

FINDING OF NO SIGNIFICANT IMPACT

NAME OF THE PROPOSED ACTION

Replace Family Housing Phase VI & VII at Malmstrom Air Force Base, Montana.

DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

Malmstrom Air Force Base proposes to construct 797 total housing units (296 in Phase 6 and 501 in Phase 7). In addition, 20 units may be taken as an option from Phase 5 and added to Phase 6 and 7 if Air Staff approves the consolidation, resulting in 817 units to include full scope in the Phase 6 and 7 projects. Under the No Action Alternative, the proposed housing construction would not occur.

SUMMARY OF ENVIRONMENTAL CONSEQUENCES

This Environmental Assessment (EA) provides an analysis of the potential environmental consequences associated with the Proposed Action and the No Action Alternative. Nine resource categories received thorough evaluation to identify potential environmental consequences. As indicated in Chapter 4.0, the Proposed Action would not result in significant impacts to any resource area. The No Action Alternative would result in no impacts (positive or negative); however, the No Action Alternative would not accomplish the housing replacement objective.

Air quality impacts, while not significant, will occur due to exhaust emissions from construction equipment and from fugitive dust created during the construction process. Current air quality in the region of influence is excellent. Future phases of housing renovation and replacement and associated construction, though not likely, may impact the attainment status of the region.

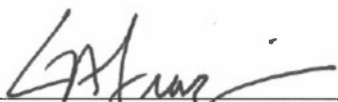
Implementation of the Proposed Action will have temporary increases in localized noise levels in the project area during construction. Noise will be typical construction noise, lasting for the duration of the specific construction activities. However, noise will be mitigated by the use of equipment sound mufflers and restricting construction activity to normal working hours. Although noise disruptions would be temporary and would be limited to daytime hours, these disruptions will be very noticeable.

Under the Proposed Action, the overall ecological effect would be insignificant. There would be no impacts to wetlands and the Proposed Action would not conflict with the wetlands management program at Malmstrom AFB. No special species or sensitive habitats are expected to be impacted. Standard construction best management practices would be applied to control sedimentation and erosion during construction, thereby avoiding secondary effects to any wetlands or freshwater aquatic communities. The replacement of existing housing under the proposed action will reduce the amount of impervious surface within the project area, which may result in a slight reduction of stormwater discharge. Cumulative impacts are insignificant.

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14. ABSTRACT This Environmental Assessment has been developed for the Replace Family Housing Phase 6 and Phase 7 design and construction project at Malmstrom AFB. The current family housing situation at Malmstrom AFB is very poor. Of the 1,471 housing units on base, only 498 are deemed adequate according to current Air Force Housing Guidance (USAF 1995a, 2003). Many of the existing homes have deteriorated and the following problems have been reported electrical wiring and fixtures that do not meet current building codes, plumbing fixtures that have corroded, outdated flooring, asbestos is present in flooring and countertops, and lead-based paint has been detected on several interior and exterior surfaces. The Air Force proposes to build new housing units within the existing housing area to remedy these needs.					
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CONCLUSION

In accordance with the Council on Environmental Quality (CEQ) regulations implementing the National Environmental Policy Act (NEPA), as amended, and the Air Force Environmental Impact Analysis Process regulations contained in 32 Code of Federal Regulations (CFR) 989, an assessment of the environmental effects has been completed for the Phases VI and VII replacement of family housing units at Malmstrom AFB. I have determined that the Proposed Action will not have a significant adverse impact on the environment or the quality of the human environment. Therefore, an Environmental Impact Statement is not required.



GEOFFREY A. FRAZIER, Colonel, USAF
Malmstrom AFB ESOH Council Chairman

6 DEC 05

Date

FINAL
ENVIRONMENTAL ASSESSMENT FOR
PHASE 6 AND PHASE 7
REPLACE FAMILY HOUSING AT
MALMSTROM AIR FORCE BASE, MONTANA



Prepared for:



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Prepared by:



**US Army Corps
of Engineers** ®
Seattle District

2005

DOCUMENT PAGE

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This document was prepared by the Environmental Resources Section (ERS) for the U.S. Army Corps of Engineers, Seattle District and Malmstrom AFB. This draft report is intended to solicit public input on the proposed project for the purpose of satisfying the National Environmental Policy Act. Comments based on this Environmental Assessment shall be consolidated and used to develop a final Environmental Assessment which will determine whether this activity represents a significant impact to the human environment, and require the preparation of an Environmental Impact Statement.

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APPENDIX A**Public Comments**

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ENVIRONMENTAL ASSESSMENT

REPLACE FAMILY HOUSING PHASE 6 & 7

MALMSTROM AIR FORCE BASE; GREAT FALLS, MONTANA

1.0 PURPOSE OF AND NEED FOR PROPOSED ACTION

1.1 Executive Summary/Abstract

This Environmental Assessment has been developed for the Replace Family Housing Phase 6 and Phase 7 design and construction project at Malmstrom AFB. The current family housing situation at Malmstrom AFB is very poor. Of the 1,471 housing units on base, only 498 are deemed adequate according to current Air Force Housing Guidance (USAF 1995a, 2003). Many of the existing homes have deteriorated and the following problems have been reported: electrical wiring and fixtures that do not meet current building codes, plumbing fixtures that have corroded, outdated flooring, asbestos is present in flooring and countertops, and lead-based paint has been detected on several interior and exterior surfaces. The Air Force proposes to build new housing units within the existing housing area to remedy these needs.

The Phase 6 project area is located within the Lincoln Drive housing area, just north of the Main gate and Goddard Avenue, and will include some construction on Washington Circle. Phase 7 construction is expected to encompass all other housing areas not previously replaced. The Proposed Action includes the construction of 797 homes (296 in phase 6 and 501 in phase 7) consisting of duplex units, along with single units, in the existing housing area at Malmstrom AFB. Existing housing on the project site will be demolished prior to construction. Due to the prior removal of substandard housing from this site, project alternatives consisted of different densities and types of new construction.

This Environmental Assessment discusses in detail the potential effects the Proposed Action will have on air, water, geological, biological, cultural, noise, health, land, and socioeconomic resources. The Proposed Action would occur in Cascade County, Montana, where the air quality is designated as in attainment 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 is likely to be short-term and not significant.

Groundwater resources consist of deep, confined aquifers that range from 100 feet to 200 feet below land surface on base. Surface water drains in ephemeral streams and coulees to the Missouri River, which is located about one mile north of the base. The Proposed Action would not be expected to significantly impact groundwater resources. Short-term impacts to surface water could potentially occur during construction, but long-term impacts to surface water resources would not occur.

The Proposed Action would occur within Seismic Zone 1 but it is recommended that the buildings be designed for Seismic Zone 2B because Great Falls is situated near the seismic zone

boundary. The modern soils of Malmstrom AFB have developed directly on Quaternary glacial deposits and consist of: sandy lean clay, clayey sand, silty sand, fat clay, and high-plasticity, lean clay. Although the Proposed Action includes developing the existing site, it was previously used for housing, thus no significant long-term impacts to site soils are expected.

There are no federally listed threatened or endangered species that occur on Malmstrom AFB, and no delineated wetlands currently exist within the site. Consistent with the lack of impact to the site soils, the Proposed Action would have an insignificant impact on biological resources, wetland areas, habitat areas, or threatened or endangered species.

Cultural resources of concern located near the proposed area of impact include a railroad segment that may be eligible for the National Register of Historic Places. The site proposed to be developed in this action was previously used for housing, thus impacts to traditional resources are not expected under the Proposed Action.

Existing noise levels are documented as falling within the “Urban Residential” noise level, consisting of a typical range of 58 to 62 dB. The Proposed Action would increase existing noise levels as construction commences and continues, but this noise will be intermittent and occur at times when most residents are not in the area surrounding the construction site.

Land use at Malmstrom AFB consists of primarily the airfield and housing units. Private vehicles dominate traffic at Malmstrom, and no public transit is available. The presence of construction vehicles will increase traffic levels in the north-west section of Malmstrom AFB, but increases in traffic volumes associated with construction activity would be temporary. No long-term impacts to on-base transportation systems would result from the Proposed Action.

The operation of Malmstrom AFB makes an important contribution to the economy of the region through both direct employment and purchases from local businesses. The presence of the base provides economic stability to the city and the region. No long-term changes in base employment or expenditures are anticipated as a result of the Proposed Action. No permanent or long-lasting socioeconomic impacts are anticipated as a result of implementation of the Proposed Action.

Construction impacts on air quality will be short-term and limited to localized areas. Permanent changes to soil structure and stability can occur by disrupting and reworking certain soils. Noise from construction activities is an unavoidable short-term impact. As multiple phases of housing construction occur, on-base roads will begin to deteriorate due to construction traffic and may require replacement. In light of past, present, and reasonably foreseeable future actions, USAF expects no significant cumulative impacts as a result of this project.

1.2 Introduction

The United States Air Force (USAF), as the 341st Civil Engineering Squadron (341 CES/CEV), proposes to redevelop 797 homes (296 in phase 6 and 501 in phase 7) consisting of duplex units, along with single units, in the existing housing area at Malmstrom AFB.

This Environmental Assessment (EA) has been prepared to analyze the potential environmental consequences associated with the Proposed Action and No Action Alternatives in accordance with the requirements of the National Environmental Policy Act (NEPA) and the implementing regulations.

Section 1.3 provides background information on Malmstrom Air Force Base (AFB). The Purpose of and Need for the Proposed Action are discussed in Section 1.4. A detailed description of the Proposed Action and the No Action Alternative is provided in Chapter 2. Chapter 3 describes the existing conditions of various environmental resources that could be affected by the Proposed Action or the No Action Alternative. Chapter 4 describes how those resources would be affected by implementation of the Proposed Action or the No Action Alternative. Chapter 5 evaluates the cumulative effects of the Proposed Action. Chapter 6 is a bibliography of resources cited in the preparation of this EA.

1.3 Background

Malmstrom AFB encompasses over 3,600 acres of land in Cascade County in west central Montana (Figure 1). The base lies approximately 0.3 miles east of the City of Great Falls city limit at its closest point and is 5 miles from the central business district of the City. Interstate Highway 15 passes along the western boundary of Great Falls. Access to the base main gate is off US Highway 87/89, east of Interstate Highway 15, via 2nd Avenue North.

The construction proposed in Phase 6 consists of the replacement of 310 of the existing housing units in the Lincoln Drive housing area, located to the north of the main gate to Malmstrom AFB on Goddard Drive. The existing housing units will be demolished, and replaced with new townhouse-style units and stand alone single family housing for senior officers and Non-Commissioned Officers (NCOs).

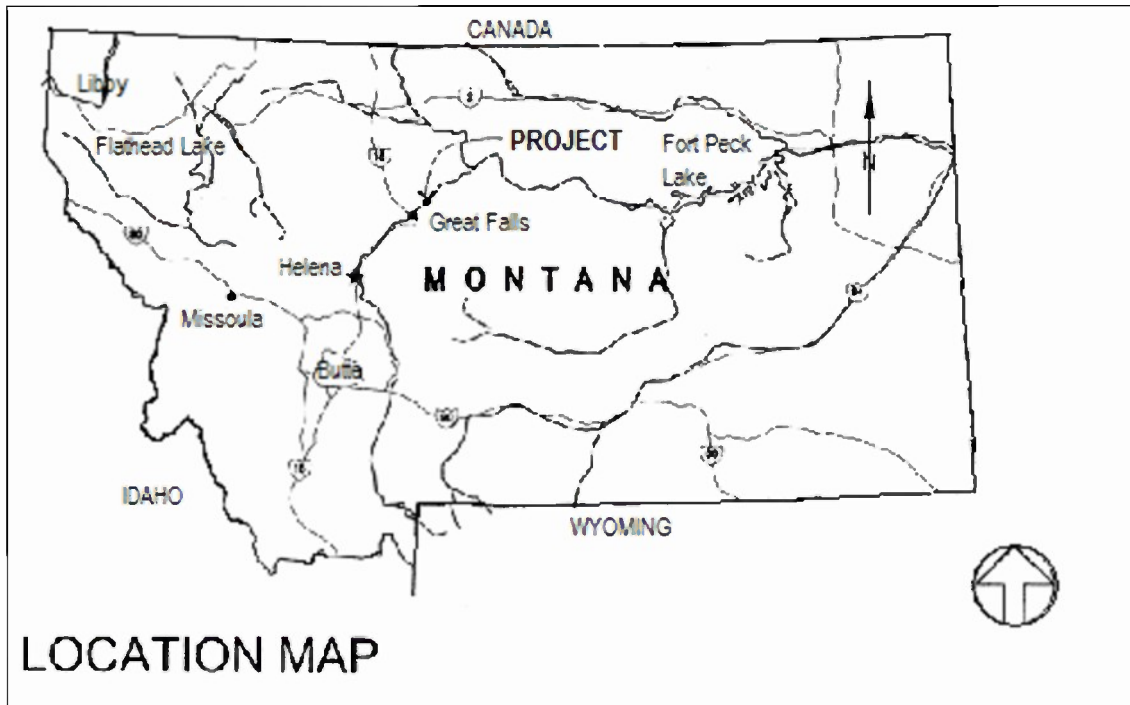


Figure 1: Vicinity Map of Malmstrom AFB

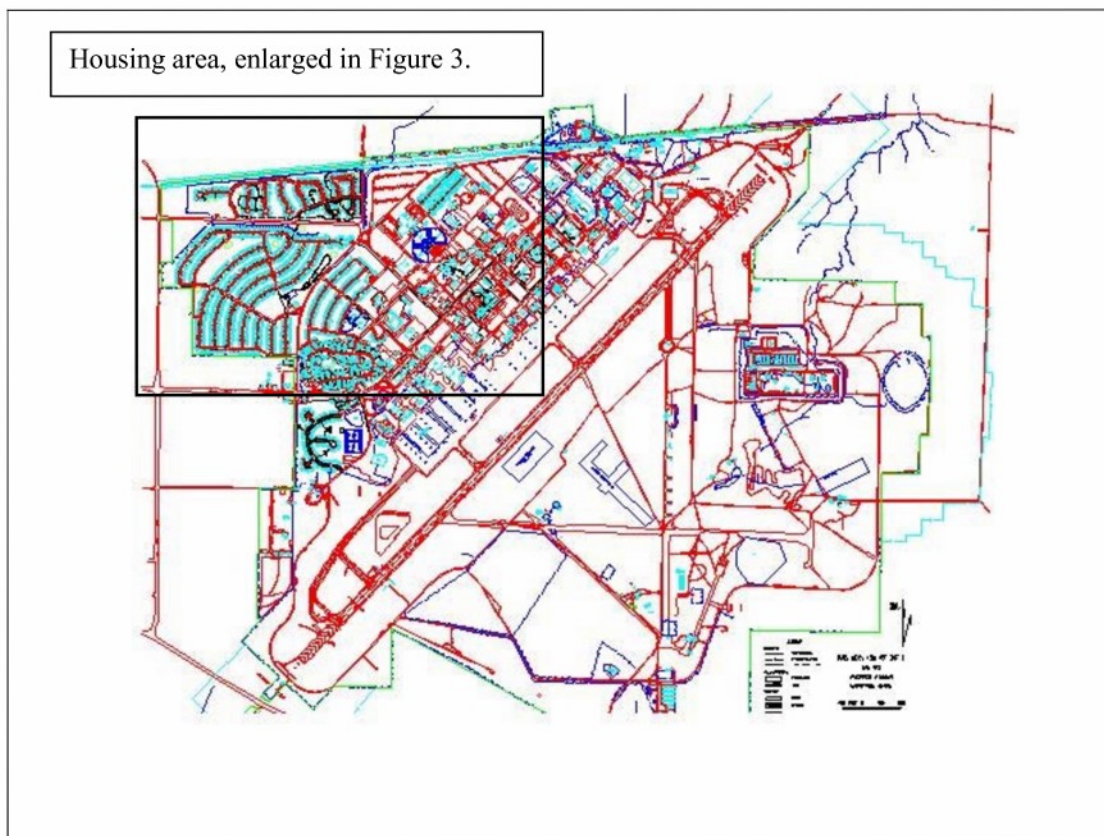


Figure 2: Map of Malmstrom Air Force Base, Great Falls Montana.

