Final

Base Realignment and Closure (BRAC) Environmental Assessment for Realignment of Nellis Air Force Base

Prepared for
Headquarters Air Combat Command and Nellis AFB, NV

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14. ABSTRACT

The Air Force proposes to implement the 2005 BRAC Commission?s mandated realignment for Nellis AFB. Realignment would supplement the 57th Adversary Tactics Group complement of aircraft for two existing aggressor squadrons at the base. The 64th Aggressor Squadron (64 AGRS) and the 65th Aggressor Squadron (65 AGRS) would receive 5 F-16 aircraft and 18 F-15C aircraft, respectively. Currently, the missions of these aircraft at Nellis AFB are performed by aircraft and aircrews on temporary duty (TDY) assignment. For this reason, the realigned aircraft would not conduct additional operations at the base or at the Nevada Test and Training Range beyond those performed previously by the TDY aircraft. Beddown of the aircraft would occur in Fiscal Year 2007 (FY07), FY10, and FY11. The proposed action would include construction of 11 new facilities for personnel and equipment scheduled for FY07 through FY09. Personnel increases of 464 permanently-based personnel and 60 part-time Reservists would also form part of the action. Because it is mandated by law, the Air Force must implement the BRAC realignment. Since the Air Force may supplement the BRAC action, the service considered a post-BRAC alternative. This alternative would incorporate all of the components of the BRAC realignment and provide additional aircraft construction, and personnel. Under the post-BRAC alternative, the 64 AGRS would receive an additional 8 F-16 aircraft in FY07. To support these aircraft, the post-BRAC alternative would add 45 personnel and 7 construction projects. Construction would occur in FY11. Because the additional F-16s would comprise more aircraft than previously flown by TDY aircrews performing the aggressor mission, the 64 AGRS would fly 1,400 more sorties from Nellis AFB. This Final EA analyzes the potential environmental consequences of the proposed BRAC realignment at Nellis AFB, the post-BRAC alternative, and the no-action alternative. The no-action alternative is presented primarily for comparison purposes, as the implementation of BRAC action is required by law.

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ACRONYMS AND ABBREVIATIONS

53 WG	53rd Wing
57 WG	57th Wing
98 RANW	98th Range Wing
99 ABW	99th Air Base Wing
64 AGRS	64th Aggressor Squadron
65 AGRS	65th Aggressor Squadron
ACC	Air Combat Command
ACM	Asbestos-containing material
AFB	Air Force Base
afy	acre feet per year
AGE	aerospace ground equipment
AGL	above ground level
AGM	air-to-ground missiles
AICUZ	Air Installation Compatible Use Zone
Air Force	United States Air Force
AMU	Aircraft Maintenance Unit
APZ	accident potential zone
ATCAA	Air Traffic Control Assigned Airspace
ATG	Adversary Tactics Group
AWACS	Airborne Warning and Control System
BAQ	Bureau of Air Quality
BLM	Bureau of Land Management
BRAC	Base Realignment and Closure
CAA	Clean Air Act
CAAA	Clean Air Act Amendments
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensations, and Liability Act
CFR	Code of Federal Regulations
CO	carbon monoxide
CWA	Clean Water Act
CZ	clear zone
dB	decibel
DNL	Day-Night Average Sound Level
DNWR	Desert National Wildlife Range
DOE	Department of Energy
DoD	Department of Defense
EA	Environmental Assessment
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
ERP	Environmental Restoration Program
ESA	Endangered Species Act
FONSI	Finding of No Significant Impact
FY	Fiscal Year
gpd	gallons per day
HAZMAT	hazardous materials
ICRMP	Integrated Cultural Resources Management Plan
IICEP	Intergovernmental and Interagency Coordination of Environmental Planning
L	sound level
LBP	lead-based paint
L_{dnmr}	Onset Rate-Adjusted Monthly Day-Night Average Sound Level
Lmax	maximum sound level
LOLA	live ordnance loading area
MILCON	Military Construction
MLWA	Military Land Withdrawal Act
MOA	Military Operation Area
MSA	Munitions Storage Area
MSL	mean sea level
NAAQS	National Ambient Air Quality Standards
NAC	Nevada Administrative Code
NDEP	Nevada Department of Environmental Protection
NDOT	Nevada Department of Transportation
NEPA	National Environmental Policy Act
NFA	No Further Action
NHPA	National Historic Preservation Act
nm	nautical mile
NO_2	nitrogen dioxide
NO_x	oxides of nitrogen
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NTS	Nevada Test Site
NTTR	Nevada Test and Training Range
O_3	ozone
Pb	lead
PL	public law
PM_{10}	particulate matter less than 10 microns
$PM_{2.5}$	particulate matter less than 2.5 microns
PSD	Prevention of Significant Deterioration
RCRA	Resource Conservation and Recovery Act
REDHORSE	Rapid Engineers Deployable Heavy Operational Repair Squadron Engineer
SEL	Sound Exposure Level
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SO_2	sulfur dioxide
SO_x	oxides of sulfur
SWPPP	Stormwater Pollution Prevention Plan
TDY	temporary duty
TPECR	Tolicha Peak Electronic Combat Range
USACE	United States Army Corps of Engineers
USAFWC	United States Air Force Warfare Center
USAFADS	United States Air Force Air Demonstration Squadron
USCB	United States Census Bureau
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
VOC	volatile organic compound
WINDO	Wing Infrastructure Development Outlook
WSA	Weapons Storage Area

FINDING OF NO SIGNIFICANT IMPACT

1.0 NAME OF THE PROPOSED ACTION

Realignment of Nellis Air Force Base Under Base Realignment and Closure

2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

The United States Air Force (Air Force) proposes to implement the 2005 Base Realignment and Closure (BRAC) Commission's mandated realignment for Nellis Air Force Base (AFB). Realignment would supplement the 57th Adversary Tactics Group complement of aircraft for two existing aggressor squadrons at the base. The 64th Aggressor Squadron (64 AGRS) and the 65th Aggressor Squadron (65 AGRS) would receive 5 F-16 aircraft and 18 F-15C aircraft, respectively. Currently, the missions of these aircraft at Nellis AFB are performed by aircraft and aircrews on temporary duty (TDY) assignment. For this reason, the realigned aircraft under the proposed action would not conduct additional sorties from the base or sortie-operations at the Nevada Test and Training Range (NTTR) beyond those performed previously by the TDY aircraft. Beddown of the aircraft would occur in Fiscal Year 2007 (FY07), FY10, and FY11. The proposed action would include construction of 11 new facilities for personnel and equipment scheduled for FY07 through FY09. Personnel increases of 464 permanently-based personnel and 60 part-time Reservists would also form part of the action. Because it is mandated by law, the Air Force must implement the BRAC realignment.

Since the Air Force may supplement the BRAC action, the service considered a post-BRAC alternative. This alternative would incorporate all of the components of the BRAC realignment and provide additional aircraft, construction, and personnel. Under the post-BRAC alternative, the 64 AGRS would receive an additional 8 F-16 aircraft in FY07. To support these aircraft, the post-BRAC alternative would add 45 personnel and 7 construction projects. Construction would occur in FY11. Because the additional F-16s would comprise more aircraft than previously flown by TDY aircrews performing the aggressor mission, the 64 AGRS would fly 1,400 more sorties from Nellis AFB. These sorties would also result in additional sortie-operations at NTTR, although they would not cause total annual sortie-operations to exceed the current maximum of 300,000.

The Air Force also analyzed the no-action alternative. Because BRAC law requires implementation of the Nellis AFB realignment, baseline conditions as reflected by the no-action alternative provide a comparison to the environmental impacts of the proposed action and post-BRAC alternative.

3.0 SUMMARY OF ENVIRONMENTAL CONSEQUENCES

The Environmental Assessment (EA) analyzed the potential environmental consequences resulting from implementation of the proposed action (i.e., BRAC) and post-BRAC alternative. The Air Force assessed several resources that in accordance with CEQ regulations warrant no further examination in the EA. Those resources were Land Management and Use, Environmental Justice and Protection of Children, Recreation and Visual Resources Airspace Management and Use, and Safety. Seven resource categories were analyzed in detail to identify potential impacts. The following summarizes and highlights the results of the detailed analysis by resource category.

Noise. Implementing the proposed action would not change the noise conditions on or around the base since the number of total annual sorties flown from Nellis AFB would not change. Similarly, no changes in noise levels at NTTR would result from the realignment. Under the post-BRAC alternative, the increase in 1,400 sorties would not result in a perceptive change in noise in the airfield environment of Nellis AFB or in the NTTR airspace. The additional sorties would account for a 3 percent increase over baseline conditions. A perceptible change in noise levels would require a doubling (i.e., 100 percent increase) of total sorties at the base. Therefore, the minimal increase in sorties under the post-BRAC alternative would be insufficient to raise noise levels even by a fraction of 1 decibel (dB) and would not be perceptible. For the same reasons, no perceptible changes to noise levels would occur at NTTR. There would be no change in noise conditions under the no-action alternative.

Air Quality. Effects to air quality under the proposed action would occur during facility construction period; however, the emissions would not pose an adverse impact. Maximum construction emissions of any criteria pollutant would not exceed *de minimus* levels nor would they contribute more than 0.039 percent to regional totals. The beddown of aircraft would not change or alter sortie numbers at the base airfield or within NTTR; no additional emissions would result. Use of aerospace ground equipment would produce a maximum of 3.55 tons per year for CO, and much less for other pollutants. Commuting by 464 additional personnel would generate additional emission, but none would exceed 0.003 percent of regional totals. Under the post-BRAC alternative, combined emission from all components would remain below *de minimus* thresholds for any year. The maximum regional contribution for criteria pollutants would be negligible, ranging from 0.01 to 0.1 percent. Emissions would remain unchanged under the no-action alternative.

Socioeconomics and Infrastructure. Under the proposed action, 464 permanently-based personnel and their dependents would relocate to Nellis AFB and Clark County, producing a base population increase of 3.9 percent and an increase of 0.03 percent for Clark County. This limited increase would not adversely affect housing, schools, or utilities in the Las Vegas area. An additional 45 permanent personnel and their dependents would relocate under the post-BRAC alternative resulting in a slightly greater increase to both the base and Clark County, but not appreciably more than 3.9 and 0.03 percent, respectively. This alternative would not have an adverse impact on community services, utilities, housing, or transportation. No change to the regional economy would occur under the no-action alternative.

Water and Soil Resources. Construction activities would disturb approximately 27 acres under the proposed action. These activities would account for about 2 percent of the base's water allotment, but spread over 3 years. Addition of 464 personnel would draw about 1 percent of the daily allotment. Combined, these amounts would produce a minimal effect on water availability. Use of best management practices would minimize the potential for soil loss and sedimentation. Construction for the post-BRAC alternative would add 22 acres of affected area: combined with the BRAC realignment construction, it would draw about 0.001 percent of the base's annual water allotment. The 45 additional personnel would not appreciably affect water use. Best management practices would minimize erosion and sedimentation. No changes to existing water resources or soil conditions would occur under the no-action alternative.

Biological Resources. Overall, there would be no adverse impact to vegetation, wildlife, wetlands, or special-status species from implementation of the proposed action or post-BRAC alternative. The endangered desert tortoise would not be adversely impacted by either action alternative. Should any be encountered during demolition or construction activities, appropriate measures to minimize impacts to the species would be taken. No changes to existing resources would occur under the no-action alternative.

Cultural Resources. One National Register-eligible site exists on Nellis AFB, but this resource would be avoided during construction activities. No traditional cultural properties are known to occur on Nellis AFB. No impacts to cultural resources would occur through implementation of the proposed action, post-BRAC alternative, or the no-action alternative.

Hazardous Materials and Waste. No significant impacts would occur due to hazardous materials or waste. No new waste streams would be created through implementation of the proposed action or post-BRAC alternative since the base already has F-15C and F-16 aircraft in their inventory. Due to additional aircraft maintenance, total base hazardous waste would increase by 6 and 8 percent, respectively, for the BRAC realignment and post-BRAC alternative. Such amounts would not change the large generator status of Nellis AFB. Under both the proposed action and post-BRAC alternative, construction would affect a single Environmental Restoration Program site. The required waiver has been obtained from Headquarters Air Combat Command and engineering controls would be employed. No impacts to this resource would occur under the no-action alternative.

4.0 CONCLUSION

Based on the findings of the EA, conducted in accordance with the requirements of the National Environmental Policy Act, the Council on Environmental Quality regulations, and Air Force Environmental Impact Analysis Process, as promulgated in Title 32 of the Code of Federal Regulations Part 989, and after careful review of the potential impacts, I conclude that implementation of the proposed action, post-BRAC alternative, or the no-action alternative would result in no significant impact on the quality of the human or natural environment. Therefore, a Finding of No Significant Impact (FONSI) is warranted, and an Environmental Impact statement (EIS) is not required for this action.

MARK D. WRIGHT, Colonel, USAF
Deputy Director, Installations (ACC/A7-2)

12 March 2007
Date

BASE REALIGNMENT AND CLOSURE (BRAC)
REALIGNMENT OF NELLIS AIR FORCE BASE

Responsible Agency: United States Air Force, Air Combat Command

Proposed Action: The United States Air Force (Air Force) proposes to realign 18 F-15C and 5 F-16 aircraft at Nellis Air Force Base (AFB), Nevada, as required by the 2005 Base Realignment and Closure (BRAC) Commission recommendations. The BRAC realignment would also require construction of new facilities and addition of personnel at Nellis AFB.

Written comments and inquiries regarding this document should be directed to:

HQ ACC/A7ZP
129 Andrews St., Ste 102
Langley AFB, VA 23665-2769
ATTN: Ms. Sheryl Parker

In addition, the document can be viewed on and downloaded from the World Wide Web at http://www.accplanning.org/

Designation: Final Environmental Assessment (EA)

Abstract: The Air Force proposes to implement the 2005 BRAC Commission's mandated realignment for Nellis AFB. Realignment would supplement the 57th Adversary Tactics Group complement of aircraft for two existing aggressor squadrons at the base. The 64th Aggressor Squadron (64 AGRS) and the 65th Aggressor Squadron (65 AGRS) would receive 5 F-16 aircraft and 18 F-15C aircraft, respectively. Currently, the missions of these aircraft at Nellis AFB are performed by aircraft and aircrews on temporary duty (TDY) assignment. For this reason, the realigned aircraft would not conduct additional operations at the base or at the Nevada Test and Training Range beyond those performed previously by the TDY aircraft. Beddown of the aircraft would occur in Fiscal Year 2007 (FY07), FY10, and FY11. The proposed action would include construction of 11 new facilities for personnel and equipment scheduled for FY07 through FY09. Personnel increases of 464 permanently-based personnel and 60 part-time Reservists would also form part of the action. Because it is mandated by law, the Air Force must implement the BRAC realignment.

Since the Air Force may supplement the BRAC action, the service considered a post-BRAC alternative. This alternative would incorporate all of the components of the BRAC realignment and provide additional aircraft, construction, and personnel. Under the post-BRAC alternative, the 64 AGRS would receive an additional 8 F-16 aircraft in FY07. To support these aircraft, the post-BRAC alternative would add 45 personnel and 7 construction projects. Construction would occur in FY11. Because the additional F-16s would comprise more aircraft than previously flown by TDY aircrews performing the aggressor mission, the 64 AGRS would fly 1,400 more sorties from Nellis AFB.

This Final EA analyzes the potential environmental consequences of the proposed BRAC realignment at Nellis AFB, the post-BRAC alternative, and the no-action alternative. The no-action alternative is presented primarily for comparison purposes, as the implementation of BRAC action is required by law.

Final

Base Realignment and Closure (BRAC) Environmental Assessment for Realignment of Nellis Air Force Base

United States Air Force
Air Combat Command

March 2007

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

This Environmental Assessment (EA) analyzes the potential environmental consequences resulting from the Nellis Air Force Base (AFB) proposal to implement the 2005 Base Realignment and Closure (BRAC) Commission recommendations, made law on November 9, 2005 in accordance with the Defense Base Realignment and Closure Act of 1990, as amended. Under this proposal, Nellis AFB would beddown 18 F-15C aircraft and 5 F-16 aircraft to augment the 65th Aggressor Squadron (65 AGRS) and the 64th Aggressor Squadron (64 AGRS). This action, conducted between 2007 and 2011, would also involve 11 construction projects and an increase of 464 based personnel and 60 part-time Reservists. This EA has been prepared by Headquarters Air Combat Command (ACC) in accordance with the requirements of the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations, and Air Force Environmental Impact Analysis Process, as promulgated in Title 32 of the Code of Federal Regulations (CFR) Part 989.

PURPOSE AND NEED FOR THE ACTION

The purpose of the proposed action is to implement the 2005 BRAC Commission's recommendations for realignment of aircraft at Nellis AFB. The realignment is comprised of the following actions:

- Realign 18 F-15Cs and 5 F-16s to the 65 AGRS and 64 AGRS to Nellis AFB;
- Construct 11 new facilities to accommodate this growth;
- Add 464 permanently-based personnel and 60 part-time Reservists to support the beddown;

The need for the proposed action is to comply with the Department of Defense's (DoD) overall military transformation process with its focus on reorganizing installation infrastructure, doctrine, and force structure to more efficiently and effectively support combat forces and increase operational readiness.

PROPOSED ACTION AND ALTERNATIVES

For the proposed action, the Air Force proposes to implement the 2005 BRAC Commission's mandated realignment for Nellis AFB. Realignment would supplement the 57th Adversary Tactics Group complement of aircraft for two existing aggressor squadrons at the base. The 64 AGRS and the 65 AGRS would receive 5 F-16 aircraft and 18 F-15C aircraft, respectively. Currently, the missions of these aircraft at Nellis AFB are performed by aircraft and aircrews on temporary duty (TDY) assignment. For this reason, the realigned aircraft would not conduct additional sorties from the base or sortie-operations at the Nevada Test and Training Range (NTTR) beyond those performed previously by the TDY aircraft. Beddown of the aircraft would occur in Fiscal Year 2007 (FY07), FY10, and FY11. The proposed action would include construction of 11 new facilities for personnel and equipment scheduled for FY07 through FY09. Personnel increases of 464 permanently-based personnel and 60 part-time Reservists would also form part of the action. Because it is mandated by law, the Air Force must implement the BRAC realignment.

Since the Air Force may supplement the BRAC action, it considered a post-BRAC alternative. This alternative would incorporate all of the components of the BRAC realignment described under the proposed action and provide additional aircraft, construction, and personnel. Under this alternative, the 64 AGRS would receive an additional 8 F-16 aircraft in FY07. To support these aircraft, the alternative would add 45 personnel and 7 construction projects. Construction would occur in FY11. Because the additional F-16s would comprise more aircraft than previously flown by TDY aircrews performing the aggressor mission, the 64 AGRS would fly 1,400 more sorties from Nellis AFB. These sorties would also result in additional sortie-operations at NTTR, although they would not cause total annual sortie-operations to exceed the current maximum of 300,000.

In addition to the proposed action and post-BRAC alternative, the Air Force analyzed the no-action alternative. However, under BRAC law, the Air Force must implement the proposed BRAC realignment so analysis of the no-action alternative occurs merely for comparison purposes in accordance with NEPA.

MITIGATION MEASURES

In accordance with 32 CFR 989.22, the Air Force must indicate if any mitigation measures would be needed to implement the proposed action. However, no mitigation measures would be needed to arrive at a finding of no significant impact (FONSI) if either the BRAC proposed action or the post-BRAC alternatives were selected for implementation at Nellis AFB.

SUMMARY OF POTENTIAL ENVIRONMENTAL IMPACTS

This EA provides an analysis of the potential environmental consequences resulting from implementation of the proposed action-BRAC realignment, post-BRAC alternative, and no-action alternative. Seven resource categories were analyzed to identify potential impacts: noise; air quality; socioeconomics and infrastructure; soils and water resources; biological resources; cultural resources; and hazardous materials and waste. According to the analysis in this EA, implementation of the proposed action, post-BRAC alternative or no-action alternative would result in no significant environmental impacts in any resource category. Implementing the proposed action-BRAC realignment or post-BRAC alternative would not significantly affect existing conditions at Nellis AFB or NTTR. The following summarizes and highlights the results of the analysis by resource category.

Table ES-1. Comparison of Alternatives by Resource

Resource Category	***Proposed Action-BRAC Realignment***	***Post-BRAC Alternative***	***No–Action Alternative***
Noise	• Addition of 23 aircraft would not increase sorties beyond baseline levels, so noise levels would not change.	• Additional 8 aircraft would increase annual sorties by 1,400 over baseline of 43,000. This 3 percent increase would raise noise levels by only a fraction of a decibel.	• Baseline conditions would continue within current contours.
Air Quality	• Emissions generated by construction, demolition, and paving would be localized and temporary. • Maximum emissions of any criteria pollutant would not exceed *de minimis* thresholds or contribute more than 0.039 percent of regional totals. • Maximum emissions would range from 0.14 to 19.70 tons/year.	• Emissions generated by construction, demolition, and paving would be localized and temporary. • Maximum combined emissions of any criteria pollutant would not exceed *de minimis* levels or contribute more than 0.1 percent of regional totals. • Maximum emissions would range from 13.39 to 63.56 tons/year.	• No change to existing emissions.
Socioeconomics and Infrastructure	• Population increase of 3.9 percent for Nellis AFB and 0.03 percent for Clark County. • Revenue to region would be about $1.2 million annually.	• Approximate 4.2 percent increase in base personnel over baseline and 0.09 percent for Clark County. • Revenue to region would be similar to proposed action.	• No change to existing socioeconomic resources or infrastructure.

Table ES-1. Comparison of Alternatives by Resource

Resource Category	***Proposed Action-BRAC Realignment***	***Post-BRAC Alternative***	***No–Action Alternative***
Water and Soil Resources	• Construction and demolition activities would affect about 27 acres at Nellis AFB (or about 0.2 percent of the base). • Impacts would be minimized by use of best management practices required by the base and permits. • Overall water use would draw about 1 percent of the base's daily allotment.	• Construction and demolition activities would affect a total of 49 acres (or about 0.3 percent of the base). • Impacts would be minimized by use of best management practices required by the base and permits. • Overall water use would be slightly more than 1 percent of the base's daily allotment.	• Ongoing activities at Nellis AFB would continue at baseline levels; no additional effects on water and soils resources would occur.
Biological Resources	• No adverse impacts to vegetation or wildlife from the proposed action. • A 404 Permit would be obtained, if required, as would consultation with USFWS. • Burrowing owls exist in or near construction areas; the appropriate procedures would be implemented prior to construction.	• No adverse impacts to vegetation or wildlife from the proposed action. • A 404 Permit would be obtained, if required, as would consultation with USFWS. • Burrowing owls exist in or near construction areas; the appropriate procedures would be implemented prior to construction.	• No change to current baseline conditions on Nellis AFB.
Cultural Resources	• All of Nellis AFB has been inventoried with results subjected to consultation under Section 106 of the NHPA. No eligible or National Register properties are in the Area of Potential Effect.	• All of Nellis AFB has been inventoried with results subjected to consultation under Section 106 of the NHPA. No eligible or National Register properties are in the Area of Potential Effect.	• The effect on the environment would be unchanged relative to baseline.

Table ES-1. Comparison of Alternatives by Resource

Resource Category	***Proposed Action-BRAC Realignment***	***Post-BRAC Alternative***	***No–Action Alternative***
Hazardous Materials and Waste	• No new waste streams would be created and hazardous materials would not change. • Total hazardous wastes would increase by 6 percent. • Proposed AMU hangar would be affected by the location of an active ERP site. The required ERP waiver has been obtained from Air Combat Command.	• No new waste streams would be created and hazardous materials would not change. • Total hazardous wastes would increase by 8 percent. • Proposed AMU hangar would be affected by the location of an active ERP site. The required ERP waiver has been obtained from Air Combat Command.	• Ongoing activities at Nellis AFB would continue at baseline levels.

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CHAPTER 1

INTRODUCTION

1.0 PURPOSE AND NEED FOR THE PROPOSED ACTION

1.1 INTRODUCTION

The United States Air Force (Air Force) proposes to implement the 2005 Base Realignment and Closure Commission's (BRAC) mandated realignment for Nellis Air Force Base (AFB), in Las Vegas, Nevada. This realignment stems from the Department of Defense's (DoD) focus on reorganizing installation infrastructure, doctrine, and force structure to more efficiently and effectively support combat forces, increase operational readiness, and facilitate new methods for meeting requirements. The BRAC process forms the primary vehicle for this reorganization effort and the overall military transformation process. On September 8, 2005, the BRAC Commission recommended a set of domestic realignment and closure actions (BRAC Commission 2005). After the President approved these recommendations on September 15, 2005, he forwarded them to Congress (DoD 2005), which did not alter any of the BRAC Commission's recommendations. Thus, on November 9, 2005, the recommendations became law (DoD 2006). For this reason, the Air Force must now implement the 2005 BRAC Commission recommendations stipulated in the Defense Base Closure and Realignment Act of 1990 (Public Law 100-526, as amended).

The Air Force, through Air Combat Command (ACC), proposes to implement the BRAC realignment by supplementing the 57th Adversary Tactics Group's complement of aggressor aircraft for two existing squadrons. One squadron, the 64th Aggressor Squadron (64 AGRS), would add to its inventory of F-16s, and the other 65th Aggressor Squadron (65 AGRS), would receive F-15C aircraft. Currently, the missions of these aircraft at Nellis AFB are performed by aircraft and aircrews on temporary duty (TDY) assignment. For this reason, the realigned aircraft would not conduct additional sorties from the base or sortie-operations at the Nevada Test and Training Range (NTTR) beyond those performed previously by the TDY aircraft. This action would also include construction of new facilities and airfield pavements to accommodate these additional aircraft, as well as basing of additional personnel.

The Air Force identified an additional action alternative that includes all elements of the BRAC realignment, and also incorporates post-BRAC actions. As proposed, the post-BRAC alternative would beddown eight F-16 aircraft with the 64 AGRS, add personnel, and implement 7 new construction projects. Because the additional F-16s would comprise more aircraft than previously flown by TDY aircrews performing the aggressor mission, the 64 AGRS would fly 1,400 more sorties from Nellis AFB.

In accordance with National Environmental Policy Act (NEPA) of 1969 (42 United States Code 4321-4347), Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] Sections 1500-1508), and 32 CFR Part 989, *et seq*., Environmental Impact Analysis Process (EIAP), ACC has prepared this Environmental Assessment (EA) that considers the potential consequences to the human and natural environment. The

EA examines the consequences of implementing the proposed BRAC realignment, post-BRAC alternative, and no-action alternative. Under BRAC law, the Air Force must implement the proposed BRAC realignment; therefore, analysis of the no-action alternative occurs primarily for comparison purposes.

1.2 BACKGROUND

Location of the Proposed Action

Nellis AFB

Nellis AFB, located in the southeast corner of the state of Nevada, lies adjacent to the city of North Las Vegas (Figure 1-1). Nellis AFB is the center for ACC training and testing activities at NTTR, with the base providing logistical and organizational support for NTTR, the aircraft training, and personnel. Situated in Clark County, the base lies 5 miles northeast of the City of Las Vegas. The unincorporated town of Sunrise Manor and undeveloped portions of Clark County surround the majority of the base, although open space dominates to the northeast. Covering 14,161 acres, the base contains three major functional areas (Figure 1-2). Area I, the Main Base, is located east of U.S. Highway 93 and includes the airfield and most base functions. Northeast of the main base lies Area II, the Munitions Storage Area/Weapons Storage Area (MSA/WSA). Area III, situated northwest of the Main Base, includes a number of facilities such as a hospital, storage, and housing. The areas north and east of Nellis AFB consist primarily of open range and mountains, with urban uses along Highway 93. Directly southwest of the base, commercial and residential land uses mixed with some industrial activities, dominate the area.

Nevada Test and Training Range

NTTR refers to the land withdrawn for a range and its associated airspace which covers approximately 12,000 square nautical miles (nm). The range covers about 2.9 million acres of southern Nevada (refer to Figure 1-1), consisting of two main functional areas, the North Range and South Range. The range within NTTR was originally established by Executive Order as the Las Vegas Bombing and Gunnery Range in 1940. By 1999, Public Law 106-65 (Military Lands Withdrawal Act of 1999), extended the land withdrawal until 2021 and superseded any former land withdrawals. NTTR-associated facilities include Tolicha Peak Electronic Combat Range (TPECR) in the northern portion of the range and Creech AFB in the southern portion of the range.

