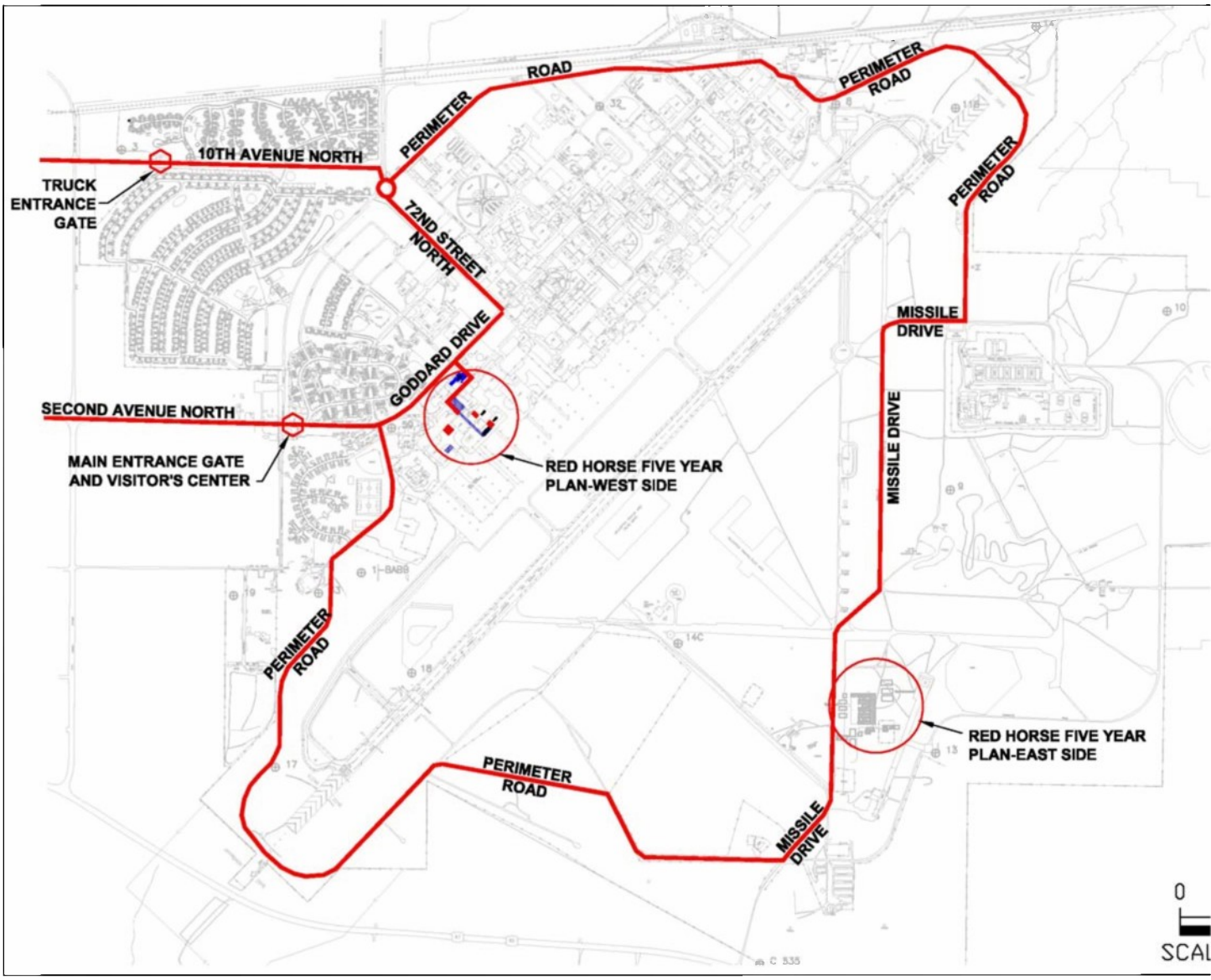
Few roads are located on the east side of Malmstrom AFB because of the current limited vehicular requirements. Some "roads" are airfield pavements that are no longer used by aircraft (USAF 2006b). Access to the southeast side of the base is provided by Perimeter Road (from Second Avenue North on the west side of the base), which mostly follows the outer edge of the base. Perimeter Road meets Missile Drive, which is the main thoroughfare through the eastern side of the base. Both Perimeter Road and Missile Drive are two-lane roadways paved with asphalt. Missile Drive reduces to a width of 18 feet on the southern stretch of road.

The current on base road infrastructure supports traffic demand with no identified traffic problems. Traffic flow is smooth and indicates the road network has surplus capacity.

3.3.9.6 Electricity/Natural Gas

Malmstrom AFB receives its electrical power from Northwestern Energy. A 100 kilovolt (kV), 3-phase overhead transmission line feeds the base electrical substation, Building 81120, which is located in the industrial area on the north end of the main base. This 15 megavolt-amperes (MVA) substation consists of two 7.5-megawatt (MW) distribution transformers. Electrical distribution on base is via a three-phase 7200/12470 volt wye connected system. On an overall basis, the base has recorded a maximum demand of 11 MVA registered during July 2005.

Figure 3-5 Primary Roadways for Affected Environment



With the addition of forced air cooling added to the substation transformers, the base has the capacity of 16.5 MVA (2 x 7.5 x 1.1). The WSA feeder serving the east side of the base presently has the maximum demand of approximately 100 amps (USAF 2006b).

Most of the electrical lines on the northwest side of the base are aboveground. The installation is transitioning all electrical lines to underground as it is feasible to decrease the amount of maintenance that needs to be done. On the east side of the base, since it is in the area of the old airfields, most of the electrical lines are underground. All of the lines are reportedly in good condition and the power currently provided to the base is more than sufficient for its utility usage. In addition, backup generators are in place to support the critical systems (USAF 2005a).

Malmstrom AFB is supplied with natural gas by Energy West via one 12-inch steel pipeline that enters the base near the south gate. The natural gas supply capacity is 117.4 million cubic feet (MCF), which is much more than is necessary to maintain base operations. Natural gas is supplied to the east side of the base through 6-inch and 4-inch steel and plastic pipe that runs around the north side of the runway. All of the natural gas lines are in good condition. The original piping is steel and that piping is being replaced with PVC when feasible. The steel piping still in place has a cathodic protection system to protect against corrosion (USAF 2005a). The natural gas lines extend from the main lines to the various facilities and both sides of the base via smaller pipes. The system has 54 pounds per square inch gauge (psig) throughput to the east side of the base (USAF 2006b).

3.3.10 Socioeconomics and Environmental Justice

Malmstrom AFB is located in Cascade County, Montana, which is immediately east of the City of Great Falls. Although Malmstrom AFB's socioeconomic impact most directly affects the City of Great Falls, the installation's socioeconomic impact also spans a 50-mile radius to include the counties of Cascade, Judith, Basin, Lewis and Clark, Teton, Ponderosa, and Choteau (USAF 2005a).

Socioeconomics are characterized in terms of population, employment, and economy. The most current U.S. Census Bureau (USCB) data available was utilized for population information.

EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, provides that "each Federal Agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." In an accompanying Presidential memorandum, the President specified that federal agencies shall analyze the environmental effects of their proposed actions on minority and low-income communities, including human health, economic, and social effects when such analysis is required by NEPA.

3.3.10.1 Population and Employment

According to the USCB, the estimated population of Cascade County on 1 July 2005 was 79,569, a 3.6 percent decrease from the 1 April 2000 estimated population (USCB 2006a). In 1990,

Cascade County's population was 77,691 (USCB 2006a). From 1990 to 2005, the Cascade County population increased approximately 2.4 percent.

Approximately 56,690 people, or 29.5 percent of the estimated Cascade County population, were residents of the City of Great Falls in 2000 (USCB 2006b and 2006c), which experienced a 2.8 percent increase in population from 1990 to 2000 (USCB 2006d). Population growth for the state of Montana from 1990 to 2000 was approximately 12.91 percent, compared with the nationwide population growth of 13.2 percent for the same period (USCB 2006e and 2006f). Malmstrom AFB's north and west border follows the border of the USCB's Census Tract 12. The Census Tract's southern and eastern borders extend past the installation's borders slightly. Malmstrom AFB has a population of approximately 9,072, including over 3,409 active duty military personnel; 435 appropriated fund civilians; 4,500 dependents; and 728 non-appropriated fund civilians, constructor employees, and private-business employees (USAF 2005a).

In June 2000, the Great Falls Metropolitan Statistical Area unemployment rate was 5.1 percent, which was slightly higher than the Montana average for that period (4.8 percent) and the U.S. average (4.0 percent) (USDL 2006a and USDL 2006b). In Great Falls, the leading non-governmental industries in 2000 were educational, health, and social services (25.1 percent of working civilian population); retail trade (14.4 percent of working civilian population); arts, entertainment, recreation, accommodation and food services (10.5 percent); and finance, insurance, real estate, and rental and leasing (7.8 percent). Federal, state, or local government employees accounted for 16.5 percent of the working population, with 2.9 percent employed by the Armed Forces (USCB 2006g).

3.3.10.2 Economy

Malmstrom AFB contributes to the regional economy both through direct employment and purchase from local businesses. Payroll from the installation to military and civilian employees totals $151.6 million annually and the Air Force contributes approximately $97.9 million annually in construction and service contracts and other purchases from local businesses (USAF 2005a).

According to the 2000 USCB, the per capita personal income in Census Tract 12 was $11,450 in 1999 (USCB 2006h) and Great Falls was $18,059 in 1999 (USCB 2006i). This is approximately 46.9 and 16.3 percent less, respectively, than the U.S. per capita personal income in 1999 ($21,587) (USCB 2006i).

3.3.10.3 Environmental Justice

Disadvantaged groups within the Region of Influence (ROI), including low-income and minority communities, are specifically considered in order to assess the potential for disproportionate occurrence of impacts. For the purposes of this analysis, disadvantaged groups are defined as follows:

- *Minority Population*: Persons of Hispanic origin of any race, Blacks, American Indians, Eskimos, Aleuts, Asians, or Pacific Islanders.

- *Low-Income Population*: Persons living below the poverty level, according to income data collected in U.S. Census 2000.

Malmstrom AFB lies approximately 0.3 miles east of the City of Great Falls in Cascade County. In the year 2000, the population of Cascade County was approximately 90.7 percent Caucasian and 9.3 percent minorities. The predominant minority in Cascade County was American Indian and Alaska Native persons at 4.2 percent (USCB 2006j).

Based on 2000 Census data, the incidence of persons in Cascade County with incomes below the poverty level was comparable to state levels accounting for 13.5 percent and 14.6 percent of the population, respectively. Nationally, 12.4 percent of the population lives below the poverty level (USCB 2006j, USCB 2006k).

In 2000, the total population of the United States was 281,421,906. Minorities represented 24.9 percent of the population with 12.3 percent Black, 0.9 percent Native American, 3.6 percent Asian, 0.1 percent Native Hawaiian/Other Pacific Islander, and 12.5 percent identifying a cultural heritage of Hispanic (USCB 2006l).

In 2000, Census Tract 12, comprised almost entirely of Malmstrom AFB, demonstrated that 6.2 percent of that population lived below the poverty line which is exactly half of the national average (USCB 2006h).