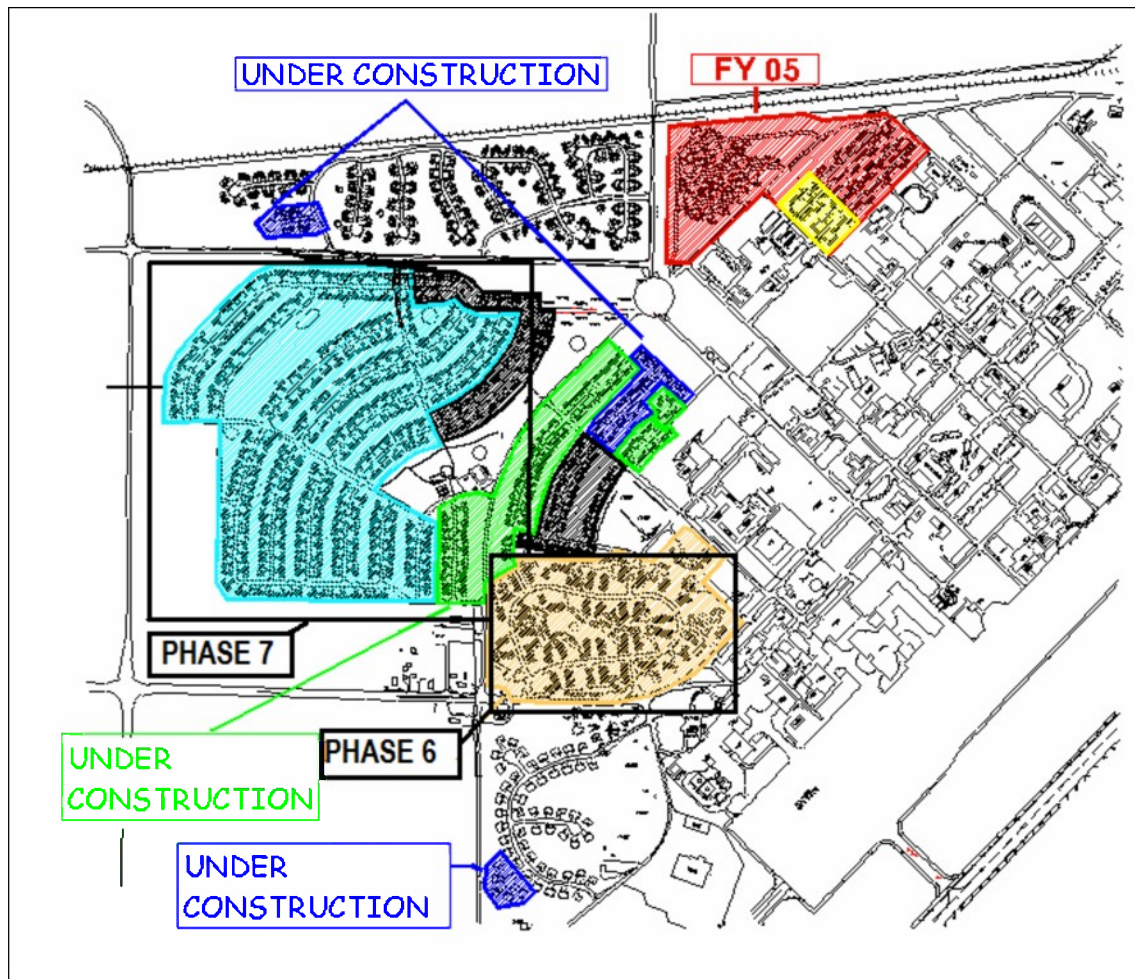


Figure 3: Malmstrom AFB Family Housing Renovation Schedule by Location on Base.

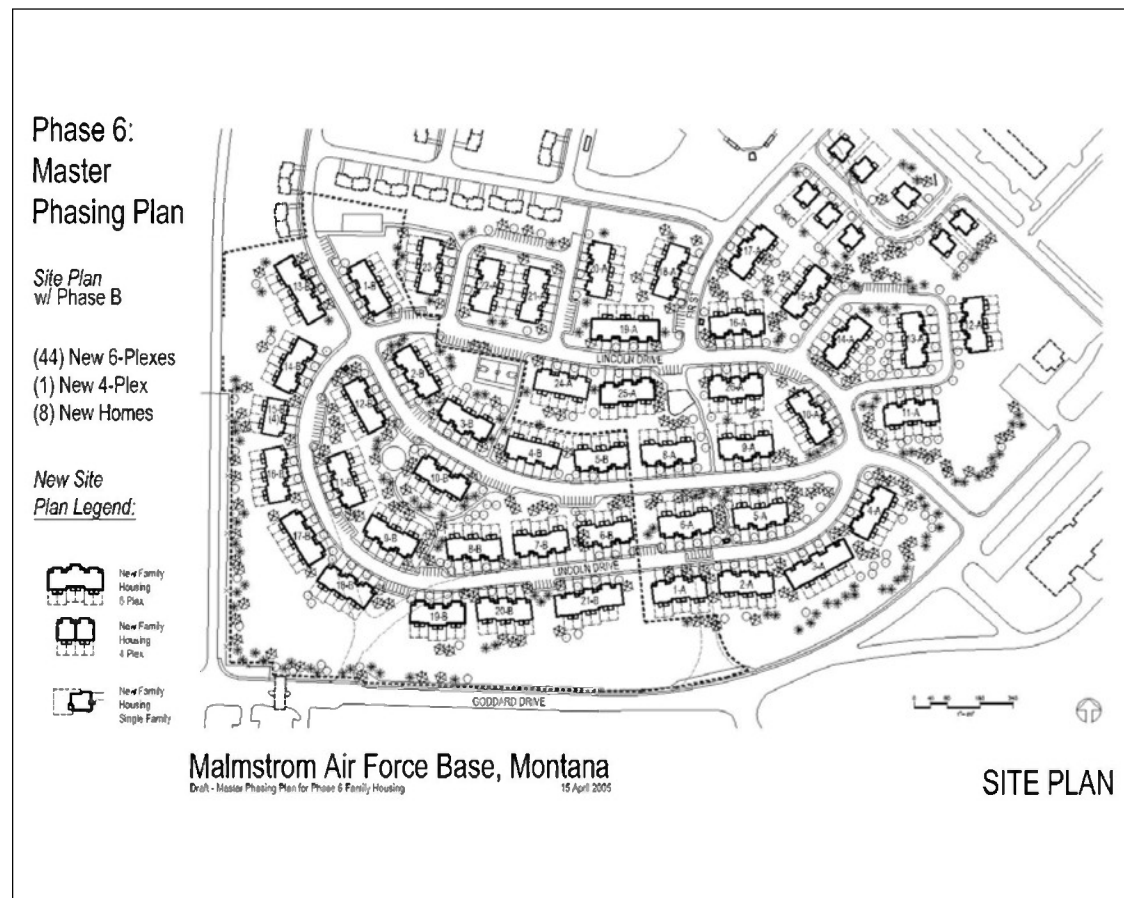
The purpose of the Air Force Housing Community Plan and the whole house/whole neighborhood focus is to increase the overall quality of the entire family housing area. It provides a comprehensive plan for improving the overall quality of the family housing environment by integrating elements such as utility and infrastructure planning, site planning, open/recreation space development, and “streetscape” development (USAF 1995a). The goal of neighborhood design for Air Force family housing is to develop and sustain a residential environment that responds to the Air Force family and reinforces the connection between the families and the community. Malmstrom AFB provides on-base family housing for military personnel and their families. Over 600 housing structures comprised of multi-family apartments, duplexes, and single-family homes, house over 1,400 family units.

1.4 Project Need and Purpose

Recent inspections of the on-base housing reveal that:

- Most electrical wiring and fixtures do not meet current building codes, wiring is brittle and exposed in many units and is a fire hazard, there are no Ground Fault Interrupter circuit protections, and outlets lack proper grounding protection.
- Plumbing systems have succumbed to the effects of hard water and corrosion, resulting in severe constriction and pipe leakage, and plumbing fixtures are worn and discolored and require replacing.
- Bedrooms are small and lack closet space.
- Bathrooms are small and fixtures are outdated and energy-inefficient.
- Kitchens lack sufficient storage and counter space, cabinets are old and unsightly, and countertops and sinks are badly worn.
- Flooring throughout the homes is outdated.
- Asbestos has been detected in flooring, counter tops, roofing material, and insulation.
- Lead-based paint has been detected on both interior and exterior surfaces

The purpose of this action is to replace existing substandard housing with adequate housing. The bulk of the currently available family housing at Malmstrom AFB include structures that are typically 30 to 40 years old and no longer meet the Air Force's standards for military housing. Of the 1,471 housing units on base, only 498 are deemed adequate according to current Air Force Housing Guidance (USAF 1995a, 2003).



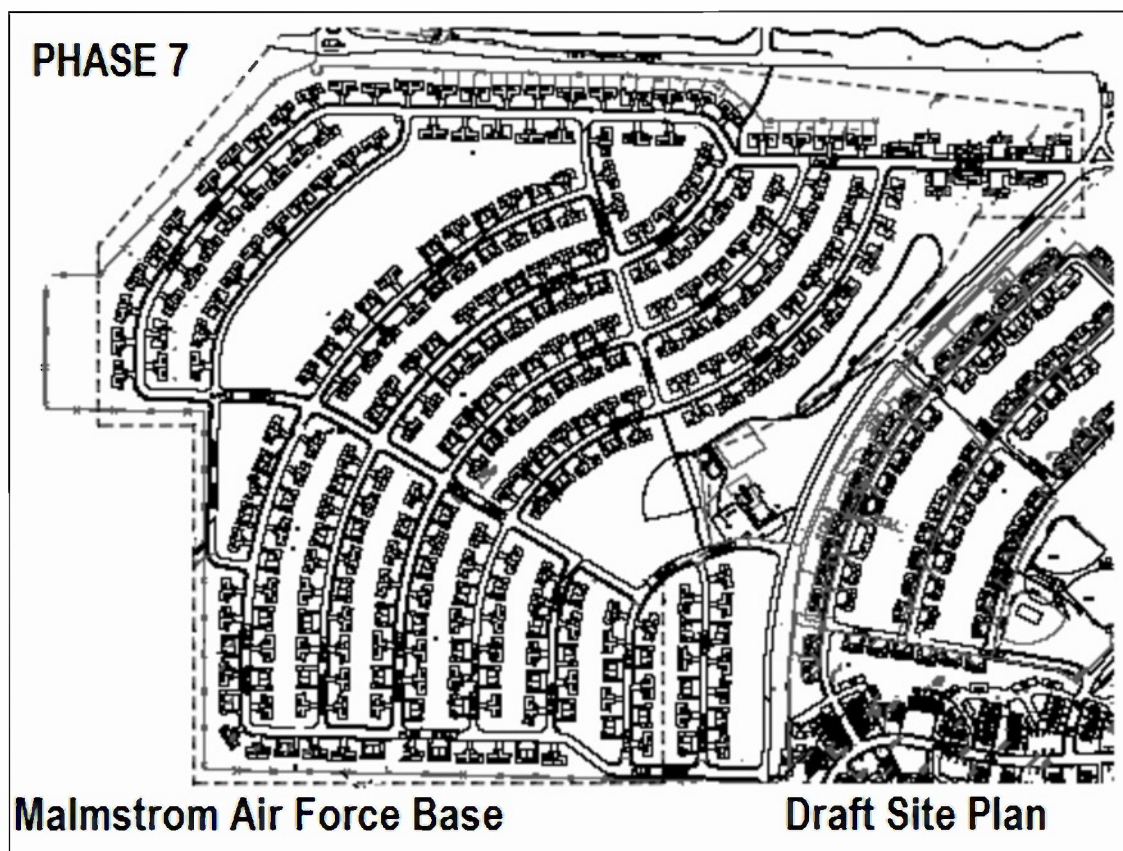


Figure 5: Phase 7 draft housing development plan, Malmstrom Air Force Base, Great Falls Montana.

Table 1: Malmstrom AFB On-Base Housing Inventory

Neighborhood	Renovated	Bedrooms	Net Sq.Ft.	No. of Units	Construction Schedule
Atlas Village	No	2	808	219	FYs 2006-07
	No	3	1,069	74	
	No	3	1,148	9	
	No	3	1,200	4	
Jupiter	No	3	1,104	90	FY 2005
Matador Manor	No	3	1,522	6	Scheduled for FY 2003
	Yes	3	1,522	39	New construction in FY 2003
	Yes	3	1,534	35	
	Yes	3	1,574	6	
	Yes	4	1,722	8	
Minuteman Village	No	3	1,522	2	Scheduled for FY 2003
	No	3	1,534	2	
	Yes	2	1,282	10	New Construction in FY 2003
	Yes	3	1,534	2	
	Yes	3	1,670	143	
	Yes	3	1,707	4	
	Yes	3	1,800	2	
	Yes	3	1,954	13	
	Yes	4	1,801	24	
Peacekeeper Park	Yes	3	1,775	10	Previously Completed
	Yes	3	1,813	16	
	Yes	4	1,407	1	
	Yes	4	2,072	22	
	Yes	4	2,116	9	
	No	3	1,080	157	Ten to be replaced in FY 2004, others in FY 2007 and beyond
	No	3	1,116	140	Ten to be replaced in FY 2004, others in FY 2007 and beyond
	No	3	1,259	73	FY 2007+
	No	3	1,346	20	FY 2007+
	No	4	1,247	96	Four to be replaced in FY 2004, others in FY 2007 and beyond
	No	4	1,407	16	FY 2007+
Titan Village	Yes	2	1,353	48	Previously Completed
	Yes	4	1,838	4	
	No	2	1,311	6	To be replaced in FY 2004
	No	2	1,353	28	To be replaced in FY 2004
	No	3	1,380	22	2 Scheduled for 2003, 20 to be replaced in FY 2004
	No	3	1,788	14	Scheduled for FY 2003
	No	3	1,811	8	To be replaced in FY 2004
	No	4	1,714	8	To be replaced in FY 2004
	No	4	2,051	2	Scheduled for FY 2003
	No	4	2,113	6	Scheduled for FY 2003
	No	4	2,648	2	To be replaced in FY 2004
Washington Circle	No	3	1,553	4	FYs 2006-07

Bold/shading indicates housing included in the current Proposed Action

This document addresses the impacts related to the construction of approximately 797 homes (296 in phase 6 and 501 in phase 7) consisting of duplex units, along with single units, notably for the Base Senior NCO. Construction initiation is planned in Fiscal Year (FY) 2006, and 2007, with 52 optional units to be added in either 2006 or 2008, depending on appropriation. Construction will be phased, as described below, over subsequent years until project completion. This construction is to replace housing units that will be demolished.

Table 2 lists the maximum gross floor area authorized by pay grade according to the Air Force Family Housing Guide (USAF April 2004 DRAFT). Much of the available family housing at Malmstrom AFB is substantially smaller than these guidelines.

Table 2: Maximum Gross Floor Area Authorized by Air Force Guidance

If the occupant's pay grade is	Then the number of bedrooms is	And the maximum gross square footage is
0-7 and above	4	3,660 SF
0-6	4	2,770 SF
E-9	4	2,540 SF
0-4 and 0-5	4	2,310 SF
	3	2,020 SF
0-1 through 0-3 and E-7 through E-8	5	2,510 SF
	4	2,150 SF
	3	1,860 SF
	2/Den	1,670 SF
	2	1,490 SF
E-1 through E-6	5	2,300 SF
	4	1,950 SF
	3	1,630 SF
	2/Den	1,480 SF
	2	1,340 SF

1.5 Scope of the Environmental Review

This EA was prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality (CEQ) regulations (§40 CFR 1500-1508), and Air Force Instruction (AFI) 32-7061, which has been superseded by 32 CFR 989. As allowed by §40 CFR 1500.4 and 1508.9 and 32 CFR 989, this EA focuses on specific issues and concerns affecting Malmstrom AFB.

1.6 Other Applicable Regulatory Requirements

Each environmental resource is regulated and/or protected by Federal and State of Montana regulations. In establishing the background conditions and assessing the potential environmental consequences of the Proposed Action, the following regulations were also considered.

1.6.1 Air Quality

The Montana Clean Air Act (Montana Code Annotated [MCA], Title 75, Chapter 2) implements the federal Clean Air Act. The Montana Clean Air Act, implemented by the Air Quality Procedural Regulations, the Air Quality Regulations, and the Ambient Air Quality Standards, establishes ambient air quality standards and permitting and monitoring procedures.

The Clean Air Amendment Act (CAAA) of 1990 established new federal nonattainment classifications, new emission control requirements, and new compliance dates for nonattainment areas. The requirements and compliance dates are based on the severity of nonattainment classification.

1.6.2 Water Quality

The Water Pollution Control Law (MCA 75.05) sets forth water conservation, water quality protection, and pollution prevention and abatement measures. Implementing regulations include the Water Pollution Control Regulations (Administrative Rule of Montana [ARM], Title 17, Chapter 30, Subchapter 7).

The Montana Pollutant Discharge Elimination System (MPDES) Rules (ARM 17.30.12-13) establish effluent limitations, treatment standards, and other requirements for point source discharge of waste into State waters, including storm water runoff.

The Groundwater Pollution Control Regulations (ARM 17.30.10) establish groundwater classification, and set forth protection and permitting requirements, while the Surface Water Quality Standards (ARM 17.30.06) establish surface water quality criteria to ensure public health and safety and provide for water conservation.

1.6.3 Public Health and Safety/Hazardous Waste

The Solid Waste and Litter Control Act (MCA 75.10) provides for coordinated State solid waste management and a resource recovery plan. The Integrated Waste Management Act (MCA 75.10) provides for waste reduction and recycling programs.

The Hazardous Waste Act (MCA 75.10), and the Hazardous Waste Management Regulations (ARM 16.44) control the generation, storage, transportation, treatment, and disposal of hazardous wastes; the Act also authorizes the State to implement a program pursuant to the Federal Resource Conservation and Recovery Act (RCRA).

The Refuse Disposal Regulations (ARM 16.14.05) implement the hazardous waste act and regulations. These regulations provide uniform standards for the storage, treatment, recycling, recovery, and disposal of solid waste, including hazardous waste, and the transportation of hazardous waste.

1.6.4 Biological Resources

The Endangered Species Act (§16 USC 1531-1543) requires Federal agencies that authorize, fund, or carry out actions to avoid jeopardizing the continued existence of endangered or

threatened species or destroying or adversely modifying their critical habitat. Federal agencies must evaluate the effects of their actions on endangered or threatened species of fish, wildlife, and plants and their critical habitats and take steps to conserve and protect these species. The Act requires the avoidance or mitigation of all potentially adverse impacts to endangered and threatened species.