Background for the Aggressor Squadron

Nellis AFB's Red Flag exercises and the Weapons School's mission form the most extreme training experiences a fighter pilot will ever experience outside of combat. The nature and intensity of these

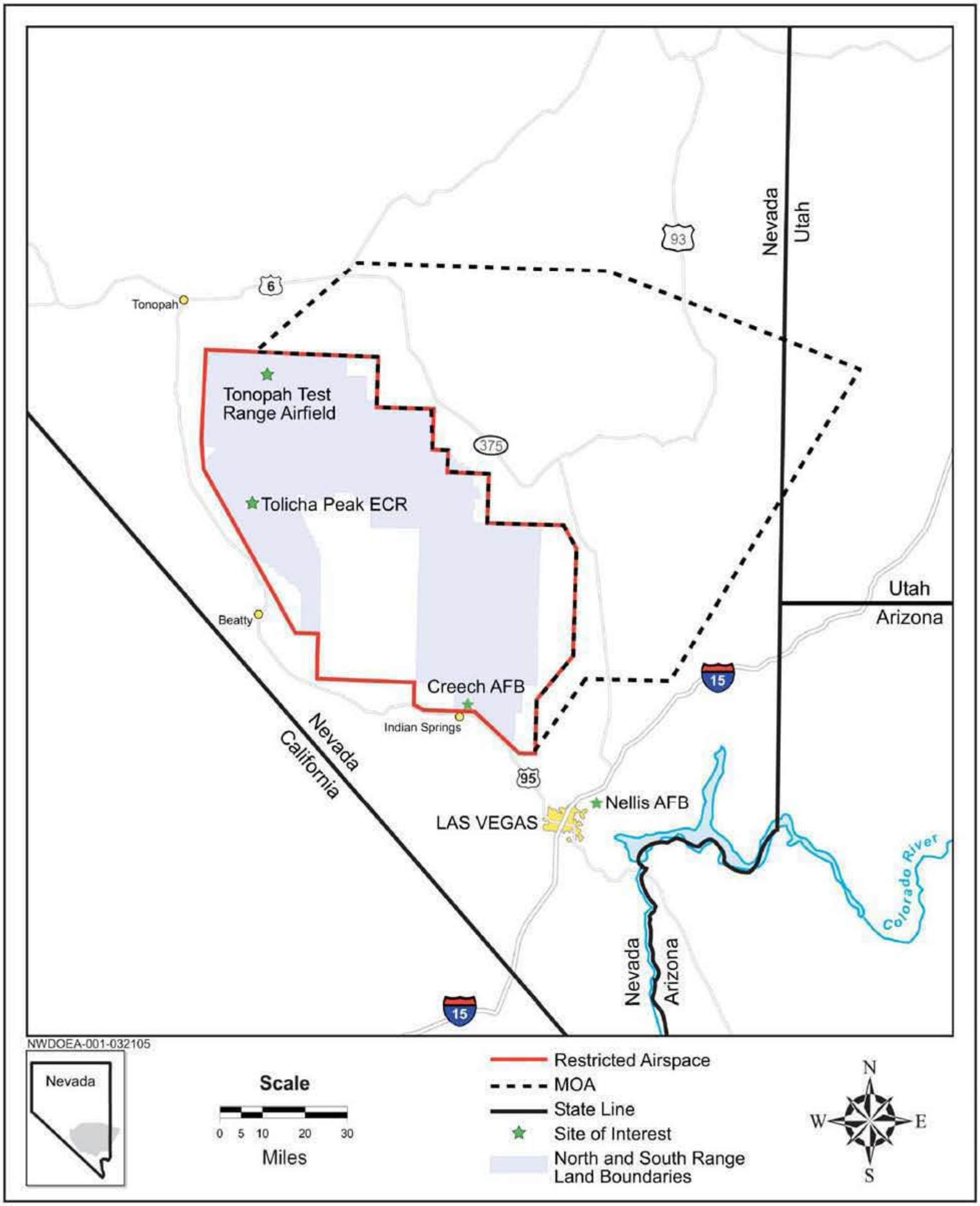


Figure 1-1. Nellis AFB and NTTR Location Map

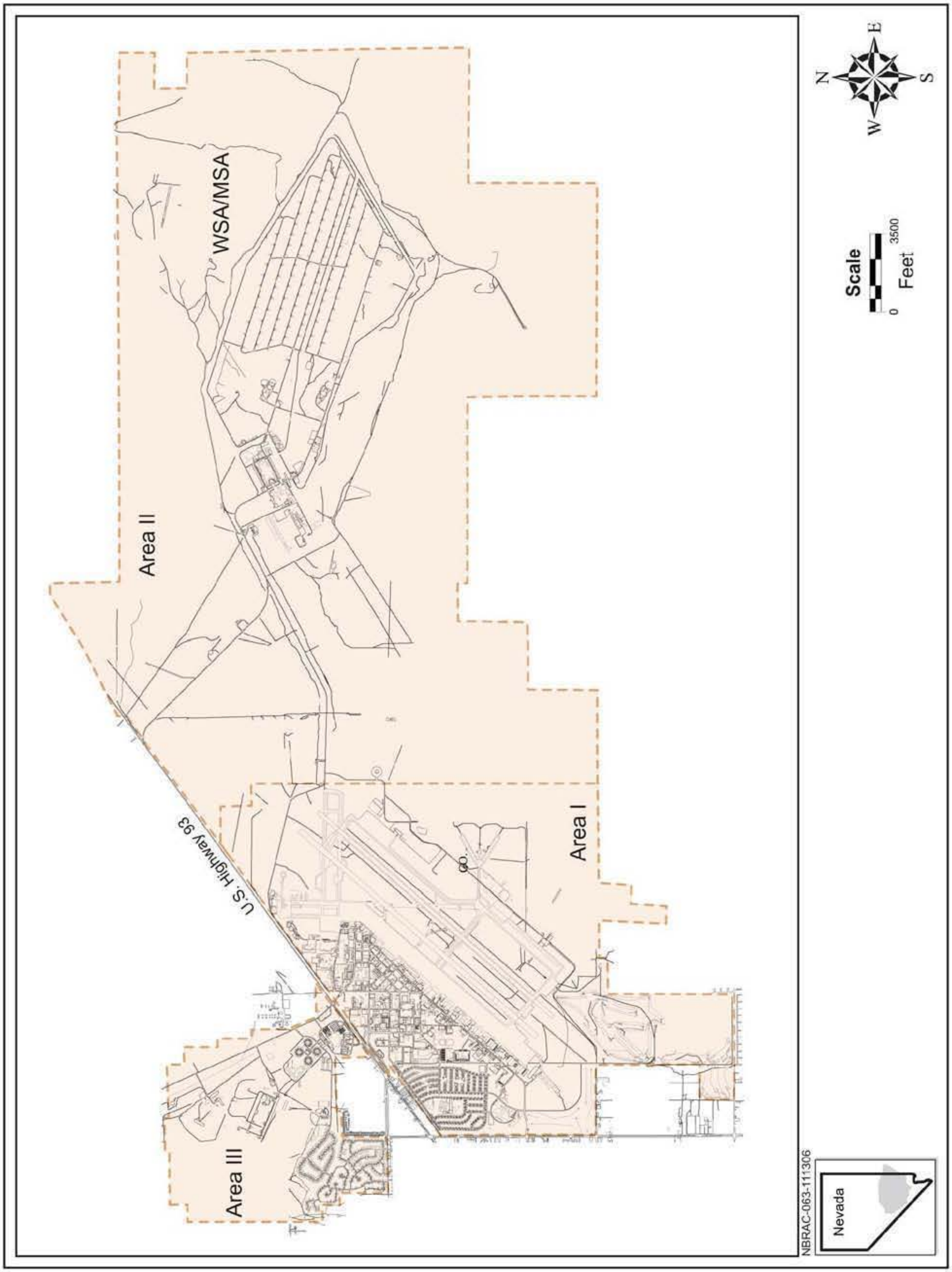


Figure 1-2. Nellis AFB Map

exercises effectively counteracted Vietnam-era survivability problems. Prior to implementation of these training exercises, pilots received little to no opportunity to experience and understand combat situations before entering combat. "On-the-job training" significantly reduced a pilot's chances of surviving his first missions. By receiving training that closely resembles actual combat, aircrews know what to expect and how to perform under combat conditions. U.S. and allied pilots that participate in these exercises become the best trained pilots in the world. With abundant and modern electronic threats, targets, aircraft, and tracking systems, Nellis AFB and NTTR provide a realistic battlefield environment. However, these physical components only support the technological realism of these exercises. True combat realism can be achieved only by flying against "enemy" forces using tactics and maneuvers expected to be employed in combat. As such, the Air Force established the Adversary Tactics Group and the aggressor squadrons at Nellis AFB to provide the simulated enemy aircraft and aircrews for these exercises.

The 64 and 65 AGRSs date back to the early seventies at Nellis AFB. During the Vietnam War, the Air Force realized that pilots were most frequently shot down during their first 10 combat missions. After the experience of 10 missions, aircrew survival and effectiveness increased significantly. In 1975, the Air Force instituted the Red Flag exercises at Nellis AFB and NTTR and created aggressor squadrons. Allowing pilots to fight against aggressor squadrons essentially provided the experience of flying their first 10 missions. After the Cold War, the Air Force deactivated the based aggressor squadrons using TDY aggressor squadrons from other bases to fly the Red Flag exercises. Respectively, in 2003 and 2006, the Air Force reactivated the 64 and 65 AGRSs at Nellis AFB with the 64 AGRS flying F-16 aircraft and the 65 AGRS flying F-15Cs.

Goal of BRAC Recommendations

In previous rounds of BRAC, the government explicitly sought to save money and downsize the military in order to reap a "peace dividend." While acknowledging the importance of fiscal savings as a BRAC goal in this 2005 round, the BRAC Commission considered more than a business model analysis of DoD's recommendations. Rather, it also weighed the strategic environment within which recommendations would be implemented and their effect on DoD's transformational goals. The purpose of many 2005 BRAC recommendations was to advance the goals of transformation, improve capabilities, and enhance military value (BRAC Commission 2005).

The BRAC Commission evaluated DoD's recommendations in the context of a stable or increasing force structure, an ongoing conflict in Southwest Asia, and the projected redeployment of 70,000 service and family members from Europe and Asia to the United States. The BRAC Commission also assessed the DoD's closure and realignment recommendations for consistency with the eight statutory selection criteria (Table 1-1) and the DoD Force Structure Plan.

Table 1-1. BRAC Statutory Selection Criteria
Military Value (Given Priority Consideration)
1. The current and future mission capabilities and the impact on operational readiness of the total force of the DoD, including the impact on joint warfighting, training, and readiness. 2. The availability and condition of land, facilities, and associated airspace (including training areas suitable for maneuver by ground, naval, or air forces throughout a diversity of climate and terrain areas and staging areas for the use of the Armed Forces in homeland defense missions) at both existing and potential receiving locations. 3. The ability to accommodate contingency, mobilization, surge, and future total force requirements at both existing and potential receiving locations to support operations and training. 4. The cost of operations and the manpower implications.
Other Considerations
5. The extent and timing of potential costs and savings, including the number of years, beginning with the date of completion of the closure or realignment, for the savings to exceed the costs. 6. The economic impact on existing communities in the vicinity of military installations. 7. The ability of the infrastructure of both the existing and potential receiving communities to support forces, missions, and personnel. 8. The environmental impact, including the impact of costs related to potential environmental restoration, waste management, and environmental compliance.

Source: BRAC Commission 2005

1.3 PURPOSE AND NEED FOR THE PROPOSED ACTION

The underlying purpose for the Air Force's proposed action is to implement realignment actions that create a center of excellence for the Adversary Tactics Group at Nellis AFB and supply personnel to support this goal. The action would add aircrews and aircraft to the aggressor squadrons, thereby eliminating the need for TDY aircraft and crew to act as aggressors for exercises. By providing for a full complement of based aircraft and aircrews, as well as appropriate permanent facilities, the realignment action would create a more cohesive aggressor program and ensure the highest levels of training. The overarching need for the proposed action is to improve the ability of the Air Force to respond rapidly to challenges of the 21st century through quality training.

Because the Air Force must, by law, implement the 2005 BRAC Commission recommendations, and the aggressor squadrons fill such an important role for aircrew training, the proposed action would fulfill both legislative requirements and the practical training needs. Since Nellis AFB and NTTR met all of the BRAC selection criteria (refer to Table 1-1), the BRAC Commission decided on a realignment that moves aircraft from other bases to Nellis AFB in order to add to existing aggressor squadrons. The BRAC realignment also directs two minor and inconsequential actions: realignment of the 926 Wing and 442 Wing headquarters elements to Nellis AFB. Neither action would involve construction, additional aircraft operations, or substantive personnel changes. In order to implement the BRAC actions, Nellis AFB needs facilities to house and support the additional aggressor function.

CHAPTER 2

DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

This chapter describes the Air Force proposal to implement recommendations of 2005 BRAC Commission pertaining to Nellis AFB. Under this proposal, Nellis AFB would beddown 18 F-15C aircraft and 5 F-16 aircraft to augment the existing aggressor squadrons, the 65 and 64 AGRS, respectively. These 23 aircraft would replace TDY aircraft that currently support the aggressor mission. For this reason, the realigned aircraft under the proposed action would not conduct more flight operations at the base or NTTR than those performed previously by the TDY aircraft. Beddown of the aircraft would occur in Fiscal Year 2007 (FY07), FY10, and FY11. The proposed action would include construction of 11 new facilities scheduled for FY07 through FY09. Personnel increases of 464 permanently-based personnel and 60 part-time Reservists would also form part of the action. An alternative that involves post-BRAC actions would include implementation of all components of the BRAC realignment plus the beddown of eight additional F-16s. To support these aircraft, the post-BRAC alternative would add 45 personnel and 7 construction projects. Construction would occur in FY11. Because the additional F-16s would comprise more aircraft than previously flown by TDY aircrews performing the aggressor mission, the 64 AGRS would fly 1,400 more sorties for Nellis AFB. This EA also evaluates the no-action alternative, as required under NEPA and CEQ regulations (40 CFR 1500-1508). However, BRAC law precludes the implementation of the no-action alternative. Therefore, this analysis considers the no-action alternative for the purposes of comparison to the proposed action and BRAC elements of the alternative, and for assessing the degree of environmental consequences (Table 2-1). In addition, no action would apply to the post-BRAC elements of the alternative.

Table 2-1. Relationship of Proposed Action and Post-BRAC Alternative to No-Action Alternative

	Component(s)	*No-Action Alternative*
Proposed Action	BRAC Realignment	Comparison Only
Post-BRAC Alternative	BRAC Realignment	Comparison Only
	Post-BRAC Beddown	Can be Selected

2.1 ALTERNATIVE IDENTIFICATION PROCESS

Alternatives form the core of the NEPA process. In compliance with NEPA and CEQ regulations 32 CFR 989, which implements the Air Force's NEPA process, the Air Force must consider reasonable alternatives to the proposed action. Only those alternatives determined as reasonable relative to their ability to fulfill the need for a proposed action warrant detailed analysis. To be considered reasonable, an alternative must not only fulfill the purpose and need for the action, it must be technically and fiscally feasible. It must also involve a reasonably foreseeable action. Through rigorous evaluation, an agency needs to examine a range of alternatives, determining those deemed reasonable and those not carried forward for detailed analysis.

For this proposal, alternative identification must also recognize that the law governing BRAC requires implementation of the BRAC recommendations. As such, any alternative must include those actions in an unmodified form. However, alternatives may contain other, additional components that augment the basic proposal. In the process of considering potential alternatives to the proposed action, Nellis AFB examined optional means to further implement operations of the aggressor squadrons, eliminate the need for TDY operational combat aircraft, expand the based squadrons' capabilities, and maximize the synergy derived from basing the full complement of aggressors at one location.

2.2 NO-ACTION ALTERNATIVE

Under NEPA and CEQ regulations (40 CFR Part 1502.14(d)), "no action" means that the proposed action (i.e., BRAC Realignment for Nellis AFB) would not take place, and the resulting environmental effects from taking no action would be compared to the effects of permitting the proposed action to go forward. Despite legislation requiring implementation of BRAC actions, NEPA also requires analysis of baseline conditions as reflected by the no-action alternative to compare the impacts to those resulting from the proposed action. The following descriptions of the current status of Nellis AFB and NTTR provide a context for comparing the changes that would occur with the proposed action.

2.2.1 Nellis AFB

Nellis AFB is the "Home of the Fighter Pilot" and the U.S. Air Force Warfare Center (USAFWC) with 125 based aircraft. The USAFWC provides advanced combat training, tactics development, and operational testing. The center also supports worldwide combat operations with the Predator unmanned aircraft systems operating out of Creech AFB. As weapons systems, enemy capabilities, and world situations change, Nellis AFB also changes to stay ahead of potential threats. The resulting changes always ensure that Nellis AFB and its training and testing mission produce the best trained, most capable aircrews in the world.

To fulfill its mission, Nellis AFB provides realistic combat training involving every type of aircraft in the Air Force inventory. It also supports test and evaluation programs and weapons schools for all Air Force fighter aircraft: A-10s, F-15C/Ds, F-15Es, F-16s, and F-22As. The organizational structure of Nellis AFB includes four major wings and 60 other units. The USAFWC headquartered at Nellis AFB consists of four wings; three wings—the 57th Wing (57 WG), the 98th Range Wing (98 RANW), and the 99th Air Base Wing (99 ABW)—are based at Nellis AFB. The fourth, the 53rd Wing (53 WG), operates from Eglin AFB, Florida, although some of its units like the 422nd Test and Evaluation Squadron, are at Nellis AFB. Table 2-2 summarizes the major units and their functions. In addition, Nellis AFB and NTTR host and conduct large-force exercises for U.S. and allied air forces. During these exercises, many of the TDY aircraft operate out of Nellis AFB using ramp space and other facilities.

Table 2-2. Nellis AFB Units Relevant to the Proposed Action

Unit	***Relevant Functions***
USAFWC	• Manages all advanced pilot training and integrates test and evaluation requirements. • Oversees flying operations at Nellis AFB: 57 WG, 98 RANW, and the 53 WG.
57 WG Weapons School 414th Combat Training Squadron (Red Flag) 57 Adversary Tactics Group	• Oversees all flying operations at Nellis AFB including the Weapons School and 414th Combat Training Squadron. • Manages airspace. • Ensures realistic training in combined air, ground, and electronic threat environment. • Provides an advanced combat training course in weapons and tactics. • Trains graduate-level fighter aircrews for all fighter aircraft. • Conducts large-force exercises involving combat training for multiple "friendly" and "adversary" forces. • Provides the "adversary" forces with the 64 and 65 AGRS.
53 WG 422nd Test and Evaluation Squadron	• Based at Eglin AFB except for the 422nd Test and Evaluation Squadron. • Responsible for operational testing and evaluation of new equipment and systems proposed for use by the forces. • Develops new tactics for aircraft in the Air Force inventory. • Operates A-10, F-15C, F-15E, F-16C, F-22A, and HH-60G aircraft.
98 RANW	• Operates, maintains, and develops NTTR comprising about 3 million acres of land and 12,000 square nm of airspace. • Operates airfields at Creech AFB and the Tonopah Test Range.
99 ABW	• Host wing for Nellis AFB. • Oversees all day-to-day operations and functions of the base.

The 414th Combat Training Squadron conducts large-force exercises that maximize the combat readiness and survivability of participants by providing a realistic training environment. Red Flag is a special multi-week large force exercise that realistically simulates aircrew deployment and combat situations. Red Flags are complex, full-scale simulated wars, complete with aggressor aircraft using adversary tactics. These exercises teach units how to deploy and operate in an integrated manner. In a typical Red Flag exercise, Blue Forces (friendly) engage Red Forces (aggressor) in combat situations. Blue Forces are made up of units from ACC, Air Mobility Command, U.S. Air Forces Europe, Pacific Air Forces, Air National Guard, U.S. Air Force Reserve, Army, Navy, Marine Corps, and allied air forces. They are led by a Blue Forces commander who orchestrates the employment plan. Red Forces are composed of the 57th Adversary Tactics Group and provide the threats through the emulation of enemy tactics. In a typical year, the Air Force plans three to five Red Flag exercises at Nellis AFB and NTTR.

Nellis AFB Assigned Aircraft and Airfield Operations

Under the no-action alternative, the number and nature of aircraft assigned to Nellis AFB and the quantity and type of airfield operations would remain unchanged from the baseline conditions described below. Nellis AFB supports 125 based aircraft consisting of A-10s, F-15Cs, F-15Es, F-16s, F-22A, and HH60s.

Since Nellis AFB supports major force exercises such as Red Flag, more than a dozen types of transient (visitors not based at Nellis AFB) aircraft temporarily operate from the base during exercises. These aircraft range from U.S. B-1B bombers to fighters such as the Mirage 2000 and Tornado, operated by U.S. allies. Table 2-3 summarizes the principal operational tasks of the major types of aircraft that are stationed at Nellis AFB, use the base as transients, or operate within NTTR. Other aircraft at Nellis AFB are minor transient users and are not listed.

Table 2-3. Major Types of Aircraft Operating at Nellis AFB and in NTTR

Aircraft Type	*Status*	*Description*
A-10 and OA-10	B/T	Low altitude, heavily protected aircraft designed to defeat armored vehicles and act as forward air controller
AV-8B	T	Close support attack aircraft used by the Marine Corps; has short takeoff and vertical landing capabilities
B-1B	T	Long range, high and low altitude bomber performing deep interdiction strikes
B-2	T	Long range, high and low altitude bomber performing deep interdiction strikes with stealth technology
B-52H	T	Long range, high and low altitude bomber performing deep interdiction strikes
C-130	T	Four engine turboprop troop and cargo transport
C-17A	T	Long range, heavy lift cargo transport
E-3	T	Airborne Warning and Control System (AWACS) capable of high- or low-level surveillance of air vehicles over all types of terrain
E-8C	T	Multi-engine aircraft modified with a side-looking radar for ground surveillance, targeting, and battle management missions
EA-6B	T	Navy all weather, electronic warfare aircraft capable of detecting, locating, jamming, and destroying enemy air defense radar; now employed by the Air Force to replace the EF-111
F/A-18C/D	T	Navy, Marine, and Canadian Air Force twin-engine, multi-mission tactical air-to-air and air-to-ground fighter aircraft
F-15C	B/T	Performs air-to-air combat and air intercept operations; no surface attack missions
F-15E	B/T	Air-to-ground fighter with air-to-air capability
F-16C/D	B/T	Multi-role fighter performing close air support, air-to-air combat, interdiction strikes, and suppression of enemy air defenses
F-117A	T	Light bomber with stealth technology
F-22A	B	Air-to-air combat and intercept missions and air-to-ground missions with stealth technology
HH-60G	B	Combat search and rescue helicopter designed for long range, rapid response missions
KC-135R, KC-10A	T	High-altitude aerial refueling aircraft to support varied aircraft missions
Mirage 2000	T	High performance delta-winged fighter/bomber used by foreign air forces
Unmanned Aircraft Systems RQ-4, MQ-1, and MQ-9	B B*	Unmanned Aircraft Systems providing long endurance, unmanned aerial reconnaissance, surveillance, and target acquisition, based at Creech AFB
RC-135	T	Surveillance aircraft equipped with sophisticated intelligence gathering devices for monitoring enemy electronic activity
Tornado	T	Swing-wing interceptor, attack, and reconnaissance aircraft used by air forces of the United Kingdom, Italy, Germany, and Saudi Arabia

Notes: B = Based, T = Transient for exercises, B*= Based at Creech AFB

This document uses three terms to describe different aircraft flying activities: *sortie, airfield operation,* and *sortie-operation*. Each has a distinct meaning and commonly applies to a specific set of activities in particular airspace units. A *sortie* consists of the flight activities of a single military aircraft from takeoff through landing. For this EA, the term sortie is commonly used when summarizing an amount of flight activity from Nellis AFB. In contrast, an *airfield operation* represents the single movement or individual portion of a flight in the base airfield airspace environment such as one takeoff, one landing, or one transit of the airport traffic area. A single sortie generates at least two airfield operations (takeoff and landing), and a sortie can result in more than one *sortie-operation* at NTTR. A *sortie-operation* comprises the use of one airspace unit (e.g., Military Operations Area [MOA], Restricted Area) within NTTR by one aircraft. Sortie-operation applies to flight activities outside the airfield airspace environment. Each time a single aircraft conducting a sortie flies in a different airspace unit, one sortie-operation is counted for that unit.

From 1987 through 1994, annual airfield operations at Nellis AFB have varied between 61,000 and 181,000 (Air Force 1999a) as a result of budget constraints, aircraft realignments, and changes in the number, composition, and duration of the exercises conducted at Nellis AFB. The most recent available data indicate that in 2003 aircraft conducted approximately 86,000 airfield operations (Air Force 2003a). Table 2-4 presents the baseline annual airfield operations at Nellis AFB according to based versus transient aircraft and day or night operations.

Table 2-4. Annual Airfield Operations at Nellis AFB

Aircraft Type	***Annual Airfield Operations***		***Total***
	Day (7:00 a.m. - 10:00 p.m.)	*Night[2] (10:00 p.m. - 7:00 a.m.)*	
Aircraft Based at Nellis AFB[1]	56,401	6,073	62,474
Transient Aircraft	23,155	0	23,155
Total	**79,556**	**6,073**	**85,629**

Source: Air Force 2003a
[1] Includes authorized F-22A operations
[2] Defined as environmental night for noise analysis purposes

These airfield operations translate into approximately 42,800 sorties per year. Aircraft commonly perform only a landing and take-off at Nellis AFB; closed patterns occur rarely. While operations occur regularly after dark, only about 7 percent are conducted during environmental night.

Facilities and Infrastructure

Nellis AFB includes a well-developed infrastructure supporting a broad spectrum of functions and organizations. Covering 14,161 acres, the base consists of three functional areas (refer to section 1.2 and Figure 1-2). Area I, the main base, occupies about 30 percent of the base and contains runways, flightline, industrial facilities, housing, and administrative and support facilities and contains over 2,000 buildings, including more than 1,200 family housing units, dormitories, and billeting facilities. Area II, the Munitions Storage Area (MSA)/Weapons Storage Area (WSA) covers approximately 60 percent of the base. Area III covers about 10 percent of the base. Under the no-action alternative, no change to this existing infrastructure would occur.

Personnel

No increase of personnel would occur under the no-action alternative. Estimated personnel levels at Nellis AFB would remain unchanged from the present, as shown in Table 2-5. However, Nellis AFB is a vital and active installation constantly changing and refining missions and organizations. This dynamism results in fluctuations of personnel levels within a year and year-to-year. Variations of a few hundred personnel occur consistently, and Nellis AFB absorbs and adjusts to them.

Table 2-5. Nellis AFB Personnel

	Military	***Civilian and Contract Employees***	***Total***	***Part-Time Reservists***
Nellis Personnel	8,071	3,917	11,988	63

Source: Air Force 2005b

2.2.2 Nevada Test and Training Range

The NTTR refers to the land withdrawn for the range and its associated military training airspace. The NTTR airspace covers approximately 12,000 square nm. Two airfields, Creech AFB and Tonopah Test Range, lie within NTTR and support the activities performed within the complex. The North Range contains four unmanned weapons delivery complexes and multiple and dispersed facilities supporting three Electronic Combat Ranges: Tonopah Electronic Combat Range, TPECR, and Electronic Combat South Range. These ranges provide a spectrum of high-to-low electronic threat environments.

The South Range contains five weapons delivery areas consisting of two manned weapons delivery complexes and three unmanned complexes. The South Range overlaps a portion of the Desert National Wildlife Range (DNWR), an area established in 1936 for the protection and preservation of desert bighorn sheep. Through mutual and collaborative efforts, the Air Force and the U.S. Fish and Wildlife Service (USFWS) work to maintain proper management of the DNWR land areas that coincide with NTTR.

Airspace Structure

NTTR includes restricted areas that overlie the military lands and are adjacent to the MOA airspace. The restricted areas comprise special use airspace within which the Federal Aviation Administration (FAA) has determined that potentially hazardous activities occur, including air-to-ground ordnance delivery. Regulations prohibit nonparticipating military and civil/commercial aircraft from flying within this airspace without authorization. Training activities within NTTR predominantly involve subsonic flight. However, supersonic flight is authorized in all NTTR airspace units, although at differing altitudes (Table 2-6 and Figure 2-1). Under the no-action alternative, the structure, function, and use of NTTR would not change. Variation in the amount of use would likely occur, but it would remain within the range of variability noted over the past decade or more.

Table 2-6. Charted Airspace Associated with NTTR

Airspace Unit	***Floor (lower) Altitude***	***Ceiling (upper) Altitude***	***Supersonic Flight Authorized***
Reveille MOA	100 feet above ground level (AGL)	17,999 feet mean sea level (MSL)	Above 5,000 feet AGL
Desert MOA	100 feet AGL	17,999 feet MSL	Portions above 5,000 feet AGL and rest of the MOA above 30,000 feet MSL
Restricted Area R-4806	100 feet AGL	Unlimited	West side above 5,000 feet AGL and rest of area above 30,000 feet MSL
Restricted Area R-4807	Surface	Unlimited	Portions above 100 feet AGL; portions above 5,000 feet AGL; and rest of area above 30,000 feet MSL
Restricted Area R-4809	Surface	Unlimited	Above 5,000 AGL, with authorization
Restricted Area R-4808[1]	Surface	Unlimited	Above 14,000 feet MSL

[1] DOE airspace over the Nevada Test Site (NTS); it is not part of NTTR but its western portion is used by NTTR aircraft to transit to and from the North Range.

The NTTR airspace consists of restricted areas: R-4806, R-4807, and R-4809. The Tonopah Test Range underlies a portion of restricted area R-4809. R-4808 lies adjacent to the NTTR airspace and is controlled by the Department of Energy (DOE) for NTS activities. Through a cooperative and collaborative scheduling process, NTTR aircraft can transit this restricted airspace for entering and exiting NTTR North Range. Currently, NTTR and DOE are coordinating changes to the management and use of R-4808. However, these changes would ensure continuation of R-4808 for its intended purpose and protection of surrounding airspace uses.

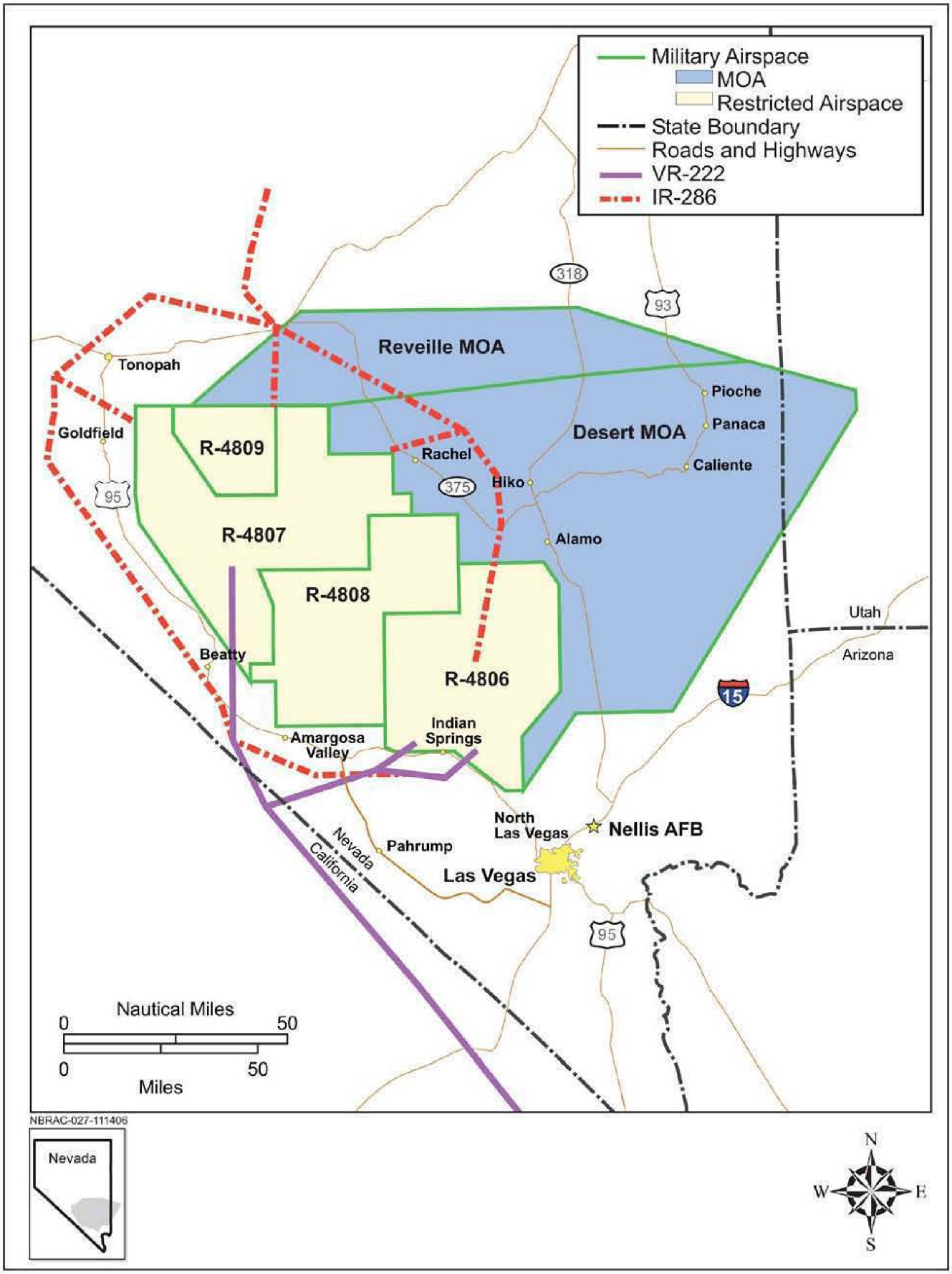


Figure 2-1. NTTR North and South Ranges and Associated Airspace

The airspace also includes the Desert and Reveille MOAs with overlying Air Traffic Control Assigned Airspace (ATCAA). MOAs consist of special use airspace that provides maneuvering room for military aircraft training, and separates that training from other air traffic. MOAs also identify areas where concentrated military aircraft operations may occur. The ATCAA overlies both MOAs, extending from 18,000 feet MSL to an altitude assigned by the FAA. The ATCAA provides additional maneuvering airspace for training, and the FAA assigns it on an as-needed basis.