As typically observed at rural military installations, the demographic composition of the Malmstrom AFB population differs significantly from the demographic composition of the local area. Minority persons represent 16.9 percent of the Census Tract 12 population. In contrast to the racial and cultural demographic of the county and state populations in the preceding paragraphs, the Census Tract 12 population is composed of 6.6 percent Black, 0.6 percent Native American, 2.3 percent Asian, 0.2 percent Pacific Islander, 3.3 percent other, and 3.9 percent of persons identifying themselves as "Two or More Races" (USCB 2006m). The Census 2000 data for Census Tract 12 reveals a "white only, not Hispanic or Latino" population of 3,780 or 83.2 percent (USCB 2006m).

Table 3-4 summarizes census data on minority and low-income populations for Census Tract 12 and the City of Great Falls. Additional information is provided for Census Tract 12, the State of Montana, and the United States.

Table 3-4 Percent Minority Population and Low-Income Population

Demographic Area	Total Population	Total Minority Population	Percent Minority	All Income Levels[a]	Total Low-Income Population	Percent Low Income
Census Tract 12	4,544	764	16.9%	2,379	258	6.2%
City of Great Falls	56,690	5,694	10.2%	28,015	7,989	14.5%
Cascade County	80,357	7,460	9.3%	40,135	10,605	13.5%
State of Montana	902,195	84,966	9.4%	458,306	128,355	14.6%
United States	281,421,906	69,961,280	24.9%	138,820,935	33,899,812	12.4%

[a]All income levels includes everyone in the labor force who is greater than 16 years old.
Source: USCB 20006h, USCB 20006i, USCB 20006j, USCB 20006k, USCB 20006l, USCB 20006m

The USEPA defines minority and/or low-income populations of an affected area as being greater than 50 percent of the affected area's general population; or the minority population percentage of the area being greater than the minority population percentage in the general population. For the purposes of this analysis data for Census Tract 12 and the City of Great Falls will be used for comparison. Based upon the 2000 Census Population, the Census Tract 12 minority percentage is greater than that of the City of Great Falls. According to the USEPA threshold, Census Tract 12 has a minority population; therefore, Malmstrom AFB is considered an environmental justice community.

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CHAPTER 4
ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

This chapter describes the potential environmental impacts that are likely to occur as a result of implementation of the proposed or alternative actions. The No Action Alternative provides a baseline against which the impacts of the proposed and alternative actions can be compared. The Proposed Action and the No Action Alternative could generate no impact to environmental issues, or encompass environmental consequences that may fall into the categories described in Table 4-1. Any resultant irreversible or irretrievable commitments are noted. Criteria and assumptions used to evaluate potential impacts are discussed at the beginning of each section.

4.2 DESCRIPTION OF THE EFFECTS OF ALL ALTERNATIVES ON THE AFFECTED ENVIRONMENT

Table 4-1 Description of Terms Used to Describe Effects on Affected Environment

Word	Definition
Short-term	effects caused during the construction and/or initial operation of the action
Long-term	effects caused after the action has been completed and/or the action is in full and complete operation or effects of the action if not approved
Irreversible	those effects caused by the proposal that cannot be reversed
Irretrievable	effects caused by an alternative that changes outputs or commodities (e.g. trees, cattle, hiking fishing) of land's use and must be reversible
Positive	constructive, progressive effects
Negative	harmful, destructive, unsafe, risky
Minor	trivial, irrelevant, inconsequential
Major	vital, primary, important
Adverse	unfavorable, undesirable, harsh
Direct	caused by the action and occur at the same time and place
Indirect	caused by the action and effects occur later in time or farther removed in distance, but reasonable foreseeable
Cumulative	non-related actions that have, are, or probably would occur in the same locality

A **significant** impact, as it applies to NEPA, requires considerations of both context and intensity. The following descriptions are brief and do not cover all aspects of the terminology. Context means that the significance of an action must be analyzed in several arenas, such as society as a whole (human, national), the affected region, the affected interests, and the locality. Significance varies with the setting of the proposed and alternative actions. Intensity refers to the severity of impact. Responsible officials must bear in mind that more than one agency may make decisions about partial aspects of a major action. Impacts may be both beneficial and adverse. Intensity also includes the degree to which the proposed and alternative actions affect public health or safety. Table 2-2 provides a summary of the environmental resources that are determined to be impacted by the proposed and alternative actions.

4.2.1 Noise

The following factors were considered in evaluating potential noise impacts: (1) the degree to which noise levels generated by construction activities were higher than the ambient noise levels; (2) the degree to which there is annoyance and/or interference with activity; and (3) the proximity of noise-sensitive receptors to the noise source.

Noise naturally dissipates by atmospheric attenuation as it travels through the air. Factors that can affect the amount of attenuation are ground surface, foliage, topography, and humidity. Assuming that noise from the construction equipment radiates equally in all directions, the sound intensity would diminish proportional to the square of the distance from the source. Therefore, in a free field (no reflections of sound), the sound pressure level decreases 6 dB with each doubling of the distance from the source. Under most conditions, reflected sound will reduce the attenuation owing to distance. Therefore, doubling the distance may only result in decrease of 4 to 5 dB (American Industrial Hygiene Association [AIHA] 1986). Table 3-1 shows the anticipated noise levels at a distance of 50 feet for miscellaneous heavy equipment.

4.2.1.1 Potential Impact from Proposed Action

The primary source of noise would result from construction activities, which would be generated by heavy equipment and vehicles. Construction activities would be expected to occur between 7:00 a.m. and 5:00 p.m. Buildings adjacent to ongoing construction would temporarily experience outside noise levels similar to those noted in Table 3-1. It is important to note that sound levels within nearby buildings would be lower because of sound transmission loss through building walls and windows. Noise reduction within residences generally ranges from 18 to 27 dB depending on the type of walls and windows (U.S. Department of Transportation [USDOT] 1992). On the west side of the flightline, the nearest noise-sensitive receptor to a construction site is the military family housing. Given the distance of 400 feet from the nearest construction site and the sound attenuation resulting from walls and windows, the construction sound level would be below 65 dB at the point at which it reached the housing area. Any elevation in noise level at the military family housing would be **short-term**. Other noise-sensitive receptors located on the west side of the flightline would experience noise levels less than that at the military family housing.

The Malmstrom AFB dog kennel, a noise-sensitive receptor located on the east side of the flightline would also experience short-term elevated construction noise levels. However, the distance from the construction site to the dog kennel is such that the elevated sound level would be attenuated to a level below 65 dB at the point at which it reached the kennel. Because all proposed construction activities are temporary and the proposed actions are adequate distance from noise sensitive receptors, no **long-term impacts** to noise would occur.

4.2.1.2 Potential Impact from the No Action Alternative

Under the No Action Alternative, there would be no change in the baseline conditions described in Section 3.3.1. Therefore, there would be **no impact** from noise-related issues if this alternative were selected.

4.2.2 Land Use

The impact analysis for land use focuses on general land use patterns and land management practices. The methodology to assess impacts on individual land uses requires identification of those uses and determination of the degree to which those areas would be affected.

4.2.2.1 Potential Impact from Proposed Action

At the developed western site, all project construction activities under the Proposed Action would occur within an area already designated as either industrial or runway/taxiway/apron land use types. Proposed activities in this area mostly consist of renovating existing structures or additions to existing facilities. There would be **no change** in land use designation for the Proposed Action on the west side. In accordance with the Base Plan (USAF 2002), new development would be designed and constructed to be architecturally consistent and compatible with existing facilities and structures. The Proposed Action would be consistent with surrounding land use and project activities in this area would not contribute to any change in land use pattern.

At the less-developed eastern site, most of the area is currently designated as open space, although some RED HORSE storage facilities already occupy the site. Development of this site would convert the land use designation from open space to an industrial land use type for approximately five acres. This site has been extensively disturbed due to previous construction related activities and surface disturbance. The proposed development in this area is relatively close to a concrete crushing area south of Pow Wow Recreational Park, combat arms training and maintenance facility, and weapons storage facility. Therefore, the industrial use of this site poses **no adverse impact** to the surrounding land use and is appropriate for consolidating similar land uses in the eastern part of the base. Future land use plans should be updated to reflect proposed development.

Developments resulting from the Proposed Action should pose no conflict with Cascade County or City of Great Falls land use planning goals and objectives. Land use remains unchanged at the western project site and that portion of the base is compatible with adjacent land uses in the unincorporated county land. A buffer of open space is maintained between industrial developments on the east side of the base and adjacent lands.

4.2.2.2 Potential Impact from the No Action Alternative

Under the No Action Alternative, the existing conditions would remain unchanged and there would be **no impact** or change to land use.

4.2.3 Air Quality

Measurable and persistent changes to air quality as a result of the Five Year Plan are evaluated in this section.

4.2.3.1 Potential Impact from Proposed Action

A **short-term minor** increase in emissions from equipment and vehicles would occur during construction activities under the Proposed Action. Fugitive dust and particulate matter would be emitted into the air from access roads, stockpiles, and/or other work areas. These emissions would be temporary and would return to pre-construction levels once the construction was completed. Dust control measures could include watering of the disturbed area, proper soil stockpiling methods, and timely replacement of ground cover, especially if a nuisance or road hazard due to fugitive dust particulate arises, or is anticipated due to windy or dry weather conditions. To reduce emissions from all construction equipment, constructors would avoid long periods of engine idling.

The Proposed Action would be in compliance with, or consistent with, all relevant requirements and milestones contained in the State of Montana Air Quality Control Implementation Plan. Constructor(s) and subcontractor(s) of this project must comply with these regulations, including 42 USC 7418(a) (state and local requirements).

The Proposed Action would not increase the number of stationary sources at the installation, nor result in an increase in vehicular traffic. Therefore, the overall impact to air resources from the Proposed Action would be **short-term and not significant**.

4.2.3.2 Potential Impact from the No Action Alternative

Under the No Action Alternative, there would be **no impact** to air quality, as no construction would occur.

4.2.4 Water Resources

The impacts of the Five Year Plan and the No Action Alternative on surface water, groundwater and wetlands are discussed in the sections below. The water resources section does not address impacts to the stormwater drainage utility as it is covered in Section 4.2.9.4. Impacts assessment for water resources focus on factors that could cause a measurable and persistent change to water quality, quantity, or groundwater recharge. Additionally, impact assessments focused on activities that may result in long-term violation of federal or state water quality criteria.

4.2.4.1 Surface Water

4.2.4.1.1 Potential Impact from Proposed Action

The Proposed Action would not significantly affect existing Base discharge to Whitmore Ravine. No increase in surface runoff due to increased impervious surface will occur. All proposed increases to impervious surface will be offset by demolishing an equal amount of existing impervious surface and implementing LID techniques in development of the site, when to appropriate.

On the east side of the Base, as discussed in Section 4.2.9.4, Pow Wow Pond and the stormwater drainage channels are not currently utilized to their capacity. The east side drainage system is sufficiently sized to control the stormwater that would enter the pond due to the Proposed

Action. The existing drainage conditions on the east side of the base do not currently indicate any qualitative stressors, which would signal approaching the discharge or recharge capacity of the existing stormwater drainage system or Drainage Area 6. (Malmstrom AFB East Base Development Issues Report, December 15, 2006.) The surface runoff would not exceed the available recharge headroom of the system capacity. The recharge would not have detrimental impacts to surface water quality. In addition, as part of master planning, site layout and design, RED HORSE would develop a full site grading plan to encourage and control site sheet flow and east site drainage.