EO 11990, Protection of Wetlands, requires Federal agencies to take action to avoid, to the extent practicable, the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands. The intent of EO 11990 is to avoid direct or indirect construction in wetlands if a feasible alternative is available. All Federal and federally supported activities and projects must comply with EO 11990. In addition, activities occurring in jurisdictional wetlands and other Waters of the U.S. require compliance with Section 404 of the Clean Water Act administered by the U.S. Army Corps of Engineers and Section 401 of Clean Water Act administered by the Environmental Protection Agency (EPA) for on-Base lands and the Montana Department of Environmental Quality for off-Base lands.

1.6.5 Cultural, Paleontological, and Archaeological Resources

The primary goal of the National Historic Preservation Act (NHPA) of 1966 (§16 USC 470 et seq., as amended); is to ensure adequate consideration of the values of historic properties in carrying out Federal activities and to attempt to identify and mitigate impacts to significant historic properties. The NHPA is the principal authority used to protect historic properties. Federal agencies must determine the effect of their actions on cultural resources and take certain steps to ensure they locate, identify, evaluate, and protect all resources. 36 CFR 800 defines the responsibilities of the State, the Federal Government, and the Advisory Council on Historic Preservation (ACHP) in protecting historic properties identified in a project area. Section 106 of the NHPA and its implementing regulations mandate identification of cultural resources which would be potentially affected by project activities and that the Air Force address the effects of the undertaking on such resources. §36 CFR 60 establishes the National Register of Historic Places (NRHP) and defines the criteria for evaluating eligibility of cultural resources to the NRHP.

The Archaeological Resources Protection Act of 1979 (§16 USC 470a-47011, as amended) protects archaeological resources on Federal lands. If an agency discovers archaeological resources during site activities, the act requires permits for excavating and removal of any archaeological resources.

2.0 ALTERNATIVE ANALYSIS

This Section describes the elements of the No Action Alternative, Other Alternatives analyzed and rejected, and the Proposed Action including the construction of approximately 797 housing units in two phases (Phase 6 and 7) over several years.

2.1 No Action Alternative

The No Action Alternative would result in no construction or renovation of existing housing by the Air Force in the remaining housing areas/phases. Due to the severe shortage of adequate

family housing units at Malmstrom AFB, if these houses are not constructed, 797 soldiers and their families will be forced to rent or purchase housing off base. Thus, the No Action Alternative would result in a decrease in readiness, morale and base unity.

2.2 Other Alternatives Analyzed and Rejected

During the project development, the Air Force analyzed the options of renovating the existing structures, as well as renovation with partial replacement of the housing units in the worst condition. Air Force guidance states that if the cost of renovation exceeds 70% of the replacement cost, then the housing unit should be replaced (USAF 1995a). Due to the presence of multiple sources of potential hazardous contamination (lead-based paint, asbestos floor tiles and exteriors, PCB containing light ballasts, etc), the renovation option was discarded from further analysis due to the prohibitive cost of containment and abatement as part of the renovation package. In addition, renovated structures would not meet current Air Force housing standards for square footage for personnel of a given grade.

The combined renovation/replacement plan was likewise rejected from further consideration due to the high cost of contaminant abatement and the inability of the Base to meet current Air Force housing standards for square footage by renovating certain structures and replacing others.

2.3 Proposed Action

The Proposed Action involves the construction of approximately 797 housing units in two phases (296 in phase 6 and 501 in phase 7) over several years. The current project schedule assumes documents are ready to advertise (RTA) on 15 Oct 2005. Anticipated proposal due date is December 2005. Construction for phase 6 is tentatively set for January 2006, at the direction of Air Staff Command. Construction of Phase 7 is currently schedules in Jan 2007. This Proposed Action represents two phases of a multiple phase base housing replacement program to upgrade all of the on-base family housing at Malmstrom AFB. Figure 3 and Table 1 show the current housing inventory and actual or planned dates for renovation or replacement. The replacement actions are those described on the map as FY '06 or later, and constitute the remaining housing units in need of replacement.

2.3.1 Demolition

In order to accommodate ongoing housing needs, and to prevent severe adverse impacts to the Great Falls Community, demolition and construction will be phased under both Phase 6 and Phase 7. Figure 5 presents the demolition sequence for Phase 6. Similar demolition and construction sequencing will be completed for Phase 7 prior to construction contract award. At no time will more than 85 housing units be demolished or under construction at any time. All utilities are underground. Previous units were heated with natural gas-fired forced-air furnaces. Other buried utilities include water and sewer, telephone, and television cable. Telephone and electrical services were originally installed above ground, but have been buried during one of many interim renovations of these homes.

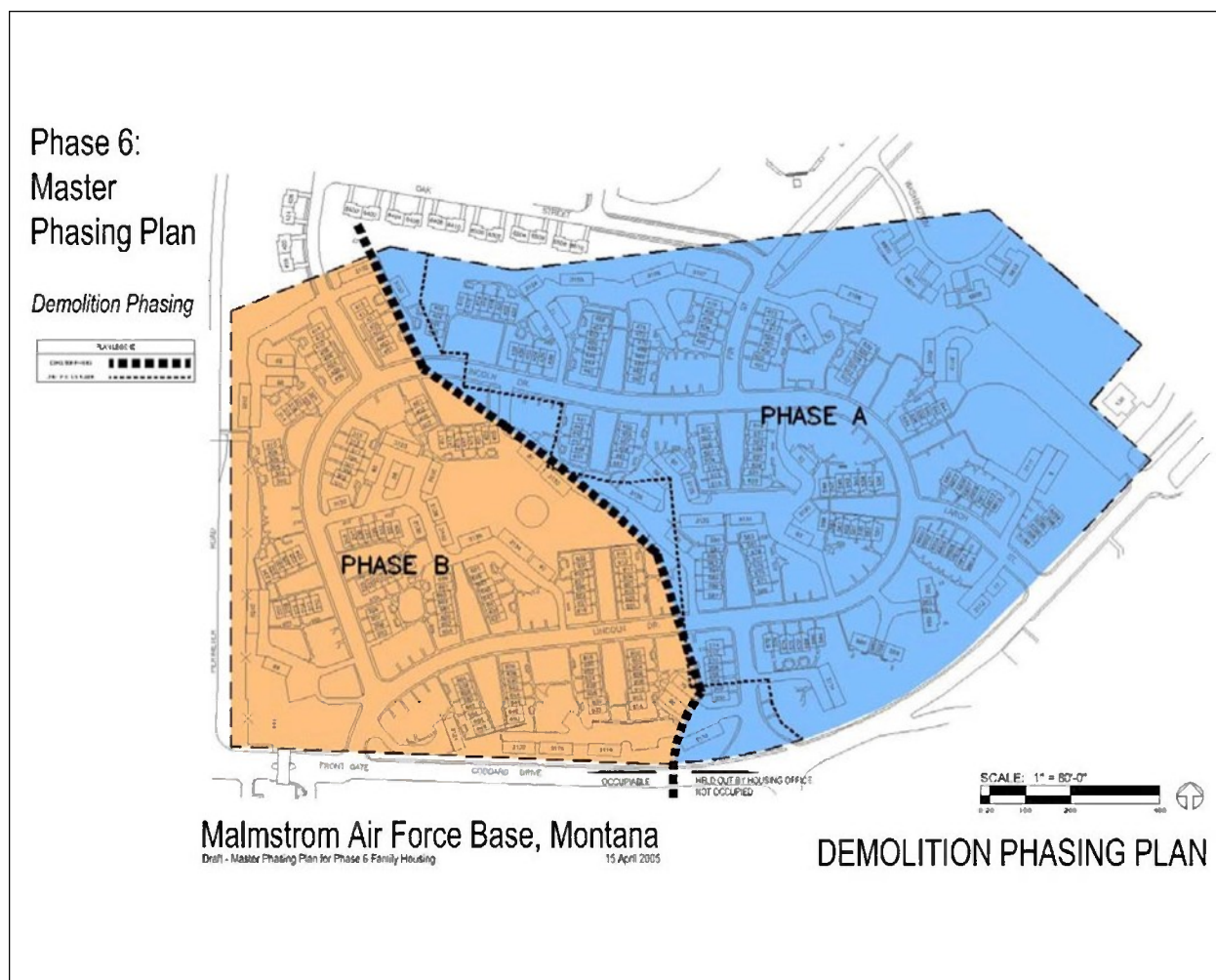


Figure 6 Phase 6 demolition and construction area sequencing, Replace Family Housing Malmstrom AFB, Great Falls Montana.

2.3.2 New Home Construction

Construction will commence following the completion of the demolition and fill work described above. The Proposed Action includes the construction of 797 new homes (Figure 2 and Figure 3, above). In addition, 20 units may be taken as an option from Phase 5 and added to Phase 6 and 7 if Air Staff approves the consolidation, resulting in 817 units to include full scope in the Phase 6 and 7 projects. The homes will be built on an elevated floor system bearing on grade beams. The units will be traditional wood-frame structures, and each unit will have an attached single car garage. The new homes will include amenities to match the current Air Force Family Housing Guide (USAF April 2004 DRAFT). These include items such as master bedrooms with $\frac{3}{4}$ -bathrooms, separate living rooms and family rooms, outdoor patios with privacy fencing, additional arctic recreation rooms, and substantial storage area in the garages. All new structures will be built to current building codes.

- Electrical, telephone and cable television service will be connected to the new homes using new service drops from existing main feeder lines. Specific replacement and upgrades to the utilities include:
 - Due to EPA requirements for off-site storm water runoff, current and future development must not increase runoff. Existing storm sewer lines will be rerouted during construction, as illustrated in Figure 6. New curbs and storm sewer inlets will be constructed during each phase. The amount of pervious and impervious surface in the housing area will remain the same as a result of this construction.
 - New natural gas valves will be installed where necessary to tie the existing 4 inch gas main to the new construction.
 - Sanitary sewer and drinking water lines will remain to provide service to occupied units during construction. Damaged or degraded sections of piping will be replaced as needed during construction. New electrical circuits and supporting infrastructure will be provided as need to tie in new units with out disrupting services to existing, occupied housing.

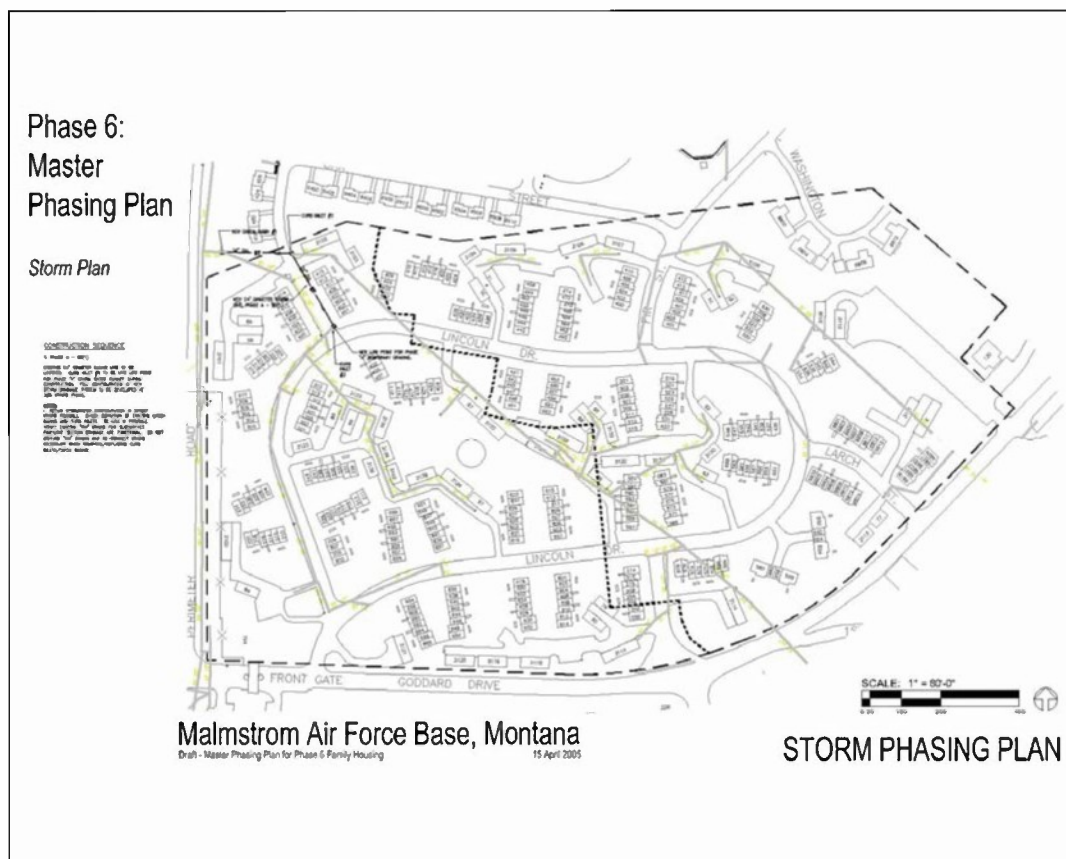


Figure 7 Storm sewer construction sequencing plan for Phase 6, Replace Family Housing Malmstrom Air Force Base, Great Falls Montana.

2.4 Comparison of Alternatives

Table 3 summarizes the potential environmental impacts of the Proposed Action and alternatives, based on the impact analyses presented in Chapter 4.0. Potential environmental consequences are not significant with the implementation of the Proposed Action or no action alternatives.

Table 3: Summary of Potential Environmental Impacts of Proposed Action and No Action Alternatives.

Resource	Proposed Action	No Action Alternative
Air Resources	0	0
Water Resources	0	0
Geological Resources	0	0
Biological Resources	0	0
Cultural Resources	0	0
Noise (Construction)	-	0
Health, Safety and Waste Management	0	0
Land Use (Transportation)	0	0
Socioeconomics and Environmental Justice	+	0
- = Adverse, but not significant short-term or long term impact + = Positive/beneficial short-term or long-term impact 0 = No change short-term or long-term.		

3.0 AFFECTED ENVIRONMENT

This chapter describes the affected environment at Malmstrom AFB. The existing environmental conditions within the expected geographic extent of potential impacts, known as the Region of Influence (ROI), are addressed for each environmental resource in this chapter.

3.1 Air Resources

This section describes the existing concentrations of various pollutants and the climatic and meteorological conditions that influence the quality of the air in the area around Malmstrom AFB. Precipitation, wind direction and speed, and atmospheric stability conditions are factors that determine the extent of pollutant dispersion.

The type and concentration of pollutants in the atmosphere, the size and topography of the air basin, and local and regional meteorological influences determine air quality. Comparing these values to federal and/or state ambient air quality standards determine the significance of a pollutant concentration in a region or geographical area. Under the authority of the Clean Air Act (CAA), the United States Environmental Protection Agency (USEPA) has established nationwide air quality standards to protect public health and welfare, with an adequate margin of safety.

These federal standards, known as the National Ambient Air Quality Standards (NAAQS), represent the maximum allowable atmospheric concentrations and were developed for six “criteria” pollutants: ozone (O₃), nitrogen dioxide (NO₂), carbon monoxide (CO), respirable particulate matter less than 10 micrometers in diameter (PM₁₀), sulfur dioxide (SO₂), and lead (Pb). Based on measured ambient criteria pollutant data, the USEPA designates areas of the United States as having air quality equal to or better than the NAAQS (attainment) or worse than the NAAQS (nonattainment). Nonattainment areas that achieve attainment are subsequently redesignated as maintenance areas for a period of 10 or more years. Areas are designated as unclassifiable for a pollutant when there is insufficient ambient air quality data for the USEPA to form a basis of attainment status. For the purpose of applying air quality regulations, unclassifiable areas are treated similar to areas that are in attainment of the NAAQS.

In 1997, the USEPA promulgated two new standards: a new 8-hour O₃ standard (which will eventually replace the existing 1-hour O₃ standard) and a new standard for particulate matter less than 2.5 micrometers in diameter (PM_{2.5}), which are fine particulates that have not been previously regulated. In addition, the USEPA revised the existing PM₁₀ standard. The two new standards are scheduled for implementation over the next few years, as monitoring data becomes available to determine the attainment status of areas in the United States. Meanwhile, the USEPA will enforce the existing 1-hour O₃ standard for areas that are still in nonattainment of the standard.

Under the CAA, state and local agencies may establish ambient air quality standards (AAQS) and regulations of their own, provided these are at least as stringent as the federal requirements. For selected criteria pollutants, the State of Montana has established its state AAQS, some of which are more stringent than the federal standards. Montana AAQS are more restrictive than

federal standards for CO, NO₂, O₃, and SO₂. Montana does not have state standards for PM_{2.5}. In addition, Montana regulates emissions of settleable particulates, visibility, fluoride in foliage, and hydrogen sulfide (H₂S), for each of which no federal standards exist. A summary of the federal and Montana AAQS that apply to the proposed project area is presented in Table 4.

Table 4: Montana and Federal Ambient Air Quality Standards.