NTTR Airspace Use

More than 20 different types of aircraft conduct testing or training missions within NTTR. Aircraft stationed at Nellis AFB, such as F-15s, F-16s, and F-22As form the predominant aircraft using the complex. Aircraft from other services (e.g., Navy, F/A-18s) and U.S. allies also conduct operations in NTTR. The capabilities available at NTTR are in extremely high demand. Annually, the Air Force expends over 45 percent of its total training ordnance at NTTR for testing tactics and training missions. With an average of three to five major exercises planned each year, NTTR represents a major training asset, ensuring aircrew and aircraft readiness. For example, most of the U.S. and some of the Coalition aircrews received their first “combat” missions at NTTR’s simulated battlespace before fighting in the most recent conflicts in Afghanistan and Iraq.

Annual military use of NTTR varies, depending on many factors. These factors include Congressional funding levels, weapons testing requirements, aircrew training requirements, scheduling conflicts, deployments, and the actions of potential enemies that may pose a threat to the security interests of the United States or our allies. Due to these year-to-year variations in use, and the expectation that they will continue, the Air Force previously conducted a comprehensive review of NTTR aircraft sortie-operations (Air Force 1999a).

Since the NTTR airspace includes several MOAs, restricted areas, and subdivisions, sorties at NTTR commonly result in multiple sortie-operations, particularly during major exercises. For example, an average F-16 from Nellis AFB uses six different airspace units during a sortie with a sortie-operation counted for each unit. Previous review of NTTR sortie-operations established a low-to-high range for annual sortie-operations in order to account for year-to-year variations in use (Air Force 1999a). For a low-use year, a total of 200,000 sortie-operations occur in the NTTR airspace, whereas a total of 300,000 sortie-operations represent a high-use year. Table 2-7 presents sortie-operations by airspace unit for a low-use and high-use year. The Air Force anticipates that sortie-operations in the NTTR airspace under the no-action alternative would continue to range between 200,000 and 300,000 per year in the foreseeable future.

Table 2-7. Baseline Sortie-Operations by Airspace Unit		
Airspace Unit	***Low Use - 200,000 Annual Sortie-Operations***	***High Use - 300,000 Annual Sortie-Operations***
Desert MOA	51,224	76,170
Reveille MOA	14,038	20,911
R-4806	30,134	44,135
R-4807	74,127	112,121
R-4808	12,953	20,008
R-4809	17,524	26,655
Total	**200,000**	**300,000**

Source: Air Force 1999a.

NTTR supports realistic training by permitting the use of ordnance, both live and inert. Aircrews must be skilled in the use of the full range of conventional Air Force weapons, from unguided ordnance and laser-guided bombs to air-to-ground missiles. NTTR provides for safe training, testing, and evaluation of weapons systems in support of potential technological improvements in hardware, software, tactics, and training. In recent years, the total amount of ordnance used annually on NTTR has varied, with a high of 4,500 tons and a low of 3,000 tons (Air Force 1999a). Inert (i.e., non-explosive) ordnance represents slightly more than 50 percent of the ordnance expended on NTTR. Since ordnance use does not directly correlate to the number of sortie-operations flown in NTTR, the amount of ordnance tends to vary year-to-year and would continue to do so under the no-action alternative. NTTR provides the capability to use an extensive inventory of conventional live and inert training ordnance including a wide range of air-to-ground weapons: so-called “iron” (unguided) bombs, guided bombs and missiles, cluster bombs, rockets, and cannon.

Inert training ordnance includes no high explosives and commonly consists of a small steel projectile or a larger steel-encased concrete projectile. Constructed to function like actual munitions, inert ordnance ranges in weight from about 10 pounds to 2,000 pounds. Some inert ordnance contains a small spotting charge that generates a puff of smoke to aid in scoring weapons delivery. Live ordnance, as the designation indicates, includes high explosive charges. Live ordnance used in training and testing at NTTR is identical to that used in actual combat. Live ordnance ranges from cluster bomb units to general purpose bombs weighing 2,000 pounds and containing almost 1,200 pounds of high explosive. Air-to-ground missiles (AGM), such as the AGM-65 Maverick (300-pound explosive warhead) and 2.75 inch rockets are also used on authorized targets at NTTR. While air-to-air missile training occurs at the range, safety rules require the missiles remain fixed to the aircraft. No actual launching of air-to-air missiles is permitted over NTTR.

Public protection is ensured at NTTR by excluding the public and non-required military personnel from locations simulating an active, high-stress battlefield environment. Air Force control of NTTR enables flight and ground operations to train and test equipment for the defense of national security interests while minimizing risks to the public.

2.3 PROPOSED ACTION

The proposed action would include four basic components: Aircraft Beddown, Construction, Personnel Changes, and Aircraft Operations. The following sections describe these components.

Aircraft Beddown

To fulfill BRAC recommendations, the Air Force would realign F-16 and F-15C aircraft from various locations to supplement the 64 and 65 AGRS at Nellis AFB. For the 64 AGRS, Nellis AFB would receive five F-16 aircraft in FY07 (Table 2-8). As a result of this action, the operational aircraft assigned to the 64 AGRS would increase from 11 to 16. All F-16s realigned to and part of the 64 AGRS would be equipped with non-combat F100-PW-220 engines. The F100-PW-220 engines, which provide less thrust than Air Force combat engines, better simulate the capabilities of potential enemy aircraft. Realignment would provide 18 additional F-15C aircraft to the 65 AGRS in FY10 and FY11, bringing the total of operating F-15Cs assigned to the 65 AGRS to 24 aircraft.

Table 2-8. Proposed BRAC Beddown of Aircraft

Squadron	*Aircraft*	*Current Total*	*BRAC Beddown*	*Total*
64 AGRS	F-16	11	5	16
65 AGRS	F-15C	6	18	24
Other Nellis AFB Aircraft	Various	108	0	108
Total		**125**	**23**	**148**

[1]Nellis aircraft include HH-60, A-10, F16, F-15C, F-22A

The proposed action would increase the current total based aircraft at Nellis AFB by 18 percent. Since TDY aircraft at Nellis AFB currently perform the mission of the aircraft proposed for beddown, the actual number of aircraft at the base at a given time would not increase. Furthermore, Nellis AFB has accommodated more than this total of aircraft in the past (Air Force 1999c). As recently as the 1990s, the base supported more than 150 aircraft (Air Force 1999c).

Construction

Construction would also be required to fulfill the BRAC recommendation to supplement the aggressor squadron at Nellis AFB. Because BRAC requires the movement of aircraft, funding for the facilities comes from congressionally-designated BRAC funds and would not compete with normal Military Construction (MILCON) funding sources.

The existing 64 and 65 AGRSs operate from the same facility. Because it is already substandard and too small for the current operations, addition of aircraft and operations personnel drive the need for construction of additional facilities. Construction activities for the proposed BRAC realignment would include an aircraft maintenance unit (AMU) hangar, a squadron operations facility, and other facilities as listed in Table 2-9 and shown on Figure 2-2. The table includes both the planned square footage of the structures and the total area expected to be disturbed as a result of pavement, parking lots, landscaping, and required security measures. In total, the BRAC realignment would affect about 27 acres, or about 0.2 percent of the base.

Table 2-9. Nellis AFB BRAC Realignment Facility Construction Requirements

Facility Requirements - BRAC	*Square Footage*	*Total Disturbed Area*
Combined Squad Ops (65 AGRS)	13,740	187,300
65 AGRS AMU Hangar	17,370	196,000
Hangar	23,940	47,880
Ramp	375,000	375,000
Fuel Cell Hangar	18,200	36,400
Aerospace Ground Equipment (AGE) Complex	6,900	13,800
Armament	19,000	88,800
Engine Shop	9,000	18,000
Sound Suppressor	4,000	8,000
Flight Simulator	16,000	174,150
926 Wing HQ Facility	8,000	16,000
Total	**511,150**	**1,161,330**

Sources: Green, personal communication 2006; McMullin, personal communication 2006; Tillman, personal communication 2006; Air Force Form 1391

Modifications to the aircraft fueling infrastructure, particularly on the east ramp, may be necessary in the future. Use of fueling bowsers (i.e., self-propelled or towed fueling tanks) in that area would meet the needs of the aircraft, however. Should modifications prove necessary in the future, the Air Force would conduct appropriate environmental analysis.

Personnel Increases

Personnel increases to support the aggressor beddown would involve military, civilian, Air National Guard, and reservist personnel. Table 2-10 shows the proposed increase of personnel required as a result of the proposed action. Personnel changes needed to support the Nellis AFB BRAC realignment, the formation and integration of reservist units into the 64 and 65 AGRSs, and transfer of the 926th Wing HQ to Nellis AFB would increase the base population by 464 permanent positions and 60 part-time reservists by FY11. These changes would represent a 3.9 percent increase over baseline levels. As a dynamic base, changes in personnel of this limited magnitude have occurred often (Air Force 1999c).

Table 2-10. Personnel Increase Due to BRAC Realignment

	Military	*Civilians and Contract Employees*	*Total*	*Part-Time Reservists*
Baseline (FY05)	8,071	3,917	11,988	63
FY11	8,929	3,947	12,876	123
Increase	**+434**	**+30**	**+464**	**+60**

Source: Air Force 2005b and personal communication, Creasy 2006

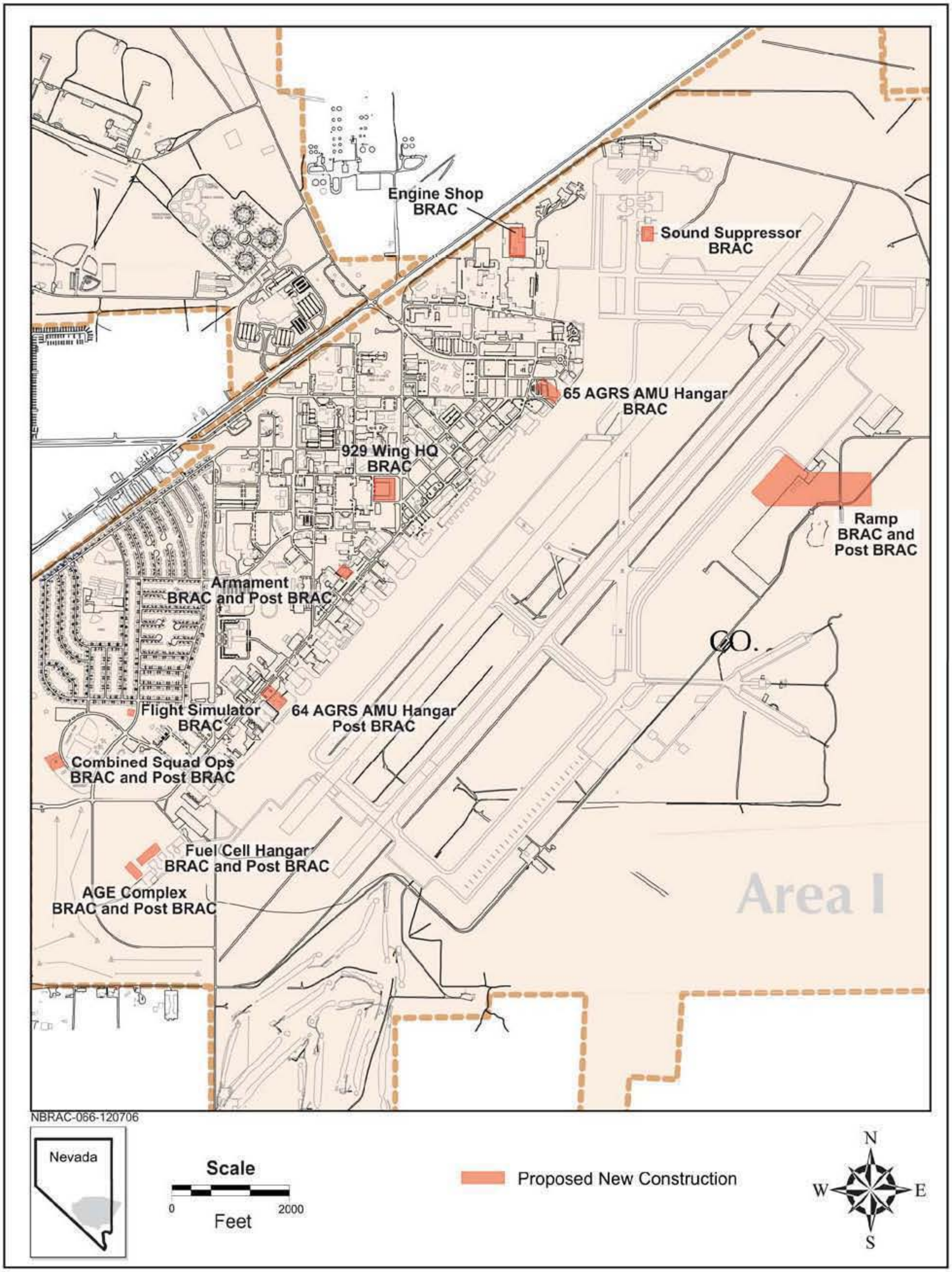


Figure 2-2. Nellis AFB Proposed Construction – BRAC and Post-BRAC

Aircraft Operations

The beddown of aggressor aircraft at Nellis AFB would eliminate the need for TDY aircraft to fly the sorties in the exercises. However, the based aircraft of the aggressor squadrons would not fly additional sorties beyond those previously flown by TDY aircraft. Therefore, neither sorties nor airfield operations would increase above baseline levels under the proposed action.

2.4 POST-BRAC ALTERNATIVE

The post-BRAC alternative includes all components of the proposed BRAC realignment plus additional related actions. Although BRAC legislation requires implementation of the recommended actions, the Air Force, like other services, can supplement a realignment if it chooses. Since supplemental activities are discretionary, the Air Force must distinguish these actions from BRAC actions when conducting NEPA. In the case of this EA, the Air Force would supplement the BRAC realignment with the beddown of 8 additional aircraft, addition of 45 personnel, 7 new construction projects, and 1,400 more annual sorties. Implementing the post-BRAC alternative would fulfill all BRAC realignment actions and further enhance the aggressor squadrons. As a result of this alternative, both the 64 and 65 AGRSs would operate a total of 24 aircraft each.

Aircraft Beddown

In addition to 18 aircraft beddown as part of the proposed action, the post-BRAC alternative would shift 8 F-16 aircraft (with F100-PW-220 engines) from the U.S. Air Force Air Demonstration Squadron (USAFADS, also known as the Thunderbirds) to the 64 AGRS. In turn, the USAFADS would receive replacement F-16 aircraft made available through realignments. Since these replacement aircraft would operate in exactly the same manner as the existing Thunderbird aircraft, this change in USAFADS aircraft warrants no further discussion in this document.

Addition of post-BRAC F-16s would complement the 64 AGRS, increasing it to a full 24 aircraft squadron. The addition of the 8 F-16s would potentially occur in FY07, with all aircraft in place by FY11. Table 2-11 shows the total number of aircraft including the BRAC and post-BRAC alternatives. Overall, this alternative would increase the inventory at the base by 25 percent. As noted previously, Nellis AFB has supported more than 150 aircraft in the past (Air Force 1999c).

Table 2-11. Total BRAC Realignment and Post-BRAC Aircraft

Squadron	*Aircraft*	*Current Total*	*BRAC Realignment*	*Post BRAC*	*Total*
64 AGRS	F-16	11	5	8	24
65 AGRS	F-15C	6	18	0	24
Other Nellis AFB Aircraft	Various[1]	108	0	0	108
Total		**125**	**23**	**8**	**156**

[1]Nellis aircraft include HH-60, A-10, F16, F-15C, F-22A

Construction

Construction would also be required to support the additional post-BRAC aircraft and associated equipment. A new hangar and squadron operations facility as well as additional space in the aerospace ground equipment facility, fuel cell, and armament facility would be constructed. These projects would also be additive to construction stemming from the BRAC realignment (Table 2-12).

Although BRAC supports facilities through congressionally designated funding, the proposed post-BRAC facilities would need to compete for MILCON funds. MILCON funding also is approved by Congress, but military priorities and political influences cause a greater degree of competition for the limited MILCON funds available each year. As a result, the post-BRAC activities represent discretionary actions segregated from the proposed BRAC realignment.

Construction would also be required to fulfill the BRAC recommendation to house the aggressor squadrons at Nellis AFB. Because BRAC requires the movement of aircraft, funding for the facilities comes from congressionally-designated BRAC funds and would not compete with normal MILCON funding sources which are also approved by Congress.

The post-BRAC alternative would require the same construction projects as described for the proposed action, including a aircraft maintenance unit hangar, a squadron operations facility, and other facilities as listed in Table 2-12 and shown on previous Figure 2-2. The additional facilities and ramp space for the post-BRAC alternative would, with the exception of an AMU and road/utility upgrades, comprise expansions of or additions to facilities constructed under the BRAC action. Road work would primarily occur near the east ramp due to its expansion. Separately, post-BRAC construction would disturb about 22 acres; combined with the BRAC realignment, construction would affect about 49 acres. This amount equates to roughly 0.3 percent of the base.

Table 2-12. Nellis AFB BRAC Realignment and Post-BRAC Facility Requirements

Facility Requirements - BRAC	***Square Footage***	***Total Disturbed Area***
Combined Squad Ops (65 AGRS)	13,740	187,300
65 AGRS AMU Hangar	17,370	196,000
Hangar	23,940	47,880
Ramp	375,000	375,000
Fuel Cell Hangar	18,200	36,400
AGE Complex	6,900	13,800
Armament	19,000	88,800
Engine Shop	9,000	18,000
Sound Suppressor	4,000	8,000
Flight Simulator	16,000	174,150
926 Wing HQ Facility	8,000	16,000
BRAC Total	**511,150**	**1,161,330**
Facility Requirements – Post BRAC		
64 AGRS AMU Hangar	17,370	196,000
AGE Complex*	6,900	13,800
Combined Squad Ops (64 AGRS)*	13,740	187,300
Road/Utilities	70,000	70,000
Armament*	19,000	88,800
Ramp*	375,000	375,000
Fuel Cell Hangar*	18,200	36,400
Post-BRAC Total	**520,210**	**967,300**
Grand Total	**1,031,360**	**2,128,630**

*Expands on BRAC facility
Sources: Green, personal communication; McMullin, personal communication 2006; Tillman, personal communication 2006; Air Force Form 1391

Construction for the post-BRAC projects would be completed in FY11. These projects would overlap with work on some BRAC required facilities.

Personnel Increases

The post-BRAC alternative would add 45 additional personnel to Nellis AFB, but the breakdown of officer, enlisted, civilian, and reservist personnel has not yet been determined. This small increase would be negligible in terms of total base population and annual variations in base populations. It is expected that these personnel would arrive at the base along with the aircraft.

Aircraft Operations

The F-16 aircraft operated by the 64 AGRS normally fly about 14 to 15 airfield sorties per month at Nellis AFB; this amount of activity is also known as the utilization rate for an aircraft. For the eight additional F-16s beddown under the post-BRAC alternative, this utilization rate would generate 1,400 sorties annually.

Relative to baseline conditions, these sorties would represent a 3 percent increase in total sorties and airfield operations. Given the normal high rate of activity at Nellis AFB, and the year-to-year fluctuation in use due to variations in the number and duration of exercises, a 3 percent change would go unnoticed. Sortie-operations in NTTR would increase slightly but stay well within the existing range of 200,000 to 300,000 sortie-operations. The additional sortie-operations would fall within normal variation for use of the NTTR airspace.

2.5 ENVIRONMENTAL IMPACT ANALYSIS PROCESS

This EA examines the specific affected environment for each alternative, considers the current conditions of the affected environment, and compares those to conditions that might occur under other alternatives, including no action. It also examines the cumulative impacts within the affected environment of these alternatives as well as past, present, and reasonably foreseeable actions of the Air Force and other federal, state, and local agencies. The following steps are involved in the preparation of this EA.

1. ***Announce that an EA will be prepared.*** An advertisement indicating that the Air Force intended to prepare an EA was published in the Las Vegas Review Journal on November 27, 2006.

2. ***Conduct Agency Coordination*.** The Air Force sent Intergovernmental and Interagency Coordination of Environmental Planning (IICEP) letters in November and December 2006 to announce the Air Force's proposal and to request input from government agencies (see Appendix A). The Air Force sent out 29 IICEP letters and received responses form the Nye County Board of Commissioners, City of North Las Vegas, and the U.S. Fish and Wildlife Service (USFWS). Nye County suggested implementing the BRAC realignment at Tonapah Test Range. However, the BRAC recommendations were passed by Congress and signed into law on November 9, 2005. As such, the Air Force is not authorized to make changes to this law, and, therefore, cannot entertain Nye County’s suggestion.

   The City of North Las Vegas raised concerns about impacts to rare plants and the implications of the 4 Corner-Post action affecting McCarran Airport in Las Vegas. Because the proposed construction projects related to this action would be located on Area I of the base, the Las Vegas Bearpoppy and Las Vegas Buckwheat populations would not be affected and no mitigation measures would be required. Noise impacts and associated noise contours relative to BRAC realignment and the 4 Corner-Post action for McCarran would not intersect and not be additive. As a result, no mitigation measures are required. Air Quality emission resulting from both the 4 Corner-Post action and the Nellis BRAC action would be below levels considered *de minimus* under the Clear Air Act; therefore, mitigation measures pertaining to air quality would not be required.

   The USFWS requested further clarification of the proposed action which the Air Force provided.

3. ***Prepare a draft EA.*** The first comprehensive document for public and agency review was the draft EA. This document, published in January 2007, examined the environmental impacts of the proposed action and the post-BRAC alternative as well as the no-action alternative.

4. ***Announce that the draft EA has been prepared.*** An advertisement was posted in the Las Vegas Review Journal on January 12, 2007 and again on January 18, 2007, notifying the public as to the draft EA's availability for review in local libraries and on the World Wide Web (www.accplanning.org and www.nellis.af.mil/library/environment.asp).

5. ***Provide a public comment period.*** After the draft EA was distributed, a 30-day public comment period began. The Air Force's goal during this process is to solicit comments concerning the analysis presented in the draft EA. During the comment period, the Air Force received three comments (Appendix A). The Clark County Department of Planning reviewed the EA and had no comments regarding its conclusion. However, the county noted two minor editorial items that have been corrected in this final EA. The State of Nevada Clearinghouse, in two separate letters, stated it had no comments. As part of these comments, the Nevada State Historic Preservation Office (SHPO) specifically supported the proposal as written.

6. ***Prepare a final EA.*** Following the public comment period, a final EA has been prepared. This document is a revision of the draft EA, includes consideration of public comments, and provides the decisionmaker with a comprehensive review of the proposed action and the potential environmental impacts.

7. ***Issue a Finding of No Significant Impact (FONSI) or prepare an Environmental Impact Statement (EIS).*** The final step in the NEPA process is signature of a FONSI if the analysis supports this conclusion or a determination that an EIS would be required for the proposal.

2.6 OTHER REGULATORY AND PERMIT REQUIREMENTS

The NEPA process is intended to assist the decision makers in understanding the environmental consequences and in taking appropriate actions that protect, restore, and enhance the environment. Other federal statutes that may apply to the proposed action are listed in Table 2-13.

Table 2-13. Other Major Environmental Statutes, Regulations, and Executive Orders Applicable to Federal Projects

Environmental Resource	*Statutes*
Noise	Noise Control Act of 1972 (PL 92-574) and Amendments of 1978 (PL 95-609); USEPA, Subchapter G-Noise Abatement Programs (40 CFR 201-211)
Air	Clean Air Act (CAA) of 1970 (PL 95-95), as amended in 1977 and 1990 (PL 91-604); USEPA, Subchapter C-Air Programs (40 CFR 52-99)

Table 2-13. Other Major Environmental Statutes, Regulations, and Executive Orders Applicable to Federal Projects (con't)

Environmental Resource	***Statutes***
Environmental Justice	Executive Order 12898-Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations; Protection of Children from Environmental Health Risks and Safety Risks (Executive Order 13045)
Water	Federal Water Pollution Control Act of 1972 (PL 92-500) and Amendments; Clean Water Act (CWA) of 1977 (PL 95-217); USEPA, Subchapter D-Water Programs (40 CFR 100-145); Water Quality Act of 1987 (PL 100-4); USEPA, Subchapter N-Effluent Guidelines and Standards (40 CFR 401-471); Safe Drinking Water Act of 1972 (PL 95-923) and Amendments of 1986 (PL 99-339); USEPA, National Drinking Water Regulations and Underground Injection Control Program (40 CFR 141-149)
Biological Resources	Migratory Bird Treaty Act of 1918; Fish and Wildlife Coordination Act of 1958 (PL 85-654); Sikes Act of 1960 (PL 86-97) and Amendments of 1986 (PL 99-561) and 1997 (PL 105-85 Title XXIX); Endangered Species Act of 1973 (PL 93-205) and Amendments of 1988 (PL 100-478); Fish and Wildlife Conservation Act of 1980 (PL 96-366); Lacey Act Amendments of 1981 (PL 97-79)
Wetlands and Floodplains	Section 401 and 404 of the Federal Water Pollution Control Act of 1972 (PL 92-500); USEPA, Subchapter D-Water Programs 40 CFR 100-149 (105 ref); Floodplain Management-1977 (Executive Order 11990); Emergency Wetlands Resources Act of 1986 (PL 99-645); North American Wetlands Conservation Act of 1989 (PL 101-233)
Cultural Resources	National Historic Preservation Act of 1966 (16 USC 470 et seq.) (PL 89-865) and Amendments of 1980 (PL 96-515) and 1992 (PL 102-575); Protection and Enhancement of the Cultural Environment-1971 (Executive Order 11593); Indian Sacred Sites-1966 (Executive Order 13007); American Indian Religious Freedom Act of 1978 (PL 94-341); Antiquities Act of 1906; Archaeological Resources Protection Act (ARPA) of 1979 (PL 96-95); Native American Graves Protection and Repatriation Act (NAGPRA) of 1990 (PL 101-601)
Solid/Hazardous Materials and Waste	Resource Conservation and Recovery Act of 1976 (PL 94-5800), as Amended by PL 100-582; USEPA, subchapter I-Solid Wastes (40 CFR 240-280); Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 USC 9601) (PL 96-510); Toxic Substances Control Act (PL 94-496); USEPA, Subchapter R-Toxic Substances Control Act (40 CFR 702-799); Federal Insecticide, Fungicide, and Rodenticide Control Act (40 CFR 162-180); Emergency Planning and Community Right-to-Know Act (40 CFR 300-399)

Stormwater: Under the proposed action, the Nellis AFB water quality Program Manger would update applicable base permits and assist in obtaining all stormwater-related permits for new construction. Nellis AFB would need to reevaluate its National Pollutant Discharge Elimination System permit and Stormwater Pollution Prevention Plans to ensure compliance.

Permits: Should the proposed action be implemented, the Air Force would need to obtain new or update existing permits. These permits would apply to the removal and disposal of asbestos as a result of demolition of, and modifications to, on-base buildings; construction of new buildings; updating Nellis AFB's Title V permit under the Clean Air Act; and stormwater discharge permits.

Asbestos and Lead-Based Paint Removal and Disposal: Prior to demolition or additions to buildings, asbestos surveys are required by Air Force regulation. For the removal of asbestos, a notification process with Clark County, the state health board, the United States Environmental Protection Agency (EPA), and the base asbestos and lead-based paint coordinator is required. Removal would be contracted out to state-certified and licensed contractors. Contractors would obtain the necessary permits for the removal, handling, and transportation of asbestos. Contractors must have access to a permitted landfill for disposal of asbestos.

Construction: For new buildings, the base would submit plans and a request for location to the Nellis AFB zoning and development board. An air quality dust permit must be obtained from Clark County if construction at any site causes 0.25 acre or more of topsoil disturbance. Nellis AFB would apply for a Clark County Surface Disturbance Permit after finalization of the building footprints and prior to construction. An Authority to Construct permit is required for construction projects, whereas, demolition projects require completion of a Clark County Demolition Notification form.

Title V Permit: Modifications to the current base-wide Title V Permit would be required if equipment other than mobile aircraft maintenance equipment were added or replaced. Due to a base exemption, no modifications are required for changes or additions to mobile equipment used to maintain or service planes on the ground (e.g., aerospace ground equipment). However, Clark County air quality operating permits for individual pieces of equipment would have to be modified for all changes. The base would make all needed modifications to the Title V Permit after finalization of equipment needs. Nellis AFB would also apply for Clark County air quality operating permits and Authority to Construct at that time.

Cultural Resources: Nellis AFB completed consultation with the Nevada SHPO on the ineligibility of nine historic structures in December 2006. In addition, the SHPO raised no issues regarding this EA.

Nellis AFB Plans and Protocols: In addition to the federal, state, and local regulations, Nellis AFB implements its environmental programs through various plans and protocols (Table 2-14). All of these plans conform to requirements defined in federal regulations and guidance. Project managers would coordinate with Nellis AFB Environmental Flight (99 CES/CEV) to ensure compliance with all local, state, and federal environmental regulations.

Table 2-14. Nellis AFB Environmental Plans

Resource Area	*Title*	*Date*
Cultural Resources	Cultural Resources Management Plan	2006
Air Quality	NAFB Air Emissions Inventory	2005
	NTTR Air Emissions Inventory	2003
Environmental Restoration Program	Environmental Restoration Plan. Management Action Plan	2004
Noise, Land Use and Planning	Air Installation Compatible Use Zone Study	2003
	General Plan for Nellis Air Force Base, Nevada. Includes General Plan Summary for Indian Springs Air Force Auxiliary Field	2002
Asbestos	Asbestos Management and Operations Plan	2003
Lead-Based Paint	Lead-based Paint Management Plan	2003
Environmental Emergencies	Facility Response Plan	2006
Hazardous Waste	Hazardous Waste Management Plan	2002
Hazardous Materials	Hazardous Materials Management Plan	2006
Natural Resources	Integrated Natural Resources Management Plan	1999*
Stormwater	Storm Water Pollution Prevention Plan	1998

*Revision expected in 2007

2.7 SUMMARY OF IMPACTS

This EA provides an analysis of the potential environmental consequences resulting from implementation of the proposed action-BRAC realignment, post-BRAC alternative, and no-action alternative. Seven resource categories were analyzed to identify potential impacts: noise; air quality; socioeconomics and infrastructure; water and soil resources; biological resources; cultural resources; and hazardous materials and waste. According to the analysis in this EA, implementation of the proposed action, post-BRAC alternative or no-action alternative would result in no significant environmental impacts in any resource category. Implementing the proposed action or post-BRAC alternative would not significantly affect existing conditions at Nellis AFB or NTTR. The following table (Table 2-15) summarizes and highlights the results of the analysis by resource category.