Short-term minor impact to Pow Wow Pond may result from construction activities in the form of increased turbidity or contamination from construction equipment due to accidental leaks or accidental spills of fuel or oil. Once construction is completed, the disturbed soil would be replaced and landscaped or removed and construction equipment would be removed. The use of BMPs and engineering controls as outlined in the required SWPPP, when the construction disturbs one acre or more, would reduce the potential for construction related impacts to surface water resources. When the construction disturbs less than one acre, BMPs specified in the Malmstrom SWPPP would be required. BMPs could include silt fences to keep disturbed soil on the site and drip pillows under vehicles stored on the site to catch any leaking fluids. Limiting the amount of soil disturbed would also decrease the amount of sediment in the stormwater.

On the West side of the Base the Proposed Action would not change the existing runoff coefficient. See Appendix A. The actions proposed on the west side of base, discharging to the West Branch of Whitmore Ravine, would not create any increased impervious surface. Proposed activities west of the flightline would pose no significant impact to surface waters. No significant change in surface water quality or recharge would occur. This area, west of the flightline, is extensively developed. This particular flightline area has little open, green space. The area immediately surrounding the proposed construction is almost entirely paved or covered by structures. The renovation of Building 1460 and constructing a mezzanine in 1460 would involve interior construction in existing facilities and have no affect on stormwater runoff.

As discussed in Section 4.2.9.4, replacing 20,500 square feet of existing pavement with 20,500 of building surface would only impart a de minimus change to the existing stormwater conditions. This de minimus change may be incrementally a positive or negative change, but in either event will not affect surface water quality, quantity or recharge or the existing conditions in the West Branch of Whitmore Ravine. The slope of the site will not change. The stormwater collection infrastructure would not be modified.

The proposed action would impart **no significant impact** to surface water resources on the west side of the base. Under Montana law, the Proposed Action requires a Montana Stormwater Permit because construction activity east of the flightline would disturb more than one (1) acre. Constructor(s) and subcontractor(s) of this project must comply with this regulation. The combined actions on the west side of the Base disturb approximately one-half acre.

Section 4.2.9.4 discusses stormwater discharge. In an effort to have more comprehensive data upon which to base future environmental analysis, Malmstrom AFB is currently conducting a comprehensive watershed analysis. However, no new data is currently available. The

comprehensive watershed analysis has only just begun. This EA is based upon the best information currently available. To offset potential effects caused by increase in impervious surface, Malmstrom would demolish an equal amount of existing impervious surface and where appropriate utilize LID techniques.

The Proposed Action may increase turbidity during construction. All construction will utilize BMPs to control turbidity effects. The Proposed Action would not significantly change the surface runoff once construction is complete. The Proposed Action, would not significantly affect surface water discharged to the any branch of Whitmore Ravine and would not impart any significant affect to the environment. The overall impact from the Proposed Action to the surface water resources is **short-term, minor and not environmentally significant**.

4.2.4.1.2 Potential Impact from the No Action Alternative

Many RED HORSE vehicles and equipment are currently stored uncovered and on unpaved surfaces. If BMPs are not implemented, a **long-term minor** impact to the surface water of Pow Wow pond may result due to fluid leaks such as gasoline or oil.

4.2.4.2 Groundwater

4.2.4.2.1 Potential Impact from Proposed Action

Groundwater beneath the sites is anticipated to be approximately 5 to 20 ft below the ground surface. Since the foundations for the Proposed Actions are relatively shallow (0 to 4 feet), As a result, groundwater is not likely to be encountered. If groundwater were encountered, care would be taken during construction activities to ensure that groundwater resources are protected from contamination.

The groundwater resources will not be permanently disturbed by the Proposed Action. Therefore, no impact to groundwater resources would be anticipated.

4.2.4.2.2 Potential Impact from the No Action Alternative

Many RED HORSE vehicles and equipment are currently stored uncovered and on unpaved surfaces. If BMPs are not implemented, a **long-term minor** impact to the shallow groundwater may result due to vehicle movement and possible contamination due to fluid leaks such as gasoline or oil.

4.2.4.3 Wetlands

4.2.4.3.1 Potential Impact from Proposed Action

No wetlands are located within the Proposed Action areas, although three EO wetlands are located north of the east side Proposed Action area. The Proposed Action on the west side will have **no impact** to wetlands.

EO wetlands RIP-16, NWI-45 and NWI-43 are north of the east side proposed action area and all are down gradient from the area. RIP-16 is located between the proposed action area and Pow Wow Pond but will not be impacted by any stormwater runoff because of a storm drain system that will pipe the stormwater from the Proposed Action area to Pow Wow Pond. NWI-45 and

NWI-43 receive overflow from Pow Wow Pond and would receive increased flow from the stormwater runoff from the Proposed Action. The increased stormwater flow is not expected to degrade the wetlands.

During the proposed construction, there is the possibility of increased sediment in the stormwater runoff from the proposed action area. Any sediment would likely settle out in Pow Wow Pond rather than flow to the wetlands. The use of BMPs and engineering controls as outlined in the required SWPPP would reduce the potential for any excess sediment. During construction, silt fences could be employed to prevent loose soil from entering the stormwater runoff. Once construction is completed, stormwater controls such as bioswales will aid in trapping any additional sediment.

A **short-term and long-term minor** increase in stormwater runoff from the Proposed Action on the east side will subsequently increase the amount of water entering the EO wetlands. **No impact** to wetlands on the west side of the base would occur from the Proposed Action.

4.2.4.3.2 Potential Impact from the No Action Alternative

For the No Action Alternative, no change in the current conditions would occur and **no impact** to wetlands would take place.

4.2.5 Geologic Resources

4.2.5.1 Potential Impact from Proposed Action

Many of the soils at the east and west Proposed Action sites are moisture sensitive, and have high clay content. These soils are expansive and have caused foundation related problems. Thomas, Dean & Hoskins, Inc (USAF 2004) developed a Geotechnical Investigation report for use on recent housing projects, which includes Malmstrom specific engineering considerations and controls that would assist the design engineer in mitigating any negative impacts of the soil conditions for the Proposed Action. The soil type at the site of the Proposed Action should not differ significantly from those evaluated in the March 2004 study.

Slopes within the project area are generally gentle. However, water and wind erosion could occur during construction activities resulting in **minor, short-term impacts**. The required site specific SWPPP would lessen the potential for soil erosion. Facility constructors would put in place engineering controls such as silt fence, straw waddles to reduce these impacts. Additionally, land disturbance due to construction activities would be minimized.

4.2.5.2 Potential Impact from the No Action Alternative

No impacts to geology or soils are expected under the No Action Alternative, there would be no changes to geology or soils. Therefore, there would be **no impact** to geology and soils if this alternative were selected.

4.2.6 Hazardous Materials and Wastes

4.2.6.1 Potential Impact from Proposed Action

Hazardous material brought onto Malmstrom AFB by the constructors must comply with the base general specifications outlined in Section 1360, Environmental Protection of the on-base contract requirements. The specifications describe procedures to obtain authorization to bring hazardous materials on-site which include identifying hazardous materials, issuing the material safety data sheets and submitting a HAZMAT account close out report. The close out report should summarize the quantities of hazardous material used. Construction completed by the RED HORSE personnel should adhere to the guidelines stated in Section 1360. Following the required guidance for handling of hazardous materials and proper disposal of hazardous waste would ensure **no long-term impact** from hazardous material.

ACM and LBP were prohibited from use as construction materials in the 1970's. Under the Proposed Action, building 160, 1464, and 1460 would see renovations or additions. These buildings were constructed in the late 1950s. Building 160 tested positive in March 2006 for ACM. The ACM was removed from building 1464 in 1989. Information is not available concerning ACM for building 1460. LBP information is not available for any of the three buildings. Renovation of building 160 would include proper abatement of ACM. Building 1460 would be tested for ACM and abated if necessary. All facilities would be tested for LBP prior to renovations or additions and abated accordingly.

Hazardous materials and wastes associated with the proposed action would be primarily related to construction activities. Buildings constructed prior to 1970s may require ACM or LBP testing and abatement. The Proposed Action would provide equipment storage space, administrative office space, and additional shop space for maintenance activities. Upon construction completion, no new activities requiring hazardous materials or generation of hazardous waste are anticipated. Therefore, **no long-term impact** to hazardous materials or wastes is anticipated.

4.2.6.2 Potential Impact from the No Action Alternative

Under the No Action Alternative, no construction would occur and no hazardous materials would be required. Therefore, the no action alternative results in **no impact** to hazardous materials and wastes.

4.2.6.3 Installation Restoration Program

4.2.6.3.1 Potential Impact from Proposed Action

There are no active IRP sites within a mile of either site of the Proposed Action. Therefore, **no impacts** to the IRP are anticipated as a result of the Proposed Action.

4.2.6.3.2 Potential Impact from the No Action Alternative

The No Action Alternative would result in no construction and no activities impacting the IRP sites. Therefore, **no impacts** to the IRP are anticipated as a result of the No Action Alternative.

4.2.7 Biological Resources

Potential impacts to biological resources including vegetation, wildlife, and threatened and endangered species are evaluated in the following section.

4.2.7.1 Potential Impact from Proposed Action

Vegetation

At the developed western construction area, there are no vegetation resources and **no adverse impacts** to vegetation would occur in that area. Excavation of soil at the less-developed eastern site would result in loss of vegetative cover at the site. However, much of this site is devoid of vegetation due to past construction or other activities. Consequently, direct impacts to vegetation resulting from implementation of the Proposed Action would be **minimal**.

Exposed and disturbed soil facilitates invasion by noxious weeds or other undesirable species. Also, construction equipment and vehicles coming onto the base for work at either project site (east or west) may transport seeds of noxious weeds onto the base. As mitigation, all construction equipment should be washed to remove weed seeds prior to entry onto the base. Areas where vegetation is disturbed should be rehabilitated and reseeded with an approved seed mix (preferably native species) as soon as possible to prevent erosion and colonization by weeds.

BMPs and control measures should be implemented to ensure that impacts to biological resources are avoided or minimized. The amount of vegetation disturbed during construction activities should be kept to a minimum. Erosion control measures should be implemented to prevent wind or water erosion and protect topsoil stockpiles.

Wildlife

The western developed site has no vegetative cover. Habitat for wildlife would consist of buildings and other structures that have limited wildlife habitat potential. Some birds, bats, and small mammals may be attracted to buildings that have sources of food or can provide nesting or roosting habitat. Wildlife species frequently associated with buildings include starling, house sparrow, rock dove, various bat species, and rodents. **No adverse impacts** to these species are anticipated due to construction activities at the western project site.

At the less-developed eastern project site, activities that remove vegetation and disturb soil may cause direct impacts to individuals of less mobile species (e.g., small mammals, amphibians, reptiles) through direct mortality or displacement and exposure to predators. Ground-nesting birds could be killed or injured by equipment and vehicle traffic during spring and early summer months when birds are nesting. Presently, no signs of ground-nesting birds exist at the eastern project site. Mobile species such as medium-sized mammals (e.g., jack rabbit, red fox) and birds would be able to flee disturbed areas. Much of the project site is sparsely vegetated or devoid of vegetation due to past construction and activities. This area is not likely to be particularly productive for wildlife because of the low habitat diversity; therefore, **no significant impact** would be expected.