Air Pollutant	Averaging Time	Montana AAQS	Federal (NAAQS)	
			Primary	Secondary
Carbon Monoxide (CO)	8-hour	9 ppm	9 ppm	---
	1-hour	23 ppm	35 ppm	---
Nitrogen Dioxide (NO ₂)	AAM	0.05 ppm	0.053 ppm	0.053 ppm
	1-hour	0.30 ppm	---	---
Sulfur Dioxide (SO ₂)	AAM	0.02 ppm	0.030 ppm	---
	24-hour	0.10 ppm	0.14 ppm	---
	3-hour	---	---	0.50 ppm
	1-hour	0.50 ppm	---	---
Particulate Matter (PM ₁₀)	AAM	50 µg/m ³	50 µg/m ³	50 µg/m ³
	24-hr	150 µg/m ³	150 µg/m ³	150 µg/m ³
Particulate Matter (PM _{2.5}) ^(a)	AAM	---	15 µg/m ³	15 µg/m ³
	24-hour	---	65 µg/m ³	65 µg/m ³
Ozone (O ₃) ^(b)	1-hour	0.10 ppm	0.12 ppm	0.12 ppm
	8-hour	---	0.08 ppm	0.08 ppm
Lead (Pb) and Lead Compounds	Calendar Quarter	---	1.5 µg/m ³	1.5 µg/m ³
	90-days	1.5 µg/m ³	---	---
Settleable Particulates (TSP)	30-day	10 g/m ²	---	---
Hydrogen sulfide (H ₂ S)	1-hr(d)	0.010 ppm	---	---
	½-hr(e)	0.100 ppm	---	---
	½-hr(f)	0.030 ppm	---	---
Fluoride in foliage	1-month	50 µg/g	---	---
	grazing season	35 µg/g	---	---
Visibility	AAM	3 x 10 ⁻⁵ /m	---	---

Notes: AAM = Annual Arithmetic Mean; AGM = Annual Geometric Mean.

ppm = parts per million; µg/m³ = micrograms per cubic meter.

(a) The PM_{2.5} standard (particulate matter with a 2.5-micron diameter) was promulgated in 1997, and will be implemented over an extended time frame. Areas will not be designated as in attainment or nonattainment of the PM_{2.5} standard until the 2003 – 2005 timeframe.

(b) The 8-hour Ozone standard was promulgated in 1997, and will eventually replace the 1-hour standard. The USEPA plans to implement this standard beginning in 2004. During the interim, the 1-hour ozone standard will continue to apply to areas not attaining it.

Sources: §40 CFR 50; USFS (2000)

For non-attainment regions, the states are required to develop a State Implementation Plan (SIP) designed to eliminate or reduce the severity and number of NAAQS violations, with an

underlying goal to bring state air quality conditions into (and maintain) compliance with the NAAQS by specific deadlines.

Section 162 of the CAA further established a national goal of preventing degradation or impairment in federally designated Class I areas. Class I areas are defined as those areas where any appreciable degradation in air quality or associated visibility impairment is considered significant. As part of the Prevention of Significant Deterioration (PSD) program, Congress assigned mandatory Class I status to all national parks, national wilderness areas (excluding wilderness study areas or wild and scenic rivers), and memorial parks greater than 5,000 acres. Class II areas are those where moderate, well-controlled growth could be permitted. Class III areas are those designated by the governor of a state as requiring less protection than Class II areas. No Class III areas have yet been so designated. The PSD requirements affect construction of new major stationary sources in the PSD Class I, II, and III areas and are a pre-construction permitting system.

CAA Section 169A established the additional goal of prevention of further visibility impairment in the PSD Class I areas. Visibility impairment is defined as a reduction in the visual range and atmospheric discoloration. Determination of the significance of an activity on visibility in a PSD Class I area is typically associated with evaluation of stationary source contributions. The USEPA is implementing a Regional Haze rule for PSD Class I areas that will also address contributions from mobile sources and pollution transported from other states or regions. Emission levels are used to qualitatively assess potential impairment to visibility in PSD Class I areas. Decreased visibility may potentially result from elevated concentrations of PM₁₀ and SO₂ in the lower atmosphere.

CAA Section 176(c), General Conformity, established certain statutory requirements for federal agencies with proposed federal activities to demonstrate conformity of the proposed activities with the each state's SIP for attainment of the NAAQS. In 1993, the USEPA issued the final rules for determining air quality conformity. Federal activities must not:

- cause or contribute to any new violation;
- increase the frequency or severity of any existing violation; or
- delay timely attainment of any standard, interim emission reductions, or milestones in conformity to a SIP's purpose of eliminating or reducing the severity and number of NAAQS violations or achieving attainment of NAAQS.

General conformity applies only to nonattainment and maintenance areas. If the emissions from a federal action proposed in a nonattainment area exceed annual thresholds identified in the rule, a conformity determination is required of that action. The thresholds become more restrictive as the severity of the nonattainment status of the region increases.

3.1.1 Climatology and Meteorology

Malmstrom AFB, located in north central Montana, is on the dry eastern side of the Rocky Mountains and has a modified semiarid continental type climate. Summertime is generally pleasant, with cool nights, moderately warm and sunny days, and very little hot, humid weather. Winters are milder than would be expected of a continental location at this latitude because of

the frequent occurrence of warm down slope winds (Chinooks) that produce temperature changes of 40° F or greater in 24 hours (USAF 1998). July is generally the warmest month, with a mean daily high temperature of 83.6° F. January is usually the coldest month, with a mean daily low temperature of 12.5° F. The growing season averages 135 days per year (USAF 1999).

Humidity and precipitation are usually low, with associated large fluctuations in daily and seasonal temperatures. Average annual precipitation is 15 inches. Most of the precipitation that occurs during the late fall, winter, and early spring falls as snow, but Chinook winds prevent large accumulations (USAF 1998). Average annual snowfall is 43.6 inches (USAF 2000). The prevailing winds are from the southwest year round and are generally moderate with speeds exceeding 25 mph only two percent of the time (USAF 1999).

Based on the average annual precipitation, the area would normally be classified as semi-arid, but about 70 percent of the annual rainfall typically occurs during the April to September growing season, so the climate is favorable for dry land farming (USAF 1998). Table 5 presents average monthly temperatures, precipitation, humidity, and wind speed data from the nearest National Weather Service station in Great Falls, Montana (USAF 1999).

Table 5: Climate Data For Great Falls, MT.

Month	Temperature		Precipitation		Relative Humidity 1		Wind
	Mean Daily Max °C (°F)	Mean Daily Min °C (°F)	Mean Total cm (in)	Mean Snow cm (in)	Mean (%)	Mean Speed m/s (mph)	Prevailing Direction
January	-0.5 (31.1)	-10.8 (12.5)	2.06 (0.81)	25.1 (9.9)	62	6.8 (15.3)	SW
February	2.3 (36.2)	-8.7 (16.3)	1.70 (0.67)	21.6 (8.5)	59	6.4 (14.3)	SW
March	5.8 (42.5)	-5.5 (22.1)	2.56 (1.01)	26.4 (10.4)	55	5.8 (13.0)	SW
April	12.9 (55.2)	0.2 (32.4)	3.15 (1.24)	18.5 (7.3)	47	5.1 (12.9)	SW
May	18.4 (65.1)	5.3 (41.4)	6.25 (2.46)	4.6 (1.8)	46	5.0 (11.4)	SW
June	22.9 (73.3)	9.5 (49.1)	6.75 (2.66)	0.8 (0.3)	44	4.5 (11.2)	SW
July	28.7 (83.6)	12.7 (54.9)	3.23 (1.27)	Trace	37	4.6 (10.1)	SW
August	27.6 (81.6)	11.9 (53.4)	3.40 (1.34)	Trace	39	5.1 (10.2)	SW
September	21 (69.8)	7.1 (44.7)	3.15 (1.24)	4.1 (1.6)	46	5.9 (11.3)	SW
October	15.1 (59.2)	2.6 (36.7)	1.96 (0.77)	7.9 (3.1)	46	6.5 (13.2)	SW
November	6.4	-3.7	1.82	19.1	54	7.0	SW

Month	Temperature		Precipitation		Relative Humidity 1		Wind
	Mean Daily Max °C (°F)	Mean Daily Min °C (°F)	Mean Total cm (in)	Mean Snow cm (in)	Mean (%)	Mean Speed m/s (mph)	Prevailing Direction
	(43.6)	(25.3)	(0.72)	(7.5)		(14.6)	
December	1.7 (35.0)	-8.2 (17.3)	1.85 (0.73)	22.6 (8.9)	60	7.4 (15.6)	SW
Annual	13.6 (56.4)	0.99 (33.8)	37.90 (14.9)	150.6 (59.3)	50	5.7 (12.8)	SW
1 Relative humidity measured at 11:00 a.m.							
2 Wind speed based on 1941-90 period; prevailing direction through 1963.							
Source: Bair (1992).							

3.1.2 Air Quality

The Proposed Action would occur within Cascade County, Montana. According to federally published attainment status for Montana in §40 CFR 81, Cascade County is designated as in attainment, better than the national standards, or unclassified for CO, NO₂, SO₂, PM₁₀, O₃, and Pb. Based on recent monitoring data, the USEPA projects that the Cascade County will be in attainment of the new 8-hour ozone and PM_{2.5} NAAQS when designations are made in 2004 or 2005 (USEPA 2002). Monitoring data in Cascade County indicate generally good air quality.

The City of Great Falls has a small area located along 10th Avenue South that had previously been classified as nonattainment or unclassifiable for carbon monoxide (CO). This area was redesignated as attainment on 8 July 2002, and is now considered to be a maintenance area for CO. With the redesignation, the area is subject to a limited maintenance plan until 2012, after which it must submit a revised maintenance plan to last another 10 years. If no exceedances of the ozone standard occur within the next 20 years, the area may apply for full attainment status.

Malmstrom AFB is located in Montana Air Quality Control Region (AQCR) 141, which covers north central Montana. Mandatory PSD Class I areas for the state of Montana are listed under 40 CFR 81. Lewis and Clark National Forest, Scapegoat Wilderness, Helena National Forest, and Gates of the Mountain Wilderness are Class I areas not within 50 miles of the project area and Malmstrom AFB. The Flathead Indian Reservation, west of Great Falls, is a non-mandatory Tribal Class I area, which requires similar protection as mandatory Class I areas.

Emissions at military installations generally include CO, volatile organic compounds (VOCs), nitrogen oxides (NO_x, commonly measured as nitrogen dioxide), sulfur oxides (SO_x, commonly measured as sulfur dioxide), and PM₁₀. Although O₃ is considered a criteria pollutant and is measurable in the atmosphere, it is not often considered a pollutant when reporting emissions from specific sources. O₃ is not typically emitted directly from most emissions sources; it is formed in the atmosphere from its precursors (NO_x and VOCs), which are directly emitted from various sources. Thus, NO_x and VOCs are commonly reported instead of O₃. Sources of pollutants include stationary sources (fossil fuel combustion and fuel or solvent evaporation), construction activities, and mobile sources.

3.2 Water Resources

Water resources consist of groundwater and surface water. The ROI for water resources is considered to be within the limits of Malmstrom AFB. Located on a plateau with drainage northward toward the Missouri River, drainage features in the study area are primarily ephemeral streams and coulees. Potable groundwater is present at depths greater than 100 feet below ground surface. All water used at Malmstrom AFB is supplied by the City of Great Falls and is treated surface water from the Missouri River.

3.2.1 Groundwater

Groundwater resources exist in the project area and occur primarily in deep, confined aquifers (e.g., the Madison-Swift aquifer). The depth to these deep aquifers ranges between about 100 feet and 200 feet below land surface at the base. Shallow groundwater (less than about 25 to 40 ft below land surface) occurs locally as noncontiguous, unconfined, perched zones. The deep confined aquifers in the area tend to flow northward; flow in the shallow, unconfined aquifers typically follows topographic gradients.

The deep Madison-Swift aquifer has the greatest potential for future groundwater development. Because of the limited supply of water and discontinuous nature of the shallow perched zones, they are unlikely to be used as a water source in the future. Due to the ample surface water supply and the depth of most of the aquifers, groundwater resources have not been developed on the base.

3.2.2 Surface Water

The base lies on a plateau roughly 10 square miles in extent that drains northward toward the Missouri River. The Missouri River is located about one mile north of the base and serves as the principal source of potable water for Malmstrom AFB and the city of Great Falls. There are no perennial streams present on the base.

Surface water drainage at the site occurs primarily through open storm ditches and in ephemeral streams and coulees (Figure 7). Storm water drainage at the site occurs primarily through open storm ditches, swales and underground pipes and discharge outfalls. Storm water discharge is regulated by a Montana Pollution Discharge Elimination System (MPDES) permit to the Base from the Montana Department of Environmental Quality.

Malmstrom AFB has an estimated 662 acres of impervious area out of a total of 3,260 acres. Storm water is comprised of nine (9) drainage areas combining to exit Malmstrom AFB at six (6) discharge points (outfalls) (Malmstrom, 2005). 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, eventually discharging into the Missouri River (Figure 8).

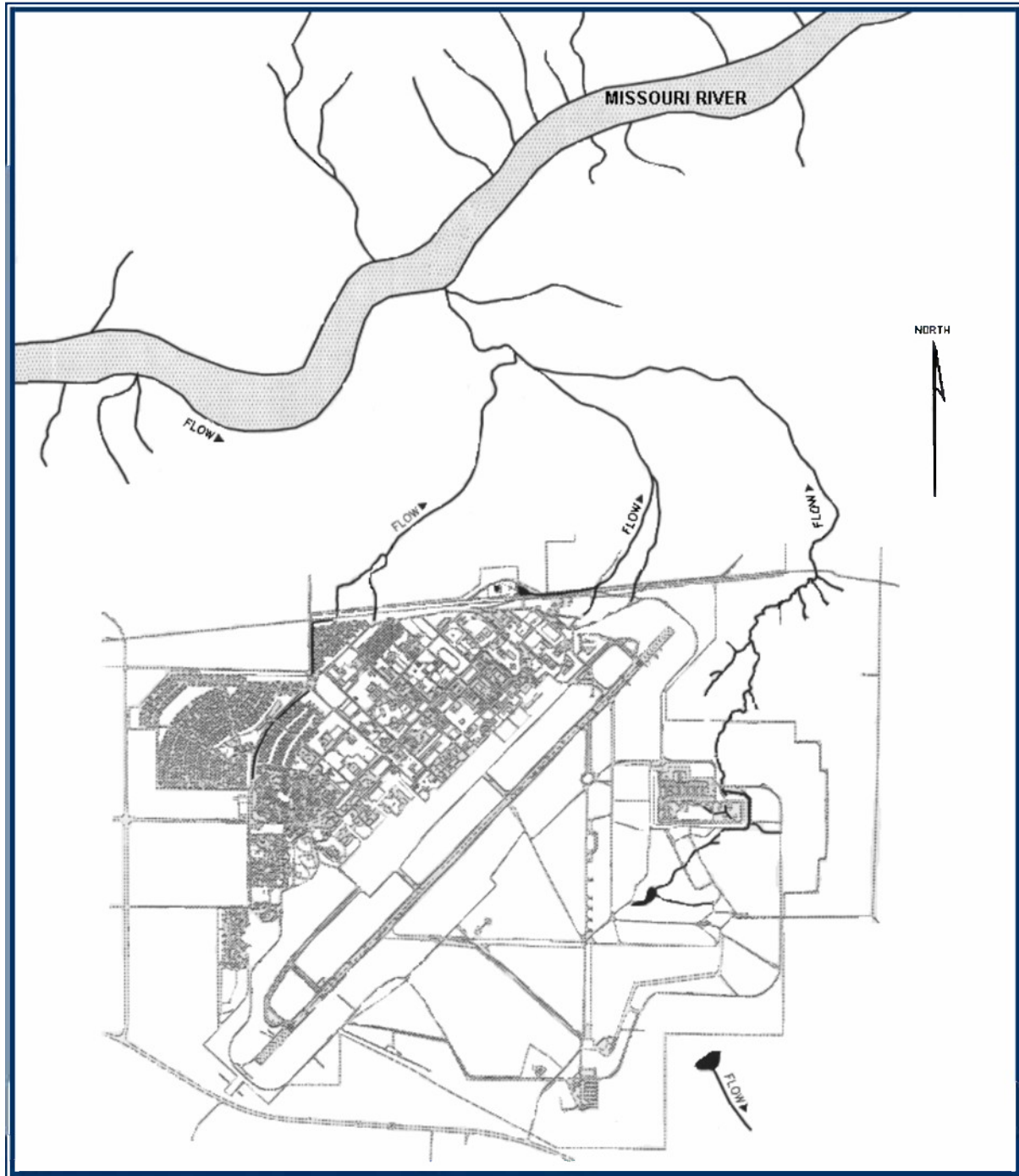


Figure 8: Surface Water Drainage Patterns at Malmstrom AFB

Drainage Area 1 collects runoff from 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. Drainage Area 1 has a steady flow due to foundation drains, sumps and perched water tables in existing areas. The basin drains

through a combination of underground concrete pipes, primarily in the former aircraft operations and maintenance and the family housing areas, curb gutters in streets and roadways, and grass covered ditches adjacent to streets. The entire basin drains through a concrete lined ditch (approximately 1,000 LF) and an intermittent grass covered ditch from the end of the lined ditch into the western branch of Whitmore Ravine to the Missouri River approximately one mile north of the base boundary. The measured peak discharge at the outfall for a 0.25-inch in 2.5 hours rain event was 49.6 cubic feet per second (cfs).