Table 2-15. Comparison of Alternatives by Resource

Resource Category	*Proposed Action-BRAC Realignment*	*Post-BRAC Alternative*	*No–Action Alternative*
Noise	• Addition of 23 aircraft would not increase sorties beyond baseline levels, so noise levels would not change.	• Additional 8 aircraft would increase annual sorties by 1,400 over baseline of 43,000. This 3 percent increase would raise noise levels by only a fraction of a decibel.	• Baseline conditions would continue within current contours.

Table 2-15. Comparison of Alternatives by Resource (con't)

Resource Category	***Proposed Action-BRAC Realignment***	***Post-BRAC Alternative***	***No–Action Alternative***
Air Quality	• Emissions generated by construction, demolition, and paving would be localized and temporary. • Maximum emissions of any criteria pollutant would not exceed *de minimis* thresholds or contribute more than 0.039 percent of regional totals. • Maximum emissions would range from 0.14 to 19.70 tons/year.	• Emissions generated by construction, demolition, and paving would be localized and temporary. • Maximum combined emissions of any criteria pollutant would not exceed *de minimis* levels or contribute more than 0.1 percent of regional totals. • Maximum emissions would range from 13.39 to 63.56 tons/year.	• No change to existing emissions.
Socioeconomics and Infrastructure	• Population increase of 3.9 percent for Nellis AFB and 0.03 percent for Clark County. • Revenue to region would be about $1.2 million annually.	• Approximate 4.2 percent increase in base personnel over baseline and 0.09 percent for Clark County. • Revenue to region would be similar to proposed action.	• No change to existing socioeconomic resources or infrastructure.
Water and Soil Resources	• Construction and demolition activities would affect about 27 acres at Nellis AFB (or about 0.2 percent of the base). • Impacts would be minimized by use of best management practices required by the base and permits. • Overall water use would draw about 1 percent of the base's daily allotment.	• Construction and demolition activities would affect a total of 49 acres (or about 0.3 percent of the base). • Impacts would be minimized by use of best management practices required by the base and permits. • Overall water use would be slightly more than 1 percent of the base's daily allotment.	• Ongoing activities at Nellis AFB would continue at baseline levels; no additional effects on water and soils resources would occur.

Table 2-15. Comparison of Alternatives by Resource (con't)			
Resource Category	***Proposed Action-BRAC Realignment***	***Post-BRAC Alternative***	***No–Action Alternative***
Biological Resources	• No adverse impacts to vegetation or wildlife from the proposed action. • A 404 Permit would be obtained, if required, as would consultation with USFWS. • Burrowing owls exist in or near construction areas; the appropriate procedures would be implemented prior to construction.	• No adverse impacts to vegetation or wildlife from the proposed action. • A 404 Permit would be obtained, if required, as would consultation with USFWS. • Burrowing owls exist in or near construction areas; the appropriate procedures would be implemented prior to construction.	• No change to current baseline conditions on Nellis AFB.
Cultural Resources	• All of Nellis AFB has been inventoried with results subjected to consultation under Section 106 of the NHPA. No eligible or National Register properties are in the Area of Potential Effect.	• All of Nellis AFB has been inventoried with results subjected to consultation under Section 106 of the NHPA. No eligible or National Register properties are in the Area of Potential Effect.	• The effect on the environment would be unchanged relative to baseline.
Hazardous Materials and Waste	• No new waste streams would be created and hazardous materials would not change. • Total hazardous wastes would increase by 6 percent. • Proposed AMU hangar would be affected by the location of an active ERP site. The required ERP waiver has been obtained from Air Combat Command.	• No new waste streams would be created and hazardous materials would not change. • Total hazardous wastes would increase by 8 percent. • Proposed AMU hangar would be affected by the location of an active ERP site. The required ERP waiver has been obtained from Air Combat Command.	• Ongoing activities at Nellis AFB would continue at baseline levels.

CHAPTER 3

DESCRIPTION OF THE AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.0 DESCRIPTION OF THE AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 ANALYSIS APPROACH

NEPA requires focused analysis of the areas and resources potentially affected by an action or alternative. It also provides that an EA should consider, but not analyze in detail, those areas or resources not potentially affected by the proposal. Therefore, an EA should not be encyclopedic; rather, it should be succinct and to the point. In order to demonstrate it took a hard look, the Air Force must provide sufficient detail and depth of both description and analysis in an EA. NEPA also requires a comparative analysis that allows decisionmakers and the public to differentiate among the alternatives. This EA focuses on those resources that would be affected by the proposed action and alternatives at Nellis AFB, Nevada.

CEQ regulations (40 CFR Parts 1500-1508) for NEPA also require an EA to discuss impacts in proportion to their significance and present only enough discussion of other than significant issues to show why more study is not warranted. The analysis in this EA considers the current conditions of the affected environment and compares those to conditions that might occur with the Air Force implementation of either the proposed action (BRAC realignment), alternative action (post-BRAC), or no-action alternative.

Affected Areas

The proposed action includes components affecting Nellis AFB. Some components, such as construction projects, essentially affect only the base due to their limited geographic scope. Similarly, the proposed changes in personnel would not only affect the base, its economic and social effects, but would extend out into the general Las Vegas community. Noise generated by airfield operations would cover much of the base and also require analysis of lands adjacent to the base. Table 3.1-1 highlights the affected areas analyzed for each resource.

Table 3.1-1 Resources Analyzed in the Environmental Impact Analysis Process		
Resource	***Nellis AFB***	***NTTR***
Noise (Subsonic and Supersonic)	Yes	No
Air Quality	Yes	No
Socioeconomics and Infrastructure	Yes	No
Water and Soil Resources	Yes	No
Biological Resources	Yes	No
Cultural Resources	Yes	No
Hazardous Materials and Waste	Yes	No
Land Management and Use	No	No
Environmental Justice and Protection of Children	No	No
Recreation and Visual Resources	No	No
Airspace Management and Use	No	No
Safety	No	No

Affected Environment and Resources Analyzed

Based on the components of the proposed action, the Air Force defined the environment potentially affected by the proposed action and alternatives at Nellis AFB and NTTR. This definition focused on specific resource categories. As a result of this review, this EA evaluated seven resource categories: noise; air quality; socioeconomics and infrastructure; water and soil resources; biological resources; cultural resources; and hazardous materials and waste (see Table 3.1-1). Due to the lack of potential impacts from the proposed action at NTTR, (e.g., no construction would occur within NTTR; increases of sortie-operations would fall within the current range of sortie-operations in the NTTR airspace and would not change airspace use or noise conditions within the area; no increase in personnel at any of the NTTR facilities is anticipated; resources were analyzed only for Nellis AFB. No changes to any of these resources from baseline conditions would occur at NTTR under the proposed action, thus supporting the justification of only analyzing these resources at the base.

Resources Eliminated from Further Analysis

The Air Force assessed several resources (refer to Table 3.1-1) that, in accordance with CEQ regulations, warrant no further examination in this EA. The following provides these resources and describes the rationale for this approach.

Land Management and Use

Land use generally refers to human modification of the land, often for residential or economic purposes. Human land uses include residential, commercial, industrial, agricultural, or recreational uses. The attributes of land use include general land use and ownership, land management plans, and special land use management areas. Activities associated with the proposed action and action alternative are consistent with on-going activities at the base. All construction would occur within the boundaries of the base, would be sited on previously disturbed land within the industrial portion of the base, and would be compatible with existing and proposed land uses. Noise levels from implementation of the proposed action and post-BRAC alternative would be consistent with exiting on-base conditions and land uses would remain compatible and unchanged. As demonstrated in the noise section below, addition of 1,400 sorties under the post-BRAC alternative would not perceptibly change noise levels. In summary, no impact to land management or use would occur; therefore, this resource has not been considered for further analysis in this EA.

Environmental Justice and Protection of Children

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*, was issued in 1994 to focus attention of federal agencies on human health and environmental conditions in minority and low-income communities and to ensure that disproportionately high and adverse human health or environmental effects on these communities are identified and addressed. Analysis of this resource is required when an action would have significant adverse impacts on human health (e.g., illness, infirmity, or death). In the area surrounding Nellis AFB, approximately 50,950 people were estimated to be affected by current noise levels above 65 DNL in 2005 (USCB 2006b). Out of that total, roughly 43 percent are considered to be minorities, and 16 percent have low-incomes. Low-income and minority populations in the residential areas associated with Sunrise Manor and other unincorporated communities near Nellis AFB are currently exposed to noise levels of 65 DNL or above. Noise levels would not increase under the proposed action. For the post-BRAC alternative, changes in noise levels would not be perceptible. In addition, there would be no shift in location or change in shape of affected clear zones or accident potential zones (i.e., safety zones) under the proposed action or action alternative.

In 1997, Executive Order 13045, *Protection of Children from Environmental Health Risks and Safety Risks (Protection of Children)*, was issued to ensure the protection of children. Under the proposed action and action alternative, the Nellis Terrace Housing Area and Lomie G. Heard Elementary School would continue to be exposed to noise levels of 70 DNL; no additional schools would be exposed to noise levels 65 DNL or above.

In summary, there would not be a disproportionately high or adverse impact to minority or low-income populations and no aspect of the proposed action or alternatives would increase the health or safety risk to children. Further analysis of these resources is not warranted.

Recreation and Visual Resources

Recreational resources include evaluation of the potential effects to activities such as swimming, boating, hiking, and fishing and the lands that support these activities. Recreation resources would not be affected by implementation of the proposed action, action alternative, or the no-action alternative. No changes to airspace use or noise would result, so recreation would not be affected. Visual resources are defined as the natural and human aspects of land use that comprise the aesthetic qualities of an area. The significance of a change in visual character is influenced by social considerations, including public value placed on the resource, public awareness of the area, and general community concern for visual resources in the area. Visual resources on the base would not be adversely affected by facility construction since most activity would occur primarily in the developed portion of the base. It is anticipated no impacts would occur to either recreational or visual resources; therefore, these resources are not carried forward for further analysis in this EA.

Airspace Management and Use

Under the proposed action, an additional 23 BRAC-directed aircraft would be added to the Nellis AFB aircraft inventory; however, the utilization rate for the additional F-15 and F-16 aircraft would remain unchanged; there would be no increase in airfield operations at Nellis AFB and no increase in sortie-operations within NTTR. Under the post-BRAC alternative, in addition to the 23 BRAC-directed aircraft, an additional 8 F-16 aircraft would be added to the bases' inventory. Under this proposal, there would be an increase of 1,400 sorties (take-offs and landings) at the base representing approximately 3 percent of the total sorties conducted at Nellis AFB in 2002. Sortie-operations within NTTR would increase by less than 1 percent of the 200,000 to 300,000 (Air Force 2003a) total annual sortie-operations authorized in the NTTR airspace. These percentages are less than the normal annual variation from year to year at Nellis AFB and NTTR (Air Force 1999a). The increased sorties would not affect the use and management of the Nellis AFB airspace. There would be no change to departure and arrival routes under either the proposed action or post-BRAC alternative action. Civil and commercial aviation airspace use would not be affected since the same flight parameters currently used for Nellis AFB terminal and NTTR airspace would continue. In addition, the increase in annual sortie-operations would not alter the structure or management of NTTR restricted areas and military operations areas. Since the number of sorties added would be negligible under the post-BRAC alternative action, they would not affect either the use and management of airspace surrounding Nellis AFB, impact civil or commercial aviation airspace, or affect the structure or management of NTTR airspace units, this resource has not been carried forward for further analysis. Current conditions would not change under the no-action alternative. Impacts from the additional 1,400 sorties at Nellis AFB under the post-BRAC alternative have been analyzed for potential effects on noise (section 3.2) and air quality (section 3.3).

Safety

Under both the proposed action and post-BRAC alternative, operations on the base and throughout NTTR would be essentially unchanged. Ground, flight, and ordnance safety considerations associated with current operations would remain unchanged. No safety arcs, explosive clear zones, or live ordnance loading areas would need modification. Effects to safety in relation to construction activities would be no different from standard, on-going activities occurring at Nellis AFB. Prescribed industrial safety standards would be followed during construction projects. Since no aspect of the proposed action, post-BRAC alternative, or no-action alternative would alter the safety conditions to persons on the base or within NTTR, this resource has been eliminated from further analysis in this EA.

3.2 NOISE

Noise is often defined as any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, diminishes the quality of the environment, or is otherwise annoying. Response to noise varies by the type and characteristics of the noise source, distance between source and receptor, receptor sensitivity, and time of day. Noise may be intermittent or continuous, steady or impulsive, and may be generated by stationary or mobile sources. Although aircraft are not the only source of noise in any area, they are readily identifiable to those affected by their noise emissions and are routinely singled out for special attention and criticism.

There are two kinds of noise discussed in NEPA documents relating to aircraft noise. The first is conventional subsonic noise, as generated by an aircraft's engines and airframe. This is the most familiar form of aircraft noise, and is heard while an aircraft is within some distance of a receiver. The second type of noise is supersonic. Sonic booms are brief impulsive sounds, which are generated by the aircraft when it flies faster than sound. Supersonic flight by many different types of aircraft occurs regularly within approved NTTR airspace. Aircraft usage on the NTTR is described in Chapter 2 and the historical use on NTTR ranges from 200,000 to 300,000 sortie-operations annually. The aggressors would fly consistent within the 200,000 to 300,000 range and sub and super-sonic noise on NTTR is not discussed further in this document.

Assessment of subsonic and supersonic aircraft noise requires a general understanding of the measurement and effects of these two kinds of noise. Appendix B contains additional discussion of noise, the quantities used to describe it, and its effects. Appendix B should be referred for explanations of concepts that are briefly defined in this section.

Noise represents the most identifiable concern associated with aircraft operations. Although communities and even isolated areas receive more consistent noise from other sources (e.g., cars, trains, construction equipment, stereos, wind), the noise generated by aircraft overflights often receives the greatest attention. General patterns concerning the perception and effect of aircraft noise have been identified, but attitudes of individual people toward noise are subjective and depend on their situation when exposed to noise. Annoyance is the primary consequence of aircraft noise. The subjective impression of noise and the disturbance of activities are believed to contribute significantly to the general annoyance response. A number of nonnoise related factors have been identified that may influence the annoyance response of an individual. These factors include both physical and emotional variables. Personal opinions on noise vary widely. For example, one person might consider loud rock music as pleasing but opera music as offensive. A second person may perceive just the opposite. Likewise, opinions on noise associated with military overflights vary from positive to negative.

Aircraft Noise Assessment Methods

Noise is represented by a variety of quantities, or "metrics." Each noise metric was developed to account for the type of noise and the nature of what (i.e., receptor) may be exposed to the noise. Human hearing is more sensitive to medium and high frequencies than to low and very high frequencies, so it is common to use "A-weighted" metrics, which account for this sensitivity. "A weighting" de-emphasizes low and very high frequencies and emphasizes mid-range frequencies. Impact of impulsive supersonic noise depends on factors other than human hearing, so that is often quantified by "C-weighted" metrics.

Factors Influencing Annoyance
Physical Variables
• Type of neighborhood • Time of day • Season • Predictability of noise • Control over the noise source • Length of time an individual is exposed to a noise
Emotional Variables
• Feelings about the necessity or preventability of the noise • Judgment of the importance and value of the activity that is producing the noise • Activity at the time an individual hears the noise (conversation, sleep, recreation) • Attitude about the environment • General sensitivity to noise • Belief about the effect of noise on health • Feeling of fear associated with the noise

Different time periods also play a role with regard to noise. People hear the sound that occurs at a given time, so it is intuitive to think of the instantaneous noise level, or perhaps the maximum level that occurs during an aircraft flyover. However, the effects of noise over a period of time depends on the total noise exposure over extended periods, so "cumulative" noise metrics are used to assess the impact of ongoing activities such as those that occur at Nellis AFB and NTTR.

Within this EA, noise is described by the Day-Night Average Sound Level (DNL), Onset Rate-Adjusted Monthly Day-Night Average Sound Level (L_{dnmr}), and Sound Exposure Level (SEL). A-weighted levels are used for subsonic aircraft noise, and C-weighted levels are used for sonic booms and other impulsive noises. A "C" is included in the symbol to denote when C-weighting is used. Sound levels occur on a logarithmic decibel scale; a sound level that is 10 decibels (dB) louder than another will be perceived as twice as loud.

DNL is the energy average of all noise events that occur during a 24-hour period with a 10 decibel penalty added to flights occurring between 10 p.m. and 7 a.m. to account for the sounds added intrusiveness—it is not the sound level heard at any given time. DNL is the most appropriate metric for predicting cumulative human effects. It is more reliable than individual sound levels when analyzing noise effects because it allows the analyst to take into account the entire exposed population rather than a few individuals. The percentage of the population annoyed is based on community surveys of noise annoyance; most commonly referred to as the Schultz Curve (Schultz 1978). The curve was updated in 1994 (Finegold *et al.*) showing only minor changes from the original curve.

Cumulative noise levels in military airspace are presented using L_{dnmr}, which is defined as an "onset-rate" adjusted monthly DNL. L_{dnmr} is similar to DNL, but includes a penalty up to 11 dB to account for the startle effect caused by aircraft flying at low-altitudes and high speeds.

SEL is a metric used to describe the sound level of one aircraft overflight. SEL is a measure of the total physical energy of a single noise event, which takes into account both intensity (loudness) and duration. SELs are used as an indicator of activity interference for humans and for impacts to domestic animals and wildlife.

3.2.1 Affected Environment

Federal, state, and local governments regulate noise to prevent noise sources from affecting noise-sensitive areas, such as residences, hospitals, and schools, and to protect human health and welfare. Both the Nevada Department of Transportation (NDOT) and the Federal Highway Administration require noise control devices such as sound walls when new highway projects generate sound levels that adversely affect sensitive land uses. Federal agencies, such as the Department of Housing and Urban Development, have established health-based maximum noise exposure recommendations. Local agencies, including cities and counties, are responsible for defining and enforcing land use compatibility in various noise environments. The Air Installation Compatible Use Zone (AICUZ) study is the Air Force's vehicle for presenting their noise environment at Nellis AFB (Air Force 2003a).

The AICUZ program at Nellis AFB promotes compatible land development in areas subject to aircraft noise and accident potential. Clark County has incorporated the AICUZ recommendations as an integral part of their comprehensive planning process and are regulated in the Clark County Unified Development Code, Title 30, Section 30.48, Part A, *Airport Environs Overlay District*, dated June 21, 2000, under the authority of Chapter 278, Planning and Zoning, of the Nevada Revised Statutes. Noise compatibility and airport environs implementing standards have also been adopted in the Clark County *Public Health and Safety Programs: Airport Environs Plan*, an amendment of the Clark County Comprehensive Plan (Clark County 1998).

Modeling for the AICUZ study noise contours were developed using the following data: aircraft types, runway utilization patterns, engine power settings, altitude profiles, flight track locations, airspeed, number of operations per flight track, engine maintenance, and time of day. These studies were based on a representative day which evaluated airfield activity during a 24-hour period when the airfield is in full operation. The advantage of this approach is that it is unaffected by daily, monthly, and yearly fluctuations in the tempo (rate) of use by individual aircraft at the base. The AICUZ study employed the same fundamental computer-aided modeling approach using the NOISEMAP model.

Nellis AFB

Sound levels from flight operations at Nellis AFB exceeding ambient background noise typically occur only beneath main approach and departure corridors and in areas immediately adjacent to parking ramps and aircraft staging areas. As aircraft take off and gain altitude, their contribution to the noise environment drops to levels indistinguishable from the ambient background. The height at which the noise becomes indistinguishable varies depending on the aircraft and meteorological conditions.
The 2003 Nellis AFB AICUZ study identified baseline noise levels ranging from 65 DNL to greater than 85 DNL for the lands encompassing Nellis AFB (Figure 3.2-1). All lands affected by greater than 85 DNL occur within Nellis AFB, with most of the area affected by 75 to 85 DNL also on base. Lower noise levels (65 to 75 DNL) affect lands primarily outside the base. For off-base areas, noise levels range from 65 DNL to greater than 80 DNL (Air Force 2003a). Total acreage of areas affected by the noise levels is shown in Table 3.2-1.

Table 3.2-1 Baseline Noise (DNL) Contours for Nellis AFB and Environs

	65-70	***70-75***	***75-80***	***80-85***	***>85***	***Total***
Acres	8,882	4,787	2,202	1,066	1,161	18,098

Current noise levels of 65 DNL to greater than 85 DNL affect approximately 18,098 acres at Nellis AFB, with the highest noise levels on and around the runway and flightline. Nellis AFB currently has a program to reduce noise over off-base residential areas. Existing noise abatement procedures for flights over residential areas to the south and southwest and North Las Vegas generally include the following:

- expedited climb to 6,000 feet MSL for fighter aircraft and 2,500 to 3,500 feet MSL for others;
- 60-degree banked right turn upon departure;
- a departure to the north before 9:00 a.m.; and
- practice approaches after 9:00 a.m. on weekends and holidays.

To the maximum extent possible, engine runup locations have been established in areas that minimize noise for those in the surrounding communities, as well as for people on base. Normal base operations do not include late-night engine runups, but heavy work loads or unforeseen contingencies sometimes require a limited number of nighttime engine runups.

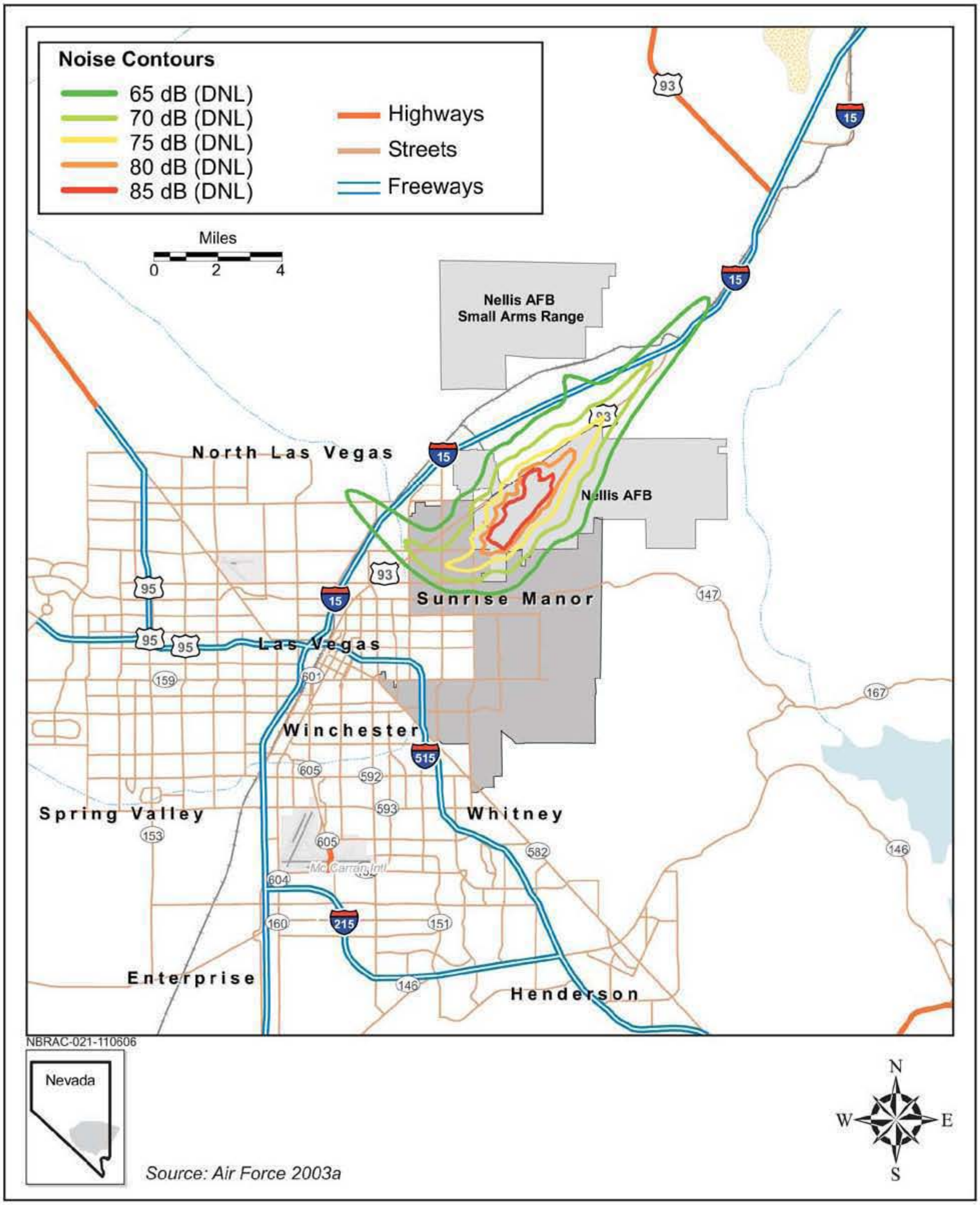


Figure 3.2-1. Nellis AFB Noise Contours Under Baseline and Proposed Action

3.2.2 Environmental Consequences

Proposed Action – BRAC Realignment

The 23 aircraft Nellis AFB would receive as a result of the BRAC realignment would fly consistent with the existing noise abatement procedures. These aircraft routinely travel to Nellis AFB to perform the aggressor duties on a temporary duty basis, therefore the number of sorties generated by the proposed BRAC realignment would not change from baseline conditions. There would be no additional impact due to the proposed action.

Post-BRAC Alternative

The post-BRAC alternative would add eight more F-16 aircraft and 1,400 additional annual sorties. Noise metrics are logarithmic and are not sensitive to small changes. The baseline number of sorties is around 43,000 annual sorties; the addition of 1,400 (a 3 percent increase) sorties would not generate a perceptible change in noise levels. As a general rule, the smallest change in DNL that typically can be detected by the human ear is 3 dB (see Appendix B). To generate DNL increase of 3 dB in noise levels, the action would need to double (a 100 percent increase) total annual sorties (i.e., 43,000 to 86,000). Since the post-BRAC alternative would increase sorties by about 3 percent, the effect would fall 97 percent below that needed to produce a perceptible change in noise. Therefore, there would be no noise impacts as a result of the post-BRAC alternative.

No-Action Alternative

Under the no-action alternative, there would be no change to the baseline conditions described in section 3.2.1.

3.3 AIR QUALITY

Understanding air quality for the affected area requires knowledge of: 1) applicable regulatory requirements; 2) types and sources of air quality pollutants; and 3) location and context of the affected area.

Regulatory Requirements

Air quality in a given location is described by the concentration of various pollutants in the atmosphere. The significance of the pollutant concentration is determined by comparing it to the federal and state ambient air quality standards. The Clean Air Act (CAA) and its subsequent amendments (CAAA) established the National Ambient Air Quality Standards (NAAQS) for seven “criteria” pollutants: ozone

(O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter less than 10 and 2.5 microns (PM_{10} and $PM_{2.5}$), and lead (Pb). These standards (see Appendix C) represent the maximum allowable atmospheric concentrations that may occur while ensuring protection of public health and welfare, with a reasonable margin of safety. The Nevada Department of Environmental Protection (NDEP), Bureau of Air Quality (BAQ) has adopted the NAAQS, with some exceptions and additions (see Appendix C).

Based on measured ambient criteria pollutant data, the United States Environmental Protection Agency (EPA) designates all areas of the U.S. as having air quality better than (attainment) or worse than (nonattainment) the NAAQS. An area that is currently in attainment, but was formerly a nonattainment area is termed a maintenance area. An area is often designated as unclassified when there are insufficient ambient criteria pollutant data for the EPA to form a basis for attainment status. Unclassified areas are typically rural or remote, with few sources of air pollution.

The CAA requires each state to develop a State Implementation Plan (SIP) which is its primary mechanism for ensuring that the NAAQS are achieved and/or maintained within that state. According to plans outlined in the SIP, designated state and local agencies implement regulations to control sources of criteria pollutants. The CAA provides that federal actions in nonattainment and maintenance areas do not hinder future attainment with the NAAQS and conform to the applicable SIP (i.e., Nevada SIP). There are no specific requirements for federal actions in unclassified or attainment areas. However, all federal actions must comply with state and local regulations.

The CAA also establishes a national goal of preventing degradation or impairment in any federally-designated Class I area. As part of the Prevention of Significant Deterioration (PSD) program, mandatory Class I status was assigned by Congress to all national parks, national wilderness areas, memorial parks greater than 5,000 acres and national parks greater than 6,000 acres in existence on August 7, 1977. The PSD program is applicable only to stationary sources. These "mandatory" Class I areas may not be redesignated to a less protective classification. Forty-eight areas within the National Park System are designated Class I (large national parks and wilderness areas established since 1977, such as most park areas in Alaska, have not been designated subsequently as Class I.). In Class I areas, visibility impairment is defined as a reduction in visual range and atmospheric discoloration. Stationary sources, such as industrial complexes, are typically an issue for visibility within a Class I PSD area. The closest Class I Area to the proposed action is Grand Canyon National Park, located in the state of Arizona and well beyond the 100 kilometer distance limitation for implementing additional PSD source requirements.

Types and Sources of Air Quality Pollutants

Pollutants considered in this EA analysis include the criteria pollutants measured by state and federal standards. These include SO_2 and other compounds (i.e., oxides of sulfur or SO_x), volatile organic compounds (VOCs), which are precursors to (indicators of) ozone; nitrogen oxides (NO_x), which are also precursors to ozone and include NO_2 and other compounds; CO, PM_{10}, and $PM_{2.5}$. These criteria pollutants are generated by the types of activities (e.g., construction, aircraft emissions) associated with the proposed action. Airborne emissions of lead and hydrogen sulfide are not included because there is no known significant hydrogen sulfide or lead emissions sources in the region or associated with the proposed action and the no-action alternative.

3.3.1 Affected Environment

For the proposed action, post-BRAC alternative, and no-action alternative, the air quality affected environment is Clark County and subsumed within this county is the Las Vegas Valley. Currently, portions of Clark County are in serious nonattainment for CO and PM_{10}; in addition, the Las Vegas Valley (defined by the boundaries of Hydrographic Area 212 and in which Nellis AFB is found), is in basic (subpart 1) nonattainment for 8-hour ozone (precursors of this pollutant include VOCs). In accordance with federal requirements, the Clark County Board of Commissioners has developed both a CO SIP (Clark County Board of Commissioners 2005) and a PM_{10} SIP (Clark County Board of Commissioners 2001) for nonattainment areas of the county. A SIP for 8-hour ozone has not yet been adopted.

Air emissions at Nellis AFB are primarily generated from mobile sources (i.e., vehicles and aircraft), equipment at maintenance shops, boilers, and paint booths. As demonstrated in Table 3.3-1, Nellis AFB contributes minimal amounts (less than 1 percent) of criteria pollutants in Clark County. Rather, vehicle traffic and construction in the region account for most of the emissions.