Permanent habitat loss would occur from constructing buildings and parking areas, while other construction activities would be temporary. The habitat loss covers 3.5 acres and is a **long-term,**

minor impact based on the overall acreage available on the east side of the base and surrounding land representing similar habitat. The existing habitat at the eastern project site is poor in quality due to previous disturbance further reducing the potential impact of habitat loss. Revegetation of disturbed areas would reduce the **short-term impacts** of habitat loss in these areas related to construction activities.

Threatened and Endangered Species

As noted in Section 3.3.7.3, no threatened, endangered or candidate plant or animal species are expected at the project area, thereby, **no impact** would be expected. Transient bald eagles (threatened) may occasionally fly over Malmstrom AFB, but neither project construction activities nor other activities associated with the Proposed Action would be expected to affect transient eagles, since potential habitat for bald eagles is not present.

Malmstrom AFB contains suitable habitat for several Montana plants and animals of concern. However, there is no habitat at the developed western project site for these species and potential habitat for those species at the less-developed site on the east side of the base is of poor quality. Grasshopper sparrow and Sprague's pipit may nest in the well-developed grassland vegetation on the eastern portion of the base, away from the project site. Roosting or nesting habitat for Swainson's hawk and ferruginous hawk is absent from the project area. However, these raptors may forage over the base. It is unlikely that project activities would affect transient or foraging Swainson's hawk and ferruginous hawk. Pow Wow Pond and other wetlands may provide habitat for leopard frog, Great Plains Toad, and plains spadefoot. Construction activities associated with the Proposed Action would not affect wetland areas. However, these species of amphibians can travel substantial distances while foraging and be exposed to increased mortality from vehicle traffic. There would be **no impact** from the project activities to the populations of these species.

Five plant species of concern have been reported within a five-mile radius of Malmstrom AFB. All of these species are associated with wetlands. A previous plant survey conducted at Malmstrom AFB (BioSystems Analysis, Inc. 1994) did not find any of these species. Potential habitat for these species would not be disturbed under the Proposed Action; therefore, there would be **no impact** expected for plant species of concern.

4.2.7.2 Potential Impact from the No Action Alternative

Under the No Action Alternative, the existing conditions would result in **no impact** because existing conditions would remain unchanged. Disturbance or mortality to wildlife from normal base activities would occur at existing levels. Minor disturbances to vegetation and wildlife would occur if excavation was required for ongoing facility maintenance.

4.2.8 Cultural Resources

Impacts to culturally significant resources including historic buildings and archaeological sites are considered in the following section.

4.2.8.1 Potential Impact from Proposed Action

Building 1464 and 160, located west of the flightline, are identified in the Five Year Plan for renovations and additions. These two buildings played a role in the Cold War history of Malmstrom AFB, and include historic elements making them potentially eligible for listing on the NRHP. The proposed renovations remain within the existing footprint of the facility and no changes to the exterior architectural features of the facilities are proposed. Both facilities have undergone previous additions and modifications. **No impacts** to the NRHP listing eligibility of these facilities are anticipated based on the proposed action. While listing on the NRHP for either facility is not expected, documentation and photography may be required prior to renovations. Consultation with the SHPO is ongoing. No modifications to the facilities may occur until after consultation with the SHPO is complete.

4.2.8.2 Potential Impact from the No Action Alternative

Under the No Action Alternative, no construction, modification, or renovation would occur therefore, **no impacts** to cultural resources are anticipated.

4.2.9 Infrastructure and Utilities

This section evaluates impacts of the potential increase or decrease of the demands on utilities including potable water, sanitary sewer, solid waste, stormwater drainage, transportation, electricity and natural gas use on the east and west sides of the base from the Proposed Action and Alternatives. The existing system and its capacity are considered when evaluating the current infrastructure.

4.2.9.1 Potable Water

4.2.9.1.1 Potential Impact from Proposed Action

The proposed action would include a few new restroom and plumbing facilities on both the east and west area. These facilities would require a very minor demand for potable water. The existing water infrastructure is sufficient to support the additional demand. There would be **no impact** to the potable water system from implementing the Proposed Action.

4.2.9.1.2 Potential Impact from the No Action Alternative

The No Action Alternative would not include any change to existing potable water use. Therefore there would be **no impact**.

4.2.9.2 Sanitary Sewer

4.2.9.2.1 Potential Impact from Proposed Action

The new restroom facilities and related plumbing in the Proposed Action would generate wastewater on both the west and east area. On the west side the sanitary sewer system has sufficient capacity to handle the very minor additional flows. The east side of the installation is not serviced by the sanitary sewer system. As part of the design of the proposed east side facilities, a system for management of the waste water supporting 25 to 50 personnel would have

to be designed. Facilities on the east side currently use septic systems; however, due to low soil percolation rates, a cistern may be more appropriate for the small wastewater flows generated by the proposed new facilities. There would be **no significant impact** to the sanitary sewer from the Proposed Action.

4.2.9.2.2 Potential Impact from the No Action Alternative

The No Action Alternative would not require new construction, nor would any change in sanitary sewer use occur. There would be **no impact** to the sanitary sewer from the No Action Alternative.

4.2.9.3 Solid Waste

4.2.9.3.1 Potential Impact from Proposed Action

The construction and expansion of facilities on the west side of the base would present no change in solid waste generation for operations. The proposed facilities on the east base would generate a small amount of solid waste at the new administrative facilities. The Proposed Action does not include any new industrial activity that would generate additional solid waste. The increase in solid waste would be insignificant. A contractor collects and hauls solid waste from Malmstrom AFB to a local commercial landfill. Minor changes would be necessary to the contract to include new waste dumpsters. In addition, infrastructure and processes are already in place to handle recycled materials on both sides of the base and would not be impacted by the very small increase from the Proposed Action.

The proposed new construction would generate construction waste. This waste must be managed and disposed of in accordance with the Malmstrom AFB SWMP and all federal, state and local laws. Incorporating sustainable design concepts within the proposed projects would reduce construction waste. These concepts might include reusing and recycling pavement and paving materials during the paving projects and using green construction materials.

Therefore, **no significant impact** to solid waste is anticipated from the Proposed Action.

4.2.9.3.2 Potential Impact from the No Action Alternative

The No Action Alternative does not include the addition of any buildings or personnel and there would be **no impact** to the solid waste management on the installation.

4.2.9.4 Stormwater Drainage

4.2.9.4.1 Potential Impact from Proposed Action

No significant increase in stormwater runoff would result from implementation of the Proposed Action. Construction of facilities and adding pavement to Malmstrom AFB would increase the impervious surface on the east side of the base. Malmstrom would offset this increase in impervious surface by demolishing an equal amount of existing impervious surface and implementing appropriate LID techniques. In addition, as part of master planning, site layout and design, RED HORSE would develop a full site grading plan to encourage and control site sheet flow and east site drainage. The Proposed Action would not impart a significant change to

stormwater runoff on the west side of the base. The Proposed Action will not increase impervious surface on the west side of the base.

Water resources are surface and subsurface resources that are finite but renewable. Construction activities may affect water resources by physical disturbances and material releases (e.g., sediment, chemical contaminants, etc.) into surface and groundwater.

Construction of facilities potentially alters a watershed's response to precipitation. The most common potential effects are reduced infiltration and decreased travel time, which may increase peak discharges and runoff of stormwater. Runoff is determined primarily by the amount of precipitation and by infiltration characteristics related by soil type, soil moisture, antecedent rainfall, cover type, impervious surfaces and surface retention. Travel time is determined primarily by slope, length of flow path, depth of flow, and roughness of flow surfaces. Peak discharges are based on the relationship of these parameters and on the drainage area of the watershed, the location of the proposed development, the effect of any storage and other natural or human induced active or passive controls, and the time distribution of rainfall during a given storm event (USDA Technical Release 55). Incremental increases of impervious surface may combine to alter peak events or baseline flow in a watershed. Beneficial impacts include increased recharge, control of peak flow events or improved water quality.

Low Impact Design (LID). Traditional methods of storm water management have generally relied on flood control schemes. These traditional methods of management fail to consider the overall natural resources management, hydrological objectives and stewardship responsibilities. LID concepts use hydrology as the integrating framework of design and protect the overall ecology of the watershed. LID maintains the site's natural and existing hydrological function. This goal is accomplished with five concepts: The site hydrology integrates the framework for the design, distributes controls through micromanagement, controls storm water at the source, incorporates non-structural systems and creates multi-functional landscapes, buildings and infrastructure. The effectiveness of LID is determined by comparing the curve number (CN) calculations for the existing site to the post-development CN. United States Department of Agriculture Natural Resources Conservation Service, Technical Release 55 (TR-55, June 1986). The percentage of impervious area and the means of conveying runoff from the impervious area to the drainage system are used in the computing of the CN. The CN represents the pre and post development conditions of the drainage area. The assumptions in the model would account for the pervious and impervious areas in the drainage area, i.e. the CN is weighted based upon the pervious and impervious conditions at the site.

On the west side, the Proposed Action includes the addition of three small buildings with an approximate total of 20,500 SF of area. The area proposed for the additional facilities is heavily developed. The facilities would be built on currently paved areas leading to an insignificant change in existing site conditions and therefore no significant change to existing permeability and stormwater runoff conditions. The facility designer will evaluate the facility design and, if necessary, incorporate LID techniques to insure no change in runoff from the existing versus the post-construction conditions.

The proposed actions on the west side would create no increase in impervious surface. The effective runoff coefficient for Drainage Area 1 would not change. See Appendix A. The

Proposed Action would replace 20,500 square feet of pavement with roof area. The existing site has a runoff coefficient in the range of 0.80 to 0.95, considering the antecedent conditions in the drainage area. The Proposed Action would not alter that range of runoff coefficient. These three buildings would be located within Drainage Area 1 without altering the impervious surface or runoff coefficient range of the existing site. The Proposed Action would not have a significant environmental impact in Drainage Area 1.

The proposed actions on the east side of the base are all located within Drainage Area 6. Stormwater in the area is managed through a combination of surface sheet flow and subsurface storm sewer system which empties into Pow Wow Pond. In addition to serving as an outdoor recreation area, Pow Wow Pond serves as a stormwater detention pond and assists in managing stormwater outflow. Stormwater exits Pow Wow Pond into a drainage channel and returns to sheet flow prior to entering a wetland, which is southeast of the WSA. From the wetland, stormwater flows through a down-gradient, grassed channel, merges with flow from Drainage Area 5 and exits the base north of the WSA at Drainage Outfall 5. These pre-existing drainage conditions present a combination of human induced and naturally occurring, LID- like, stormwater controls.

On the east side, the Proposed Action would include the addition of five new buildings and 63,500 SF of new pavement. The new buildings would have approximately 43,000 SF of area. The 3.4 acres of impervious surface added to Drainage Area 6 would be offset by demolishing an equal amount of existing impervious surface in Drainage Area 6 and implementing appropriate LID techniques to insure the actions induce no increased stormwater discharge. In addition, the path of flow from the proposed development site and drainage outfall provides substantial opportunity for stormwater infiltration. As discussed in the previous paragraph, the existing Drainage Area 6 presents several opportunities for Low Impact stormwater controls not available in storm water systems on the east side of the base. The stormwater from the east base site will sheet flow overland into a wetland and piping system feeding Pow Wow Pond. Maintaining this sheet flow is an LID concept. The Proposed Action with demolition offset and appropriate LID techniques would not cause this sheet flow to begin transition to channel flow. The Proposed Actions with offset and appropriate LID techniques would not cause siltation of riparian areas, a qualitative indicator of reaching a system's capacity.