Drainage Area 2 is bounded by 72nd St. North, Goddard Drive and Perimeter Road. The drainage area collects storm water runoff from the north central portion of the base. The drainage flows north until it discharges off base into center Whitmore Ravine near Walnut St. The basin drains by a combination of underground concrete pipes, grass-lined ditches and curb and gutters in streets and roadways. Above ground curb and gutter, and ditch flow comprise over 70% of the flow pathway. The underground flow is confined to the vehicle maintenance and storage facility area located in the northeast corner of the drainage. The outfall collection channel near Walnut St. is an unlined ditch that passes under a railroad track via two 36-inch concrete pipes and under the north boundary road via one 48 inch corrugated metal pipe. Drainage Area 2 combines with the flow from Drainage Area 1 in the west branch of Whitmore Ravine then flows north to the Missouri River. The measured peak discharge at the Walnut St. outfall (just below the 48 inch Corrugated Metal Pipe, CMP) for a 0.25-inch in 2.5 hours rain event was 10.2 cfs.

Drainage Area 3 is bounded on the east by the east edge of the runway, on the north by the base boundary extending from the pole yard storage area to the coal fired heating plant, on the west by drainage basins Nos. 1 and 2, and on the south by drainage basin No. 1. This basin collects and discharges storm water from the majority of the old aircraft operations pavements, the primary petroleum operations, storage and supply systems, several industrial facilities, and light commercial and residential (dormitory) areas. Two sub-drains are included in this drainage. These sub-drains collect and discharge shallow ground water in the area. The eastern most sub-drain collects runoff from the runway, taxiways, and aircraft parking ramps. The western most sub-drain drains the fuel facilities and cantonment area. These drainages intersect near the southeast corner of the base supply building (building 400) and form the outfall channel that flows through an oil/water separator before flowing into the center branch of Whitmore Ravine. There is a combination of storm water drainage facilities, including an extensive underground storm drain system of open ditches (concrete and grass lined), and curb and gutter at roads and streets. The peak discharge measured at the outfall for a 0.25-inch in 2.5 hours rain event was 42.4 cfs.

Drainage Area 4 includes a vacant helicopter maintenance hangar (building 1700) and associated parking apron, and runoff from a small portion of the runway. The area drains primarily by overland sheet flow. There are roadway ditches, mostly grass lined, and a small inlet and underground pipe system that collects runoff from the runway and the aircraft parking area. Runoff is carried in the underground system or flows over a grass surface. Runoff flows north through a culvert under Perimeter Road and through a set of culverts running under a gravel road leading off base in the northeast corner of the base, and under the railroad into the center branch of Whitmore Ravine, which drains into the Missouri River. The outfall is a 36-inch corrugated

metal pipe (CMP) that passes under a railroad right-of-way. The peak discharge measured during a 0.25-inch rain over a 2.5-hour storm was 2.9 cfs.

Drainage Area 5 includes runoff from the weapons storage area (WSA) and an inactive landfill, including approximately 1,000 feet of underground storm drain (concrete pipe and field catch basin) that daylight to overland sheet flow. The ditches adjacent to the roads in this area are grass lined. Most storm water in this area either infiltrates into the ground or exits this drainage basin in sheet flow; a small portion of this drainage area exits the drainage area in a broad, shallow, heavily vegetated ditch north of WSA. Flow is only observed in this drainage area if the area received a heavy rainfall because of the shape, vegetative cover, and size of the ditch exiting the base. Runoff from this area flows into the east branch of Whitmore Ravine, which drains into the Missouri River.

Drainage Area 6 includes runoff from the missile handling facility, combat arms firing range, an inactive landfill, Pow-Wow Pond, a new fire training area, and a small missile maintenance facility. Most storm water in this area either infiltrates into the ground, collects in natural and man-made retention areas (i.e. road ditches) within the drainage, or exits this drainage basin in a well defined grassed coulee north of the WSA. Runoff from this area flows into the east branch of Whitmore Ravine, which drains into the Missouri River. Actual flow measurements recorded during storm water sampling (0.1 cfs during a 0.25 inch in 2.5 hours rain event) indicate that the runoff coefficient calculated below is extremely conservative (Table 6).

Table 6. Runoff Coefficients for Malmstrom AFB Drainage Areas.

Drainage Area	Total Area	Impervious Surface	Pervious Surface	Runoff Coefficient
One	655.5	249.1	406.4	0.61
Two	213.6	76.6	137	0.60
Three	391.7	179.2	212.5	0.65
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

3.3 Geological Resources

Geological resources include geology, seismicity and soils. The ROI for geological resources is within Malmstrom AFB boundaries.

Malmstrom AFB is located in a glaciated portion of the Missouri Plateau which in the northern part of the Great Plains Province. The site is underlain by the Sweetgrass Arch, a bedrock structural feature extending northwest between the Little Belt Mountains, 24 miles to the south, past the Base on the southwestern side and into Alberta, Canada. Stratigraphic units important to the framework of the region surrounding Malmstrom range in age from the Madison Limestone of the Mississippian era (360 million years) to the Eolian Sand of the Holocene (10,000 years).

These units include sedimentary bedrock formations, unconsolidated glacial deposits, and windblown deposits. The occurrence of geologic hazards in the study area is low. Widely scattered, low-level seismicity characterizes the area. No active faults are near the project area or Malmstrom AFB and the proposed construction sites do not include significant areas of steep slopes.

In the vicinity of Malmstrom AFB, Quaternary glacial deposits overlie Early Cretaceous shale and sandstone formations. The modern soils of Malmstrom AFB have developed directly on these Quaternary deposits and consist primarily of Lawther silty clay (associated with the Pleistocene till) and Dooley sandy loam (associated with the Holocene eolian sand) (SCS 1982). These two series encompass approximately 75 percent of the base. Other soils on base include sandy loams, loamy sands, and alluvial silty clay loams. Most of the soils on Malmstrom AFB are not highly subject to wind or water erosion. According to the March 2004 Geotechnical report from Thomas, Dean & Hoskins, Inc., "In general, the subsurface soil conditions encountered within the soil borings consist of sandy, lean clay and/or sandy soils near the surface underlain by fat clay and high-plasticity, lean clay. These heavy clay soils extend down to a depth of at least 26.5 feet, which was the maximum depth investigated." The following soils were documented in the Thomas, Dean & Hoskins, Inc. report (March 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 associated with the former housing development. 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 Boring B-11). This material is slightly to moderately compressible as indicated by the consolidation test results. These figures also show that the samples exhibit slight to moderate expansion upon inundation at a surcharge pressure of 1000 psf.

3.4 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.

3.4.1 Vegetation, Wetlands, and Floodplains

Malmstrom AFB is located on a high plateau approximately one mile south of the Missouri River and is approximately 100 feet above the 100-year floodplain of the river (USAF 1998). The base is located on flat to gently rolling terrain in the Shortgrass Prairie region of the United

States. Most indigenous vegetation within the boundaries of the base and in the general vicinity has been replaced with exotic and weedy species over the past 60 years of site development. Some noxious weed populations of spotted knapweed, Canada thistle, and field bindweed are known to occur on the Base (USAF 2001b). Currently, the site is a mixture of turf grasses and small shrubs left over from previous housing development. Malmstrom AFB is bordered on the north, east, and south sides by agricultural and pasture lands, with mixed commercial, industrial, residential, and open land uses to the west and northwest (USAF 2001b).

Currently the vegetation is a mix of introduced grass species with a low percentage of native grasses of a mixed-grass steppe community. Approximately 36 acres of wet areas and moist seeps were identified on Malmstrom AFB and range from retained storm water (Pow Wow Park) to streambeds that flow only after heavy precipitation (USAF 2001b); there were no wetlands within the project area (Figure 9). In most cases, these other were areas associated with sewage lagoons or other drainage areas. In general, woody vegetation is rare within the project area, is consists primarily of trees remaining from previous housing use, and recruited species. There are no other ditches or creeks and no evidence of seeps or springs.

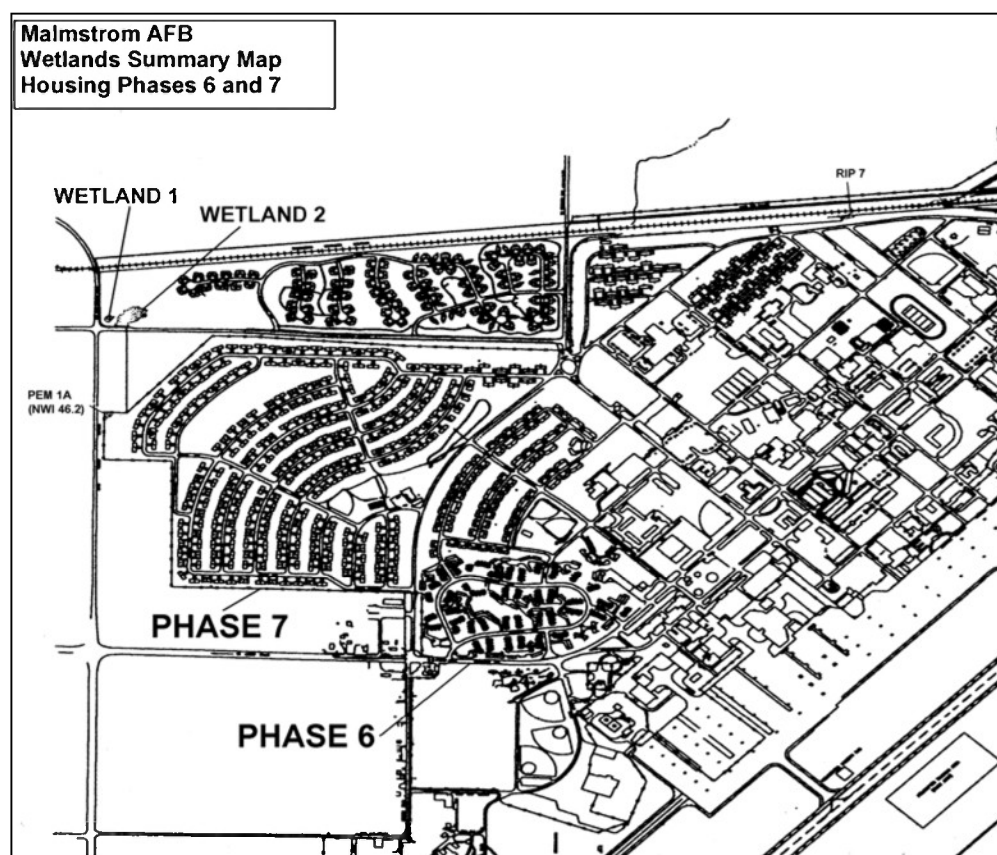


Figure 9 Wetlands locations at Malmstrom AFB in relation to the proposed project area.

No threatened or endangered plant species have been identified in the study area (USAF 1994b, Montana Natural Heritage Program [NHP] 2003).

3.4.2 Wildlife

Effective wildlife habitat is limited in the study area by the relatively large portion of land used for buildings, runways, and other base facilities (USAF 2001b). Bird species of greatest abundance include a variety of songbirds, shorebirds, raptors, and waterfowl. Common mammals include the white-tailed jackrabbit, badger, skunk, ground squirrels, and field mice. There may be transient use of the area by coyotes. There are no native fish on base; Pow Wow Pond contains stocked rainbow trout (USAF 2001b).

No federally listed threatened or endangered species occur on Malmstrom AFB (Montana NHP 2003). Two federal-candidate bird species (ferruginous hawk and Swainson's hawk) and one state-recognized species (the upland sandpiper) may be migrants to the study area. Although no specific protective measures are required, consideration should be given to minimize disruption of their habitat. Threatened or endangered wildlife species do not impose a constraint to development on Malmstrom AFB (USAF 1998).

3.5 Cultural Resources

Cultural resources are prehistoric and historic districts, sites, structures, artifacts, and any other physical evidence of human activities considered important to a culture, subculture, or community for scientific, traditional, religious, or other reasons. Cultural resources are typically divided into three major categories: archaeological resources, architectural / engineering resources, and traditional resources.

Archaeological resources are locations where prehistoric or historic activity measurably altered the earth or produced deposits of physical remains (e.g., arrowheads, bottles). Architectural / engineering resources include standing buildings, dams, canals, bridges, and other structures of historic or aesthetic significance. They generally must be more than 50 years old to be considered for inclusion in the National Register of Historic Places (NRHP). Traditional resources are associated with cultural practices and beliefs of a living community that are rooted in its history and are important in maintaining the continuing cultural identity of the community. They may include archaeological resources, locations of historic events, sacred areas, sources of raw materials, topographic features, traditional hunting or gathering areas, and native plants or animals. Significant cultural resources are evaluated for adverse impacts from a federal undertaking. Significant cultural resources are generally those that are eligible or potentially eligible for inclusion in the NRHP. Native American or other ethnic groups also may identify traditional resources as significant. The ROI for cultural resources consists of Malmstrom AFB. The APE consists of the housing areas to be constructed, and the haul route.

3.5.1 Historical Setting

Cultural frameworks for the region have been developed by Mulloy, Wedel, Frison and others (USAF 1995b), defining three major periods of human culture prior to contact with Euro-Americans. The people from the earliest period, from as long ago as 12,000 years to about 7,000

years ago, lived by hunting large game such as the now-extinct mammoth, and later deer, bison and smaller mammals. They used distinctive lanceolate spear points known as Clovis, Folsom and Plainview (USAF 1995b). Archaeological evidence from this period in the vicinity of Malmstrom AFB is usually in the form of surface sites or isolated finds, and there is little evidence for other aspects of their culture.

During the middle period, from about 7,000 to 1,500 years ago, there is evidence that bison were an important part of the economy, as well as remains of activities other than hunting, including plant collection, cooking, and food storage. Archaeological sites include a variety of projectile points, ground stone tools, and in the latter part of this period, ceramics (USAF 1995b). In the vicinity of Malmstrom AFB archaeological sites are found both on the surface and buried. However, the deposition on base precludes material being deeply buried.

In the most recent period prior to contact with Euro-Americans, from about 1500 to 300 years ago (about A.D. 1700) the variety of projectile points increases and pottery is more evident. Bison were still an important component on the economy, and stone circles are a distinctive type of site associated with this period. During the 18th century, prior to face-to-face contact, horses and trade goods such as beads and metal points made their way to this region through trade (USAF 1995b). Archaeological sites are found both on the surface and buried. When Euro-Americans contacted the Native Americans of this region, they identified Blackfoot, Crow, Plains Cree, Gros Ventre, Teton Dakota and Assinboine living a highly mobile life centered around bison hunting during the warm part of the year and village dwelling in sheltered areas such as river valleys during the cold seasons (USAF 1995b). Use of tipis and horses helped make this possible.

French and British fur traders had come through the upper Missouri River area prior to Lewis and Clark's Voyage of Discovery, but in 1805 this expedition's portage around the Great Falls probably took them across what is now Malmstrom AFB. Their route went between Belt Creek and a point upstream of the city of Great Falls. This exploration presaged later settlements, including Fort Benton to the northeast of the base during the first half of the 19th century (USAF 1995b). Forts and trading posts were followed by gold prospectors in the 1850s and 1860s, and then cattle ranching in the period between 1860 and 1880. The severe winter of 1886-1887 set the stage for sheep ranching to follow cattle ranching as the dominant industry, capped by the Great Northern Railroad reaching Great Falls in 1893. Between 1890 and 1910 homesteading increased, with the accompanying grain production contributing to the economy (USAF 1995b). The Chicago, Milwaukee, St. Paul and Pacific Railroad ("Milwaukee Road") came to Montana, passing through Great Falls in 1909 (Montana Historical Society 2003); remnants of this route now forms part of the northern border of Malmstrom AFB.

The City of Great Falls continued to grow, and in 1941 the Army Air Corps developed Great Falls Municipal Airport for use by the U.S.S.R. as part of the Lend-Lease program (USAF 1995b). Construction of the base began in 1942. Initially known as East Base, it was renamed Great Falls Air Force Base in 1947, and in 1956 was again renamed, this time for vice commander Col. Einar Malmstrom following his death in a plane crash (USAF 1995b). In March 1961 construction began on the first launch facility at Malmstrom. The base was an important player during the Cuban Missile Crisis. Missiles formed an important part of the Malmstrom AFB mission, but over the years other aspects have been added. The 301st Air

Refueling Wing was activated at Malmstrom AFB in 1988. HQ USAF redesignated the 341st Strategic Missile Wing as the 341st Missile Wing in September 1991. In July 1994, USAF Space Command took over as the Major Command replacing Air Mobility Command.

Malmstrom AFB now hosts the 819th RED HORSE squadron. RED HORSE, acronym for Rapid Engineer Deployable Heavy Operational Repair Squadron, Engineer, is the first Active Duty and Air National Guard associate unit in the Air Force. The 341st Missile Wing was redesignated the 341st Space Wing in 1997.

Identified Cultural Resources

A search of the National Register Information System database shows that no National Register-eligible resources are located on Malmstrom AFB, although the city of Great Falls is home to a number of National Register-listed historic buildings.

Three archaeological and historic resources surveys have been conducted on Malmstrom AFB proper (USAF 2001b). In 1988 Historical Research Associates conducted a survey that found a segment of the Chicago, Milwaukee, St. Paul, and Pacific Railroad (now Burlington Northern Santa Fe) that traverses the northern border of the base (site 24CA 264). The railroad segment may be eligible for the National Register of Historic Places based on its role in the Euro-American settlement of the region (USAF 1995b), but it is outside the APE. An archaeological site in the southern part of the base is considered to be not eligible for the National Register. With the exception of isolated finds, no other cultural resources were identified within Malmstrom AFB.