Table 3.3-1. Summary of Baseline Emissions at Nellis AFB (tons/year)

Source	***CO***	***VOCs***	***NO_x***	***SO_x***	***PM_{10}*** [1]
Ground-Based	19.54	37.03	33.38	3.65	37.28
Aircraft	928	318	444	345	26
Total	**947.54**	**355.03**	**477.38**	**348.65**	**63.29**
Clark County[2]	487,741	65,574	82,956	47,273	69,899
Nellis AFB Percent Contribution	0.19	0.54	0.58	0.74	0.09

Sources: Ground-based emissions, Air Emissions Inventory for 2005 at Nellis AFB (Air Force 2005a); aircraft emissions (Air Force 1999c)

Notes: [1]$PM_{2.5}$ was regulated in 2005 and is not reflected in these inventories.
[2]Clark County 1999 Emissions (USEPA 2005).

3.3.2 Environmental Consequences

Proposed Action – BRAC Realignment

Air emissions resulting from the proposed action were evaluated in accordance with federal, state, and local air pollution standards and regulations. According to the EPA, 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 any NAAQS; or
- impair visibility within any federally-mandated federal Class I area.

According to EPA General Conformity Rule in 40 CFR Part 51, Subpart W, any proposed federal action that has the potential to cause violations in a NAAQS nonattainment area (i.e., Las Vegas and surrounding environs, including Nellis AFB) must undergo a conformity analysis. Since Las Vegas is in nonattainment status for CO, 8-hour Ozone, and PM_{10}, a conformity determination must be performed if the proposed action emissions exceed the *de minimis* threshold for CO of 100 tons per year, VOCs (contributor to ozone) of 100 tons, and 70 tons per year of PM_{10}.

The analysis calculated changes in air emissions at Nellis AFB as a result of the proposed action using the same methods and types of input used to determine baseline emissions (see Appendix C). All ground-based emission sources associated with the proposed action were assessed, which predominantly included construction activities. On-base vehicle travel by construction and BRAC realignment personnel were evaluated. However, since construction personnel would come from the local area where they already drive, their commute to the base would not contribute additional emissions. Similarly, vehicle emissions that would be generated by personnel (i.e., 464 permanently-based personnel and 60 part-time Reservists) associated with the BRAC realignment would not represent any significant net increase at the base or in the City of Las Vegas. Therefore, this EA did not need to analyze emissions associated with their commute further.

Emissions from construction and demolition include contributions from engine exhaust emissions (i.e., construction equipment, material handling, and workers' travel) and fugitive dust emissions (e.g., from grading activities). Emissions would occur over the duration of the construction period, from 2007 through 2009 as presented in Table 3.3-2 and Appendix C. The BRAC realignment would also generate emissions from the commutes conducted by added personnel and AGE for the aircraft. The number of personnel added to the base each year of the beddown is estimated to be proportional to the number of aircraft. Calculation of AGE emissions employed the same assumption.

Table 3.3-2. Proposed Action – BRAC Realignment Emissions (tons/year)

Fiscal Year	*Emission Source*	*CO*	*NO_x*	*SO_x*	*VOCs*	*PM_{10}*	*$PM_{2.5}$*[3]
Baseline[1]	*Nellis AFB*	*947.54*	*355.03*	*477.38*	*348.65*	*63.29*	*NA*
FY07	Construction	1.90	3.00	0.30	0.40	27.00	2.90
	AGE	0.78	0.38	0.03	0.05	0.02	
	Commuting	3.55	0.38	0.00	0.38	0.02	
Total		6.23	3.76	0.33	0.83	27.04	2.90
FY08	Construction	0.30	0.60	0.10	0.10	0.80	0.10
	AGE	0.78	0.38	0.03	0.05	0.02	
	Commuting	3.55	0.38	0.00	0.38	0.02	
Total		4.63	1.36	0.13	0.53	0.84	0.10
FY09	Construction	1.70	3.60	0.40	0.40	11.10	1.30
	AGE	0.78	0.38	0.03	0.05	0.02	
	Commuting	3.55	0.38	0.00	0.38	0.02	
Total		6.03	4.36	0.43	0.83	11.14	1.30
FY10	AGE	1.70	0.83	0.06	0.11	0.04	
	Commuting	7.75	0.83	0.00	0.84	0.04	
Total		9.46	1.66	0.06	0.94	0.68	0.00
FY11	AGE	3.55	1.72	0.13	0.22	0.08	
	Commuting	16.15	1.73	0.01	1.74	0.09	
Total		19.70	3.45	0.14	1.96	0.17	0.00
De minimis Threshold (tons/year)[2]		100	100	NA	50	70	NA
Maximum Percent *de minimis*		20%	4%	NA	4%	39%	NA
Maximum Percent Regional Contribution		0.0040%	0.0063%	0.0006%	0.0041%	0.0387%	NA

Notes: [1]Baseline derived in Table 3.3-1, above
[2]*De minimis* threshold applies to annual emissions for a project; they are not additive year-to-year or to baseline totals.
[3] $PM_{2.5}$ considered predominant fraction of PM_{10} tail-pipe emissions; assume 100 percent $PM_{2.5}$

The proposed action would never exceed the CO, PM_{10}, VOCs, or NO_x *de minimis* standards. Specific construction activity assumptions and acreages as well as commuting and AGE calculations are provided in Appendix C. Total CO emissions would range from 4.63 to 19.70 tons per year. Maximum PM_{10} emissions would be 27.04 tons in FY09 (*de minimis* is 70 tons per year), and never exceed 11.14 tons thereafter. Ozone-contributing emissions of NO_x would be greatest in FY09 at 3.76 tons and VOCs would never exceed the maximum of 1.96 tons reached in FY11. Relative to *de minimus* thresholds, maximum annual contributions by the proposed action would range from 4 to 39 percent. In terms of percent contribution to Clark County regional air quality, maximum emissions for any criteria pollutant would be no more than 0.387 percent (PM_{10} in 2009) over the multi-year period.

Emissions generated by construction, demolition, and paving projects would be temporary in nature and would end when construction is complete. The emissions from fugitive dust (PM_{10}) would be minimized due to implementation of control measures in accordance with standard construction practices and Clark County permitting requirements. 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 best management practices used to minimize the amount of dust generated during construction. Using efficient practices and avoiding long periods where engines are running at idle would also reduce combustion emissions from construction equipment. Authority to construct and fugitive dust permits would be required for construction projects at Nellis AFB. In general, fugitive dust and combustive emissions would produce localized, short-term elevated air pollutant concentrations, which would not result in any long-term impacts on the air quality in Clark County.

As the facilities are constructed and become operational, very minimal emissions may result from the operation of small onsite water heaters, or similar building operation equipment. Due to the sizes of the buildings to be constructed, the impact from these types of operations was determined to be negligible and below permitting requirements. Therefore, these types of operational emissions were not calculated.

Since the aircraft beddown would replace F-15Cs and F-16s previously operating at Nellis AFB on a TDY basis, no additional operational emissions would occur. It is estimated however, that increased use of AGE would result from maintenance of the based aircraft. As the data show (refer to Table 3.3-2), AGE would contribute limited emissions even when the beddown is complete in FY11. Commuting by the additional personnel would produce greater emission, but none would exceed a fraction of the *de minimus* thresholds.

Post-BRAC Alternative

In addition to the activities described under BRAC action, the post-BRAC alternative includes additional construction as well as the transfer of eight F-16s to the 64 AGRS. As a result of these actions, the analysis included emission from construction, F-16 engine run-ups, maintenance, testing, and AGE, as well as emissions associated with airfield operations by the post-BRAC F-16s including taxi, takeoffs, and landings within the Nellis AFB airfield environment. Commuting by the additional 45 personnel also received examination. The aircraft are expected to be transferred to and begin operations in FY07, whereas construction would occur in FY11. Addition of 45 personnel and their commuting emissions would also begin in FY07. Table 3.3-3 presents the emissions specific to the post-BRAC alternative.

Table 3.3-3. Post-BRAC Alternative Emissions (tons/year) Not Combined with BRAC Realignment

Baseline	***Emission Source***	***CO***	***NO_x***	***SO_x***	***VOCs***	***PM_{10}***	***$PM_{2.5}$***[3]
	Nellis AFB[1]	*947.54*	*355.03*	*477.38*	*348.65*	*63.29*	*NA*[a]
FY07	Aircraft Operations/AGE	37.15	3.06	12.44	44.9	5.29	
	Personnel Commute	1.57	1.73	0	0.17	0.01	
Total		38.72	4.79	12.44	45.07	5.3	0
FY08	Aircraft Operations/AGE	37.15	3.06	12.44	44.9	5.29	0
	Personnel Commute	1.57	1.73	0	0.17	0.01	
Total		38.72	4.79	12.44	45.07	5.3	0
FY09	Aircraft Operations/AGE	37.15	3.06	12.44	44.9	5.29	0
	Personnel Commute	1.57	1.73	0	0.17	0.01	
Total		38.72	4.79	12.44	45.07	5.3	0
FY10	Aircraft Operations/AGE	37.15	3.06	12.44	44.9	5.29	0
	Personnel Commute	1.57	1.73	0	0.17	0.01	
Total		38.72	4.79	12.44	45.07	5.3	0
FY11	Aircraft Operations/AGE	37.15	3.06	12.44	44.9	5.29	0
	Personnel Commute	1.57	1.73	0	0.17	0.01	
	Construction	5.14	7.3	0.81	0.98	24.89	2.97
Total		43.86	12.09	13.25	46.05	30.19	2.97
	De minimis Threshold[2]	100.00	100.00	NA	50.00	70.00	
	Maximum Percent *de minimis*	44%	3%	NA	92%	8%	NA
	Maximum Percent Regional Contribution	0.0090%	0.0047%	0.0150%	0.0974%	0.0076%	NA
	Clark County (Regional) Baseline	487,741	65,574	82,956	47,273	69,899	NA

Notes: [1]Baseline derived in Table 3.3-1, above
[2]*De minimis* threshold applies to annual emissions for a project; they are not additive year-to-year or to baseline totals.
[3] $PM_{2.5}$ considered predominant fraction of PM_{10} tail-pipe emissions; assume 100 percent $PM_{2.5}$

None of the specific post-BRAC alternative activities would exceed the CO, PM_{10}, VOCs or NO_x *de minimis* standards. Specific construction activity assumptions, acreages, commute, and aircraft input data are provided in Appendix C. Maximum CO emissions, primarily due to increased operations by the 8 additional F-16 aircraft, would reach 43.86 tons in FY11. PM_{10} emissions would also reach a maximum of 30.19 tons in FY11, but this level would decrease to about 5 tons per year after construction. Maximum emissions of the other criteria pollutants would also occur in FY11. No criteria pollutant would exceed *de minimus* thresholds, although VOCs would reach 92 percent of *de minimus* in FY11. All emissions would contribute extremely minor (0.0047 to 0.0974 percent) amounts to regional totals.

Since the post-BRAC alternative includes all of the BRAC realignment components, the analysis evaluated the combined total emissions (Table 3.3-4). These emission calculations reflect where the components of the BRAC realignment and post-BRAC alternative overlap, and where they do not overlap. For example, construction under the BRAC realignment would occur from FY07 through FY09, whereas the post-BRAC alternative construction would take place in FY11. As shown in Table 3.3-4, emission for the criteria pollutants would not exceed *de minimus* thresholds, nor would they contribute more than 0.1 percent to regional totals.

Table 3.3-4. Combined Emissions Totals: BRAC Realignment and Post-BRAC Alternative

Fiscal Year	***CO***	***NO_x***	***SO_2***	***VOC***	***PM_{10}***	***$PM_{2.5}$***
FY07	44.95	8.55	12.77	45.90	32.34	2.90
FY08	43.35	6.15	12.57	45.60	6.14	0.10
FY09	44.75	9.15	12.87	45.90	16.44	1.30
FY10	48.18	6.45	12.51	46.01	5.38	0.00
FY11	63.56	15.54	13.39	48.01	30.36	2.97
De minimus Threshold	100.00	100.00	NA	50.00	70.00	NA
Maximum Percent *de minimus*	64%	16%	NA	96%	46%	NA
Maximum Percent Regional Contribution	0.0130%	0.0237%	0.0161%	0.1016%	0.0463%	NA
Clark County (Regional) Baseline	487,741	65,574	82,956	47,273	69,899	NA

In summary, a permanent increase in emissions would result from post-BRAC construction activities. The additional construction, along with flight operations would not, however, generate a significant increase to regional air quality or cause Nellis AFB to cross the conformity threshold for any of the criteria pollutants. Authority to construct and fugitive dust permits would be required for the post-BRAC construction projects at Nellis AFB.

No-Action Alternative

Under this alternative, emissions would match the baseline conditions presented in Table 3.3-1. Nellis AFB baseline emissions contribute insignificant amounts to Clark County emissions.

3.4 SOCIOECONOMICS AND INFRASTRUCTURE

Socioeconomics is defined as the social and economic activities associated with the human environment, particularly population and economic activity. Economic activity typically includes employment, personal income, and industrial growth. Impacts on these two fundamental socioeconomic indicators can also influence other components such as housing availability and public services. Infrastructure includes resources such as housing, public schools, utilities, and transportation resources.

Socioeconomic data are presented at the county level in order to analyze baseline socioeconomic conditions in the context of county trends. Data have been collected from previously published documents issued by federal, state, and local agencies; from state and national databases (e.g., U.S.

Census Bureau (USCB); University of Nevada Center for Business and Economic Research; and from Nellis AFB (e.g., the base's Public Affairs Office).

3.4.1 Affected Environment

Analyses of impacts to socioeconomic characteristics potentially resulting from implementation of the proposed action requires establishment of an affected environment – a primary geographical area within which direct and secondary socioeconomic effects of the Nellis AFB proposed action and action alternative would be noticed. Because direct socioeconomic effects associated with implementation of the action alternatives would occur in the immediate vicinity of Nellis AFB and since infrastructure resources are generally influenced by the socioeconomic environment, the primary focus of this analysis is Clark County.

Socioeconomics

Population

Clark County is the most populous of Nevada's 17 counties. Based on census data compiled over the past 15 years, it is the fastest growing metropolitan county in the U.S., having increased in population from about 741,500 people in 1990 to 1,375,765 people in 2000, an increase of approximately 86 percent (USCB 2006a). As of July 2005, the population of Clark County was estimated to have grown to approximately 1,691,213 people representing a 23 percent increase since 2000. By comparison, the State of Nevada increased 19 percent during the same period (USCB 2006b).

Employment and Earnings

Clark County employment sectors with the greatest number of jobs in 2005 included services, retail trade, government and government enterprises, and construction (USCB 2006b). Government and government-related enterprises comprise federal civilian, military, and state- and local-government employment.

Nellis AFB is among the area's largest employers with a workforce that totaled 11,988 personnel in 2005 (Air Force 2005b). The types of personnel included 8,071 active duty military, 3,030 non-appropriated contract civilians and private business employees, and 887 appropriated civilians. The total annual payroll expenditures in 2005 were more than $695 million. Further, the Air Force estimates that the economic stimulus of Nellis AFB created approximately 5,398 secondary jobs in the civilian economy generating nearly $187 million in the local region. Nellis AFB also purchased considerable quantities of goods and services from local and regional firms. Construction costs; service contracts; and materials, supplies, and equipment for the base totaled over $2.5 billion. In total, Nellis AFB contributed over $3.9 billion to the local economy in 2005. Also generating substantial economic activity are over 27,000 military retirees who receive and spend payrolls exceeding $519 billion in the region (Air Force 2005b). As one of the single largest government employers in Clark County, Nellis AFB and its continuing operations represent a significant source of regional economic activity.

One of the continually growing employment sectors in Clark County is construction. Rapid growth in regional population in the past 15 years is the cause of the continued growth in the construction industry. Recent data indicate that although population growth has slowed in the past 5 years, construction employment continues to grow (UNLV 2006). In the 5-year period between 2000 and 2005, the population in the Clark County increased 23 percent while the number of employed persons grew by nearly 19 percent (USCB 2006c). In 2006, the construction industry in Clark County gained 11,100 jobs; however, residential and commercial construction permits dropped resulting in a 5 percent decrease in construction growth over the previous year (UNLV 2006).

Infrastructure

Housing

Since Clark County is one of the fastest growing in the United States, this rapid population growth also includes a corresponding increase in the demand for affordable, quality housing in the region. The housing stock in Clark County increased 28 percent from 559,799 units in 2000 to 718,358 units in 2005 (USCB 2006c,d). Over the period 2003 to 2005, an average of 14,112 building permits for residential and apartment buildings were issued annually. Single family residences accounted for 92 percent of the residential and apartment buildings permits issued during the 2003 to 2005 period (Clark County 2006a). The housing vacancy rate for Clark County was approximately 3.5 percent in 2005 (USCB 2006c). Currently, housing on Nellis AFB is available in military family housing units, dormitories, and billeting facilities. A total of 1,278 two; three; and four-bedroom homes are available to Nellis AFB personnel and their families with an occupancy rate of 98 percent. An additional 1,182 beds are available in 13 base dormitories; however, 2 dormitories are currently undergoing renovation. The current occupancy rate is 97 percent (personal communication, Waikiki 2006). Billeting facilities are also available for families (60 units), visiting airmen, and visiting officers. In 2005, approximately 1,924 military personnel lived on Nellis AFB; approximately 6,147 military personnel relied on off-base housing (Air Force 2005b).

Public Schools

Public school district boundaries in southern Nevada correspond with county boundaries (i.e., the Clark County School District includes all public schools located within the geopolitical boundaries of Clark County). As the overall population of the affected environment continues to increase, there has been a corresponding increase in enrollment and construction of new schools in the district. At the start of the 2006/2007 school year, a total of 326 public schools were operating in the Clark County School District with an estimated enrollment of 302,773 students (Clark County 2006b). The Lomie G. Heard Elementary School is the only school on Nellis AFB. The school, which is included in the Clark County School District, accommodates about 800 students. The base has two child development centers with sufficient capacity to accommodate a combined total of about 490 children per day (personal communication, Omohundro 2005).

While a large federal installation such as Nellis AFB contributes greatly to the local economy, it also removes a large tax base used to supplement education costs such as purchase of textbooks, computers, utilities, and teacher and administrative staff salaries. Impact Aid is a federal program that provides funding for a portion of the educational costs of U.S. military students. The program essentially pays a tax bill directly to a local school district due to the presence of a military installation. To qualify for the impact aid, a school district must have at least 400 federal students in their average daily attendance or at least 3 percent of all children in the school district's average daily attendance must be federally-connected. The amount of impact aid varies depending on whether the military family resides on the installation or off base in the local community. The Clark County School District meets the qualifications for federal impact aid.

Utilities

Electric Power and Natural Gas. The Nevada Power Company, a subsidiary of Sierra Pacific Resources, provides electric power to the base. The Southwest Gas Company provides natural gas to Nellis AFB. Both are adequate to meet existing and projected demand (Air Force 2003b).

Potable Water. Nellis AFB's potable water sources include nine government-owned and operated wells and water purchased from Southern Nevada Water Authority via bulk-supply pipelines from Lake Mead. A small quantity is also purchased from the City of North Las Vegas Water District. Nellis AFB is allotted 7.1 million gallons per day (gpd) of surface and ground water (personal communication, Patras 2005). The total existing potable water storage is 7.5 million gallons. Nellis AFB average daily water usage varies between 2.5 million gpd in between October and April to 5.4 million gpd from May to September (Air Force 2003b).

Wastewater Treatment. Nellis AFB discharges approximately 1.5 million gpd of sanitary sewage from the base to the Clark County Water Reclamation District for treatment. This equates to about 90 to 95 percent of the base sanitary sewage. Industrial wastewater (i.e., aircraft wash water) from the flightline is also discharged through the sanitary sewer system to the Clark County Water Reclamation District for treatment with the sanitary wastewater (Air Force 2003b). The treated sewage is released into the Las Vegas Wash where it flows underneath Lake Las Vegas eventually emptying into Lake Mead (Air Force 1999b).

Transportation

Transportation resources refer to the infrastructure and equipment required for the movement of people, raw materials, and manufactured goods in geographic space. For this analysis, the affected environment includes the roadway network on Nellis AFB, and those roads likely to be used for base access. Since no effect to transportation was expected due to overflights and noise, no further analysis of transportation resources in NTTR was conducted. Nellis AFB is near several major highways. Regional access to the base is provided by Interstate 15 (I-15) via exits at Craig Road from the west, Las Vegas Boulevard from the north, and Nellis Boulevard to the south. From the base, I-15 may be reached via Craig Road or Las Vegas Boulevard; the Craig Road intersection with I-15 is the interchange closest to the base, located approximately 2.5 miles west of the main gate. Cheyenne Avenue intersects I-15 approximately 4 miles west of the base and ends at the base's southwest boundary, near the base golf course.

3.4.2 Environmental Consequences

Analysis indicated that the proposed action and alternative would represent a minor beneficial impact to the local community through facility construction expenditures and increased military income; although in the context of development and growth in the Las Vegas area, this beneficial impact would be minor.

Under both the proposed action and alternative, 60 drill reservists would be part-time and would not be permanent personnel of Nellis AFB. The small number of part-time reservists would have minimal to neglible impact to socioeconomic resources and therefore are not considered further in this analysis.

Proposed Action – BRAC Alternative

Socioeconomics

Population. In 2005, the workforce at Nellis AFB was comprised of 11,988 persons (Air Force 2005b). The proposed beddown would result in an increase of 434 active-duty and 30 civilian positions at Nellis AFB by 2011.

On average, each staff member is anticipated to have 2.04 dependents and this was used in calculating potential affects of the proposed action. Table 3.4-1 provides base population changes associated with the proposed action.

Table 3.4-1. Comparison of Existing and Projected Staff and Dependents at Nellis AFB

	Staff	***Dependents***	***Total***
Baseline	11,988	24,456	36,444
Projected 2011	12,452	25,402	37,854
Change in Baseline	**464**	**946**	**1,410**

Under the proposed action, the Nellis AFB personnel staff would increase by approximately 3.9 percent when compared to the existing baseline. When compared to the 2005 population of Clark County, this represents a 0.03 percent increase. This increase would not have an adverse impact on local or regional demand on community services, utilities, or housing. In addition, normal fluctuations in personnel and the rate of rapid growth in the region would likely make this change unnoticeable.

Employment and Earnings. As one of the single largest government employers in Clark County, Nellis AFB and its continuing operations represent a major source of local (i.e., North Las Vegas) economic activity. Because Nellis AFB is among the area's largest employers, the gain of 434 active duty military and 30 civilian positions would not have a noticeable impact on employment when placed in context with the regional environment of Clark County and Las Vegas. Construction expenditures in the millions associated with the BRAC-directed beddown decision would contribute to the local economy although the potential effects would be minor and temporary. Construction costs under the proposed action would be minor in comparison to the billions of dollars generated in the Las Vegas region (Clark County 2006c).

Nellis AFB is a major employer in the region, with total annual payroll expenditures of more than $695 million in FY05 (Air Force 2005b). Active duty military personnel at Nellis AFB received on average $66,114 annually. Based on this FY05 average, the addition of 434 active duty military personnel at Nellis AFB associated with the proposed action would generate an additional $28.7 million in payroll disbursements in the region. The average annual salary of civilian personnel in FY05 was $41,439. Based on this FY05 average, an additional $1.2 million in payroll disbursements would be generated. The combined total would represent nearly 4.3 percent of the Nellis AFB FY05 payroll.

Infrastructure

Housing. Construction has been one of the fastest growing employment sectors in the Clark County over the past 20 years. Much of this growth is attributable to rapid population growth and corresponding increased demand for affordable, quality housing in the region. With the growth in the Las Vegas regional housing supply projected to continue, sufficient and suitable (e.g., new) off-base housing would be available to personnel associated with the proposed action. Currently, housing on base is available in military family housing units, temporary living facilities, and dormitories. The on-base housing supply combined with the expanding off-base supply would be sufficient (and inherently suitable) to accommodate personnel changes associated with the proposed action.

Public Schools. The student population in the Clark County School District would increase under this beddown proposal; however, the impact would not be adverse and the school district would be able to accommodate the increase. The schools in the District would continue to receive federal impact aid for each child attending school off base in lieu of taxes.

Utilities

Electric Power and Natural Gas. There would be no appreciable change in demand for utilities under the proposed action; utility use would be minimally above baseline or no-action conditions. New facility construction would likely employ energy-conserving equipment to reduce the impact on the existing electrical infrastructure. No adverse effect to these resources would be expected.

Potable Water. Demand for potable water is expected to increase with the addition of aircraft, personnel, and dependents; however, water supplies would be sufficient to meet future demands. Based on an average consumption of 150 gpd per person, use of potable water by realigned personnel would comprise about 1 percent of the base's daily allotment. For similar reasons, the personnel increases would not be expected to have an appreciable effect on the availability of groundwater at Nellis AFB or in the surrounding areas. The overall impact on the availability of groundwater at Nellis AFB or in the surrounding areas would not be adverse, would be well below the base's allotment, and would not require Nellis AFB to seek additional water rights.

Wastewater Treatment. No adverse impacts to wastewater treatment would be anticipated at Nellis AFB or in the local community. Clark County Water Reclamation District treats over 140 million gpd of wastewater (CCWRD 2005). Proposed construction and activities associated with the additional aircraft along with increased base personnel and active duty military dependents would generate less than 2 million gpd of wastewater to be treated.

Transportation

The Nellis AFB roadways would experience increased traffic levels associated with private-owned and construction vehicles and equipment; the increased levels may create congestion during peak traffic periods (i.e., morning and evening rush hours). Traffic levels on the base would be moderate to high during the construction period. Although existing transportation resources would be affected by this alternative, the impacts would be temporary and localized in portions of the base. Nearby Las Vegas and Nellis Boulevards, Craig Road, and I-15 would be able to accommodate the anticipated temporary level of increased construction traffic.

Post-BRAC Alternative

Socioeconomics

Population. Under the post-BRAC alternative, there would be an increase of 509 personnel at Nellis AFB by 2011. Each military staff member is anticipated to have 2.04 dependents and this was used in calculating potential affects of the post-BRAC alternative (Air Force 2005b). Table 3.4-2 provides base population changes associated with the proposed action.

Table 3.4-2. Comparison of Existing and Projected Staff and Dependents at Nellis AFB under Post-BRAC

	Staff	***Dependents***	***Total***
Baseline (2005)	11,988	24,456	36,444
Post-BRAC Alternative	12,497	25,494	37,991
Change in Baseline	**509**	**1,038**	**1,547**

Under the post-BRAC alternative, the base personnel would increase by approximately 4.2 percent when compared to the existing baseline. This increase would not have a significant impact on local or regional population and would not place noticeably significant additional demands on affected community services, utilities, or housing. In addition, normal fluctuations in personnel and the rate of rapid growth in the region would likely make this change unnoticeable.

Employment and Earnings. In 2005, the workforce at Nellis AFB was comprised of 11,988 persons (Air Force 2005b). The gain of 509 manpower positions would not have a noticeable impact on employment and earnings when placed in context with the regional environment of Clark County and Las Vegas. Construction expenditures in the millions associated with the post-BRAC alternative would contribute to the local economy although the potential effects would be minor and temporary. Construction costs under the post-BRAC alternative would be minor in comparison to the billions of dollars generated in the Las Vegas region (Clark County 2006c).

Active duty military employees at Nellis AFB received on annual average salary of $66,114 in FY05. Based on this average, the addition of 479 (i.e., 434 under the proposed action; 45 under the post-BRAC alternative) active duty military personnel would generate approximately $31.7 million in payroll disbursements in the region. In addition, civilian payroll disbursements would generate approximately $1.2 million. The combined total would represent 4.7 percent of the Nellis AFB FY05 payroll.

Infrastructure

Housing. The on-base housing supply combined with the expanding off-base supply in Clark County would be sufficient (and inherently suitable) to accommodate personnel changes associated with the post-BRAC alternative. The addition of 509 active duty military personnel, civilians, and dependents would not adversely affect the housing supply either on base or in the local community.

Public Schools. The Air Force estimates that the student population in the Clark County School District would increase under this beddown proposal. However, the impact would not be adverse as the school district would be able to accommodate the pupil increase. The schools in the District would continue to receive federal impact aid for each federally-connected child attending school off base in lieu of taxes.

Utilities

Electric Power and Natural Gas. There would be no appreciable change in demand for utilities under the post-BRAC alternative; utility use would be minimally above baseline or no-action conditions. New facility construction would likely employ energy-conserving equipment to reduce the impact on the existing electrical infrastructure.

Potable Water. Demand for potable water is expected to increase with the addition of aircraft, personnel, and dependents under the post-BRAC alternative, however, water supplies would be sufficient to meet future demands. Construction activities and personnel increases would be expected to increase water consumption; however, the increases would not be expected to have an appreciable effect on the availability of potable water at Nellis AFB or in the surrounding areas. Even combined with the BRAC personnel use, the demand would be about 1 percent of the base's daily allotment. This amount would not result in noticeable impacts nor require Nellis AFB to seek additional water rights.

Wastewater Treatment. No adverse impacts to wastewater treatment would be anticipated under the post-BRAC alternative. Clark County Sanitation District treats over 140 million gpd of wastewater (CCSD 2005). Proposed construction and activities associated with the additional aircraft along with increased base personnel and active duty military dependents would generate less than 2 million gpd of wastewater to be treated.

Transportation

The Nellis AFB roadways would experience increased traffic levels associated with private owned and construction vehicles and equipment; the increased levels may create congestion during peak traffic periods (i.e., morning and evening rush hours). Traffic levels on the base would be moderate to high during the construction period. Although existing transportation resources would be affected by this alternative, the impacts would be temporary and localized in portions of the base. Nearby Las Vegas and Nellis Boulevards, Craig Road, and I-15 would be able to accommodate the anticipated temporary level of increased construction traffic.

No-Action Alternative

Under the no-action alternative, socioeconomic resources and opportunities associated with Nellis AFB or Clark County would remain at baseline conditions.

3.5 WATER AND SOIL RESOURCES

Water resources include surface and ground water. Lakes, rivers, and streams comprise surface water resources that are important for economic, ecological, recreational, and human health reasons. Groundwater is used for potable water consumption, agricultural irrigation, and industrial applications. Groundwater properties are often described in terms of depth to aquifer, aquifer or well capacity, water quality, and surrounding geologic composition. Attributes of water resources considered in this EA include hydrologic setting, availability, use, quality (including protection zones), floodplains, flood hazard, and adjudicated claims to water rights for both surface and groundwater. The Clean Water Act (CWA) of 1972 is the primary federal law that protects the nation's waters, including lakes, rivers, and aquifers. The primary objective of the Act is to restore and maintain the integrity of the nation's waters. Jurisdictional waters of the U.S. are regulated resources and are subject to federal authority under Section 404 of the CWA. This term is broadly defined to include navigable waters (including intermittent streams), impoundments, tributary streams, and wetlands. Criteria for water quality within the State of Nevada are contained in the Nevada Administrative Code (NAC), Chapter 445A.119, and apply to existing and designated beneficial uses of surface water bodies. Water quality standards are driven by the beneficial uses of specific water bodies. Beneficial uses include agriculture (irrigation and livestock watering), aquatic life, recreation (contact and non-contact), municipal or domestic supply, industrial supply, and wildlife propagation.