Pow Wow Pond provides stormwater detention, assisting with controlling peak flow events. The Proposed Action with offset and appropriate LID techniques would not alter the capacitating ability of Pow Wow Pond. When flows exceed the detention capacity of Pow Wow Pond, stormwater exits Pow Wow Pond into a drainage channel and returns to sheet flow, prior to being naturally retarded and filtered by a wetland, southeast of the WSA. The Proposed Action with offset and appropriate LID techniques would not cause this sheet flow to begin transition to channel flow and would not significantly affect the human-induced wetland southeast of the WSA. These systems would combine, providing LID methodology and function to significantly attenuate from the Proposed Action at the east base. By this point any change to Drainage Area 6, effecting storm water runoff or post-development CN, is well below significant, before merging with Drainage Area 5, near the Malmstrom boundary. Flow readings at outfall five during storm events indicate the current storm drainage system is operating well below capacity (Clavin, 2006).

Considering the Proposed Action's net zero increase in impervious surface, the inherent attenuation of the existing Drainage Area 6 system and currently low outfall readings, the current stormwater drainage system would support the stormwater from the existing and proposed development. The increased outflow would be mitigated by the offset created by demolishing an equal amount of impervious surface, the implementation of appropriate LID techniques and the drainage flow path. Therefore, the Proposed Action would not significantly affect stormwater discharged to the east base drainage system. As part of the site development plan for the east area Proposed Action, a stormwater management plan must be designed that meets all federal, state and local regulations. A SWPPP and a Montana National Pollutant Discharge Elimination System (NPDES) permit would be required prior to construction activities disturbing one acre or more. Activities disturbing less than one acre would comply with the Malmstrom SWPPP.

In an effort to have more comprehensive data upon which to base future environmental analysis, Malmstrom AFB is currently conducting a comprehensive watershed analysis. However, no new data is currently available. The comprehensive watershed analysis has only just begun. This EA is based upon the best information currently available. To offset potential effects caused by increase in impervious surface, Malmstrom would demolish an equal amount of existing impervious surface and where appropriate utilize LID techniques.

The Proposed Action would create no significant change to Whitmore Ravine, no long term change to the quantity, quality or time of concentration of stormwater discharged to Whitmore Ravine, the associated Watershed or the Missouri River. The Proposed Action would neither significantly alter or degrade the existing aquifer, groundwater table, or surface water nor significantly change groundwater recharge, water quantity or water quality. The Proposed Action would not degrade surface or groundwater quality or induce any severe or long-term violations of federal or state water quality criteria. Through implementation of offset, as described, and appropriate LID techniques, any de minimus change induced by the Proposed Action to existing stormwater conditions create **no significant impact** to the environment. The Proposed Action would have no significant environmental impact to stormwater.

4.2.9.4.2 Potential Impact from the No Action Alternative

The No Action Alternative does not include the addition of any buildings or personnel and there would be **no impact** to the stormwater management system on the installation.

4.2.9.5 Transportation

4.2.9.5.1 Potential Impact from Proposed Action

The Proposed Action includes construction of facilities and pavement and the transfer of some functions from the west side to the east side. The east base proposed construction would result in a long-term vehicle increase of 25 to 50 vehicles utilizing Perimeter Road and Missile Drive. The roads on the east side are capable of handing the very small increase in traffic. Some of the new facilities would store equipment which would travel via the road system. If the equipment is bulky and/or difficult to move then the installation can limit movement of this equipment to low traffic times.

The proposed construction activities might have a **localized, short term impact** on traffic patterns around the construction sites. Detours, delays, closed traffic lanes and large equipment on the roads are possible. Similar construction activities are common on Malmstrom AFB and the base personnel have developed and implemented safe, efficient measures for managing.

Because the existing roadway infrastructure is adequate and can support the very minor increase in traffic and localized, short term impacts, the Proposed Action would have **no significant impact** on the Malmstrom transportation system.

4.2.9.5.2 Potential Impact from the No Action Alternative

Under the No Action Alternative, no new construction would take place and no increase in personnel or vehicles would be anticipated. There would be **no impact** on the existing transportation system.

4.2.9.6 Electricity/Natural Gas

4.2.9.6.1 Potential Impact from Proposed Action

Implementation of the Proposed Action would result in a **long-term, minor** increase in electrical and natural gas usage. The Proposed Action includes construction of new facilities and renovation of others. The new facilities would require electrical service and natural gas. Electrical service would be connected to the new buildings using new service drops from existing main feeder lines. New natural gas valves would be installed where necessary to tie the existing 4-inch gas main to the new construction. Renovated facilities might incorporate a change in electrical and natural gas usage. The very slight increase in electrical and natural gas usage can be accommodated by the existing systems on both the west and east side. The new electrical and natural gas laterals and connections would be designed and installed using the appropriate industry standards.

The Proposed Action would have **no significant impact** on the electrical and natural gas systems at Malmstrom AFB.

4.2.9.6.2 Potential Impact from the No Action Alternative

Under the No Action Alternative there would be no change in electrical and natural gas usage and, therefore, **no impacts** would occur.

4.2.10 Socioeconomics Resources and Environmental Justice

Socioeconomics and Environmental Justice consider impacts to population, employment, the economy and any disproportionate impacts to minority or low-income groups as a result of the Proposed Action or No Action Alternative.

4.2.10.1 Potential Impact from Proposed Action

Population and Employment

There would be no additional personnel assigned to Malmstrom AFB as a result of the Proposed Action. Therefore, **no impacts** to population are expected. Most activities included in the

Proposed Action would be accomplished by 819th REDHORSE Squadron personnel; however, some of the projects may be accomplished by a contractor. In these instances, local contractors would be utilized, if available, resulting in a **short-term, positive** impact on regional employment.

Economy

Expenditures incurred during construction would result in a **short-term, positive impact** on the local economy.

Environmental Justice

To comply with EO 12898, ethnicity and poverty status in the study area have been examined and compared to state and national statistics to determine if minority or low-income groups could be disproportionately affected by the Proposed Action.

Construction activities associated with the Proposed Action would cause short-term increases in air and noise emissions for the duration of construction activities. However, emissions would attenuate rapidly with distance from the construction site and would be evenly distributed throughout the project area, thereby not disproportionately affecting a single population. Short-term impacts associated with surface water and drainage would be localized to the construction sites and minimized through implementation of a SWPPP. Off-site surface water and drainage impacts are not expected; therefore, no disproportionate impacts to environmental justice communities are expected. Short-term solid waste impacts are limited to the construction and established disposal sites; short-term traffic congestion would primarily occur on the west side of the installation and would equally affect all who use those roads. Therefore, no disproportionate impacts to environmental justice communities from short-term solid waste and transportation impacts are expected. Expenditures associated with project activities would have a short-term positive impact on the local economy. It is assumed that workers, both skilled and unskilled, would be drawn from the available work force. As such, **short-term positive impacts** would be evenly distributed within the region, thereby not disproportionately affecting a single population.

4.2.10.2 Potential Impact from the No Action Alternative

Under the No Action Alternative, there would be no change in the baseline conditions described in Section 3.3.10. The Great Falls region would not realize the short-term positive impacts to the local economy and employment. Also, there would be **no impact** to the environmental justice community.

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CHAPTER 5
CUMULATIVE IMPACTS

A cumulative impact, as defined by the CEQ (40 CFR 1508.7), is the "impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of which agency (federal or nonfederal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." As described in Section 2.4, other proposed actions are foreseeable at Malmstrom AFB and the surrounding community. These actions are not directly related to the Proposed Action or No Action Alternative evaluated in this EA. This EA addresses the environmental impacts of these other actions only in the context of potential cumulative impacts, if any.

The actions considered under cumulative impacts include:

- Construction of pre-engineered steel warehouse structures and temporary sprung structures at the RED HORSE east compound assessed under previous NEPA actions.
- Within the next two years, adding 165 active duty positions the 819th RHS, bringing the manpower total to 450 active duty personnel.
- Construction of an Army Reserve Building at the southeast corner of the eastern portion of the installation is planned. This construction would include 36,000 SF of facilities and 7,000 square yards of pavement and would require paving of the road to the site, as well as utilities extensions.
- Construction of a small Communication Building located north of Building 1846 will include 900 SF of construction.
- Construction of a Propulsion System Rocket Engine Building located west of Building 11664 will include 6,000 SF of construction.
- Construction of a Truck Inspection Station would occur at the south entrance to Malmstrom AFB north of Highway 83 and would be less than 3,000 SF.
- Construction of a Rivet Mile Administrative Facility will be located just north of the horse stables and will include 3,200 SF of construction.
- Expansion of the Weapons Storage Area to the south is still in the design phase.
- Renovations to the North and South Gates will add Anti-Terrorism/Force Protection controls and lighting to the existing gates.
- Military Family Housing, Phases I, II, III, IV, V VI and VII.
- Construction of a new Fitness Center and demolition of the existing Fitness Center.
- Mill and Overlay West Base (Phase IV) 52,500 square feet of existing pavements.

In addition, other actions announced for the surrounding community include:

- Construction of a 200 unit housing development outside southwestern edge of Malmstrom AFB.
- Upgrade to city sewer lines.

Noise: Noise impacts associated with the Proposed Action at Malmstrom AFB are short-term in nature and, therefore, would not accumulate over time or contribute to cumulative noise effects.

Land Use: There would be no impacts west of the flightline from the Proposed Action. The cumulative actions represent a long-term minor impact to land use east of the flightline. Currently, the area east of the flightline is primarily open space. The Proposed Action would convert 3.5 acres of current open space to industrial use. Other actions including construction of the Army Reserve Buildings and expansion of the Weapons Storage Area would result in additional permanent changes in land use. The additional changes in land use would be managed through master planning efforts to ensure appropriate development practices and consolidation of related activities. The consolidation would ensure best use of utilities, preserve open space, minimize stormwater impacts and provide opportunities for shared infrastructure such as parking lots.

Air Quality: Renovation and construction of new facilities at Malmstrom AFB and the surrounding vicinity would result in short-term emissions during construction activities. The emissions would be temporary and would be eliminated after the activity is completed. There would be no increase in long-term emissions, as no new emission sources would be added to the installation as a result of the Proposed Action.

The Air Force proposes to construct, expand, and renovate other facilities at Malmstrom during the same period as the activities under the Proposed Action. Air emissions from these other construction projects would also be primarily short-term in nature and are associated with construction activities.

The future addition of 165 personnel to the installation would increase vehicular traffic and would result in a minor long-term increase to vehicular emissions. The additional personnel would be assigned to the west side of the base and therefore, most of this traffic would occur west of the flightline on the portion of the installation which is currently well developed. Traffic increases associated with the Proposed Action would result in a short-term increase in emissions but would not contribute to the long-term cumulative effects of the addition of 165 personnel.

The cumulative effects from the activities associated with the Proposed Action are expected to have little impact when compared to the total emissions for the Great Falls Intrastate AQCR.