Malmstrom AFB conducted an architectural inventory in 1996 to identify Cold War resources. The inventory also identified a number of buildings that are eligible, potentially eligible or potentially eligible pending additional background research (USAF 2001b). None of these facilities are within the APE of the Proposed Action.

Significant paleontological resources do occur in Montana, mostly in surface to near-surface bedrock. However, the project area and Malmstrom AFB are underlain by 30 to 100 feet of glacial sediments, which do not tend to produce paleontological finds, and none have been found on the Base (USAF 2001b). Upland areas, on which the project area and Base are located, also have a lower potential for cultural and historic sites than riparian areas.

Previous contacts with the Montana Historic Preservation Office confirmed the presence of only one known National Register-eligible cultural resource (historic railroad tract segment) adjacent to, but not within the proposed project area (USAF 2001b).

3.6 Noise

Noise may be defined as unwanted sound. Noise is usually objectionable because it is disturbing or annoying. The objectionable nature of sound could be caused by its *pitch* or its *loudness*. Pitch is the height or depth of a tone or sound, depending on the relative rapidity (frequency) of the vibrations by which it is produced. Higher pitched signals sound louder to humans than sounds with a lower pitch. Loudness is intensity of sound waves combined with the reception

characteristics of the ear. Intensity may be compared with the height of an ocean wave in that it is a measure of the amplitude of the sound wave.

In addition to the concepts of pitch and loudness, there are several noise measurement scales that are used to describe noise in a particular location. A *decibel (dB)* is a unit of measurement that indicates the relative amplitude of a sound. The zero on the decibel scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Sound levels in decibels are calculated on a logarithmic basis. An increase of 10 decibels represents a ten-fold increase in acoustic energy, while 20 decibels is 100 times more intense, 30 decibels is 1,000 times more intense, etc. There is a relationship between the subjective noisiness or loudness of a sound and its intensity. Each 10-decibel increase in sound level is perceived as approximately a doubling of loudness over a fairly wide range of intensities.

There are several methods of characterizing sound. The most commonly used is the *A-weighted sound level* or *dBA*. This scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Because sound levels can vary markedly over a short period, a method for describing either the average character of the sound or the statistical behavior of the variations must be used. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events. This energy-equivalent sound/noise descriptor is called L_{eq} . The most common averaging period is hourly, but L_{eq} can describe any series of noise events of arbitrary duration.

The scientific instrument used to measure noise is the sound level meter. Sound level meters can accurately measure environmental noise levels to within about plus or minus 1 dBA. Various computer models are used to predict environmental noise levels from sources, such as roadways and airports. The accuracy of the predicted models depends upon the distance the receptor is from the noise source. Close to the noise source, the models are accurate to within about plus or minus 1 to 2 dBA.

Since the sensitivity to noise increases during the evening and at night—because excessive noise interferes with the ability to sleep—24-hour descriptors have been developed that incorporate artificial noise penalties added to quiet-time noise events. The *Day/Night Average Sound Level*, or L_{dn} , is a measure of the cumulative noise exposure in a community, with a 10 dB addition to nocturnal (10:00 p.m. to 7:00 a.m.) noise levels. Table 7 categorizes the typical range of L_{dn} levels for neighborhoods.

Table 7: Typical Day-Night Levels in Urban Areas in the United States.

Description	Typical Range of L_{dn} , dB	Average L_{dn} , dB
Quiet suburban residential	48-52	50
Normal suburban residential	53-57	55
Urban residential	58-62	60
Noisy urban residential	63-67	65
Very noisy urban residential	68-72	70

Source: U.S. Environmental Protection Agency 1974.

3.6.1 Existing Noise Setting

This analysis assesses noise levels in the residential areas where construction will occur. The most recent installation Air Compatible Use Zone (AICUZ) analysis was completed in 1994 (USAF 1994a), when the 341st ARG was still assigned to Malmstrom AFB. The base does not currently host an active air wing, thus the runway is currently inactive, with the exception of Huey helicopters, a subordinate flight of the 341st Space Wing Operations Group. The 1994 AICUZ analysis shows the residential area outside of the 65 dB contour deemed acceptable for residential housing (with sound attenuation materials present).

3.6.1.1 Residential Areas

Vehicular traffic is the primary source of noise within the residential areas. Single family and duplex homes line the streets and a medical clinic is currently operating at the intersection of Perimeter Road and Clinic Court. Perimeter Road bisects the two residential areas included in the Proposed Action and is a primary arterial for on-base travel. However, Perimeter Road is blocked for further travel at Plum Street, so it is not a through street to the Main Gate from the subject residential areas. Noise from vehicular traffic will rise to levels present prior to the removal of houses within the construction site. This increase in noise will not adversely affect local buildings or neighborhoods.

The noise experienced by residential and other noise-sensitive receptors varies according to their distance from the roadway and the number of intervening residences. (Noise typically is attenuated, or reduced, 6 dB for every doubling of distance. In addition, one intervening row of houses reduces noise about 5 dB; additional rows reduce noise by about 10 dB.)

Ambient noise levels at the areas closest to Perimeter Road are expected to be comparable to those described in Table 6 as “urban residential.” Those residences farthest from Perimeter Road will likely experience noise that is comparable to that described under “normal suburban residential.”

3.7 Health, Safety, and Waste Management

This section describes programs and activities currently in place at Malmstrom AFB including general public health and safety responsibilities, worker health and safety protection, solid and hazardous waste management, sewage and storm water management, environmental remediation activities, pesticide application, and harmful substances in the ROI.

3.7.1 Public Health Management

The USAF and agencies of the City of Great Falls, Cascade County, the State of Montana, and the federal government protect public health and safety at Malmstrom AFB. The city and county provide police protection and emergency services; the Cascade County Health Department is responsible for monitoring public health and safety issues such as drinking water quality and disease control. The Montana Department of Environmental Quality regulates waste management, toxic substance reporting, and investigation and cleanup of contaminated sites. The State of Montana also provides technical and financial assistance for occupational health

concerns such as asbestos control, radon emissions, and drinking water. The 341 CES/CEV provides regulatory guidance to Malmstrom AFB personnel regarding safe use, storage, and disposal of hazardous and toxic substances and has a pollution prevention program that includes minimization of hazardous wastes and recycling. The Environmental Office of the Montana Department of Military Affairs provides the same oversight and guidance for state-operated National Guard facilities.

3.7.2 Worker Safety and Health

Construction activities on-base are governed by the rules and regulations of the U.S. Department of Labor Occupational Safety and Health Administration (OSHA) as codified in §40 CFR 1910 Occupational Safety and Health Standards.

3.7.3 Solid and Hazardous Waste Management

Solid and hazardous waste programs provide for the collection, handling, and disposal of waste materials, response operations to spills of hazardous materials or waste, and management of the Installation Restoration Program (IRP). In Montana, hazardous and solid waste issues are regulated by the Montana Department of Environmental Quality.

At Malmstrom AFB, the solid and hazardous waste programs are managed by the Environmental Flight (341 CES/CEV). The responsibility to develop a Spill Prevention and Response Plan, provide procedures for spill reporting, containment, cleanup, and disposal, resides with the Environmental Flight. The fire department requests support, as needed, from local volunteer departments in the event of a spill (USAF 1998).

Hazardous waste management consists of the collection, storage and transportation of hazardous wastes as defined by RCRA. A release of certain materials, such as JP-8 fuel, could result in the generation of hazardous wastes. Hazardous wastes are recorded and processed through the Environmental Management Office and Defense Reutilization and Marketing Office (DRMO) (USAF 1998).

Solid waste collection and disposal services are provided to the base by civilian contractors and the City of Great Falls. Material is taken off base to a private landfill.

3.7.4 Sewage and Storm Water Waste Management

Sewage wastewater from the base is discharged to the City of Great Falls which then manages waste under a service contract with a private sewage treatment management firm. Storm water is considered a wastewater discharge by the Clean Water Act. Storm water is discharged from the base in accordance with a Montana Pollution Discharge Elimination System (MPDES) General Discharge Permit for Storm Water Associated with Industrial Activity issued by the Montana DEQ. Precipitation that falls or melts in the study area is managed in accordance with the Malmstrom AFB Storm Water Pollution Prevention Plan (SWPPP; Malmstrom AFB 1998). The SWPPP also mandates that construction discharges and industrial discharges be managed through Best management Practices, as appropriate.

3.7.5 Environmental Remediation Activities

The USAF is undergoing clean up of contaminated sites created by past activities under the Installation Restoration Program (IRP). Seven IRP sites at Malmstrom AFB are either under investigation or undergoing cleanup activities at Malmstrom AFB (USAF 1998). There are no active IRP sites within a mile of either the housing area or the proposed concrete stockpile/soil borrow area.

3.7.6 Pesticides

Past spraying of herbicides has occurred throughout the base and may have been sprayed on the Proposed Action site. Because herbicides used for base wide spraying were biodegradable and would have dissipated from the soil in less than a year, any herbicides applied by Malmstrom in the past would likely not be present at this time (USAF 1999).

3.7.7 Harmful Substances

A radon survey of the base was performed by the Bioenvironmental Engineering office in September of 1988. The results of that survey indicated that Malmstrom AFB was categorized as Low Probability. This signifies that all structures sampled had less than four picocuries of radon concentration. At this level of concentration, no further action is required (USAF 1999).

- Existing housing on the base has been part of previous base wide surveys for lead-based paint and asbestos. Housing units are suspected of having lead-based paint on exterior walls, and asbestos floor tiles as well as some asbestos containing siding. Standard Air Force contacting practice calls for the proper containment and disposal in an approved landfill of these known substances.

3.8 Land Use

This section describes land use, transportation, and visual resources on Malmstrom AFB. Land use focuses on general land use patterns, as well as management plans, policies, ordinances, and regulations. These provisions determine the type of uses that are allowable and identify appropriate design and development standards to address special use or environmentally sensitive areas. Transportation addresses roads and circulation in the project area. Aesthetic qualities in the ROI are also described.

3.8.1 Land Use

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 (refer to Figure 2). The airfield, located in the southeastern portion of the installation, is the dominant land use on the installation. Light industrial and aircraft operations and maintenance are 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. Recreation facilities are scattered throughout the base in areas adjacent to the family housing area and also south of the weapons storage area on the east side of the base. Pow Wow Park is located in the east portion of the installation and includes a manmade pond for fishing. The park also includes playground equipment and a picnic area.

Adopted plans and programs guide land use planning on Malmstrom AFB. Base plans and studies present factors affecting both on- and off-base land use and include recommendations to assist on-base officials and local community leaders in ensuring compatible development. The *Malmstrom AFB General Plan* (Malmstrom AFB 2002) provides an overall summary of strategic planning initiatives. The plan includes six components (Composite Constraints and Opportunities, Infrastructure, Land Use, Capital Improvements Program, Facilities Excellence Plan, and Five-Year Plan), which represents a summary of current base plans. The base's *Integrated Natural Resource Management Plan*, (USAF 2001b) is used to coordinate natural resource management.

The *AICUZ Study, A Citizen's Brochure* (USAF 1994a) provides a summary of the AICUZ program. The Malmstrom AFB AICUZ study includes an analysis of the effects of noise, aircraft accident potential, and land use and development on Malmstrom AFB and its neighbors.

3.8.2 Transportation

Access to Malmstrom AFB is provided from US Highway 87/89, east of Interstate 15 (refer to Figure 2). The Main Gate located on 2nd Avenue North and the Commercial Gate (North Gate) on 10th Avenue North provides access to the base. Second Avenue North becomes Goddard Avenue which serves as the main thoroughfare. Tenth Avenue 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).

Seventy five percent of base traffic enters the base through the Main Gate and the remaining 25 percent enter through the North Gate (USAF 2001a). Peak traffic hours are between 6:45 am to 7:30 am and 4:30 pm to 5:00 pm (Stordahl 2003). The majority of traffic is vehicular in nature, although there are school buses that provide transportation service to children on the base.

3.8.3 Visual Resources

Malmstrom AFB is located to the east of the city of Great Falls in rolling plains about 75 miles east of the Rocky Mountains. Malmstrom AFB lies at an elevation of 3,525 feet above sea level on a plateau (Malmstrom AFB 2002). The topography is characterized by broad, gently sloping plains that have been moderately dissected by numerous streams.

The base occupies 3,600 acres. The airfield runway occupies the largest portion of the installation. The base maintains a consistent design standard that has resulted in a uniformity of architectural design. The residential area specifically reflects modern colonial or ranch style one and two story homes with overlapping plank siding (or aluminum, if upgrades have occurred) and symmetrical window and door placement.

Little native vegetation currently exists in the housing areas of Malmstrom AFB. Native vegetation has been altered or modified by developmental activities and the introduction of exotic grasses (Malmstrom AFB 2002).

3.9 Socioeconomics and Environmental Justice

3.9.1 Definition of the Resource

Socioeconomic resources for this analysis are characterized in terms of population and employment, with a particular emphasis on minority, low-income and youth populations. For the purposes of this analysis, the ROI is Malmstrom AFB, with some information provided for Cascade County.

Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, directs federal agencies to address environmental and human health conditions in minority and low-income communities. An analysis of environmental justice helps determine if actions of federal agencies disproportionately and adversely impact the human health and environmental conditions in minority populations and low-income populations or Native Americans. The approach applied in this section is in accordance with the *Interim Guide for Environmental Justice within the Environmental Impact Analysis Process* (USAF 1997).

In addition to environmental justice issues are concerns pursuant to Executive Order 13045, *Protection of Children from Environmental Health Risks and Safety Risks*. This EO directs federal agencies to identify and assess environmental health and safety risks that may disproportionately affect children.

3.9.2 Population and Employment

There are 3,409 active duty military personnel assigned to Malmstrom AFB, of this number 1,749 (52 percent) reside on base, while the remainder live off the installation. Family members and dependents of these personnel amount to 4,544 persons (U.S. Census 2000, Tract 12). In addition, Malmstrom AFB employs 435 appropriated fund civilian employees and 728 non-appropriated fund civilians, contractors and private-business employees. The base population, including military personnel, civilian workers and dependents, totals 9,072 persons (Malmstrom AFB 2002).

The City of Great Falls is the seat of Cascade County and the second largest city in Montana with a 2000 population of 56,690 persons, accounting for 70 percent of the county population of 80,357 persons (U.S. Census 2000). Cascade County is home to 32,547 households with an average household size of 2.41 persons. In the predominantly rural area, Great Falls is largely dependent upon the fluctuations of the agricultural industry. Due to the area's natural terrain, Great Falls residents enjoy a high quality of life attributable to the numerous recreational opportunities and natural wildlife habitat in the area.

The operation of the base makes an important contribution to the economy of the region through both direct employment and purchases from local businesses. The presence of the base provides economic stability to the city and the region. Malmstrom's annual payroll obligates \$151.6

million to military and civilian employees, and the Air Force contributes an estimated \$97.9 million in construction and service contracts and other purchases from local businesses. Malmstrom AFB has a total annual economic impact of over \$282 million on a 50-mile radius that includes the counties of Cascade, Judith Basin, Lewis and Clark, Teton, Pondera, and Choteau (Malmstrom AFB 2002).

3.9.3 Environmental Justice and Protection of Children

Disadvantaged groups within the 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.
- *Youth Population:* Children under the age of 18 years.

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 (U.S. Census 2000). Nationally, 12.4 percent of the population lives below the poverty level.

Total population of the United States is 281,421,906 (U.S. Census 2000). Minorities represent 28.02 percent of the National population. The United States population is composed of 12.3 percent Black, 0.9 percent Native American, 3.6 percent Asian, and 12.5 percent identifying a cultural heritage of Hispanic. Persons under the age of 18 comprise 25.6 percent of the United States Population.

Minority persons represent 10.5 percent of both the Cascade County and Montana populations. Native American and Aleut persons are the most predominant minority group in the county, representing 40 percent of the minority population, followed by persons of Hispanic descent who account for 23 percent of minorities. At the state level, Native Americans and Aleuts represent 60 percent of the minority population and Hispanic persons represent 19 percent of minorities (U.S. Census 2000). The youth population, which includes children under the age of 18, accounts for 26.0 percent of Cascade County's population, compared to 25.5 percent at the state level.

The U.S. Census Bureau, Census 2000, data for Cascade County, Great Falls, Montana, Tract 12 specifically addresses Malmstrom Air Force Base. The areas outside the Malmstrom AFB boundaries included in Tract 12 historically are not populated and are used for farming and ranching operations. Although Tract 12 incorporates a small amount of area outside of the Malmstrom AFB boundaries, this fact should not significantly change the Census 2000 data, if at all. The incidence of persons living below the poverty level at Malmstrom AFB is 6.2 percent, far below the national average.

As typically observed at rural military installations, the demographic makeup of the Malmstrom AFB population differs significantly from the demographic makeup of the local area. Minority persons represent 21.8 percent of the Malmstrom AFB population. In contrast to the racial and cultural demographic described for the county and state populations in the preceding paragraph, the Malmstrom AFB population is composed of 31.8 percent Black, 3.2 percent Native American, 12 percent Asian, 3.6 percent Pacific Islander, 16.8 other, and 32.3 percent of persons identifying themselves as “Two or More Races.” However, the Census 2000 data for Tract 12 reveals a white only, not Hispanic or Latino population of 3554 or 78.2 percent. The youth population, which includes children under the age of 18, accounts for 36.2 percent of Malmstrom AFB’s population, compared to 25.5 percent at the State level.