The State of Nevada has adopted drinking water standards established by the EPA, under the Safe Drinking Water Act. The Nevada Department of Health regulates drinking water quality for public supply systems. Drinking water standards consist of maximum contaminant levels established for various water quality constituents to protect against adverse health effects.

The principal factors influencing stability of structures are soil and seismic properties. Soil, in general, refers to unconsolidated earthen materials overlying bedrock or other parent material. Soil structure, elasticity, strength, shrink-swell potential, and erodibility all determine the ability for the ground to support structures and facilities. Relative to development, soils typically are described in terms of their type, slope, physical characteristics, and relative compatibility or limitations with regard to particular construction activities and types of land use.

3.5.1 Affected Environment

General water and soils information pertain to Nellis AFB where proposed BRAC actions would occur; no construction on the NTTR is planned and would not be affected by the proposal. All areas are located within the southern Las Vegas sub-basin of the Great Basin, the northernmost subprovince of the Basin and Range Physiographic Province. This province is generally characterized by regularly spaced, north-south trending mountain ranges that are separated by internally-draining alluvial basins or playas. The elevations of mountains and intervening valleys increase from south to north. The Great Basin subprovince drains internally; precipitation has no surface water outlet to the Pacific Ocean.

The Sierra Nevada, stretching along Nevada's western border, interrupts the prevailing easterly flow of storm systems and the state's access to precipitation, resulting in a "rain shadow." Surface water is sparse in Nevada. Typically, as much as 75 percent of Nevada's precipitation falls during the winter. The scarcity of surface water resources is attributed to a dry regional climate characterized by low precipitation, high evaporation, low humidity, and wide extremes in daily temperatures. Average precipitation depends mainly on elevation and ranges from 4 inches on the desert floor to 16 inches in the mountain areas. With the exception of locally intense thunderstorms that can produce flash flooding, much of the warm weather precipitation is lost to the atmosphere through evaporation and transpiration. Flash floods produce high peak flows over short periods of time.

Nevada's groundwater is typically found in unconsolidated deposits of sand, gravel, silt, and clay that partly fill the many basins. Most groundwater development is in basins where water is readily obtained from shallow unconsolidated deposits where well yields are more predictable than in the mountains.

Water

The Las Vegas Valley extends in a northwest-southeast direction and drains toward the south through the Las Vegas Wash into Lake Mead. Nellis AFB lies in the southern portion of the Las Vegas Valley within the Colorado River Basin. Natural surface waters and perennial streams are nonexistent. No 100-year floodplains occur within the developed portions of the base. The little precipitation that is captured is drawn into the valley's principal basin-fill aquifer, shallow aquifers, and the Colorado River.

Nellis AFB is underlain by carbonate rock aquifers of the Death Valley and Colorado aquifer systems (USGS 1997), which are hydrologically connected to shallower alluvial aquifer systems composed of sand and gravels. The principal aquifer in the Las Vegas Valley hydrologic basin is naturally recharged by 9.8 to 11.4 billion gallons per year (gpy) mostly from the Spring Mountains on the west valley boundary. Recharge of the shallow aquifers is also occurring, primarily as a result of irrigation water percolating into the ground.

Surface water is transported to Nellis AFB by pipelines from Lake Mead. A few ephemeral streams occur on the base (personal communication, Roe 2006), particularly in Area II. No natural lakes or other open bodies of water, excluding manmade impoundments, are found on Nellis AFB. However, low precipitation, a lack of slope, and the paucity of ephemeral streams create a context where the potential for water erosion is rare.

Sources of groundwater are available from the principal alluvial-fill aquifer underlying the Las Vegas Valley. In addition to on-base wells, wells are located in both the northwest part of the valley for the Las Vegas Valley Water District/Southern Nevada Water Authority and in the northern end of the valley for North Las Vegas Water District. The current water supply at Nellis AFB is considered adequate (Air Force 2003b).

Piped surface and ground waters support base personnel and operations. This includes water for drinking and sewage systems, fire utilities, maintaining landscapes, and construction. All water sources for Nellis AFB meet EPA and State of Nevada standards.

Nellis AFB's potable water sources include five active government-owned and operated wells and water purchased from Southern Nevada Water Authority via bulk-supply pipelines from Lake Mead. A small quantity is also purchased from the City of North Las Vegas Water District. Approximately 29 percent of the Nellis AFB water supply comes from groundwater. Nellis AFB is allotted 7.1 million gpd of surface and ground water (personal communication, Patras 2005). There are nine potable water storage tanks at Nellis AFB. The total existing potable water storage is 7.5 million gallons. Nellis AFB average daily water usage varies between 2.5 million gpd in between October and April to 5.4 million gpd from May to September (Air Force 2003b).

Soils

Nellis AFB is located in the southern part of the Las Vegas Valley. The elevation of Nellis AFB is about 2,000 feet above sea level. The ground surface over most of Nellis AFB is disturbed by man-made features, such as airfields, roads, and buildings. Nellis AFB is relatively flat. Over most of the base, including the vast majority of the developed areas, slopes are 1 percent or less.

Nellis AFB lies primarily on two types of soil, the Las Vegas-Destazo complex and the Las Vegas-Skyhaven complex (USDA 1985). These soils are very similar physically and chemically. Las Vegas soils comprise 60 percent of Nellis AFB soils and Skyhaven and Destazo soils together comprise 25 to 30 percent, leaving 10 to 15 percent McCarran-Grapevine complex, Weiser-Goodsprings complex, and Glencarb silt loam. The main soil types share the following attributes:

- moderately slow permeability;
- slight potential for water erosion;
- high potential for wind erosion; and
- a shallow hardpan layer that limits construction.

These attributes indicate that ground disturbance at Nellis AFB, such as construction, could lead to a high degree of wind erosion. Erosion from precipitation and runoff is rare, due to soil characteristics and lack of slope on Nellis AFB.

3.5.2 Environmental Consequences

In terms of water resources, no aspect of current operations at Nellis AFB affect either hydrologic setting or water sources; this would not change under the proposed action. Therefore, this analysis focuses on potential effects on water use, availability, and quality.

Analysis of the potential impacts to soil resources employs the following steps: identifying locations where the actions may directly or indirectly affect earth resources, defining the nature of the affected earth resource, and evaluating the degree to which the characteristics, abundance, or value of the resource would be altered, depleted, or degraded.

Proposed Action – BRAC Realignment

Water

Under the proposed action, construction and demolition activities are expected to have limited effects on the surface waters at Nellis AFB or in the surrounding areas. Surface water for Nellis AFB is transported via pipelines from Lake Mead and accounts for 71 percent of the base's allotment. Sources of ground water are available from the principal alluvial-fill aquifer underlying the Las Vegas Valley, including on-base wells. Although implementation of the proposed projects would increase the use of water, the increase for construction would be temporary and distributed over multiple years. Construction would use roughly 0.15 million gallons, or about 2 percent of the daily allotment for the base. This amount would be spread over about 3 years. The effect on ground water at Nellis AFB or in the surrounding areas would also be minimal for the same reasons.

Use of water for operation of the proposed BRAC projects would not substantively affect availability of surface water or ground water at Nellis AFB or elsewhere in the area. Total new buildings requiring water would represent less than 1 percent of the base's built environment. Such a limited demand would not detract noticeably from water availability. Consumption by 464 additional personnel would fall well within current water allocation and would not require Nellis AFB to seek additional water rights. Given an average consumption of 150 gpd day per person, the use by personnel associated with the realignment would constitute about 1 percent of the base's allotment. Actual use levels would be less, since a proportion of personnel would live off-base. Construction of new facilities with more efficient water conservation design and measures, and demolition of existing facilities would also help offset any increased water use.

Projected construction would disturb some existing groundcover, but the potential for soil loss, erosion, and sedimentation would be temporary and limited in scope. About half the projects occur on existing pavement or other developed surfaces. Required best management practices (soil covering, watering, and stockpiling) would reduce fugitive dust, soil loss, and sedimentation.

The proposed action includes paving and construction of buildings with impermeable surfacing. If the area of disturbance for the proposed action is greater than 1 acre, it is subject to NPDES permit conditions. Nellis AFB would amend their existing NPDES permit to accommodate such construction. During construction at Nellis AFB, soils would temporarily be exposed to compaction, impeding drainage and reducing water infiltration. However, existing water filtration is limited due to the type of soils found at Nellis AFB. In addition, construction and demolition activities could increase runoff volumes and alter current hydrological processes. However, the base lacks significant open water bodies and the area altered would be a small portion of the existing permeable surfaces at Nellis AFB. Since no surface water resources of consequence are located on base and there would not be any negligible increase and/or change from existing impenetrable surfaces, implementation of the proposed action would not significantly impact surface water. Existing spill prevention, control, and countermeasure procedures would provide for protection of surface water sources during construction and use of facilities, so the potential for on-base or off-base surface water quality to be affected would be negligible.

Construction and paving associated with the proposed improvement projects could result in slightly fewer acres available to facilitate groundwater recharge, but the impact would not be adverse given the low average annual precipitation, minimal recharge associated with the soils found at the base, and the lack of year-round surface water on the base. No floodplains have been identified on base. Since the existing potential for flooding on Nellis AFB is minimal, the proposed action would not increase flood hazards on the base.

Soils

Construction of new facilities and demolition at Nellis AFB would occur under the proposed action. Depending on the size of the area of disturbance for projects, they may be subject to conditions of existing NPDES permits. The existing Stormwater Pollution Prevention Plan (SWPPP) would need to be updated to reflect these new facilities and be prepared prior to construction. The SWPPP would specify measures to reduce or eliminate any adverse erosion and sedimentation impacts (e.g., culvert and storm water runoff drainage). In addition, fugitive dust would be reduced during construction through soil watering, gravel, and proper grading to minimize any affects from this resource.

Site grading associated with construction of new facilities and demolition of existing facilities would be the primary activity with the potential to affect earth resources. Grading would cause loss of some disturbed ground cover for new facilities, which would increase the potential for soil erosion. However, several factors indicate that erosion and soil loss would be negligible. First, the area affected would be about 27 acres within the developed portion of Nellis AFB; most of the proposed construction would replace existing buildings. Second, construction activities would take place over 3 years, limiting the total area exposed to erosion at any point in time. Third, low precipitation (8 inches per year) and low runoff (0.2 - 2.1 inches per year), combined with the flat topography of the base would substantially reduce the potential for erosion. Lastly, Air Force requirements to employ standard best management practices (e.g., soil stockpiling, watering), and follow NPDES permits and SWPPP requirements would further limit both wind and water erosion. Based on these factors, construction grading would not measurably degrade soil resources through erosion or loss. In addition, limited potential for sedimentation would occur. In summary, minimal impacts to soil resources would result if the proposed action were implemented.

Post-BRAC Alternative

Under the alternative action, in addition to the BRAC actions, four facilities would be constructed on the main flightline, one operations building in Freedom Park, and additional airfield pavements on the east side of the flightline, encompassing another 22 acres (i.e., 49 total acres). Combined construction would account for about 0.3 million gallons of water distributed over several years. This amount would represent approximately 0.001 percent of the base's annual water allotment. The 45 personnel associated with the addition of 8 aircraft would require no more than 0.1 percent of the base's daily average. With the BRAC personnel, total use would remain below 1 percent of the daily average. Construction best management practices would minimize impacts to soils. Even added to the BRAC construction, less than 0.2 percent of the base would be affected, and most would consist of previously disturbed or paved areas. Therefore, minimal impacts to water and soil resources if the post-BRAC alternative was implemented.

No-Action Alternative

Under the no-action alternative, ongoing Air Force activities at Nellis AFB would continue operating at current levels as reflected in current Air Force management plans. No additional impacts to soil or water resources would occur.

3.6 BIOLOGICAL RESOURCES

Biological resources encompass plant and animal species and the habitats within which they occur. Plant species are often referred to as vegetation and animal species are referred to as wildlife. Habitat can be defined as the area or environment where the resources and conditions are present that cause or allow a plant or animal to live there (Hall *et al*. 1997). Biological resources for this EA include vegetation, wetlands, wildlife, and special-status species occurring in the vicinity of the proposed construction projects on Nellis AFB.

Vegetation

Vegetation includes all existing upland terrestrial plant communities with the exception of wetlands or special-status species. The affected environment for vegetation includes those areas subject to demolition and construction ground disturbance.

Wetlands and Waters of the United States

Wetlands are considered special category sensitive habitats and are subject to regulatory authority under Section 404 of the CWA and Executive Order 11990 *Protection of Wetlands.* They include jurisdictional and non-jurisdictional wetlands. Jurisdictional wetlands are those defined by the United States Army Corps of Engineers (USACE) and EPA as those areas that meet all the criteria defined in the USACE's 1987 *Wetlands Delineation Manual* and under the jurisdiction of the USACE (USACE 1987). Wetlands are generally associated with drainages, stream channels, and water discharge areas (natural and man-made). The discussion on wetlands pertains to the potential to affect wetlands due to construction or demolition activities under the proposed action.

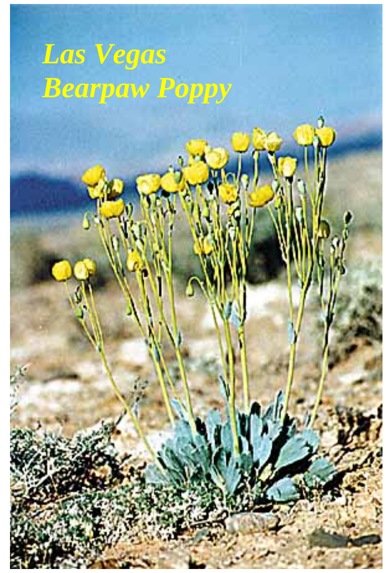
Wildlife

For the purposes of this EA, wildlife includes all vertebrate animals (i.e., fish, amphibians, reptiles, birds, and mammals) with the exception of those identified as threatened, endangered, or sensitive species. Wildlife potentially affected by demolition and construction activities and overflight noise will be discussed.

Special-Status Species

Special-status species are defined as those plant and animal species listed as threatened, endangered, or proposed as such by the USFWS. The federal Endangered Species Act (ESA) protects federally listed, threatened, and endangered plant and animal species. Species of concern are not protected by the ESA; however, these species could become listed and protected at any time. Their consideration early in the planning process could avoid future conflicts that might otherwise occur. The discussion of special-status species focuses on those species with the potential to be affected by demolition, construction, and construction-related noise.

3.6.1 Affected Environment



The affected environment for biological resources includes areas of Nellis AFB potentially affected by ground-disturbing activities such as demolition, construction, or infrastructure development and noise.

Nellis AFB

Vegetation

Nellis AFB is located in the Mojave Desert. Large expanses of the valley floors in the Mojave Desert support the creosote bush (*Larrea tridentate*)-white bursage (*Ambrosia dumosa*) desert scrub community. The creosote bush and white bursage dominate plant communities at elevations from below sea level to about 3,940 feet (Hazlett *et al.* 1997). This desert scrub community, characteristic of much of the Mojave Desert can still be found in the less developed areas of Nellis AFB, such as the eastern portion of Area II. Tamarisk or salt cedar (*Tamarix* spp.) is an introduced, non-native perennial plant species that has had a notable effect on plant associations. Nellis AFB has an aggressive program to eradicate Tamarisk from the installation. Traditionally, non-native drought-tolerant deciduous trees and shrubs, evergreen trees and shrubs, perennials, ground covers, vines, and grasses have also been planted throughout the base, however, over the past several years the focus has been on planting native vegetation. Introduced native and non-native vegetation are contained mostly within and adjacent to developed areas at the base (Air Force 1999b).

Las Vegas bearpaw poppy (*Arctomecon californica*) and Las Vegas buckwheat (*Eriogonum corymbosum*), both plant species of concern, are present on gypsiferous soils in three different locations on Nellis AFB. These two plant species are discussed in detail in the special-status species section under Nellis AFB.

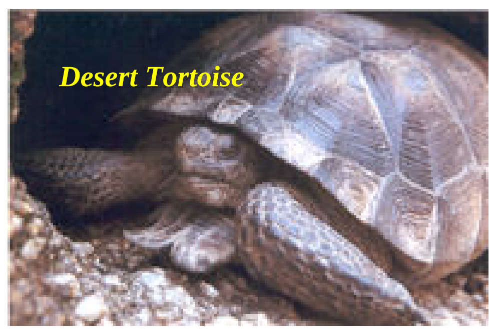
Wetlands and Waters of the United States

The only potential wetlands on Nellis AFB are the golf course ponds. The USACE personnel have determined that these man-made water sources are not subject to wetlands protection under the provisions of the CWA because they are man-made and the water source is not natural (Air Force 1999b). Because the Las Vegas Wash is connected to the Colorado River, any ephemeral streams and washes eventually emptying into the Las Vegas Wash could be considered jurisdictional under Section 404 of the CWA. Any action that would result in the placement of fill in those streams would require consultation with the USACE (Air Force 1999b).

Wildlife

Due to its location adjacent to metropolitan Las Vegas and previous development and construction activities, Nellis AFB is primarily an urban environment with some relatively undisturbed lands lying to the east and north of the base. Wildlife species found on base are mostly limited to those that have adapted to high levels of human activity and disturbance. Three general habitat types are present on the base: urban areas, open space recreation (e.g., golf course), and native desertscrub vegetation. Common bird species in the urban areas include house finch and house sparrow. Open spaces are frequented by American coot (*Fulica americana*), horned lark (*Eremophila alpestris*), great-tailed grackle (*Quiscalus mexicanus*), and domestic geese and ducks. The areas with the most diverse wildlife are those containing native desertscrub vegetation. Area II (refer to Figure 1-2) comprises the most undisturbed native desertscrub habitat on the base. Coyote (*Canis latrans*), Gambel's quail (*Callipepla gambelii*), mourning dove (*Zenaida macroura*), desert spiny lizard (*Sceloporus magister*), and side-blotched lizard (*Uta stansburiana*) are common wildlife species found in the vicinity of the base (Air Force 1999b).

Special-Status Species



Only one federally-listed animal species, the desert tortoise (*Gopherus agassizii*), is present on the base in low densities in undeveloped portions of Area II. The desert tortoise was listed by the USFWS as threatened on April 2, 1990. It is the largest reptile in the arid southwestern U.S. Tortoises spend much of their lives in underground burrows that they excavate to escape the harsh summer and winter desert conditions. They usually emerge in late winter or early spring and again in the fall to feed and mate, although they may be active during summer when temperatures are moderate. Desert tortoises are herbivorous, eating a wide variety of herbaceous vegetation, especially flowers of annual plants. Historically the tortoise occupied a variety of desert communities in southeastern California, southern Nevada, western and southern Arizona, southwestern Utah, and through Sonora and northern Sinaloa, Mexico. Today it can still be found in these areas, although the populations are fragmented and declining over most of its former range (Air Force 1999b).

A previous USFWS Biological Opinion (USFWS 1992) and amendments regarding future impacts to the desert tortoise population states the level of impact was "…not likely to appreciably reduce the likelihood of survival and recovery of the Mojave population of the desert tortoise in the wild…" The USFWS issued reasonable and prudent measures, including implementing terms and conditions designed to minimize incidental take in Areas I, II, and III. According to 50 CFR Section 402.16, any new Air Force action that may affect the desert tortoise in portions of Areas I and II, not considered in previous Biological Opinions, would require reinitiation of consultation with the USFWS. The opinion, however, noted that Area I contained no tortoises.

Two plant and two other animal species of concern have been observed or occur on Nellis AFB. These are the Las Vegas bearpoppy, Las Vegas buckwheat, chuckwalla (*Sauromalus obesus*), and western burrowing owl *(Athene cunicularia)*. Four populations of Las Vegas bearpoppy have been located on Nellis AFB: three populations in Area II and one population in Area III. In 1996, Area II had approximately 1,300 plants and Area III had the largest population (Air Force 1999b). The poppy populations are found exclusively on gypsiferous soils. The Las Vegas buckwheat is another rare species observed and documented on Nellis AFB. Habitat of two other animal species of concern, the banded Gila monster (*Heloderma suspectum cinctum*), and phainopepla (*Phainopepla nitens*) occurs on the base; however, neither of these species has been observed on Nellis AFB.

The chuckwalla, a large lizard, has been confirmed due to presence of scat on the rocky hillsides of the eastern portion of Area II. The chuckwallas inhabit rocky hillsides, talus slopes, and rock outcrops in areas dominated by creosote. Rocks and their associated crevices provide shelter and basking sites. The western burrowing owls, is a species native to southern Nevada that adapts well to urban environments. The owl prefers flat, previously disturbed areas like those found around the southern boundary of Nellis AFB, including edges of concrete flood control channels, for the excavation their burrows and are commonly found on the base The banded Gila monster is one of the few venomous lizards in the world and has not been observed on Nellis AFB. Phainopepla, a passerine species, favors mesquite groves such as those found in the Desert Wells Annex area located 4 miles west of Nellis AFB.

3.6.2 Environmental Consequences

Determination of the significance of potential impacts to biological resources is based on: 1) the importance (i.e., legal, commercial, recreational, ecological, or scientific) of the resource: 2) the proportion of the resource that would be affected relative to its occurrence in the region; 3) the sensitivity of the resource to proposed activities; and 4) the duration of ecological ramifications. Impacts to biological resources are significant if species or habitats of concern are adversely affected over relatively large areas or disturbances cause reductions in population size or distribution of a species of concern. Analysis of potential on-base impacts focuses on whether and how ground-disturbing activities and changes in the noise environment may affect biological resources.

Proposed Action – BRAC Realignment

Vegetation

The proposed action would require the construction of new facilities and the demolition of older facilities. Since construction activities, structural modifications, and demolition associated with the proposed action would occur predominantly in previously disturbed areas that currently support no sensitive plant species or wetlands, there would be no adverse impacts on vegetation at Nellis AFB.

Wetlands and Waters of the United States

No designated wetlands or areas exhibiting wetland characteristics exist on or near the sites proposed for construction; therefore, implementation of the proposed action would have no impact on wetlands. The construction activities in the live ordnance loading area (LOLA) area could intersect ephemeral streams which could be jurisdictional waters of the U.S. While the impacts to the waters of the U.S. would be minimal, a Section 404 Permit would be obtained prior to construction activities.

Wildlife

Since the proposed facilities construction and modifications would occur on previously developed areas that are predominantly graded or paved, proposed construction activities would not have an adverse impacts on terrestrial wildlife. Projected noise levels under the proposed action would be similar to current baseline noise levels and are within normally acceptable criteria. Therefore, wildlife would not be adversely affected at Nellis AFB.

Bird/wildlife-aircraft strikes have not historically presented an operational constraint to Nellis AFB. In the course of a 14-year period, there have been a total of 233 bird-aircraft strikes within the immediate vicinity of the base involving Nellis AFB aircraft (personal communication, Bass 2005). Since the F-15 and F-16 aircraft would continue to be utilized in the same manner, it is unlikely that there would be an adverse impact to wildlife from aircraft strikes.

Special-Status Species

Only the desert tortoise, listed as threatened by both the USFWS and Nevada Department of Wildlife, exists on Nellis AFB. Surveys conducted in 1992 found a small population in the northeastern portion of Area II. It does not occur in Area I where construction would occur. Therefore, in accordance with the USFWS Biological Opinion (USFWS 1992) regarding future impacts to the desert tortoise population, the proposed action would not reduce the likelihood of survival and recovery of the desert tortoise. This new Air Force action would not affect the desert tortoise in Area II, so Nellis AFB would not need to consult with the USFWS regarding impacts to the tortoise. Noise levels from flight operations would not change from baseline levels. Noise from construction activities would not adversely affect the desert tortoise in Area II.

The Las Vegas bearpoppy and Las Vegas buckwheat, currently listed as a species of concern, are located in Areas II and III on Nellis AFB. Construction activities would avoid these species. In Area II, surveys will be conducted prior to construction and any chuckwalla found would be removed. The western burrowing owl is common on the base and provisions of the Migratory Bird Treaty Act would be followed prior to the start of construction. These provisions include surveys and removal and limiting ground disturbing activities to non-breeding reason for owls.

Post-BRAC Alternative

Vegetation

The impacts to vegetation would be essentially the same as those described for the proposed action. Under the post-BRAC alternative, there would be new facility construction and demolition of an older facility. Since construction activities would occur predominantly in previously disturbed areas that currently support no sensitive plant species or wetlands, there would be no adverse impacts on vegetation at Nellis AFB.

Wetlands and Waters of the United States

No designated wetlands or areas exhibiting wetland characteristics exist on or near the sites proposed for construction under this alternative; therefore, there would be no impact on wetlands. While construction activities in the LOLA area could intersect arroyos, the impacts to the waters of the U.S. would be minimal. A Section 404 Permit would be obtained prior to construction activities.

Wildlife

Proposed construction activities would occur on previously developed areas that are predominantly graded or paved; no adverse impact to terrestrial wildlife would be expected. Projected noise levels would be similar to current baseline noise levels, and are within normally acceptable criteria. Therefore, wildlife would not be adversely affected at Nellis AFB under this alternative. No increase in the number of bird/wildlife-aircraft strikes would be anticipated with the neglible increase in airfield operations.

Special-Status Species

For the same reasons described under the proposed action, no adverse impacts to the desert tortoise would occur under the post-BRAC alternative. Nellis AFB would not need to consult with the USFWS. Construction activities would avoid the Las Vegas bearpoppy and Las Vegas buckwheat located in Areas II and III on Nellis AFB. In Area II, surveys will be conducted prior to construction and any chuckwalla found would be removed. The western burrowing owl is common on the base and provisions of the Migratory Bird Treaty Act would be followed prior to the start of construction. These provisions include surveys and removal and limiting ground disturbing activities to non-breeding season for the owls.

No-Action Alternative

Under the no-action alternative, there would be no change to current baseline conditions on Nellis AFB. No new construction or additional aircraft operations would occur; therefore, biological resources would not be adversely impacted under the no-action alternative.

3.7 CULTURAL RESOURCES

Cultural resources management is directed by federal laws. Section 106 of the National Historic Preservation Act (NHPA) of 1966 requires that federal agencies take into account the effects of their undertakings on historic properties which are locations, features, and objects older than 50 years and determined eligible for nomination to the National Register of Historic Places (NRHP).

Cultural resources are divided into three categories: archaeological resources, architectural resources, and traditional cultural resources or properties. Archaeological resources are places where people changed the ground surface or left artifacts or other physical remains (e.g., arrowheads or bottles). Archaeological resources can be classed as either sites or isolates and may be either prehistoric or historic in age. Isolates often contain only one or two artifacts, while sites are usually larger and contain more artifacts. Architectural resources are standing buildings, dams, canals, bridges, and other structures. Traditional cultural properties are resources associated with the cultural practices and beliefs of a living community that link that community to its past and help maintain its cultural identity. Traditional cultural properties may include archaeological resources, locations of historic events, sacred areas, sources of raw materials for making tools, sacred objects, or traditional hunting and gathering areas.

3.7.1 Affected Environment

The Area of Potential Effect for this action is defined as the region of influence, or affected environment, since the proposed action and alternatives are unlikely to affect setting or be visually intrusive to NRHP-eligible resources beyond Nellis AFB.

Efforts to identify and evaluate cultural resource properties for this project according to 36 CFR 800.4 were initiated in 1978 and continue to the present. Nellis AFB initiated a Native American Program in 1996 as a foundation for government-to-government consultation. Activities have included Annual Meetings, NTTR field trips, participation in professional meetings, and the formation in 1999 of a Document Review Committee which reads and comments on cultural resources reports and EAs prior to SHPO reviews.

The affected environment is Nellis AFB-managed land in Nevada that includes the NTTR and Nellis AFB's property in Las Vegas Valley.

Nellis AFB

All of Nellis AFB, which includes Area I, Area II, and Area III, and the Small Arms Range, has been surveyed for archaeological resources and all sites evaluated. One NRHP-eligible site, a quarry, is located on Nellis AFB. All other sites were determined through SHPO consultation (letter dated April 12, 2001) to be ineligible for nomination. The Nevada SHPO has concurred with these determinations (Nevada SHPO 2004).

In 1988, an inventory and evaluation of World War II structures was completed at Nellis AFB. In a letter dated 14 June 1991, the Nevada SHPO reviewed the evaluation and concurred that the only building considered eligible was the McCarran Field Air Terminal Building on Nellis AFB. Although the McCarran Field Air Terminal Building was considered by Nellis AFB as eligible on the basis of local importance, a 1996 evaluation by the SHPO historian determined the alterations to the building had compromised its physical integrity. Thus, no World War II structures on Nellis AFB are considered to be eligible to the NRHP.

In 2004, 336 Wherry houses constructed from 1950 to 1957 and 113 Capehart structures built on Nellis AFB in 1960 were proposed for destruction. Dobson-Brown (2004) conducted the field research and argued the buildings lacked physical integrity for further eligibility consideration. The SHPO concurred with the recommendation (personal communication, Myhrer 2006). Following this review, Nellis AFB determined an updated historic building inventory for the Nellis AFB Las Vegas Valley properties and Creech AFB was necessary.

According to 36 CFR 60.4 (g), special properties may have achieved significance within the last 50 years due to exceptional importance within the appropriate local, state, or national historic context. Because the Cold War had impacts for the history of the nation, the Department of Defense Legacy Resource Management Program and the Air Force Federal Preservation Officer determined it necessary to evaluate Cold War facilities (both those less than and equal to or greater than 50 years old) to comply with Section 110. To ensure compliance with Section 106, an action memo was sent in 1992 to the Air Force Civil Engineer stating that the SHPO would be consulted prior to any actions with potential to affect Cold War facilities. A new building inventory for Nellis AFB is in process that will evaluate all Cold War facilities at Nellis AFB.

Nine structures, constructed between 1951 and 1971, were inventoried in 2006 (NAFB 2006b). The buildings are part of the larger survey and evaluation of 172 buildings from the Cold War era on Nellis AFB that is in process; however due to their proposed demolition as part of the BRAC and WINDO actions occurring on the base, a separate report on eligibility recommendations for Nevada SHPO Section 106 review was requested by Nellis AFB. These facilities include seven buildings that are older than 50 years (Buildings 67, 250, 258, 265, 839, 841, and 941) and two buildings that are less than 50 years old (Buildings 264 and 413). Consultation with SHPO on the ineligibility of the nine structures was completed in December 2006. The Nevada SHPO concurred that the nine structures were not eligible to the NRHP (Appendix F).