Water Resources: On the West side of the Base, the evaluation of potential cumulative effects requires comparison of the Proposed Action in conjunction with past present and reasonably foreseeable actions which effect the west branch of Whitmore Ravine, the Watershed and the Missouri River. Stormwater discharge from Malmstrom enters the west branch of Whitmore Ravine from both Drainage Area 1 and Drainage Area 2.

The past present and reasonably foreseeable future actions include:

Drainage Area I
Proposed Action change in impervious surface
Mill and Overlay West Base (Phase IV)
Matador Manor (PH I,II, & III)
Phases I, II & III demolition
Phases IV,V,VI & VII roughly net zero
Net increase in impervious surface

Drainage Area 2
Phase V
Demolish relocatables
New Fitness Center
Demolish existing fitness center
Net increase in impervious surface

With respect to the actions proposed on the west side of the Base, the Proposed Action makes no change, in impervious surface. Adding the Proposed Action to the actions set forth above would not precipitate a cumulatively significant affect to the runoff coefficient, existing prior to the Proposed Action, in Drainage Area 1 or Drainage Area 2. The Proposed Action does not change the Runoff Coefficients in Drainage Area 1 or Drainage Area 2 or combine with any of the past, present or reasonably foreseeable future actions to cumulatively affect the Runoff Coefficients in Drainage Area 1, Drainage Area 2 or the Watershed. See Appendix A.

On the east side of the Base, the Proposed Action with offset and appropriate LID techniques would insure no increase in recharge to Pow Wow Pond. Stormwater from the east base site drains through Drainage Area 6. Additional facility construction within drainage area six is in process or anticipated within the reasonably foreseeable future. The Propulsion System Rocket Engine building, Rivet Mile Administrative Facility, and expansion of the Weapons Storage Area would impact drainage area six. The Proposed Action with offset and appropriate LID techniques would contribute no cumulative long term minor increase in surface runoff. The past present and reasonably foreseeable future actions represent a 0.15% increase in impervious surface. Although the past, present and reasonably foreseeable future actions may add up to 24,000 SF (0.55 Acres) of impervious surface to Drainage Area 6, the Proposed Action with offset and appropriate LID techniques creates none of this increase. The cumulative total addition of impervious surface represents a 0.15 percent increase in impervious surface. The additional surface runoff from other planned construction would be managed through implementation of appropriate stormwater controls, including LID. The truck inspection station and Army Reserve buildings would drain into Drainage Area 7 thus not contributing to the cumulative surface water increase for drainage area six and Drainage Area 7 drains south, not into Whitmore Ravine.

The path of flow from the past, present and reasonably foreseeable proposed development in drainage Area 6 provides good opportunities for stormwater infiltration. The existing Drainage Area 6 presents several opportunities for Low Impact storm water controls not available in storm water systems on the east side of the base. The stormwater will sheet flow overland into an EO wetland and piping system feeding Pow Wow Pond. Maintaining this sheet flow is an LID concept. The 0.15 percent increase should not cause this sheet flow to begin transition to channel flow. The additional 0.15 percent should not cause indications of siltation of riparian areas, another qualitative indicator of reaching a system's capacity. Pow Wow Pond provides stormwater detention, assisting with controlling peak flow events. The 0.15 percent change would not exceed the capacitating ability of Pow Wow Pond. When flows exceed the detention capacity of Pow Wow Pond, stormwater exits Pow Wow Pond into a drainage channel and returns to sheet flow, prior to being naturally retarded and filtered by an EO wetland, southeast of the WSA. The 0.15 percent increase would not cause this sheet flow to begin transition to channel flow and would not interrupt the naturally occurring biological function and filtration of the wetland southeast of the WSA. These systems would combine, providing functions in the spirit of LID to significantly attenuate the 0.15 percent increase.

By incorporating impervious surface offset and appropriate LID techniques, none of the 0.15 percent increase arises from the Proposed Action. Any change to the storm water runoff or post-development CN is well below significant, before merging with Drainage Area 5, near the Malmstrom boundary. None of the change arises from the Proposed Action with offset and appropriate LID techniques, combining with effects from the past, present and reasonably foreseeable future actions. Flow readings at outfall five during storm events indicate the current storm drainage system is operating well below capacity (Clavin, 2006). No significant effect to an aquifer, groundwater table or surface water body would occur. No impact to surface or groundwater would occur that would induce any violation of federal or state water quality criteria.

The Proposed Action when combined with past, present and reasonably foreseeable future actions will not change the existing character, quantity or quality of stormwater discharged to Whitmore Ravine. In an effort to have more comprehensive data upon which to base future environmental analysis, Malmstrom AFB is currently conducting a comprehensive watershed analysis. However, no data is currently available. The comprehensive watershed analysis has only just begun. This EA is based upon the best information currently available. To offset potential effects caused by increase in impervious surface, Malmstrom would demolish an equal amount of existing impervious surface and where appropriate utilize LID techniques.

These conclusions are based upon the best information currently available. The Proposed Action, when combined with past, present and reasonably foreseeable future actions, will create no significant environmental effect to Whitmore Ravine and significant change to the quantity, quality or time of concentration of stormwater discharged to Whitmore Ravine, the associated Watershed or the Missouri River.

Other planned construction is similar in type to the Proposed Action. The shallow foundations would not be expected to encounter the groundwater. Should groundwater be encountered, it would be protected from contamination. No long term impacts to groundwater would be anticipated therefore, there is no cumulative impact anticipated.

The EO wetlands east of the flightline would be protected from other planned construction. The long term minor increase in stormwater runoff would not present detrimental impacts to the EO wetlands. With respect to wetlands, no detrimental cumulative impact would occur as a result of the proposed action, when combined with past, present and reasonably foreseeable future actions.

As part of the site development plan for the east area Proposed Action, a stormwater management plan must be designed that meets all federal, state and local regulations. This plan would protect water resources. A SWPPP and a Montana National Pollutant Discharge Elimination System (NPDES) permit would be required prior to construction activities, when the activities disturb 1 acre or more. Based upon implementation of these measures, the de minimis change to existing conditions on the west side of the base and preceding discussion regarding offset of impervious surfaces and appropriate LID techniques on the east side of the base, **no significant impact** to the water resources on Malmstrom AFB, the associated watershed or the Missouri River would occur from the Proposed Action when combined with past, present and reasonably foreseeable future actions.

Geological Resources: Permanent changes to soil structure and stability could occur by disrupting and reworking certain soils. However, none of the proposed projects assessed as part of cumulative impacts geologically overlap. The limited scope of these cumulative actions in a finite area does not combine to create significant geological environmental impact when considered individually or cumulatively.

Hazardous Materials and Wastes: No long-term impacts to hazardous material and waste are anticipated as a result of the Proposed Action. Other actions anticipated in the reasonably foreseeable future are similar in nature and would result in no cumulative impacts.

Biological Resources: The Proposed Action would pose a long-term minor impact to vegetation and wildlife in the form of permanent habitat loss due to facility construction and paving east of the flightline. Additional construction proposed would result in additional habitat loss. The impacts to habitat loss could be minimized through good planning practice in the form of consolidated proposed industrial activities and permanent designation of open space for vegetation and wildlife habitat.

Cultural Resources: The actions anticipated in the reasonably foreseeable future do not include additions or alterations to facilities listed or designated as potentially eligible for listing on the NRHP. No activities are planned at or near the vicinity of the lithic scatter on base. Therefore, no cumulative impacts to cultural resources are anticipated.

Infrastructure and Utilities: Additional construction east of the flightline would result in additional demand increases on potable water, sanitary sewer, stormwater drainage, solid waste, transportation, electricity and natural gas. Currently, facilities east of the flightline are supported through septic systems and cisterns. As development continues, a sanitary sewer system would be necessary to manage the additional utility demand. As presented under "Water Resources" in this chapter, the additional impervious surface would result in a long term minor increase in stormwater runoff. Considering the limited increase in impervious surface, the current stormwater system should support this minor increase. The addition of 165 personnel would

primarily reside on the western side of the flightline resulting in a minor increase in demand on all utilities. The utility systems have surplus capacity and no construction or modification to utility systems would be required as a result of the personnel increase. Therefore, no significant cumulative impacts to infrastructure and utilities west of the flightline would be anticipated as a result of the Proposed Action or future proposed actions.

Socioeconomics and Environmental Justice: The Proposed Action is not expected to cause any long-term adverse impacts to population, employment, or economy. The addition of 165 personnel to the installation in the foreseeable future would contribute to a change in population and school enrollment; however, since the Proposed Action does not include any additional permanent party personnel the Proposed Action would also not contribute to any increase in school enrollment. Also, projects occurring during the same time period as the Proposed Action would contribute additional positive impacts to the economy through expenditures in the local area.

The impacts associated with the Proposed Action are short-term in nature and would not disproportionately affect minority or low-income populations in the project area or contribute to negative cumulative effects for environmental justice populations.

CHAPTER 6
LIST OF PREPARERS

Name/Organization	Degree	Resource Area	Years of Experience
Jonathan Anstey P.G./WESTON	BS, Environmental Geology	Resource Specialist, Geology, Hazardous and Solid Waste	7
Heidi Brothers, Ph.D./WESTON	BS Civil Engineer; MS Systems Management; PhD, Environmental Engineering	Technical Review	22
Tamara Carroll/WESTON	BS, Bioenvironmental Science	Resource Specialist, Air Quality, Noise, Socioeconomic Resources, Environmental Justice; Document formatting	5
Pete Feigley, PhD./WESTON	BS, Fish & Wildlife Management; MS, Zoology; Ph.D., Environmental and Forest Biology	Resource Specialist, Biological Resources and Land Use	24
Sarah Firebaugh/WESTON	BS, Chemistry and Biochemistry; MS Environmental Engineering	Resource Specialist, Water Resources, Infrastructure and Utilities	3
John Glabach P.E./WESTON	BS, Civil Engineering	Project Manager; Resource Specialist, Transportation, Cultural Resources	9
Elisa Morales/WESTON	BS, Biology	Resource Specialist, Socioeconomic Resources	4
Raul Reyes, Jr./WESTON	BAAS, Wildlife Biology	Resource Specialist, Environmental Justice	8
Paige Rhodes/WESTON	BS, Biology; MS, Environmental Science	Technical Review	15
Tim Vidra P.G./WESTON	BS, Geology; MS, Environmental Science + Engineering	Site walk coordinator	12

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CHAPTER 7
LIST OF PERSONS AND AGENCIES CONSULTED

Federal Agencies

Malmstrom Air Force Base
- Clavin, Karen (Stormwater Program Manager)
- De La Rosa, Christian (Mechanical Engineer)
- Grady, Lt. Tim (Project Engineer)
- Lucas, Tony (CES Environmental Project Manager)
- Murray, Mike (Civil Engineer, Maintenance Engineering)
- Pleinis, Justin (Chief of Base Development)

Montana State Agencies

Montana Department of Environmental Quality
- Merchant, Eric (Air Quality Permit Specialist)

Other Agencies and Individuals

Cascade County Planning Department
- Conolly, Susan (Planner I)
- Nerud, John (Planning Director)

Continental Divide Consulting
- Butts, Tom (Consulting Biologist/Sole Proprietor)

Great Falls Chamber of Commerce
- Olds, Teresa (President)

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CHAPTER 8
REFERENCES

AIHA 1986. American Industrial Hygiene Association. *Noise and Hearing Conservation Manual*, Fourth Edition, 1986.