4.0 ENVIRONMENTAL CONSEQUENCES

Chapter 4.0 presents the environmental consequences of the Proposed Action at Malmstrom AFB for each of the resource areas discussed in Chapter 3.0. To define potential direct and indirect impacts, this chapter evaluates the project elements described in Chapter 2.0 against the affected environments provided in Chapter 3.0. Specifically, each resource analysis considers the demolition and reconstruction of 797 housing units in the existing housing area. Cumulative effects of the Proposed Action with other foreseeable future actions, as well as past and present activities, are presented in Chapter 5.0.

4.1 Air Resources

The significance of impacts to air quality is based on federal, state, and local pollution regulations or standards. Air quality impacts from a proposed activity or action would be significant if they:

- increase ambient air pollution concentrations above any NAAQS;
- contribute to an existing violation of any NAAQS;
- interfere with or delay timely attainment of NAAQS; or
- Impair visibility within any federally mandated federal Class I area.

According to Sepia’s General Conformity Rule in §40 CFR 51, Subpart W, any proposed federal action that has the potential to cause violations, as described above, in a no attainment or maintenance area must undergo a conformity analysis.

As previously discussed, Section 169A of the CAA established the PSD regulations to protect the air quality in regions that already meet the NAAQS. Certain national parks, monuments, and wilderness areas have been designated as PSD Class I areas, where appreciable deterioration in air quality is considered significant. The nearest PSD Class I area is more than 50 miles from the region potentially affected by the Proposed Action. Therefore, the Proposed Action could potentially have an impact on the PSD Class I areas identified in Section 3.1.2, depending on the emission levels associated with the Proposed Action.

4.1.1 Potential Impact from Proposed Action

A military installation can constitute a major source of CO, VOCs, SO_x, NO_x, and PM₁₀ pollution. Sources of these pollutants include stationary sources (fossil fuel combustion and fuel or solvent evaporation), construction activities, and mobile sources. The Proposed Action, however, is a residential construction project not unique to a military installation.

Construction activities produce short-term combustion emissions (exhaust emissions from heavy equipment) and fugitive dust emissions (PM₁₀), which would cease once construction is completed. Potential effects created from construction activities include road dust entrainment from construction vehicles and dust from temporary storage piles. Impacts can also result from increased vehicular emissions from construction vehicles, material hauling, and labor force transportation.

However, emissions generated by construction projects are short-term and temporary in nature. Fugitive dust emissions will be minimized and controlled by implementation of dust control measures in accordance with standard construction practices. For instance, frequent spraying of water on exposed soil during construction, proper soil stockpiling methods, and prompt replacement of ground cover or pavement are standard landscaping procedures that will be used to minimize the amount of dust generated during construction. Using efficient grading practices and avoiding long periods where engines are running at idle will reduce combustion emissions from construction equipment. Vehicular combustion emissions from construction worker commuting may be reduced by carpooling.

The Proposed Action will not increase the number of stationary sources at the Base and would not result in a net permanent increase in vehicular traffic. Therefore, the overall impact to air resources from the Proposed Action is likely to be short-term and not significant.

4.1.2 Potential Impact from the No Action Alternative

No impacts to air quality would result from the no-action alternative, since the proposed housing phase would not occur.

4.2 Water Resources

Water resources are surface and subsurface resources that are finite but renewable. Construction activities affect water resources by physical disturbances and material releases (e.g., sediment, chemical contaminants, etc.) into surface and groundwater. An impact to water resources at Malmstrom AFB would be considered significant if an aquifer, groundwater well, or surface water body is degraded resulting in a measurable and persistent change in a water supply or potential water supply. An impact would also be considered significant if surface or groundwater quality were degraded such that severe or long-term exceedances of federal or state water quality criteria resulted. Increased recharge or improved water quality are examples of beneficial impacts.

4.2.1 Potential Impact from Proposed Action

The Proposed Action will not be expected to significantly impact groundwater resources. Excavations at the housing construction sites will be shallow and will not intersect groundwater (except, possibly minor perched zones). Short-term impacts due to leaks or spills of contaminants during construction (e.g., fuels, lubricants) could possibly impact shallow perched zones; however, they would not be expected to enter the deeper confined aquifers and can be readily mitigated through implementation of appropriate construction/maintenance practices.

Short-term impacts to surface water could potentially occur during construction. These potential impacts could include increased turbidity in surface waters that are adjacent to construction activities and potential contamination due to leaks and spills of fuels and lubricants from construction equipment. Use of Best Management Practices (BMP's) and engineering controls as prescribed in the required SWPPP, and compliance with the protective provisions of the mandatory State of Montana, Storm Water Permit for the Proposed Action would significantly reduce the potential for construction related impacts to surface water resources. Under Montana law the Proposed Action requires a Montana Storm Water Permit because this construction activity disturbs more than one (1) acre.

Replacement of existing housing units in Phase 6 will result in a small net decrease in impervious surface due to a decrease in asphalt paving (Table 6). Increases in concrete paving are due to changes in curb and gutter systems within the site. The design of Phase 7 is not completed. Due to the scope of work in Phase 7, best professional judgment would indicate that either a reduction in impervious surfaces would likely occur, or there would be no net change in impervious surfaces.

Table 8: Changes in Impervious Surface Area for Phase 6, Replace Family Housing project.

Impervious Area Type	Existing Housing Sq.Ft.	Proposed Phase 6 Sq.Ft.	Increase/(Decrease) in impervious surface (Sq.Ft.)	Acres Increase/(Decrease)
Asphalt Paving	391,682	223,175	(168507)	(3.87)
Concrete Paving	203,340	260,659	57,319	1.32
Roof Areas	301,076	349,543	48,467	1.11
Total Area	896,098	833,377	(62721)	(1.44)

4.2.2 Potential Impact from No Action Alternative

Under the no action alternative, the proposed housing development would not occur. Therefore, no significant impacts to water resources are anticipated.

4.3 Geological Resources

4.3.1 Potential Impacts from Proposed Action

Slopes within the project area are generally gentle; however, water and wind erosion could occur during construction activities. Engineering controls described in Chapter 2.0 will reduce these impacts.

Many of the soils at the site are moisture sensitive, and have high clay content. These soils are expansive and have caused foundation related problems. Thomas, Dean & Hoskins, Inc (March, 2004) have developed a Geotechnical Investigation report for use on this housing project which includes site specific engineering considerations and controls that could mitigate the negative impacts of the soil conditions.

Therefore, no significant long term impacts to site soils are expected.

4.3.2 Potential Impact from No Action Alternative

No impacts to geology or soils are expected under the no action alternative since this phase of the housing development would not occur.

4.3.3.1 Storm Water - Erosion and Sedimentation: Impacts of the Proposed Action

Storm water effects related to erosion and sedimentation from construction are negligible. Only, short-term impacts to surface water could potentially occur during construction. These potential impacts could include increased turbidity in surface waters that are adjacent to construction activities and potential contamination due to leaks and spills of fuels and lubricants from construction equipment. Use of Best Management Practices (BMP's) and engineering controls as prescribed in the required Storm Water Pollution Prevention Plan (SWPPP), and compliance with the protective provisions of the required Erosion Control Plan for the Proposed Action would significantly reduce the potential for construction-related impacts to surface water resources. Cumulative effects are also considered negligible (see Section 5.0). As noted above, Phase 6 construction is reducing net impervious area by approximately 1.4 acres, which may result in a slight reduction in storm water outflow.

Malmstrom AFB has previously studied storm water outflows from housing areas under the proposed action (and previous actions; NZAS 93-0012B, June 2004). The study determined that for a ten-year discharge event, the combined outflow for Basins 1-4 (which includes the housing replacement areas for Phase 6 and 7) has a combined maximum discharge of 480 cfs. The report recommended a combined detention pond (now completed), regrading of the storm channel redesign, which if implemented would reduce total discharge by 25% to 355 cfs, which is nearer to the capacity of outfall number 1 at 300cfs.

4.3.3.2 Storm Water - Erosion and Sedimentation: Impacts of the No-Action Alternative

With no construction under the no action alternative, there would be no change in storm water related erosion and runoff. Malmstrom AFB would continue to modify the existing storm water system as needed to address base run-off independently of housing replacement actions.

4.4 Biological Resources

Direct disturbances include excavation and removal of existing habitat. Impacts to biological resources could also result from noise and dust generation during the construction of the site.

4.4.1 Potential Impacts from Proposed Action

The proposed site is within a housing complex that consisted of housing units, paved roads, and small yards planted with turf grasses and a few landscaped shrubs. This site was recently demolished and returned to its original conditions.

Surface disturbance associated with the Proposed Action can result in an increased risk of invasion by noxious weeds. Prompt revegetation of all disturbed areas adjacent should be considered. Because of the limited amount of biological resources of the project area, the Proposed Action would have an insignificant impact on biological resources. In addition, no significant impacts to wetland areas, significant habitat areas, or threatened or endangered species are expected.

4.4.2 Potential Impact from No Action Alternative

Under the Proposed Action, this phase of housing development and construction would not occur. Therefore, the limited biological resources within the ROI would not be impacted by the no- action alternative.

4.5 Cultural Resources

A number of federal regulations and guidelines have been established for the management of cultural resources. Section 106 of the National Historic Preservation Act (NHPA), as amended, requires federal agencies to take into account the effects of their undertakings on historic properties. Historic properties are cultural resources that are listed in, or eligible for listing in, the National Register of Historic Places (NRHP). Eligibility evaluation is the process by which resources are assessed relative to NRHP significance criteria for scientific or historic research, for the general public, and for traditional cultural groups. Under federal law, impacts to cultural resources may be considered adverse if the resources have been determined eligible for listing in the NRHP or have been identified as important to Native Americans as outlined in the American Indian Religious Freedom Act (AIRFRA) and EO 13007 Indian Sacred Sites. Department of Defense (DoD) *American Indian and Alaska Native Policy* (1999) provides guidance for interacting and working with federally-recognized American Indian governments. DoD policy requires that installations provide timely notice to, and consult with, tribal governments prior to taking any actions that may have the potential to significantly affect protected tribal resources, tribal rights, or American Indian lands.

Analysis of potential impacts to cultural resources considers direct impacts that may occur by physically altering, damaging, or destroying all or part of a resource; altering characteristics of the surrounding environment that contribute to the resource's significance; introducing visual or audible elements that are out of character with the property or alter its setting; or neglecting the

resource to the extent that it deteriorates or is destroyed. Direct impacts can be assessed by identifying the types and locations of proposed activity and determining the exact location of cultural resources that could be affected. Indirect impacts generally result from increased use of an area.

4.5.1 Potential Impact from Proposed Action

All undisturbed areas at Malmstrom AFB have been surveyed and no National Register-eligible archaeological resources have been identified (USAF 1995a). Furthermore, the depositional environment is such that there is little potential for deeply buried archaeological remains (Malmstrom AFB 2002). It is extremely unlikely that the construction effort will affect archaeological resources because buried cultural material is unlikely to occur in the depositional environment.

Use of existing roads along the route proposed for hauling material to the construction site will not affect archaeological or architectural resources. Should improvements to existing roads be part of the Proposed Action, this also should have no effect on archaeological resources. However, construction of additional roads or widening the existing right-of-way would be considered a separate undertaking. It would be necessary to comply with Section 106 of the NHPA, including identification and NRHP evaluation of any affected resources.

The portion of the Chicago, Milwaukee, St. Paul and Pacific Railroad (site 24CA 264) that borders the northern boundary of the base will not be affected by the haul route.

In the unlikely event that archaeological resources are encountered in the course of any aspect of the Proposed Action, compliance with Section 106 of the NHPA, including NRHP evaluation of all identified resources, would be necessary prior to completing the Proposed Action. Contact with the Montana State Historic Preservation Office regarding this action is currently in process. Impacts to traditional resources are not expected under the Proposed Action. No traditional resources have been identified to date within Malmstrom AFB.

4.5.2 Potential Impact from No Action Alternative

Under the No Action Alternative, there would be no construction of new housing units. Thus, there would be no effects to cultural resources.

4.6 Noise Resources

4.6.1 Potential Impact from Proposed Action

The residential areas where housing units will be constructed will experience construction-related noise impacts. Table 9 lists typical construction-related noise for several different types of construction. Typical noise sources include diesel engines on construction equipment (e.g., backhoes, front-end loaders, dump trucks), air compressors and jackhammers to demolish concrete structures, back-up horns on construction equipment, and movement of construction materials. Noise levels should be similar to those listed for Domestic Housing below.

Table 9: Noise Levels for Construction Phases.

Phase	Typical Ranges of Energy Equivalent Noise Levels at Construction Sites (L_{eq} in dBA)							
	Domestic Housing		Office Building, Hotel, Hospital, School, Public Works		Industrial Parking Garage, Religious Amusement & Recreations, Store, Service Station		Public Works Roads & Highways, Sewers, and Trenches	
	I	II	I	II	I	II	I	II
Ground Clearing	83	83	84	84	84	83	84	84
Excavation/Demolition	88	79	88	79	88	71	88	78
Foundations	81	81	79	79	77	77	88	88
Erection	81	65	87	79	81	72	79	78
Finishing	88	72	89	74	89	74	84	84

I = All pertinent equipment present at site.

II = Minimum required equipment present at site.

Source: USEPA, Legal Compilation on Noise, Vol. 1, p. 2-104, 1973.

The new construction is currently scheduled to last 16 months, although the impacts will vary depending on the phase of construction for a specific unit. Construction of homes in the Jupiter Village neighborhood will directly impact residents in the housing areas southwest of 67th Street. The existing Clinic at the intersection of Clinic Court and Perimeter Road will experience increased noise attributable to construction activities.

Based on Table 8, Finishing would be the single loudest phase of construction. Assuming this activity generated a maximum L_{eq} of 89 dBA, noise would exceed 60 dBA (the point at which construction noise could affect activity or speech communication outdoors and sleep indoors) at residential or other noise-sensitive receptors with a direct line-of-sight of the activity for a distance of 1,300 feet. Given the cleared nature of the site in the project area, noise wouldn't be attenuated by intervening structures at many locations. Thus, noise would be perceived as very loud while construction occurred in the same neighborhood.

Prior to the start of construction for this project the existing site will be regraded. This process will include the placement of approximately 15,000 cubic yards of fill material to level the site and thus allow better drainage. In residential neighborhoods, 20-cubic yard trucks and dozers would be used to deliver and grade the fill material before construction began. Noise associated with the construction of the houses in this project would come from delivery trucks such as lowboys and refuse hauling trucks. Assuming that all trucks used the same route (Perimeter Road), the trucks would generate approximately 62 dBA. This noise would not be distinguishable from the overall noise in areas where construction activities were underway. Noise would be more perceptible along the local streets that serve as primary access routes for larger areas (e.g., Perimeter Road and 67th Street), but impacts along these routes would not be significant given the limited amount of time noise exposure would occur (most areas would not

experience increased truck noise for more than one construction season) and the fact that trucks would only be used during the daytime on weekdays.

One of the most essential elements in ensuring that noise impacts do not reach a level of significance is requiring that construction occur during daytime hours and on weekdays. All internal combustion engine-driven equipment should be equipped with mufflers that are in good condition. Although the construction traffic will have increased noise levels, they are not unlike the current intermittent industrial activity in the vicinity.

4.6.2 Potential Impact from No Action Alternative

No impacts associated with noise are expected under the No Action Alternative, since this phase of the housing development would not occur. The haul route would not be used.

4.7 Health, Safety, and Waste Management

4.7.1 Potential Impact from Proposed Action

Worker safety is the primary health and safety concern during construction activities. There are inherent risks associated with construction operations. The contractor selected to implement the Proposed Action will be subject to rigorous safety management requirements as part of the contract with the Corps of Engineers. These requirements are primarily associated with OSHA workplace safety practices. If the required safety precautions are enforced, no significant safety impacts are anticipated.

Household hazardous and toxic wastes are regulated by state and federal cleanup standards. Malmstrom has completed a hazardous and toxic waste study of the existing homes and determined that there are examples of household hazardous materials (asbestos, lead) in the homes as well as common household chemicals (MedTox NW, 2005). To the degree that the existing information provides evidence that materials require remediation, housing Contractors shall comply with all state and federal regulations with respect to management, abatement and disposal of hazardous waste. Plans for the management of such materials already exist for actions taken at Malmstrom AFB.

4.7.2 Potential Impact from No Action Alternative

This alternative presents no health, safety or waste management impacts since construction activity associated with this phase of the housing development would not occur.

4.8 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. Impacts to transportation are assessed with respect to the potential for disruption or improvement of current transportation patterns and systems; deterioration or improvement of existing levels of service, and changes in existing levels of safety.

Determination of the significance of the impact on visual resources is based on the level of visual sensitivity in the area.

4.8.1 Potential Impact from Proposed Action

The proposed construction would occur in an area that previously had on-base housing, and would be consistent with surrounding land uses. The replacement housing units would meet current Air Force “whole house/neighborhood” standards and would be visually consistent with current and proposed housing design.

The Proposed Action is in accordance with the General Plan. New development would be designed and constructed to be architecturally consistent and compatible with existing facilities and structures. Landscaping for the new housing units would be provided using standards identified in the General Plan.

Construction traffic associated with the implementation of the Proposed Action would comprise only a small portion of the total existing on base traffic. Increases in traffic volumes associated with construction activity would be temporary and are not unlike volumes experienced during earlier housing development phases. Upon completion of construction, no long-term impacts to on-base transportation systems would result.