3.7.2 Environmental Consequences

Procedures for assessing adverse effects to cultural resources are discussed in regulations for 36 CFR Part 800 of the NHPA. An action results in adverse effects to a cultural resource eligible to the NRHP when it alters the resource characteristics that qualify it for inclusion in the register. Adverse effects are most often a result of physical destruction, damage, or alteration of a resource; alteration of the character of the surrounding environment that contributes to the resource's eligibility; introduction of visual, audible, or atmospheric intrusions out of character with the resource or its setting; and neglect of the resource resulting in its deterioration or destruction; or transfer, lease, or sale of the property. In the case of the proposed action, potential effects to cultural resources could result from ground-disturbing activities associated with construction or demolition of significant structures, from modification of significant structures, from increased noise levels and vibrations, visual intrusions from overflights, and effects from ordnance, and chaff, and flare use.

Proposed Action – BRAC Realignment

Archaeological Resources

Under the proposed action, construction and demolition of structures would take place along the flightline, on the Operations/Academics Campus, and on the east side of the flightline in the east side development area. All of Nellis AFB has been surveyed for archaeological resources. Construction will be placed in areas previously disturbed areas that do not contain NRHP-eligible archaeological sites. No eligible or National Register properties are in the Area of Potential Effect. If an unanticipated discovery of archaeological materials occurs during construction, then an investigation and evaluation will be conducted according to procedures in 36 CFR Part 60. Projected noise levels under the proposed action would be similar to current baseline noise levels and are within normally acceptable criteria. Therefore the setting of archaeological sites in the Nellis AFB area would not be affected by the proposed action.

Architectural Resources

No NRHP-eligible structures would be affected by construction or demolition activities. One structure, Building 941, the pump house, would be demolished as part of the proposed action. Building 941 was constructed in 1951 as a fuel pump station. It is basically rectangular in plan and is constructed entirely of steel-reinforced concrete. Building 941 was inventoried in 2006 along with eight other structures proposed for demolition under different projects (NAFB 2006b). Building 941 functions as a support building at Nellis AFB, and though it remains substantially intact, it does not have any significance or special associations with any major missions or persons at Nellis AFB, nor is it associated with any broad pattern of American or Cold War history that would qualify it for inclusion in the NRHP under Criteria A or B. Building 941 is not representative of the work of a significant architect or engineer, or does it display and distinctive characteristics of a type, period, or method of construction that would qualify it for inclusion in the NRHP under Criterion C. This building does not have the potential to yield any information regarding the prehistory or history of the base, and therefore does not qualify for inclusion in the NRHP under Criterion D. The Nevada SHPO concurred that Building 941 was not eligible to the NRHP in December 2006 (see Appendix F).

If an infrastructure project would affect a known NRHP-eligible structure, then procedures in accordance with 36 CFR Part 60 for the Section 106 process would be implemented. Therefore, construction activities would not have an adverse effect on NRHP-eligible architectural resources on Nellis AFB.

Traditional Cultural Resources

No traditional cultural properties are known to occur on Nellis AFB; therefore, impacts to this resource are unlikely.

Post-BRAC Alternative

Archaeological Resources

The impacts to archaeological resources would be essentially the same as those described for the proposed action. The additional construction associated with the post-BRAC alternative would be in previously disturbed areas. Procedures for anticipated discoveries would be the same as those for the proposed action.

Architectural Resources

No demolition would occur under this alternative. If an infrastructure or construction project would affect a known NRHP-eligible structure, then procedures in accordance with 36 CFR Part 60 for the Section 106 process would be implemented . Therefore, construction activities would not have an adverse effect on NRHP-eligible architectural resources on Nellis AFB.

Traditional Cultural Resources

No traditional cultural properties are known to occur on Nellis AFB; therefore, impacts to this resource are unlikely.

No-Action Alternative

Under the no-action alternative, there would be no construction or demolition at Nellis AFB associated with BRAC or post-BRAC actions. No buildings associated with the action would be demolished, modified, or constructed. The effect on the environment would be unchanged relative to baseline. Therefore, this alternative would have no impacts to archaeological, architectural, or traditional resources.

3.8 HAZARDOUS MATERIALS AND WASTE

Hazardous materials (HAZMAT), listed under the Comprehensive Environmental Response, Compensations, and Liability Act (CERCLA), and the Emergency Planning and Community Right-to-Know Act, are defined as any substance that, due to quantity, concentration, or physical, chemical, or infectious characteristics, may present substantial danger to public health, welfare, or the environment. Examples of HAZMAT include petroleum products, synthetic gas, and toxic chemicals. Hazardous wastes, listed under the Resource Conservation and Recovery Act (RCRA), are defined as any solid, liquid, contained gaseous, or semisolid waste, or any combination of wastes, that pose a substantial present or potential hazard to human health or the environment. Additionally, hazardous wastes must either meet a hazardous characteristic of ignitability, corrosivity, or reactivity under 40 CFR Part 261, or be listed as a waste under 40 CFR Part 263.

Hazardous materials and wastes are federally regulated by the EPA, in accordance with the Federal Water Pollution Control Act; CWA; Toxic Substance Control Act; RCRA; CERCLA; and CAA. The federal government is required to comply with these acts and all applicable state regulations under Executive Order 12088 and DoD Directive 4150.7, AFI 32-1053. Additionally, Executive Order 12088, under the authority of the EPA, ensures that necessary actions are taken for the prevention, management, and abatement of environmental pollution from HAZMAT or hazardous waste due to federal activities. Other topics commonly addressed under hazardous materials and waste includes underground storage tanks and potential contaminated sites designated under the Air Force's Environmental Restoration Program (ERP).

Asbestos-containing material (ACM) is any material containing more than 1 percent by weight of asbestos and can be crumbled, pulverized, or reduced to powder, when dry, by hand pressure. Asbestos is made up of microscopic bundles of fibers that may be airborne when distributed or damaged. Due to its availability to withstand heat, fire, and chemicals, asbestos was historically used in construction materials, and is typically found in ceiling tiles, pipe and vessel insulation, floor tile, linoleum, mastic, and on structural beams and ceilings. Laws which address the health risks of exposure to asbestos and ACMs include Toxic Substance Control Act, Occupational Health and Safety Administration regulations (29 CFR), and CAA (Section 112 of the CAA, as amended, 42 USC § 7401 *et seq*.). EPA regulations concerning asbestos are contained in 40 CFR 61. The regulations require that the EPA or authorized state agencies be notified of asbestos removal projects.

Lead-based paint (LBP) was commonly used from the 1940s until the 1970s for exterior and interior painted surfaces. In 1978, the U.S. Consumer Product Safety Commission lowered the legal maximum lead content in most kinds of paint to trace amounts, therefore, buildings constructed after 1978 are presumed not to contain LBP. The use and management of LBP is regulated under Section 1017 of the Residential Lead-Based Paint Hazard Reduction Act of 1992. Section 1017 requires the implementation of federally supported work involving risk assessments, inspection, interim controls, and abatement of lead-based paint hazards. Regulations relating to LBP can be found at 29 CFR, 40 CFR, and 49 CFR.

3.8.1 Affected Environment

The affected areas for potential impacts related to HAZMAT and waste consists of Nellis AFB, with an emphasis on aircraft maintenance and munitions handling areas. Since the proposed beddown and aircraft operations within NTTR training airspace would not generate or require disposal of hazardous wastes, a discussion of hazardous wastes within and under the associated airspace is not provided.

Hazardous Materials and Hazardous Waste Generation

Activities at Nellis AFB require the use and storage of a variety of hazardous materials that include flammable and combustible liquids, acids, corrosives, caustics, anti-icing chemicals, compressed gases, solvents, paints, paint thinners, and pesticides. The Nellis AFB Hazardous Waste Management Plan (Air Force 2002a) provides guidance and procedures for proper management of RCRA and non-RCRA hazardous waste generated on the base to ensure compliance with applicable regulations. To manage these materials, Nellis AFB uses a hazardous material pharmacy pollution prevention system. This process provides centralized management of the procurement, handling, storage, and issuing of hazardous materials, as well as the turn-in, recovery, reuse, recycling, and disposal of hazardous wastes. The pharmacy approval process also includes review and approval by Air Force personnel. In addition, the base has a Facilities Response Plan, (Air Force 2002b), which includes site specific contingency plans.

Nellis AFB generated approximately 113,900 pounds of RCRA hazardous waste in 2005 (personal communication, Rodriguez 2006), and is therefore considered a large quantity generator by the EPA. Hazardous waste at Nellis AFB is accumulated at an approved 90-day storage area on the base, or at satellite accumulation points. Approximately 100 satellite accumulation points are located at Nellis AFB (Air Force 2002a). One 90-day storage area is operated at Nellis AFB as a collection area for wastes received from satellite accumulation points. Each accumulation point must comply with requirements for siting, physical construction, operation, marking, labeling, and inspection and must maintain a container inspection log. Generators of hazardous wastes are responsible for properly segregating, storing, characterizing, labeling, marking, and packaging all hazardous waste for disposal. The proper container can be determined by reference to the Hazardous Materials Table in 49 CFR Part 172.101.

A variety of activities on base, including aircraft maintenance and support, civil engineering, and printing operations, have been identified as primary contributors to hazardous waste streams. Numerous other shops add to hazardous waste streams, including AGE, Aircraft Structural Maintenance, Fuels Management, Non-Destructive Inspection, Munitions and Armament Shops, In-Squadron Maintenance, the Wheel and Tire Shop, and others (e.g., avionics, egress systems, electrical, metals, pneudraulics, hydraulics, radio, jet engine, and structural maintenance). Routine activities conducted on the flightline generate paints containing lead-mercury-chromium, hazardous waste containers, and contaminated rags. Wastes derived from maintenance activities include petroleum, oils, and lubricants, paints and paint-related wastes such as thinners and strippers, batteries, contaminated spill absorbent, adhesives, sealers, solvents, fuel filters, photochemicals, ignitable wastes, and metals. Basic processes and waste handling procedures for general aircraft maintenance activities are identified in the Nellis AFB Hazardous Waste Management Plan (Air Force 2002a). Hazardous waste quantities directly related to aircraft maintenance activities are listed in Table 3.8-1, and represent an average, based on data from August 2005 through January 2006. If annualized, the total would be approximately 37,920 pounds of hazardous waste resulting from based aircraft maintenance activities for Nellis AFB. It would account for approximately one-third of the total hazardous wastes generated by Nellis AFB for 2005.

Table 3.8-1. Baseline Aircraft Related Hazardous Waste by Activity

Activity	***Pounds of Waste (average per month)***
Corrosion Control	1,200
AGE	10
In-Squadron Maintenance	870
Propulsion and Test Cell	1,080
Total	3,160

Source: personal communication, Beckworth 2006

Nellis AFB has a proactive program to identify asbestos and lead in all structures in order to reduce potential hazards to occupant, workers, and the environment during future construction projects. Many buildings on base date from the 1940s through the 1980s; asbestos-containing materials have been identified in many of these facilities. Renovation or demolition of on-base structures is reviewed by Civil Engineering personnel to ensure appropriate measures are taken to reduce potential exposure to, and release of, friable asbestos. Non-friable asbestos is not considered a hazardous material until it is removed or disturbed. The Nellis AFB Asbestos Management and Operations Plan (Air Force 2003c) and Nellis AFB Lead-Based Paint Management Plan (Air Force 2003d) provides guidance on the proper handling and disposal of ACM and lead-based paint.

The ERP is the process by which contaminated sites and facilities are identified and characterized and by which existing contamination is contained, removed, and disposed of to allow for beneficial reuse of the property. ERP sites include landfills, underground waste fuel storage areas (e.g., oil/water separators), and maintenance-generated wastes. Compliance activities for ERP sites address underground storage tanks, hazardous materials management, closure of active sites, polychlorinated biphenyls, water discharges, and other compliance projects that occur on or near ERP sites. There are currently nine active ERP sites on Nellis AFB (Air Force 2004).

3.8.2 Environmental Consequences

Since changes associated with the proposed action would not affect hazardous materials and waste in NTTR, only potential impacts on Nellis AFB are discussed. Overall, effects from hazardous materials and waste associated with construction of new facilities would not be adverse. In addition, no adverse impact would occur from the beddown of additional F-15 and F-16 aircraft at Nellis AFB since no new waste streams would be created, waste amounts would not substantially increase, and hazardous materials would not change.

Proposed Action – BRAC Realignment

The hazardous materials and waste associated with the F-15 and F-16 programs would not have an adverse impact on installation management programs. No new waste streams would be created and hazardous materials would not change at the base. Management protocols for hazardous substances related to the F-15 and F-16 aircraft would follow existing regulations and procedures. A proportional increase of hazardous wastes for aircraft maintenance would occur, as shown in Table 3.8-2. The waste types would be identical to existing wastes generated by maintenance activities currently used for the F-16s and F-15s already based at Nellis AFB. Based on averages, annual total waste generated would amount to 6,972 pounds, or an 18 percent increase over the baseline maintenance wastes, and 6 percent increase over the total hazardous wastes generated by the base. Since Nellis AFB is already a large-quantity generator, this increase would not alter the base's generator status and the current waste operations could accommodate the amounts without management or permit changes.

Table 3.8-2. BRAC Aircraft Related Hazardous Waste by Maintenance Activity

Activity	*Baseline - Pounds of Waste per Month*	*BRAC Aircraft*
Corrosion Control	1,200	220
AGE	10	2
In-Squadron Maintenance	870	160
Propulsion and Test Cell	1,080	199
Monthly Total	**3,160**	**581**
Annual Total	**37,920**	**6,972**

Construction and maintenance activities associated with the proposed action would require the use of hazardous substances such as petroleum, oil, and lubricants. During construction, use of these substances for fueling and equipment maintenance would have the potential for minor spills and releases. Use of best management practices would reduce this potential to an insignificant level. Asbestos may be encountered as structures are remodeled or demolished to accommodate new support facilities. It is current Air Force practice to remove exposed friable asbestos and manage other asbestos-containing materials in place, depending on the potential threat to human health. Friable asbestos, if encountered would be removed by licensed contractors and disposed of in a local asbestos-permitted landfill.

Uncontaminated construction debris from facility construction projects would either be transported to the Nellis AFB landfill or off-site to the Apex landfill.

One of the nine active ERP sites (SS-28) would be impacted by the proposed construction of a new AMU/Hangar in FY08 (Figure 3.8-1). Site SS-28 is a historic fuel spill area and remedial action operations are underway for extraction of product/ground water and long term monitoring to ensure CERCLA compliance. ACC has provided an ERP construction waiver required for this proposed facility (Appendix E). The remediation effort for Site SS-28 is such that all remediation activities are subsurface. The primary remedial activity for this site is using soil-vapor extraction to remove volatile contaminates from the site. Standard design and construction techniques would be employed, such as using clean fill and vapor barriers, minimizing the potential for fumes to permeate into the facility. Project designers and engineers would work with the environmental flight to assure proper engineering controls are in place. The proposed construction would occur on this site and construction activities and operational facilities would provide accommodation for the remedial actions to continue.

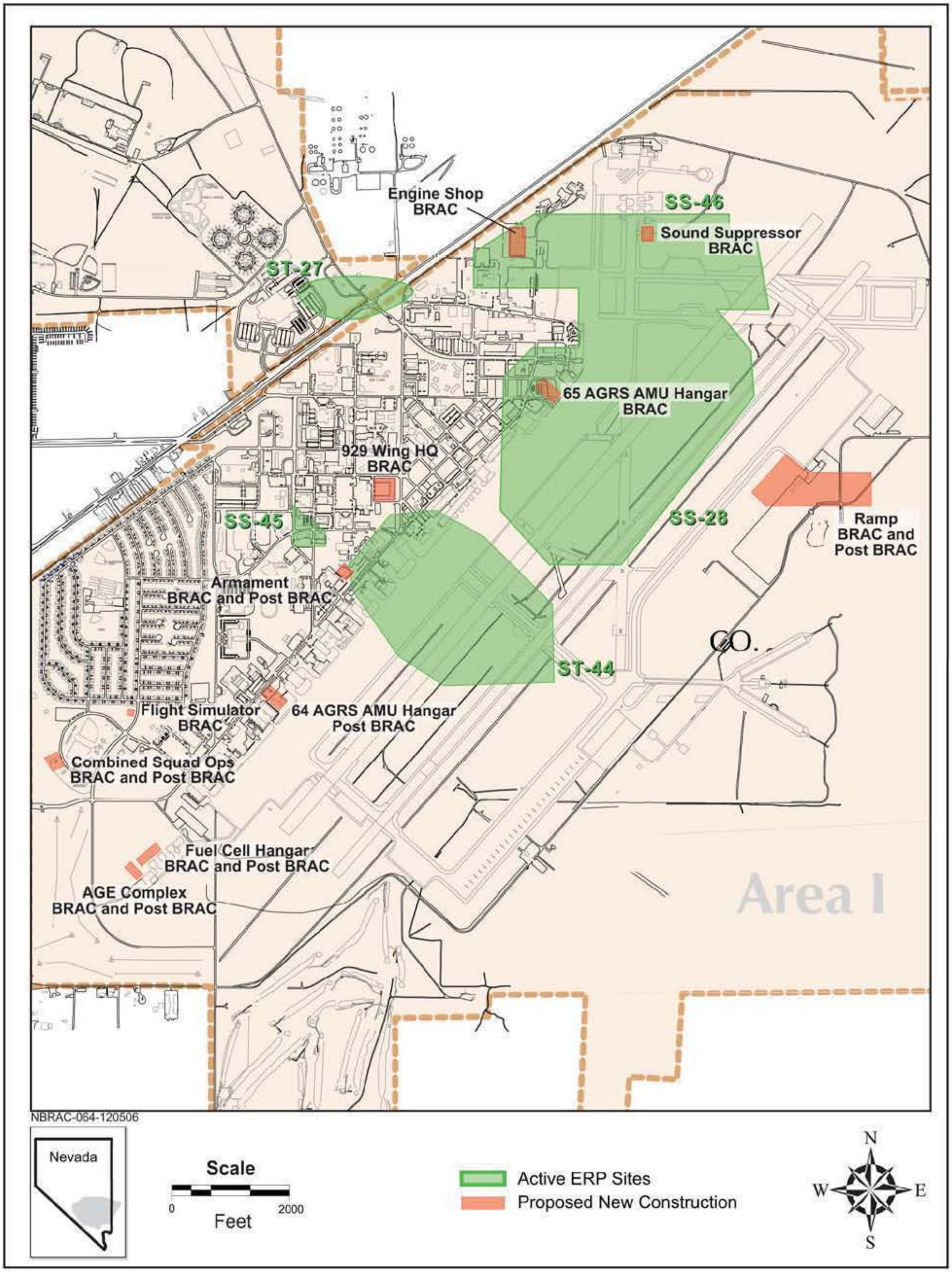


Figure 3.8-1. Active ERP Sites and Proposed Construction

Figure 3.8-1 also shows the engine shop, sound suppressor, and armament sites intersect ERP sites. The ERP sites shown depict the ground water plumes and lie 40 to 60 feet below the ground surface. Construction and operation of these facilities would not extend below the surface and not impact the ERP site or any remedial actions for those sites; and therefore, no ERP waivers would be required. No locations for BRAC proposed construction would overlap with ERP sites identified as needing No Further Action (NFA) (Figure 3.8-2).

Post-BRAC Alternative

All aspects for the handling and use of hazardous materials and the disposition of hazardous waste would be consistent with those described under the proposed action. No new waste streams would be created and hazardous materials would not change at the base. The amount of hazardous waste generated would increase as shown on Table 3.8-3. The annual total hazardous waste generated would amount to 9,420 pounds, or a 25 percent increase over the baseline maintenance wastes and 8 percent increase over the total hazardous wastes generated by Nellis AFB. Since Nellis AFB is already a large-quantity generator, this increase would not alter the base's generator status and the current waste operations would have the capability of processing the additional waste.

Table 3.8-3. BRAC and Post-BRAC Aircraft Related Hazardous Waste by Maintenance Activity

Activity	Baseline - Pounds of Waste per Month	BRAC and Post-BRAC Aircraft
Corrosion Control	1,200	298
AGE	10	3
In-Squadron Maintenance	870	216
Propulsion and Test Cell	1,080	268
Monthly Total	**3,160**	**785**
Annual Total	**37,920**	**9,420**

Aircraft hangers currently use and would continue to be equipped with oil-water separators that capture waste petroleum products and solvents, thus preventing discharges of hazardous substances into sanitary or storm sewer systems. Adherence to all requirements for hazardous materials storage and use, as well as temporary storage of hazardous wastes, would be monitored under the Air Force's Environmental Safety and Occupational Health Compliance Assessment Management Program. Personnel that may come in contact with these materials would receive specialized training for handling and disposal of wastes.

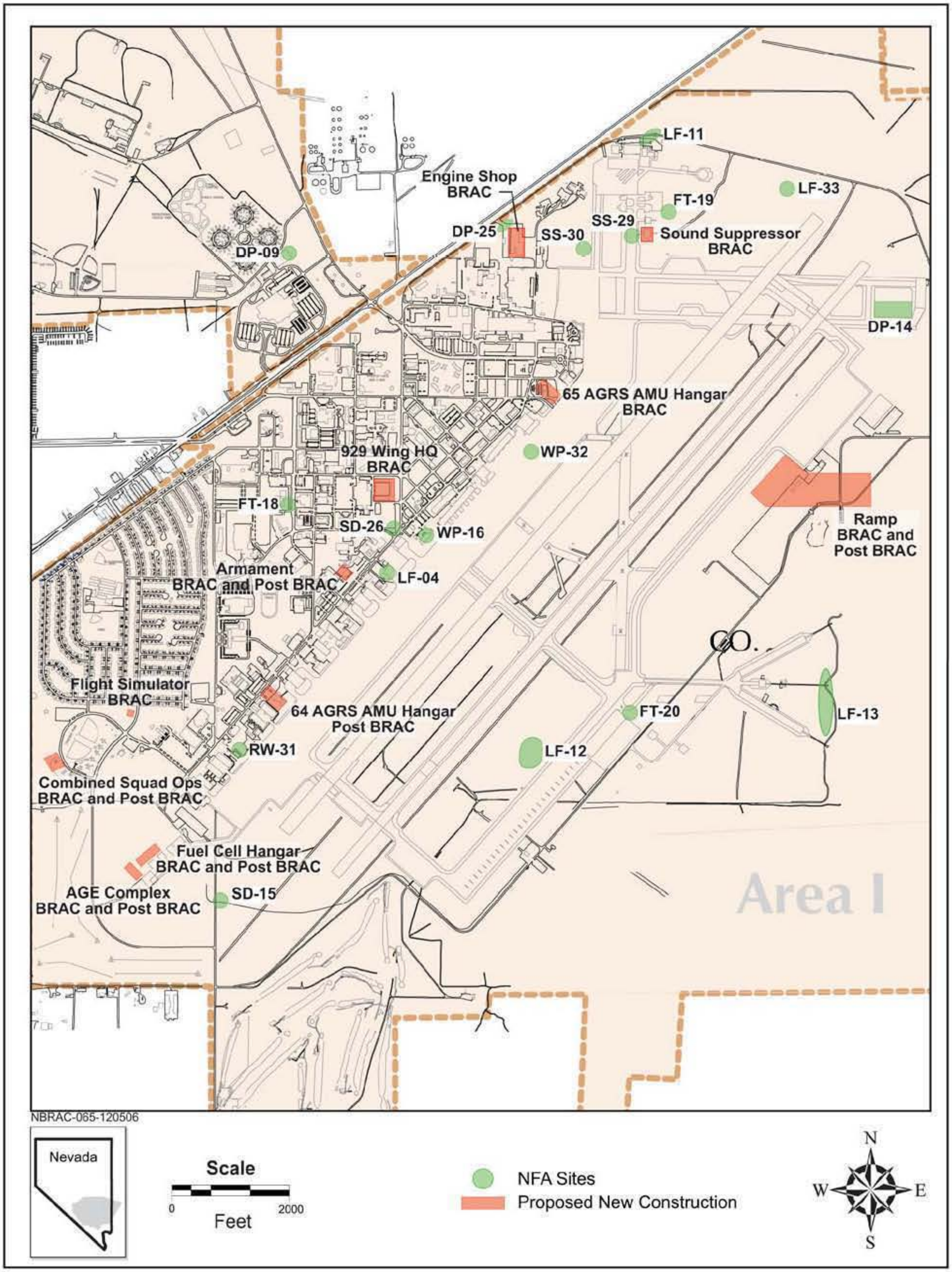


Figure 3.8-2. NFA ERP Sites and Proposed Construction

Construction and maintenance activities associated with the post-BRAC alternative would require the use of hazardous substances such as petroleum, oil, and lubricants. During construction, use of these substances for fueling and equipment maintenance would have the potential for minor spills and releases. Use of best management practices would reduce this potential to a minimal level. Asbestos may be encountered as structures are remodeled or demolished to accommodate new support facilities. It is current Air Force practice to remove exposed friable asbestos and manage other asbestos-containing materials in place, depending on the potential threat to human health. Friable asbestos, if encountered would be removed by licensed contractors and disposed of in a local asbestos-permitted landfill. Uncontaminated construction debris from facility construction projects would either be transported to the Nellis AFB landfill or off-site to the Apex landfill. No specific post-BRAC proposed construction sites would overlap ERP NFA sites. However, the BRAC realignment construction subsumed under this alternative would affect ERP sites as described above. These effects would not impede remediation or cause health and safety issues for workers.

No-Action Alternative

Under no-action alternative, Nellis AFB personnel would continue to use hazardous materials in the same manner and quantity as present. The types and amounts of hazardous waste generated would continue without change under this alternative. Existing procedures for the centralized management, procurement, handling, storage, issuing, and disposal of hazardous materials used on base would remain unchanged.

The no-action alternative includes no specific plans to alter or demolish asbestos-containing buildings. Normal modifications and repairs to such buildings would likely occur as at present. Any asbestos-containing materials encountered during these efforts would be handled under existing rules to reduce exposure to, and release of, friable asbestos.

CHAPTER 4

CUMULATIVE EFFECTS, IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

4.0 CUMULATIVE EFFECTS AND IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

4.1 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). 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 other projects that coincide with the location and timetable of the proposed action and other actions. Cumulative effects analysis 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 concurrently or in a similar location. Actions overlapping with or in close proximity to the proposed action would be expected to have more potential for a relationship than those more geographically separated. Actions that coincide, even partially, in time would tend to offer a higher potential for cumulative effects.

To identify cumulative effects the analysis needs to address three fundamental 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, then does an assessment reveal any potentially significant impacts not identified when the proposed action is considered alone?

4.1.1 Scope of Cumulative Effects Analysis

The scope of the cumulative effects analysis involves both the geographic extent of the effects and the time frame in which the effects could be expected to occur. For this EA, the affected area defines the geographic extent of the cumulative effects analysis. This area includes Nellis AFB and its vicinity, including Las Vegas and its associated airspace. It also includes NTTR. Examination of other actions not occurring within or adjacent to this affected area reveals that they lack the necessary interactions to result in cumulative effects.

Past actions within the two affected areas relate predominantly to activities on and use of Nellis AFB. Under the no-action alternative, the current environmental conditions of the affected area underwent analysis in this EA. Since those conditions represent the result of long-term use occurring at Nellis AFB, analysis of the no-action alternative has considered those past and present effects engendered by the operation and use of the base. Previous analyses addressing the affected area include *Wing Infrastructure Development Outlook (WINDO) EA* (Air Force 2006) and *F-22 FDE and WS Beddown at Nellis AFB, Nevada EIS* (Air Force 1999c).

Another factor influencing the scope of cumulative effects analysis involves identification and consideration of other actions. Beyond determining that the geographic scope and time frame for the actions interrelate with the proposed action, the analysis employs the measure of "reasonably foreseeable" to include or exclude other actions. For the purposes of this analysis, public documents prepared by federal, state, and local government agencies form the primary sources of information regarding reasonably foreseeable actions. Documents used to define other actions included notices of intent for EISs and EAs, management plans, land use plans, other NEPA studies, and economic and demographic projections.

4.1.2 Cumulative Effects of Reasonably Foreseeable Actions

Actions potentially relating to the cumulative effects for the BRAC realignment of Nellis AFB could include those of the DoD, Department of Energy, Department of the Interior, and local counties. The following outlines these actions and assesses their relationship to the proposed action and alternative.

DoD Actions

Nellis 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. Mission and training requirements have resulted in facility construction and upgrades on Nellis AFB.

By far the largest reasonably foreseeable action is the proposed beddown of the F-35 aircraft for Nellis AFB. This action would include 36 new aircraft and numerous facilities. An EIS is underway for this action and a Draft EIS should be available for public review in early 2007. Where available and applicable to the proposed action and post-BRAC action of this document, cumulative impacts are presented here. The F-35 action is clearly larger than this proposal and environmental impacts resulting from that action would dominate all other actions relative to Nellis AFB.

The Air Force proposes to implement a full program of infrastructure improvements for 2005 and 2006 (Air Force 2006). The proposed action consists of implementing 631 WINDO projects at Nellis AFB, NTTR and associated facilities, Creech AFB, and Tonapah Test Range. These projects include repair, maintenance, installation, renovation, construction, and demolition. The Air Force has determined the WINDO projects are necessary for Nellis AFB to achieve its myriad test, training, and evaluation missions, both now and in the future.

By taking this comprehensive approach to planning and implementing the infrastructure improvements over 2005 and 2006, Nellis AFB would ensure that these goals are not only achieved, but also maximized. The Air Force plans to revisit the WINDO EIAP after 2008 to make adjustments to the planning process based on any changes in mission requirements or identified gaps in capabilities. These will be evaluated under EIAP and addressed at that time.

Most (554) of the WINDO projects consist of minor improvements, repairs, and maintenance projects that represent routine activities as classified under 32 CFR Part 989, Air Force EIAP, and result in negligible effects to the environment. However, 77 proposed projects would involve new construction, expansion, or demolition of facilities and infrastructure. Nellis AFB would support most (45) of these projects, ranging from construction of a shoppette to construction of a rappel tower. All of these proposed projects would occur within functionally compatible areas on the base. Given their functional relationships with existing facilities, Nellis AFB would likely site these projects on previously used and disturbed ground, avoiding sensitive locations such as cultural resources, important habitat, and environmental restoration program sites.

The WINDO EA describes numerous facility and infrastructure repairs and maintenance activities, but also describes some new construction. Nellis AFB is currently updating their General Plan which will include Area Development Plans. These plans take the next step by further defining the projects by subsuming many of the WINDO construction projects and placing like activities clustered together. The Area Development Plans under preparation include a Main Base Town Center, Unaccompanied Housing, Main Flightline, Eastside Flightline, Freedom Park, Area III Town Center and a Creech AFB Area Development Plan. An Environmental Assessment is currently being prepared to analyze the impacts of these general planning documents and is expected to be issued for public comment in the spring of 2007.

DOE Actions

In 2002, DOE completed an EIS for the Yucca Mountain repository located in Nye County. President Bush considered the Yucca Mountain site qualified for application to the Nuclear Regulatory Commission (NRC) for construction authorization and recommended the site to Congress. Subsequently, on July 23, 2002, the President signed into law (Public Law 107-200), a joint resolution of the House of Representatives and the Senate designating the Yucca Mountain site for development as a geologic repository for disposal of spent nuclear fuel and high-level radioactive waste. The DOE is preparing a license application for submission to the NRC. DOE has announced that, subject to NRC issuance of a construction authorization, construction could be completed and operations could commence by 2017. In its EIS, DOE evaluated the likelihood of an accidental crash of aircraft (military and commercial) into the surface aging facility (an above-ground storage area). DOE is updating these evaluations for the license application and will continue to coordinate with the AF regarding these evaluations.