BioSystems Analysis, Inc. 1994. Endangered species biological survey: Final Report. Prepared for Malmstrom Air Force Base, prepared by BioSystems Analysis, Inc., Billings, MT,

Cascade County Board of Commissioners. 2006. Cascade County Growth Policy. Prepared by the Cascade County Planning Department, adopted September 19, 2006, Resolution # 06-066. Available at: http://www.co.cascade.mt.us/getfile.phtml?ido=693. Accessed 8 November 2006.

Cascade County Planning Department. 2005. Cascade County Zoning Map. Adopted April 26, 2005, Resolution #05-018, Board of Cascade County Commissioners. Available at: http://gis.co.cascade.mt.us/Website/ZoningMapbook.htm. Accessed 9 November 2006.

Cowardin, Lewis M; Carter, Virginia; Golet, Francis C.; and LaRoe, Edward T. 1979. *Classification of Wetlands and Deepwater Habitats of the United States*. U.S. Department of the Interior, Fish and Wildlife Service. FWS/OBS-79/31.

Dobkin, D.S. 1994. Conservation and management of neotropical migrant landbirds in the Northern Rockies and Great Plains. University of Idaho Press, Moscow, ID. Pp. 47, 49, 125, 127, 165.

Ecosystem Research Group (ERG). 2006. *2006 Malmstrom Air Force Base Draft Wetland Delineation Report*.

FAA. 1992. Guidelines for the Sound Insulation of Residences Exposed to Aircraft Operations. Federal Aviation Administration. Washington, D.C. United States Department of Transportation.

Foresman, K.R. 2001. The Wild Mammals of Montana. Special Publication No. 12. American Society of Mammalogists. 278 pp.

Grady, T. 2006. E-mail correspondence from John Glabach, Weston Solutions, Inc. to Lt. Tim Grady, 819th Red Horse Project Manager regarding confirmation of Five Year Plan facilities, activities, and layout; manpower increase and distribution of personnel in new facilities; and review and discussion of details of DD Forms 1391s provided on 15 November 2006.

Great Falls City Commission. 2005. Great Falls, Montana Growth Policy. Adopted June 21, 2005 by the Great Falls City Commission. Available at: http://www.ci.great-falls.mt.us/people_offices/planning/growthpol.htm. Accessed 7 November 2006.

Great Falls City Planning Department. 2006. Official Zoning Map, City of Great Falls, Montana, January 1, 2006. Available at: http://www.ci.great-falls.mt.us/citycodes/landsign/zonemap.htm. Accessed 7 November 2006.

Great Falls City Planning Department. 2005. Average daily traffic count matrix, Great Falls urban transportation study area, Great Falls, Montana. Great Falls City Planning Department. Available at: http://www.ci.great-falls.mt.us/people_offices/planning/trafficcount.pdf. Accessed 9 November 2006.

Clavin, K. 2006. Telephone call from Sarah Firebaugh, Weston Solutions, Inc. to Karen Clavin, CES Environmental Stormwater manager, Malmstrom Air Force Base.

Lucas, T. 2006a. Telephone call from Pete Feigley, Absaroka Ecological Consulting, to Tony Lucas, CES Environmental Project Manager, Malmstrom Air Force Base.

Lucas, T. 2006b. Personal communication during kickoff meeting at Malmstrom Air Force Base between Pete Feigley, Absaroka Ecological Consulting, and Tony Lucas, CES Environmental Project Manager, Malmstrom Air Force Base.

Lucas, T. 2006c. Telephone call from John Glabach, Weston Solutions, Inc., to Tony Lucas, CES Environmental Project Manager, Malmstrom Air Force Base, regarding cultural resources and status of facilities identified as historic or eligible as outlined in MAFB General Plan.

MBMG 2002. Geologic Map of the Great Falls North Quadrangle, Central Montana, Montana Bureau of Mines and Geology Open File Report MBMG 459.

MDEQ. 2006. Montana Department of Environmental Quality. Operating Permit Technical Review Document.

Malmstrom AFB. 2006a. Malmstrom Air Force Base Website: History of Col. Einar Malmstrom. Available at: http://www.malmstrom.af.mil/library/history/col.einarmalmstrom.asp. Accessed 28 November 2006.

Malmstrom AFB. 2006b. Malmstrom Air Force Base Website. Fact Sheet: 819th RED HORSE Squadron. Available at: http://www.malmstrom.af.mil/library/history/col.einarmalmstrom.asp. Accessed 28 November 2006.

Merchant. 2006. Telephone conversation between Tamara Carroll, Weston Solutions, and Eric Merchant, Air Quality Permit Specialist, Montana Department of Environmental Quality.

MTNHP. 2006a. Montana Natural Heritage Program. Point Observation Database records for Cascade County, requested October 12, 2006. Montana Natural Heritage Program, Montana State Library, Helena, Montana.

MTNHP. 2006b. Element Occurrence Records for species of concern in Cascade County, requested October 12, 2006. Montana Natural Heritage Program, Montana State Library, Helena, Montana.

MTNHP. 2006c. Plant species of concern. Montana Natural Heritage Program, Montana State Library Helena, Montana. June 2006. Available at: http://nhp.nris.state.mt.us/plants/reports/PlantSOC_2006.pdf. Accessed 20 October 2006.

MTNHP & MFWP. 2006. Montana Natural Heritage Program and Montana Department of Fish Wildlife and Parks. Animal species of concern. Helena, MT. July 2006. Available at: http://nhp.nris.state.mt.us/reports/2006_MASOC.pdf. Accessed 20 October 2006.

Montana. 2000. State of Montana. Air Quality Control Implementation Plan – Cascade County Carbon Monoxide Limited Maintenance Plan. Volume II Chapter 7 of the State Implementation Plan.

Nesser, J., G. Ford, C. Maynard, D. Page-Dumroese. 1997. Ecological Units of the Northern Region: Subsections. Gen. Tech. Rep. INT-GTR-369. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station. 88 p. Available at http://forest.moscowfsl. wsu.edu/smp/solo/GeoPath/subsection/index.php (accessed November 8, 2006).

President of the United States. 1977. Executive Order 11990, *Protection of Wetlands*. 42 F.R. 26961.

Reagan, Jerry A. and Charles. A. Grant. 1977. Special Report: Highway Construction Noise: Measurement, Prediction, and Mitigation. Federal Highway Administration Bulletin: 2 May 1977.

Trimble. 1980. The Geologic Story of the Great Plains by Donald E. Trimble. Geological Survey Bulletin 1493, U.S. government Printing Office, Washington D.C.

USAF. 2006a. Headquarters 341st Space Wing, Malmstrom AFB, Montana, 341 SW OPLAN 32-7042. Hazardous Waste Management Plan, OPR: 341 CES/CEV.

USAF. 2006b. Utility and Development Plan: East Base Area. Prepared for Malmstrom Air Force Base, Montana by Weston Solutions, Inc.

USAF. 2005a. Malmstrom AFB General Plan. Malmstrom Air Force Base, Montana.

USAF. 2005b. Final Environmental Assessment for Phase 6 and Phase 7: Replace Family Housing at Malmstrom Air Force Base, Montana. Prepared for Malmstrom Air Force Base by the U.S. Army Corps of Engineers, Seattle District.

USAF. 2005c. 341st Space Wing Solid Waste Management Plan (U), OPR: 341 CES/CEVV, Malmstrom AFB, Montana.

USAF. 2004. Preliminary Report of Geotechnical Investigation for Replacement Housing, Phase 6 and 7; Malmstrom Air Force Base; Great Falls, Montana. Prepared for Malmstrom AFB and Bazan & Associates by Thomas, Dean & Hoskins, Inc. Contract No. DACW67-01-D-1005, Task order 30.

USAF. 2003. Untied States Air Force. Malmstrom AFB Air Quality Permit # 1427-06.

USAF. 2002. 341st Space Wing Integrated Hazardous Materials Emergency Response Plan 32-4 (U), OPR: 341 CES/CEX, Malmstrom AFB, Montana. August.

USAF. 2001a. Final Integrated Natural Resources Management Plan, Malmstrom Air Force Base. 341 CES/CEV Malmstrom Air Force Base, Montana.

USAF. 2001b. Final Environmental Assessment Weapons and Munitions Maintenance and Storage Complex, Malmstrom Air Force Base, Montana.

USAF. 1996. United States Air Force. Malmstrom Air Force Base Fish and Wildlife Plan.

USAF. 1994. United States Air Force. AICUZ Study, A Citizen's Brochure. Malmstrom AFB, Montana.

USCB. 2006a. United States Census Bureau. Population Estimates for Cascade County, Montana. Available at: http://factfinder.census.gov/servlet/DTTable?_bm=y&-context=dt&-ds_name=PEP_2005_EST&-mt_name=PEP_2005_EST_G2005_T001&-CONTEXT=dt&-tree_id=805&-all_geo_types=N&-geo_id=05000US30013&-search_results=01000US&-format=&-_lang=en. Accessed 21 November 2006.

USCB 2006b. United States Census Bureau. Great Falls, Montana People Quick Facts. Available at: http://quickfacts.census.gov/qfd/states/30/3032800.html. Accessed 21 November 2006.

USCB 2006c. United States Census Bureau. Cascade County, Montana People Quick Facts. Available at: http://quickfacts.census.gov/qfd/states/30/30013.html. Accessed 21 November 2006.

USCB 2006d. United States Census Bureau. Population data for Great Falls city, Montana. Available at: http://factfinder.census.gov/servlet/SAFFPopulation?_event=Search&geo_id=01000US&_geoContext=01000US&_street=&_county=Great+Falls+City&_cityTown=Great+Falls+City&_state=04000US30&_zip=&_lang=en&_sse=on&ActiveGeoDiv=geoSelect&_useEV=&pctxt=fph&pgsl=010&_submenuId=population_0&ds_name=null&_ci_nbr=null&qr_name=null&reg=null%3Anull&_keyword=&_industry=. Accessed 21 November 2006.

USCB 2006e. United States Census Bureau. Population data for Montana. Available at: http://factfinder.census.gov/servlet/SAFFPopulation?_event=&geo_id=04000US30&_geoContext=01000US%7C04000US30%7C16000US3032800&_street=&_county=Great+Falls+City&_cityTown=Great+Falls+City&_state=04000US30&_zip=&_lang=en&_sse=on&ActiveGeoDiv=geoSelect&_useEV=&pctxt=fph&pgsl=160&_submenuId=population_0&ds_name=null&_ci_nbr=null&qr_name=null&reg=null%3Anull&_keyword=&_industry=. Accessed 21 November 2006.

USCB 2006f. United States Census Bureau. Population Estimates for United States. Available at: http://factfinder.census.gov/servlet/SAFFPopulation?_event=&geo_id=01000US&_geoContext=01000US&_street=&_county=&_cityTown=&_state=&_zip=&_lang=en&_sse=on&ActiveGeoDiv=&_useEV=&pctxt=fph&pgsl=010&_submenuId=population_0&ds_

name=null&_ci_nbr=null&qr_name=null&reg=null%3Anull&_keyword=&_industry=. Accessed 21 November 2006.