4.8.2 Potential Impact from No Action Alternative

Under the No Action Alternative, the existing conditions would remain unchanged and impacts associated with land use, transportation, and visual resources would not occur.

4.9 Socioeconomic and Environmental Justice Impacts

This Environmental Assessment section considers the potential socioeconomic and environmental justice impacts of the Proposed Action. Employment, race, ethnicity, poverty status and age characteristics of populations in Cascade County were analyzed by evaluating the data presented in Section 3.9. With regard to environmental justice and protection of children, Malmstrom and County figures were compared to regional, state and national demographics to evaluate whether or not proportional differences exist. Should the data analysis reveal areas containing relatively high environmental justice-related populations, the evaluator should give special consideration regarding potential impacts in order to address the potential of disproportionately high or adverse human health or environmental effects on these communities.

Comparison of the data set forth in Section 3.9 does not highlight any areas of concern with respect to minority populations, low-income populations or youth populations. Malmstrom AFB has a higher concentration of the highlighted populations than Cascade County or the State of Montana. The housing replacement projects at issue will enhance the quality of life for person residing on Base. The effects and impact of the demolition of the existing units and construction of the new housing is short term and would not expose the on or off base populations to disproportionately high or adverse human health or environmental effects.

No long-term change in base employment or expenditures are anticipated as a result of the Proposed Action, which consists of a series of housing construction projects of relatively short

duration (less than five years). All construction activity, including demolition, material hauling and recycling, is anticipated to occur within the boundaries of the base therefore negligible off-base socioeconomic or environmental justice impacts would be expected.

Construction-related noise impacts will occur in the affected residential areas surrounding the new housing sites. Noise impacts will be limited, as much as practicable, by restricting construction activity to daytime hours on weekdays. Appropriate construction measures will be taken to ensure that the generation of dust during construction and hauling of materials does not create any significant health or safety risks to children and other nearby residents.

4.9.1 Potential Impact from Proposed Action

Construction activities associated with the Proposed Action could take place during FY2005 and involve expenditures of approximately \$29.91 million. The proposed construction activity would generate construction jobs and income and induce regional purchases and expenditures. These potential impacts would be temporary, however, only occurring for the duration of the construction period. No permanent or long-lasting socioeconomic impacts are anticipated as a result of implementation of the Proposed Action.

4.9.2 Potential Impact From No Action Alternative

Under the No Action alternative, Malmstrom AFB would maintain its existing housing and not undertake the proposed new home construction as described in detail in Section 2.0. Failure to implement the proposed improvements would not generate any of the construction-related employment or earnings impacts associated with the Proposed Action. Implementation of the No Action alternative could result in significant adverse socioeconomic or environmental justice impacts if Air Force personnel were forced to relocate off base and compete with civilians for housing within the existing housing market in Great Falls.

5.0 CUMULATIVE EFFECTS AND IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

5.1 Cumulative Effects

This section provides (1) a definition of cumulative effects, (2) a description of past, present, and reasonably foreseeable actions relevant to cumulative effects, and (3) an evaluation of cumulative effects potentially resulting from these interactions.

5.1.1 Definition of Cumulative Effects

CEQ regulations stipulate that the cumulative effects analysis within an EA should consider the potential environmental impacts resulting from “the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions” (§40 CFR 1508.7). Recent CEQ guidance in considering cumulative effects affirms this requirement, stating that the first steps in assessing cumulative effects involve defining the scope of the other actions and their interrelationship with the Proposed Action. The scope must consider geographic and temporal overlaps among the

Proposed Action and other actions. It must also evaluate the nature of interactions among these actions.

Cumulative effects are most likely to arise when a relationship or synergism exists between a Proposed Action and other actions expected to occur in a similar location or during a similar time period. Actions overlapping with, or in close proximity to, the Proposed Action would be expected to have more potential for a relationship than actions that may be geographically separated. Similarly, actions that coincide, even partially, in time would tend to offer a higher potential for cumulative effects.

To identify cumulative effects, this EA addresses three questions:

- (1) Does a relationship exist such that elements of the Proposed Action might interact with elements of past, present, or reasonably foreseeable actions?
- (2) If one or more of the elements of the Proposed Action and another action could be expected to interact, would the Proposed Action affect or be affected by impacts of the other action?
- (3) If such a relationship exists, does an assessment reveal any potentially significant impacts not identified when the Proposed Action is considered alone?

In this EA, an effort has been made to identify all related actions under consideration or in the planning phase at this time. To the extent that details regarding such actions exist and the actions have a potential to interact with the Proposed Action in this EA, these actions are included in this cumulative analysis. This combined approach enables stakeholders to have the most current information available so that environmental consequences of the Proposed Action can be evaluated.

5.1.2 Past, Present, and Reasonably Foreseeable Actions

This EA applies a stepped approach to provide stakeholders with not only the cumulative effects of the Proposed Action, but also the incremental contribution of past, present, and reasonably foreseeable actions.

5.1.2.1 Past and Present Actions Relevant to the Proposed Action

Malmstrom AFB is an active military installation that undergoes continuous change in mission and in training requirements. This process of change is consistent with the United States defense policy that the Air Force must be ready to respond to threats to American interests throughout the world. The most recent mission change at Malmstrom was in 1997 when the 819th RED HORSE squadron was assigned to Malmstrom.

The Proposed Action is part of an ongoing phased plan to upgrade all of the on-base family housing. Of the 1,404 housing units on base at Malmstrom, upgrades under Phase 1, 2 and 3 have already occurred for 503 units. The base, like any other major institution, also requires new occasional construction, facility improvements, and infrastructure upgrades. Phase 4 and 5 of the housing upgrade project have a current EA and FONSI signed (August 2004). The recent Heat

Plant Upgrade has been categorically excluded from requiring an EA because the purpose of the project is maintenance. The Installation Commander signed a FONSI for the Corrosion Control Facility upgrade which was recently completed. There is also a Base-wide storm retention basin and outfall upgrade project currently underway to address storm water handling issues.

The Air Force anticipates a continuing mission for Malmstrom AFB, but the specific nature of that mission and the military units stationed at Malmstrom to undertake that mission are subject to change. The Department of Defense released a Base Realignment and Closure list on 16 May 2005, and the realignment may result in restationing of additional units to Malmstrom AFB. Such a restationing action would require the completion of a separate EA at a later date.

5.1.2.2 Incremental Impacts of the Proposed Action with Reasonably Foreseeable Future Actions

As stated above, the Proposed Action is part of an ongoing phased plan to upgrade all of the on-base family housing. In addition to the 130 units for FY 2005 assessed previously, 310 units are projected for FY 2006-2007, and 478 for FY 2007 and beyond.

5.1.3 Analysis of Cumulative Impacts

The following analysis examines how any impacts resulting from the Proposed Action at Malmstrom AFB might affect the impacts of these other actions and whether such a relationship would result in potentially significant impacts not identified when the Proposed Action is considered alone.

Phases 6 and 7 under the proposed project are components of an ongoing phased plan to upgrade all of the on-base family housing. Previous family housing phases are either constructed or under construction and coordinated through phase specific NEPA documents. This EA provides consideration of the proposed project in light of past housing phases. In addition to potential cumulative affects from the overall phased housing program, the EA considers related base construction, facility improvements, and infrastructure upgrades common to any major installation. Potential cumulative impacts have been identified for the following environmental resources:

- **Air Resources:** Because of the nature of the development activities required, it is expected that construction impacts on air quality will be short-term and limited to localized areas. However, prolonged construction activity, such as a long-term housing program could impact regional air quality attainment status given suitable scope and intensity. However, when construction of the proposed project phases when compared to the scope of the entire base housing plan and nearby (off-installation) developments; it is unlikely that the housing program individually or cumulatively will result in lowered air attenuation standards or long term air quality degradation. Additional infrastructure required to support the proposed plan appears generally adequate. As such, significant additional energy or related support systems should not be required as a result of this proposed project. The proposed project will not result in a significant cumulative effect.

- **Geological Resources:** Permanent changes to soil structure and stability can occur by disrupting and reworking certain soils. The activities would be limited to a small area and are insignificant when considered by individually or cumulatively.
- **Noise Resources:** Noise from construction activities would represent an unavoidable impact. This impact is short-term for an individual residence, but will be evident over the 16-month construction schedule, lessening over the last three months (when finish work is being completed indoors) associated with this phase and a longer period when combined with the other phases. Cumulative impacts to noise resources from the entire housing program are negligible. Construction of this and earlier phases have been phased to reduce peak noise levels and duration. Post construction noise impacts from the project are consistent with other nearby and established residential uses. No significant cumulative impacts to noise resources are anticipated.
- **Transportation:** Transportation alone was not identified as a short or long term impact. However, as multiple phases of housing construction occur, and particularly if soil backfilling is a component of future construction projects, on-base roads will begin to deteriorate. Road and other infrastructure around and outside the installation are suitable for the volume of rehabilitated houses. Overall vehicle traffic when compared to existing uses and possible future development will not result in significant cumulative impacts.
- **Water Resources:** Short term increases in sediment discharge within existing base storm water facilities are possible during construction, however best management practices implemented to control erosion required by storm water discharge permits and establishment of appropriate storm water detention facilities will prevent any significant short term impacts. The long term quantity and quality of storm water discharged from the base will not be affected by the Phase 6 or 7 Housing Replacement project. Phase 6 replacement will result in a small (1.44 acres) net decrease in impervious surface within the project area. Future housing construction projects scheduled for Malmstrom AFB also consist of replacement of existing housing in the same locations and should not change the quality or quantity of storm water discharged from the base.

In addition to a review of the proposed project, a review of the overall Malmstrom AFB housing replacement program and the programs potential cumulative effects has also been conducted. Results show that some small temporary elevation in storm flows may have occurred into drainages around the base but annual flows through Whitmore Ravine and other drainages have not changed significantly.

Phases 1, 2 and 3 of the Replace Family Housing Project demolished 296 housing units from Wherry Housing, Malmstrom Drive and the Relocatables and constructed 296 new units in two areas entitled Minuteman Village and Matador Manor. This construction provided storm water discharge into two drainage areas, Drainage Area 1 and Drainage Area 2, which flow into the west branch of Whitmore Ravine. Under the demolished footprint the Malmstrom Drive units and Relocatable units drained to Drainage Area 1 and Drainage Area 2. The Wherry Housing, located off base, drained south and did not drain into Whitmore Ravine.

Drainage Area 1 and Drainage Area 2 combine to total 869.1 acres. The demolition completed in these early phases removed 5.4 acres of impervious surface area. Phases 1, 2 and 3 then constructed 35.7 acres of impervious surface area. The combined work adds 30.3 acres of impervious surface area, affecting storm water flow in both Drainage Area 1 and Drainage Area 2. Phases 1, 2 and 3 created, a maximum, storm water increase of 3.5 percent in the west branch of Whitmore Ravine, during peak flow events. The measured peak discharge for Drainage Area 1 at the outfall for a 0.25-inch in 2.5 hours rain event was 49.6 cubic feet per second (cfs). The measured peak discharge for Drainage Area 2 at the Walnut St. outfall (just below the 48 inch Corrugated Metal Pipe, CMP) for a 0.25-inch in 2.5 hours rain event was 10.2 cfs.

Prior to any phase of the housing replacement, Drainage Area 1 and Drainage Area 2 demonstrated a combined measured peak discharge of 59.8 cfs. Phases 1, 2 and 3 combined to increase peak discharge to the west branch of Whitmore Ravine, a maximum of 2.1 cfs. These same phases did not combine to create a significant increase in the average daily flow in Drainage Area 1 or Drainage Area 2. In addition, they do not significantly change the runoff coefficient for the area. The combined runoff coefficient for Drainage Area 1 and Drainage Area 2, based upon 356 total impervious acres and 513.2 pervious acres, is 0.63 (Compare to Table 6). The cumulative effects of Phases 1, 2 and 3 do not combine to create a significant change to storm water discharged into the west branch of Whitmore Ravine and therefore do not create a significant impact on the storm water discharged into Whitmore Ravine.

Phase 4 demolished 100 existing family housing units and rebuilt 36 two-bedroom, 42 three-bedroom, and 16 four-bedroom; all two story duplexes for a total of 94 new homes. Replacement of existing housing units and final regrading did not result in a significant increase of impermeable surface. As a result, no long-term impacts to groundwater recharge or surface water resources resulted.

Phase 5 demolished 180 housing units (90 duplexes) and constructed 130 housing units (100 two-bedroom and 30 four-bedroom; all two story duplexes). After demolition, workers demolished foundations and restored the sites to their natural grade. Malmstrom AFB donated these housing units to local Indian tribes for use through the Walking Shield Program. Taken as a whole, Phase V provided 50 less units than previous conditions.

No changes in cumulative environmental impacts to surface water are expected from the implementation of previous or currently proposed actions. In addition, the Base has designed appropriate retention and storm drain outfall systems to address surface water runoff issues during peak flow events. Cumulatively, the family housing projects at Malmstrom, combined with the detention pond, will maintain or slightly improve existing surface water conditions on and around the installation.

In light of past, present, and reasonably foreseeable future actions, USAF expects no significant cumulative impacts to surface waters as a result of this project or the overall housing program as currently designed.

5.2 Irreversible and Irretrievable Commitment of Resources

NEPA recommends that environmental analysis include identification of “. . . any irreversible and irretrievable commitments of resources which would be involved in the Proposed Action should it be implemented.” Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that the uses of these resources have on future generations. Irreversible effects primarily result from the use or destruction of a specific resource (e.g., energy and minerals) that cannot be replaced within a reasonable time frame. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the action (e.g., extinction of a threatened or endangered species or the demolition of a historic building).

For the Proposed Action, most resource commitments are neither irreversible nor irretrievable. Most environmental consequences are short-term and temporary (such as air emissions and noise from construction activities) or longer lasting but negligible.

The design team has specified that sustainable materials be used throughout the construction of this project. For example, the existing roads and associated concrete shall be crushed and reused as appropriate on future projects.

Those limited resources that may involve a possible irreversible or irretrievable commitment under the Proposed Action include consumption of limited amounts of materials typically associated with interior and exterior housing construction (e.g., concrete, wiring, insulation, and windows). However, the amount of these materials used is not expected to significantly decrease the availability of the resources.

5.3 CONCLUSIONS

Based on the forgoing analysis of the Phase 6 and Phase 7 housing replacement actions, the Air Force concludes that the Phase 6 and 7 Housing Replacement Program is not an activity with a significant impact to the human environment, and therefore the preparation of an Environmental Impact Statement is not required. Rather, the Installation Commander, as the decision maker, is encouraged to sign a Finding of No Significant Impact.

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Public Comments

FINDING OF NO SIGNIFICANT IMPACT

NAME OF THE PROPOSED ACTION

Replace Family Housing Phase VI & VII at Malmstrom Air Force Base, Montana.

DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

Malmstrom Air Force Base proposes to construct 797 total housing units (296 in Phase 6 and 501 in Phase 7). In addition, 20 units may be taken as an option from Phase 5 and added to Phase 6 and 7 if Air Staff approves the consolidation, resulting in 817 units to include full scope in the Phase 6 and 7 projects. Under the No Action Alternative, the proposed housing construction would not occur.

SUMMARY OF ENVIRONMENTAL CONSEQUENCES

This Environmental Assessment (EA) provides an analysis of the potential environmental consequences associated with the Proposed Action and the No Action Alternative. Nine resource categories received thorough evaluation to identify potential environmental consequences. As indicated in Chapter 4.0, the Proposed Action would not result in significant impacts to any resource area. The No Action Alternative would result in no impacts (positive or negative); however, the No Action Alternative would not accomplish the housing replacement objective.

Air quality impacts, while not significant, will occur due to exhaust emissions from construction equipment and from fugitive dust created during the construction process. Current air quality in the region of influence is excellent. Future phases of housing renovation and replacement and associated construction, though not likely, may impact the attainment status of the region.

Implementation of the Proposed Action will have temporary increases in localized noise levels in the project area during construction. Noise will be typical construction noise, lasting for the duration of the specific construction activities. However, noise will be mitigated by the use of equipment sound mufflers and restricting construction activity to normal working hours. Although noise disruptions would be temporary and would be limited to daytime hours, these disruptions will be very noticeable.

Under the Proposed Action, the overall ecological effect would be insignificant. There would be no impacts to wetlands and the Proposed Action would not conflict with the wetlands management program at Malmstrom AFB. No special species or sensitive habitats are expected to be impacted. Standard construction best management practices would be applied to control sedimentation and erosion during construction, thereby avoiding secondary effects to any wetlands or freshwater aquatic communities. The replacement of existing housing under the proposed action will reduce the amount of impervious surface within the project area, which may result in a slight reduction of stormwater discharge. Cumulative impacts are insignificant.

CONCLUSION

In accordance with the Council on Environmental Quality (CEQ) regulations implementing the National Environmental Policy Act (NEPA), as amended, and the Air Force Environmental Impact Analysis Process regulations contained in 32 Code of Federal Regulations (CFR) 989, an assessment of the environmental effects has been completed for the Phases VI and VII replacement of family housing units at Malmstrom AFB. I have determined that the Proposed Action will not have a significant adverse impact on the environment or the quality of the human environment. Therefore, an Environmental Impact Statement is not required.

GEOFFREY A. FRAZIER, Colonel, USAF
Malmstrom AFB ESOH Council Chairman

Date