USCB 2006g. United States Census Bureau. Profile of Selected Economic Characteristics: 2000, Great Falls city, Montana. Available at: http://factfinder.census.gov/servlet/QTTable?_bm=y&-geo_id=16000US3032800&-qr_name=DEC_2000_SF3_U_DP3&-ds_name=DEC_2000_SF3_U&-_lang=en&-_sse=on. Accessed 22 November 2006.

USCB 2006h. United States Census Bureau. Profile of Selected Economic Characteristics: 2000, Census Tract 12, Cascade County, Montana. Available at: http://factfinder.census.gov/servlet/QTTable?_bm=y&-context=qt&-qr_name=DEC_2000_SF3_U_DP3&-ds_name=DEC_2000_SF3_U&-CONTEXT=qt&-tree_id=4001&-redoLog=true&-all_geo_types=N&-geo_id=14000US30013001200&-search_results=01000US&-format=&-_lang=en. Accessed 22 November 2006.

USCB 2006i. United States Census Bureau. Census 2000 Demographic Profile Highlights, Great Falls city, Montana. Available at: http://factfinder.census.gov/servlet/SAFFFacts?_event=Search&geo_id=01000US&_geoContext=01000US&_street=&_county=Great+Falls+city&_cityTown=Great+Falls+city&_state=04000US30&_zip=&_lang=en&_sse=on&ActiveGeoDiv=geoSelect&_useEV=&pctxt=fph&pgsl=010&_submenuId=factsheet_1&ds_name=ACS_2005_SAFF&_ci_nbr=null&qr_name=null&reg=null%3Anull&_keyword=&_industry=&show_2003_tab=&redirect=Y. Accessed 22 November 2006.

USCB 2006j. United States Census Bureau. Census 2000 Demographic Profile Highlights, Cascade County, Montana. Available at: http://factfinder.census.gov/servlet/SAFFFacts?_event=&geoid=05000US30013&_geoContext=01000US%7C04000US30%7C05000US30013&_street=&_county=Cascade+County&_cityTown=Cascade+County&_state=04000US30&_zip=&_lang=en&_sse=on&ActiveGeoDiv=geoSelect&_useEV=&pctxt=fph&pgsl=050&_submenuId=factsheet_1&ds_name=ACS_2005_SAFF&_ci_nbr=null&qr_name=null&reg=null%3Anull&_keyword=&_industry=. Accessed 29 November 2006.

USCB 2006k. United States Census Bureau. Census 2000 Demographic Profile Highlights, Montana. Available at: http://factfinder.census.gov/servlet/SAFFFacts?_event=&geo_id=04000US30&_geoContext=01000US%7C04000US30%7C05000US30013&_street=&_county=Cascade+County&_cityTown=Cascade+County&_state=04000US30&_zip=&_lang=en&_sse=on&ActiveGeoDiv=geoSelect&_useEV=&pctxt=fph&pgsl=050&_submenuId=factsheet_1&ds_name=DEC_2000_SAFF&_ci_nbr=null&qr_name=null&reg=null%3Anull&_keyword=&_industry=. Accessed 29 November 2006.

USCB 2006l. United States Census Bureau. Census 2000 Demographic Profile Highlights, United States. Available at: http://factfinder.census.gov/servlet/SAFFFacts?_event=&geo_id=01000US&_geoContext=01000US%7C04000US30%7C05000US30013&_street=&_county=Cascade+County&_cityTown=Cascade+County&_state=04000US30&_zip=&_lang=en&_sse=on&ActiveGeoDiv=geoSelect&_useEV=&pctxt=fph&pgsl=040&

_submenuId=factsheet_1&ds_name=DEC_2000_SAFF&_ci_nbr=null&qr_name=null&reg=null%3Anull&_keyword=&_industry=. Accessed 29 November 2006.

USCB 2006m. United States Census Bureau. Census Tract 12, Cascade County, Montana, Profile of General Demographic Characteristics: 2000. Available at: http://factfinder.census.gov/servlet/QTTable?_bm=y&-context=qt&-qr_name=DEC_2000_SF1_U_DP1&-ds_name=DEC_2000_SF1_U&-CONTEXT=qt&-tree_id=4001&-redoLog=true&-all_geo_types=N&-geo_id=14000US30013001200&-search_results=01000US&-format=&-_lang=en. Accessed 29 November 2006.

USDA. 1982. Soil Survey of Cascade County Area, Montana. U.S. Department of Agriculture. Soil Conservation Service. U.S. Government Printing Office. Washington D.C.

USDL. 2006a. United States Department of Labor. Create Customized Maps – Unemployment Rates. Available at: http://data.bls.gov/map/servlet/map.servlet.MapToolServlet?survey=la. Accessed 22 November 2006.

USDL. 2006b. United States Department of Labor, Bureau of Labor Statistics. Unemployment Rates for Previous Years. Available at: http://www.bls.gov/cps/prev_yrs.htm. Accessed 22 November 2006.

USDOT. 1992. United States Department of Transportation, Federal Aviation Administration, *Guidelines for Sound Insulation of Residences Exposed to Aircraft Operations*.

USEPA. 1974. *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, Report EPA550/9-74-004*. Washington, D.C.: U.S. Environmental Protection Agency, Office of Noise Abatement and Control.

USFWS. 2006. Endangered, Threatened, Proposed, and Candidate Species; Montana Counties. U.S. Department of the Interior, Fish and Wildlife Service, Montana Field Office, Helena, MT. Available at: http://montanafieldoffice.fws.gov/Endangered_Species/Listed_Species.html. Accessed 26 October 2006.

Werner, J.K., B.A. Maxell, P. Hendricks, and D. L. Flath. 2004. Amphibians and Reptiles of Montana. Mountain Press Publishing Company, Missoula, MT. 262 pp.

Wikipedia. 2006. Definition of Lend-Lease. Available at: http://en.wikipedia.org/wiki/Lend-Lease. Accessed 21 November 2006.

APPENDIX A

Runoff Coefficient Discussion

Stormwater discharge from Malmstrom enters the west branch of Whitmore Ravine from both Drainage Area 1 and Drainage Area 2. The Fitness Center and HAWC, currently under construction, will demolish the existing 54,160 sf, fitness center but not the existing HAWC, which occupies roughly 5442 sf in Building 1145. The HAWC space left in Building 1145 would be converted to another use. Construction of the Fitness Center will demolish the parking lot and tennis courts to the northwest of the existing facility and a small portion of the paved streets on the northwest side of the existing facility. After demolition of the existing fitness center, the existing parking lot will be reconfigured, but this reconfiguration will not exceed the surface area of the pavement demolished.

The runoff coefficient was evaluated considering the following past actions:

Drainage Area 1

Proposed Action change in impervious surface	0 sf
Pavement Mill & Overlay West Base (52,500 SF)	0 sf (impervious surface increase)
Matador Manor (PH I,II, & III)	1,556,912 sf
Phases I, II & III demolition	(235,889 sf)
Phases IV,V,VI & VII roughly net zero	0 sf
Net increase in impervious surface	1,321,023 sf = 30.53 acres

Drainage Area 1 Total Surface Area = 655.5 acres

Drainage Area 2

Phase V	669,700 sf
Demolish relocatables	(573,177 sf)
New Fitness Center with LID	107,406 sf
Demolish existing fitness center	(54,160 sf)
Net increase in impervious surface	149,769 sf = 3.44 acres

Drainage Area 2 Total Surface Area = 213.6

The runoff coefficient is derived for use in storm water calculation methods commonly accepted in the engineering field, such as the Rational Method, Q=CiA, a storm water calculation method. Where Q= peak discharge (cfs), C = runoff coefficient (ASCE Manual of Practice), i = rainfall intensity (in/hr) and A = watershed area (acres). The runoff coefficient is the component of the rational formula that requires the greatest exercise of judgment by the engineer. The coefficient is not amenable to exact determination, due to the influence of a number of variables, such as infiltration capacity, interception by vegetation, depression storage and antecedent conditions. The American Society of Civil Engineers' (ASCE) Manual on the Design and Construction of Sanitary and Storm Sewers suggests coefficient ranges of 0.70 -0.95 for Bituminous pavements, 0.80-0.95 for Concrete pavements and 0.75 to 0.95 for Roofs. Similarly, the City of Great Falls, Storm Drainage Design Manual, suggests coefficients of 0.9 for parking lots and 0.9 for Industrial (impervious area greater than 70%).

The existing site is a mixture of Bituminous and Concrete pavements in an industrial area with greater than 70% impervious surface. The Proposed Action would construct three small building additions on the west side of the Base, replacing 20,500 square feet of existing pavement with 20,500 square feet of roof area. These facts would reasonably lead the design engineer to conclude the existing site has a runoff coefficient in the range of 0.80 to 0.95. These three buildings would be located within Drainage Area 1 without altering the impervious surface site.

Using the surface areas described above, we can consider an effective runoff coefficient for the combination of the various surfaces and slopes found in the drainage area. Since we are not altering the rainfall intensity or the boundaries of the watershed area, the only proposed change that could affect peak discharge is the change in impervious surface area, as that change causes us to consider the runoff coefficient for the new type of surface from the ASCE Practice Manual. The runoff coefficients for pavement and for a building have a substantially similar range. The runoff coefficient provides one of several factors in the Rational Method that assists the engineer in evaluating runoff versus infiltration. Stormwater is further evaluated in Chapter 4, Section 4.2.9.4 and Chapter 5. Malmstrom would further minimize effects by utilizing appropriate LID considerations and Best Management Practices, as described in the Malmstrom MS4 (Municipal Separate Storm Sewer) MPDES Permit. The Proposed Action does not change the range of Runoff Coefficient for Drainage Area 1 or Drainage Area 2 or combine with any of the past, present or reasonably foreseeable future actions to cumulatively effect the Runoff Coefficient of Drainage Area 1 or Drainage Area 2.

On the east side of the Base, stormwater from the Proposed Action would drain through Drainage Area 6. Additional facility construction within Drainage Area 6 is anticipated within the reasonably foreseeable future. The Propulsion System Rocket Engine building, Rivet Mile Administrative Facility, and expansion of the Weapons Storage Area would impact Drainage Area 6. The Proposed Action adds 3.4 acres of impervious surface to Drainage Area 6, but Malmstrom will offset that increase by demolishing 3.4 acres of existing impervious surface within the same drainage area. Other construction in the reasonably foreseeable future may add up to 24,000 SF (0.55 Acres) of impervious surface to Drainage Area 6. The cumulative total addition of impervious surface within the east base represents a 0.15% increase in impervious surface. The additional surface runoff from other planned construction would be managed through implementation of stormwater controls such as LID. The truck inspection station and Army Reserve buildings would drain into Drainage Area 7 thus not contributing to the cumulative surface water increase for drainage area six and Drainage Area 7 drains south, not into Whitmore Ravine.

Following the analysis used to evaluate the west side of the base, for the east side of the base, the runoff coefficients for pavement and for a building have substantially similar ranges. Malmstrom would further minimize potential effects by utilizing appropriate LID considerations and Best Management Practices, as described in the Malmstrom MS4 (Municipal Separate Storm Sewer) MPDES Permit. The Proposed Action does not change the range of Runoff Coefficients in Drainage Area 6 or combine with any of the past, present or reasonably foreseeable future actions to cumulatively effect the Runoff Coefficient of Drainage Area 6.