Although these DOE actions occur on lands underlying DOE restricted airspace (R-4808N) jointly used by aircraft operating in the NTTR, they do not impact the proposed BRAC use of that airspace. Decisions concerning the NTS and Yucca Mountain would not influence decisions regarding the BRAC realignment. Furthermore, use of the overlying airspace by Air Force aircraft would not contribute to the impacts of the activities at the NTS or Yucca Mountain. For these reasons, the DOE activities lack a demonstrable interaction with the proposed action and alternatives and do not warrant inclusion in the cumulative impacts analysis.

The DOE will continue to gather information about aircraft operations at NTTR and will also continue to communicate with AF officials regarding these activities.

Department of Interior Actions

BLM

The BLM manages millions of acres of public lands in southern Nevada which include portions of NTTR and areas near Nellis AFB. Management of the multiple-use public lands requires continued updating and changes to area resource management plans to maintain land use flexibility while protecting sensitive species. The proposed action and alternatives would be a continuation of aircraft activity within NTTR and would not affect BLM lands adjacent to the base. Therefore, there are no cumulative impacts.

USFWS

Aircraft operate within the DNWR in accordance with a Letter of Agreement between the Air Force and the USFWS. Realignment of the F-15 and F-16s at Nellis AFB and their use of NTTR would not change the amount or nature of overflights of the DNWR. Therefore, there are no cumulative impacts.

Local Actions

While not involving specific actions, planning and anticipated growth in local cities as well as Clark, Nye, and Lincoln counties in Nevada represent factors worthy of consideration for cumulative effects when combined with the proposed action and alternatives. Nellis AFB, Las Vegas, and a portion of NTTR lie within Clark County, whereas Nye and Lincoln counties encompass the majority of NTTR.

Census data and other information indicate that Clark County exhibited the greatest growth in population within the United States over the last 15 years. From 1990 through 2000, the population increased approximately 86 percent. Estimates for 2005 place the county population at 1.69 million people representing a 128 percent increase since 1990. This amount exceeds that anticipated in the Regional Transportation Plan for Clark County (Regional Transportation Commission 1994), which anticipated that Clark County's population would increase to approximately 1.2 to 1.4 million persons by 2005. The growth and economic development of the Las Vegas and Clark County areas far overshadow the influence of Nellis AFB. As such, the minimal effects on local socioeconomic conditions from the BRAC and post-BRAC actions would not be perceptible given the context.

4.1.3 Assessment of Cumulative Effects by Resource Area

Analysis of the proposed action resulted in a finding of no direct or indirect effects on socioeconomics and infrastructure; cultural resources; and hazardous materials and waste. Therefore, these resources will not be discussed further in this section. This analysis of the proposed action and post-BRAC alternative indicated that cumulative effects of other actions could interact with potential direct or indirect effect on noise, air quality, water and soil resources, and biological resources. The following analyzes these resources further.

Noise

No change in noise would result from the proposed action. As such, it could not combine with any other action to produce cumulative effects. The 1,400 sorties that would be generated by the post-BRAC alternative represent approximately 3 percent of the number of sorties at Nellis AFB. Such a small increase would not alter noise conditions, representing less change than produced by year-to-year variation in use or through addition of another exercise. A doubling of total annual sorties (i.e., from 43,000 to 86,000) would be required to generate a perceptible change in noise levels. In contrast, the proposed F-35 Force Development Evaluation/Weapons School Beddown would increase the number of sorties by over five times this many, resulting in about a 20 percent increase in total sorties. The increase of noise would be overwhelmingly dominated by the F-35 action. Preliminary analysis of noise generated by F-35 operations indicates that areas affected by 65 DNL to greater than 85 DNL would not change significantly. No location would experience a 3 dB increase in noise. Since the post-BRAC alternative would not produce a perceptible change in noise levels, it would not be additive to the noise from the F-35 beddown.

Air Quality

Cumulative impacts from multiple actions occurring simultaneously on the installation include emissions from both construction and airfield operations due to overlap of the BRAC action and post-BRAC alternative with the F-35 Force Development Evaluation and Weapons School Beddown (F-35 Beddown). The F-35 beddown action is a large multi-year project involving both construction and aircraft-related emissions during the course of the action, beginning in FY07. Specifically, the years FY07 through FY11 constitute the primary overlap period with construction, operations, and commuting. Table 4-1 presents the cumulative criteria pollutant emissions, by year.

While the maximum operational emission for the F-35 would occur in FY22, determining the nature of and activities by the aggressor program would be speculative, especially since the F-35 is slated to replace the F-16 and the F-22A would replace F-15Cs.

Table 4-1. Cumulative Projected Pollutant Emissions – Nellis AFB BRAC Realignment, Post-BRAC, and F-35 Beddown (tons/year)

Action	***Fiscal Year***	***CO***	***NO_x***	***SO_2***	***VOC***	***PM_{10}***
BRAC+	FY07	44.95	8.55	12.77	45.90	32.34
F-35		1.10	0.96	0.10	0.18	2.29
Total		**46.05**	**9.51**	**12.87**	**46.08**	**34.63**
BRAC+	FY08	43.35	6.15	12.57	45.60	6.14
F-35		1.18	1.41	0.16	0.26	2.18
Total		**44.53**	**7.56**	**12.73**	**45.86**	**8.32**
BRAC+	FY09	44.75	9.15	12.87	45.90	16.44
F-35		3.07	4.37	0.49	0.55	16.08
Total		**47.82**	**13.52**	**13.36**	**46.45**	**32.52**
BRAC+	FY10	48.18	6.45	12.51	46.01	5.38
F-35		3.61	4.04	0.45	0.59	14.23
Total		**51.79**	**10.49**	**12.96**	**46.60**	**19.61**
BRAC+	FY11	63.56	15.54	13.39	48.01	30.36
F-35		1.69	1.64	0.18	0.36	9.55
Total		**65.25**	**17.18**	**13.57**	**48.37**	**39.91**
	De minimus Threshold	100	100	NA	50	70
	Maximum Percent *de minimus*	65%	17%	NA	97%	57%
	Maximum Percent Regional Contribution	0.01%	0.03%	0.02%	0.10%	0.06%
	Clark County (Regional) Baseline	487,741	65,574	82,956	47,273	69,899

Cumulative impacts from both projects would not exceed *de minimis* thresholds for any of the overlapping years. Emissions of criteria pollutants for all of the overlapping years would not reach the regionally significant level of 10 percent of the regional emission inventory. None would exceed a 0.2 percent contribution. In conclusion, the combination of actions would not result in significant impacts to air quality.

Potential WINDO and General Plan construction projects would add to emissions from the base. However, the timing and scope of the projects outlined under these actions are not fixed, and may or may not overlap with the BRAC realignment or post-BRAC alternative. Furthermore, the WINDO and General Plan construction projects may not even occur. If the timing is such that projects of sufficient scope and duration do overlap, the possibility exists for cumulative emissions to exceed *de minimus*, particularly for PM_{10}. Should that potential arise, Nellis AFB would conduct a conformity determination.

Water and Soil Resources

Construction of new facilities under both the F-35 beddown and the BRAC realignment poses the largest potential for impact on soils, including soil loss and erosion. Several factors indicate that erosion and soil loss would be negligible. Precipitation in the Nellis AFB/Las Vegas area is low, most construction would occur on previously developed land, and the Air Force and Clark County require employment of standard construction practices. Overall, the proposed action combined with the other planned construction would not result in potential incremental impacts from ongoing activities and no cumulative adverse impacts to soils. Combined construction activities and population growth of Nellis AFB are expected to have no appreciable cumulative effects on the water resources at Nellis AFB. Construction activities would be temporary and water use limited to less than 1 percent of the base’s daily allotment. Nellis AFB is currently allotted about 7.1 million gpd of combined surface and groundwater sources, and full implementation of the proposed action and other beddowns in 2011 would result in use of approximately 355,180 gpd to 446,419 gpd, which is well within Nellis AFB’s water allocation. Since this water use is well below the allocation, it is unlikely that the cumulative effects of the proposed action would have significant adverse effect on water resources at Nellis AFB and in the surrounding area.

Biological Resources

An aspect of this BRAC realignment proposal and the F-35 beddown proposal common to both actions would be an increase of the ramp on the east side of the Nellis AFB airfield. The BRAC action would increase the size of the east ramp by 375,000 square feet and the F-35 expansion would be similar in size. They would connect with one another, extending outward. The eastern corner of the ramp could intersect a portion of an ephemeral wash, and water runoff from the ephemeral wash could potentially intersect with the Las Vegas Wash. The Las Vegas Wash represents a water of the U.S., therefore, a Section 404 permit in accordance with the CWA may be required. Despite the requirement for a permit, the combined actions would not result in a significant cumulative impact.

4.2 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

NEPA requires 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 this use could 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 disturbance of a cultural resource).

For the proposed action or the post-BRAC alternative, most resource commitments are neither irreversible nor irretrievable. Most impacts are short-term and temporary, or longer lasting but negligible. Those limited resources that may involve a possible irreversible or irretrievable commitment under the proposed action are discussed below.

Facilities construction and maintenance for support activities would require consumption of limited quantities of aggregate, steel, concrete, petroleum, oil, and lubricants. Construction would occur on previously disturbed areas, so no irreversible loss of habitat and wildlife would result. No eligible or National Register properties are in the Area of Potential effect. Similarly, construction on base would avoid significant cultural resources. Any discoveries of cultural resources during construction or infrastructure upgrades, would evoke an investigation and evaluation according to procedures in 36 CFR Part 60 and the Nellis AFB Cultural Resources Management Plan to ensure preservation of the resources. While construction of new facilities on the base would incur some soil disturbance and loss, measures to localize and minimize soil loss would be implemented. The Air Force would continue to comply with all requirements of the USFWS 1992 Biological Opinion and subsequent modifications to minimize desert tortoise mortality, harassment, or habitat destruction on Nellis AFB.

Personal vehicle use by the staff proposed to support the BRAC and post-BRAC activities would consume fuel, oil, and lubricants. The amount of these materials used would not likely exceed that currently used by these same individuals and their families. The proposed action would not increase consumption of these resources. Use of ordnance would cause negligible ground disturbance, soil exposure, and erosion. Areas affected by use of ordnance consist of existing targets, so new disturbance would be unlikely.

CHAPTER 5

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5.0 REFERENCES CITED

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CHAPTER 6

PERSONS AND AGENCIES CONTACTED

6.0 PERSONS AND AGENCIES CONTACTED

Atkinson Gates, Yvonne. Clark County Board of Commissioners. Las Vegas, Nevada. 2006.

Austin, Jay. ACC/A7ZP. Langley AFB, Virginia. 2006.

Bass, Thomas, Captain. 57 WG/SEF, BASH Program POC. Nellis AFB, Nevada. 2005.

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Creasy, Del. ACC/A5B. Langley AFB, Virginia. 2006.

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Kotanchik, Paul. 99 CES/CEVC (Lead Based Paint, Asbestos). Nellis AFB, Nevada. 2006.

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Patterson, Brian, Major. 64 AGRS/ADO. Nellis AFB, Nevada. 2006.

Porterfield, Mark. 99 CEV/CEVP (Hazardous Materials and Waste). Nellis AFB, Nevada. 2006.

Reilly, Thom. Clark County Manager. Las Vegas, Nevada. 2006.

Rodriquez, Fernando. 99 CES/CEVP. Nellis AFB, Nevada. 2006

Roe, John. 99 CES/CEVC (Water, Solid Waste). Nellis AFB, Nevada. 2006.

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Turner, Bob. 99 CEV/CEVN (Wildlife and Wildlife Habitat). Nellis AFB, Nevada. 2005.

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Wenker, Ron. BLM State Office. Reno, Nevada. 2006.

Williams, Robert. USFWS Nevada Ecological Field Office. Reno, Nevada. 2006.

CHAPTER 7

LIST OF PREPARERS AND CONTRIBUTORS

7.0 LIST OF PREPARERS AND CONTRIBUTORS

James Campe, *Project Manager*
B.S., Naval Architecture and Offshore Engineering, University of California, 1986
Years of Experience: 18

Christina Cummings, *Production Coordinator*
A.A.S., Administrative Office Technology, Boise State University, 1999
Years of Experience: 7

Cathy Doan, *Land Use and Visual Resources, Soils and Water, Airspace Management and Safety*
B.S., English, Central Michigan University, 1980
M.A., Human Resources Development, Webster University, 1985
Years of Experience: 11

Lesley Hamilton, *Air Quality*
B.A., Chemistry, Mary Baldwin College, 1988
Years of Experience: 17

Chareé Hoffman, *Socioeconomics, Environmental Justice, Biological Resources, Hazardous Waste*
B.S., Biology, Christopher Newport University, 1999
Years of Experience: 8

Edie Mertz, *Graphics*
A.A. General Education, Cerro Coso College, CA, 1994
Years of Experience: 13

Kevin J. Peter, *Program Manager*
B.A., Anthropology, Pomona College, CA, 1975
M.A., Anthropology, Washington State University, 1986
Years of Experience: 29

Kathy L. Rose, *Air Quality*
B.A., Political Science/German, University of Massachusetts/Amherst, 1980
M.A., International Relations, George Washington University, 1983
M.S., Forest Resource Management, University of Idaho, 1996
Years of Experience: 12

Teresa Rudolph, *Cultural Resources, QA/QC*
B.A., Anthropology, Florida State University, 1975
M.A., Anthropology, Southern Illinois University, 1981
Years of Experience: 27

APPENDIX A

INTERAGENCY AND INTERGOVERNMENTAL COORDINATION FOR ENVIRONMENTAL PLANNING, PUBLIC NOTIFICATION, AND COMMENTS ON THE DRAFT EA

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR COMBAT COMMAND
LANGLEY AIR FORCE BASE, VIRGINIA

NOV 20 2006

MEMORANDUM FOR Clark County Board of Commissioners
P.O. Box 551601
Las Vegas, NV 89155
Attn: Mr. Tom Collins, Commissioner

FROM: HQ ACC/A7ZP
129 Andrews St., Suite 102
Langley AFB, VA 23665-2769

SUBJECT: Proposed Base Realignment and Closure Actions at Nellis Air Force Base (AFB), NV

1. The United States Air Force is preparing an Environmental Assessment (EA) to assess the potential environmental impacts of a proposal to realign 18 F-15C and 5 F-16 aircraft in accordance with the 2005 Base Realignment and Closure (BRAC) Commission directives. The proposed action would permanently beddown 18 F-15C and 5 F-16 aircraft within the existing 65^{th} and 64^{th} Aggressor Squadrons, add 464 personnel and 60 part-time Reservists, and construct 11 new facilities. The Air Force will also analyze an alternative to the proposed action. Under the post-BRAC alternative, the Air Force would add 8 F-16 aircraft, 45 personnel, and construct 7 new facilities in addition to those actions defined under the proposed action. All construction activity would occur within the boundaries of Nellis AFB.

2. The EA will be prepared to evaluate potential environmental impacts resulting from implementation of the proposed action and alternative while examining the potential for cumulative impacts when combined with past, present, and any future proposals. In support of this process, we request your input in identifying general or specific issues or areas of concern you feel should be included in the environmental analysis.

3. Please forward any identified issues or concerns to our project manager, Ms. Sheryl Parker, at the above address. If you have any specific questions relative to the proposal, you may contact Ms. Parker at (757) 764-9334. We cordially request comments or concerns be sent by December 22, 2006; however, we will consider comments received at any time during the environmental impact analysis process to the extent possible.

Mark J. Shoviak

MARK J. SHOVIAK, Major, USAF
Acting Chief, Integrated Planning Branch (A7ZP)

IICEP Letter
Distribution List

The preceding letter was also sent to:

Clark County Board of Commissioners
P.O. Box 551601
Las Vegas, NV 89115
Attn: Ms. Lynnette Boggs McDonald, Commissioner

Clark County Board of Commissioners
P.O. Box 551601
Las Vegas, NV 89115
Attn: Mr. Rory Reid, Commissioner

Clark County Board of Commissioners
P.O. Box 551601
Las Vegas, NV 89115
Attn: Ms. Yvonne Atkinson Gates, Commissioner

Clark County Board of Commissioners
P.O. Box 551601
Las Vegas, NV 89115
Attn: Ms. Myrna Williams, Commissioner

Clark County Board of Commissioners
P.O. Box 551601
Las Vegas, NV 89115
Attn: Mr. Chip Maxfield, Commissioner

Clark County Board of Commissioners
P.O. Box 551601
Las Vegas, NV 89115
Attn: Mr. Bruce Woodbury, Commissioner

Nye County Board of Commissioners
P.O. Box 1729
Tonopah, NV 89049
Attn: Ms. Joni Eastley, Commissioner
Vice-Chair

Nye County Board of Commissioners
1510 E. Basin
Pahrump, NV 89060
Attn: Ms. Candice Trummell, Commissioner
Chairperson

Nye County Board of Commissioners
1510 E. Basin
Pahrump, NV 89060
Attn: Ms. Patricia Cox, Commissioner

Nye County Board of Commissioners
HCR 60, Box 5400
Round Mountain, NV 89045
Attn: Ms. Roberta Carver, Commissioner

Nye County Board of Commissioners
1510 E. Basin
Pahrump, NV 89060
Attn: Mr. Gary Hollis, Commissioner

Mayor of Las Vegas
400 E. Stewart Avenue
Las Vegas, NV 89101
Attn: Honorable Oscar Goodman

City of North Las Vegas
2200 Civic Center Drive
North Las Vegas, NV 89030
Attn: Mr. Gregory Rose, City Manager

City of Las Vegas
400 E. Stewart Avenue
Las Vegas, NV 89101
Attn: Mr. Douglas Selby, City Manager

Desert National Wildlife Range
HCR 38, Box 700
Las Vegas, NV 83124
Attn: Ms. Amy Sprunger-Allworth

U.S. Department of the Interior
Office of Environmental Policy and Compliance
Washington, DC 20240
Attn: Mr. Willie Taylor, Director

Desert National Wildlife Refuge Complex Office
4701 N. Torrey Pines Drive
Las Vegas, NV 89103
Attn: Linda Miller, Acting Project Leader

Bureau of Land Management State Office
1340 Financial Boulevard
Reno, NV 89502
Attn: Mr. Ron Wenker, State Director

Bureau of Land Management
Las Vegas Field Office
4701 N. Torrey Pines Drive
Las Vegas, NV 89103
Attn: Mr. Juan Palma, Office Manager

Nevada State Clearinghouse
Dept. of Administration
209 E. Musser Street, Room 200
Carson City, NV 89701
Attn: Gosia Sylwestrzak or Reese Tietje

Clark County Government Building
500 S. Grand Central Pkwy, 6th Floor
Las Vegas, NV 89155
Attn: Mr. Thom Reilly, Clark County Manager

City Hall
Mayor of North Las Vegas
2200 Civic Center Drive
North Las Vegas, NV 89030
Attn: Honorable Michael Montandon

Indian Springs Town Advisory Board
P.O. Box 12
Indian Springs, NV 89018

Honorable Shelley Berkley
U.S. Congresswoman, District 1
2340 Paseo Del Prado, Suite D 106
Las Vegas, NV 89102

Honorable Jim Gibbons
U.S. Congressman, District 2
600 Las Vegas Blvd.
Las Vegas, NV 89101

Honorable Harry Reid
U.S. Senate
333 Las Vegas Blvd. South, Suite 8016
Las Vegas, NV 89101

Honorable John Ensing
U.S. Senate
333 Las Vegas Blvd. South, Suite 8203
Las Vegas, NV 89101

Honorable Jon Porter
U.S. Congress
2501 North Green Valley Pkwy., Suite 112D
Henderson, NV 89014

Honorable Kenny Guinn
Governor's Office
555 East Washington Ave., Suite 5100
Las Vegas, NV 89101

Mayor
Michael L. Montandon

Council Members
William E. Robinson
Stephanie S. Smith
Shari Buck
Robert L. Eliason

City Manager
Gregory E. Rose

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December 19, 2006

Ms. Sheryl Parker,
Project Manager
HQ ACC/A7ZP
129 Andrews St., Suite 102
Langley AFB, WA 23665-2769

Subject: Proposed Realignment and Closure Actions at Nellis Air Force Base (AFB)

Dear Ms. Parker:

The City of North Las Vegas would like to thank the Department of the Air Force for inviting the City to comment on the Proposed Base Realignment and Closure Actions at Nellis AFB, NV. The proposed changes to the federally owned land will effect the endangered plant species Las Vegas Bearpoppy and the sensitive plant species Las Vegas Buckwheat. To offset the "take permit" it is seeking, Nellis AFB may want to consider mitigation efforts to offset the "take" of the aforementioned species. The City would be interested in any mitigation efforts regarding the Las Vegas Bearpoppy and Las Vegas Buckwheat as Nellis AFB is a neighbor to the City.

Currently, there is an Supplemental Environmental Assessment (SEA) for the Proposed Modification to the 4 Corner-Post Plan at McCarran Airport. The City is interested in the cumulative impacts of the proposed flight patterns from McCarran towards Nellis AFB airspace. The SEA cites an airspace-use agreement between Nellis and McCarran that addresses the proposed flight patterns from McCarran. This SEA also discusses air quality and noise impacts to the affected area near Nellis AFB and, consequently, may affect North Las Vegas residents. The City would be interested in any mitigation efforts regarding air quality and noise issues.

The City of North Las Vegas thanks you for this opportunity to comment. If you have any questions or comments regarding the City's input, please contact me or Assistant City Manager Maryann Ustick at 633-1005.

Sincerely,

Gregory E. Rose
City Manager

cc: Maryann Ustick, Assistant City Manager, Development
Dr. Qiong Liu, P.E., P.T.O.E., Acting Director of Public Works
Jory Stewart, Director of Planning and Zoning
Johanna Murphy, Landscape Architect
Jan Schweitzer, Paralegal

NYE COUNTY

Board of County Commissioners
Nye County, Nevada

Tonopah Office
Nye County Courthouse
William P. Beko Justice Facility
PO Box 153
Tonopah, NV 89049
Phone (775) 482-8191
Fax (775) 482-8198

December 19, 2006

HQ ACC/A7ZP
Attn: Ms Sheryl Parker
129 Andrews St., Suite 102
Langley AFB, VA 23665-2769

Subject: Nye County Scoping Comments for General and Specific Issues to be Addressed in the Environmental Assessment on the *Proposed Base Realignment and Closure Actions at Nellis Air Force Base (AFB)*: reference letter from Major Mark Shoviak, USAF, dated November 20, 2006

Dear Ms. Parker:

Nye County appreciates the opportunity to submit comments for inclusion in the Environmental Assessment (EA) for the proposed action. Nye County is host to the vast majority of the land and airspace withdrawn to support the Nevada Test and Training Range (NTTR) as well as all the land and airspace withdrawn to support the Department of Energy's Nevada Test Site (NTS). Nye County has a long history of supporting Department of Defense (DOD) missions in Nevada and supports both the proposed permanent beddown of additional F-15C and F-16 aircraft and the alternative to the proposed action. However, as a general issue, Nye County asks that the beddown of these aircraft, associated personnel and facilities be in Nye County. Nye County, specifically Town of Tonopah, Nevada, would be a supportive host of the aircraft, facilities, and personnel at the Tonopah Test Range (TTR) Airfield. Therefore, Nye County asks that an additional alternative or sub-alternatives be evaluated in the EA. The description of the new alternative or sub-alternatives would be the same as the proposed action and alternative described in the letter dated November 20, 2006, except the permanent location for the aircraft, facilities, and personnel would be the TTR.

Nye County asks that the EA address and compare the pros and cons of basing the aircraft at the TTR as opposed to Nellis AFB. For each alternative, the EA should specifically address the operational considerations of the action on flight operations and congestion at Nellis, potential benefits and difficulties for DOD operations within Nevada airspace, and the socioeconomic impacts to the Nellis AFB and TTR areas.

By its own admission, Nellis acknowledges that *"The Air Force's ability to perform its mission within the Las Vegas Valley is being endangered by the ever-increasing pressure of urban encroachment. Any development that threatens or has the potential to threaten accomplishing current and forecasted Air Force mission requirements at Nellis Air Force Base (NAFB), Creech Air Force Base (CAFB) and/or the Nevada Test and Training Range (NTTR)* ***is not compatible with the Air Force mission.***" (emphasis added).

Nye County asks that the Air Force address this alternative beddown location in light of its long term ability to sustain unhindered flight operations into and out of the Las Vegas Valley, when facilities and less congested airspace, free of encroachment issues, exist within the NTTR at the TTR airfield.

Again, Nye County thanks you for the opportunity to provide input on this important action proposal.

Sincerely,

Gary Hollis, Chairman
Nye County Board of Commissioners

CC: Nye County Board of County Commissioners
Nevada's Congressional Delegation
Governor Kenny Guinn
Chairman, Senate Armed Services Committee
Chairman, House Armed Services Committee
Commander, USAF Weapons Center

From: Leilani_Takano@fws.gov [mailto:Leilani_Takano@fws.gov]
Sent: Thursday, January 04, 2007 10:12 AM
To: Parker Sheryl K Civ ACC/A7ZP
Subject: Re: FW: USFWS request for Nellis BRAC proposed construction locations figure

Hi Sheryl,

Because the proposed construction is within areas that are already developed and listed species and/or sensitive species do not occur in these areas, we do not have any concerns and will not be sending formal comments. Thank you for your patience and sending the figure.

Leilani

Department of Comprehensive Planning

500 S Grand Central Pky • Ste 3012 • Box 551741 • Las Vegas NV 89155-1741
(702) 455-4314 • Fax (702) 385-8940

Barbara Ginoulias, Director • Rod Allison, Assistant Director

February 5, 2007

99 ABW/PA (Mike Estrada)
4430 Grissom Avenue
Suite 107
Nellis AFB, NV 89191

Re: Base Realignment and Closure Environmental Assessment for Realignment of Nellis Air Force Base

Dear Mr. Estrada,

Thank you for the opportunity to participate in the Department of the Air Force's review process for this draft environmental assessment.

Clark County's Department of Comprehensive Planning has reviewed the document and has no comment regarding the conclusions. Regarding the document we do have a few comments that are as follows.

First, on page 3-20, the Wastewater Treatment paragraph of the Utilities section states:

> "Nellis AFB discharges approximately 1.5 million gpd of sanitary sewage from the base to the Southern Nevada Water Authority Clark County Sanitation District for treatment."

We don't believe it is correct to cite the Southern Nevada Water Authority (SNWA) here. While the SNWA is a partner agency on some water related efforts we do not believe it is the agency to which wastewater is discharged to for treatment.

Second, the document cites the "Clark County Sanitation District" in a number of places, including the excerpt above. A few years ago this agency formally changed its name to the "Clark County Water Reclamation District."

Lastly, the document uses and cites many population estimates and forecasts using a variety of sources. It does not appear though that many of the locally generated estimates and forecasts for Clark County which are available were consulted or used. These are resources that you may want to consider for use in the future.

Regarding population estimates, once each year the local governments of Clark County work together to generate a consensus population estimate which is submitted to the State of Nevada as required. Regarding population forecasts, Clark County along with the Regional Transportation Commission of Southern Nevada and the Southern Nevada Water Authority has contracted with the Center for Business and Economic Research at the University of Nevada, Las Vegas to generate a forecasted population in annual increments for Clark County out to the year 2035. This population forecast is updated annually.

Population estimate and forecast information, and more, can be found on our department's webpage (http://www.co.clark.nv.us/comprehensive_planning/05/Demographics.htm).

Should you have any questions please feel free to contact me.

Sincerely,

Charles Pulsipher
Planning Manager

CP\JW\dk

JIM GIBBONS
Governor

STATE OF NEVADA

ANDREW K. CLINGER
Director

DEPARTMENT OF ADMINISTRATION
209 E. Musser Street, Room 200
Carson City, Nevada 89701-4298
(775) 684-0222
Fax (775) 684-0260
http://www.budget.state.nv.us/

January 12, 2007

Ms. Sheryl Parker
US Air Force
Air Combat Command
HQ ACC/A7ZP
129 Andrews Street
Suite 102
Langley AFB, VA 23665-2769

Dear Ms. Sheryl Parker:

Attached please find a "No Comment" letter from Nevada State Clearinghouse regarding Base Realignment and Closure Actions at Nellis AFB. We erroneously mailed this letter to Nellis AFB. We apologize for any inconvenience this might have caused you.

Please feel free to contact me, should you have any questions.

Sincerely,

Gosia Sylwestrzak

Gosia Sylwestrzak
Nevada State Clearinghouse Coordinator

JIM GIBBONS
Governor

STATE OF NEVADA

ANDREW K. CLINGER
Director

DEPARTMENT OF ADMINISTRATION
209 E. Musser Street, Room 200
Carson City, Nevada 89701-4298
(775) 684-0222
Fax (775) 684-0260
http://www.budget.state.nv.us/

January 12, 2007

Ms. Sheryl Parker
US Air Force
Air Combat Command
HQ ACC/A7ZP
129 Andrews Street
Suite 102
Langley AFB, VA 23665-2769

Re: SAI NV # **E2007-159** Reference:

Project: **Base Realignment and Closure Actions**

Dear Ms. Sheryl Parker:

The State Clearinghouse has processed the proposal and has no comment. Your proposal is not in conflict with state plans, goals or objectives.

This constitutes the State Clearinghouse review of this proposal as per Executive Order 12372. If you have questions, please contact me at (775) 684-0209.

Sincerely,

Gosia Sylwestrzak
Nevada State Clearinghouse

Enclosure

JIM GIBBONS
Governor

STATE OF NEVADA

ANDREW K. CLINGER
Director

DEPARTMENT OF ADMINISTRATION
209 E. Musser Street, Room 200
Carson City, Nevada 89701-4298
(775) 684-0222
Fax (775) 684-0260
http://www.budget.state.nv.us/

February 9, 2007

Mike Estrada
US Department of Defense
US Air Force
99 ABW/PA
4430 Grissom Avenue, Ste 107
Nellis AFB, NV 89191

Re: SAI NV # **E2007-198** Reference:

Project: **DEA- Base Relignment and Closure for Nellis AFB**

Dear Mike Estrada:

Enclosed are comments from the agencies listed below regarding the above referenced document. Please address these comments or concerns in your final decision.

Division of State Lands

The following agencies support the above referenced document as written:

State Historic Preservation Office

This constitutes the State Clearinghouse review of this proposal as per Executive Order 12372. If you have questions, please contact me at (775) 684-0209.

Sincerely,

for Gosia Sylwestrzak
Nevada State Clearinghouse

Enclosure

2/1

Rebecca Palmer

From: Clearinghouse [clearinghouse@budget.state.nv.us]
Sent: Thursday, January 18, 2007 12:24 PM
To: Rebecca Palmer
Subject: E2007-198 DEA- Base Relignment and Closure for Nellis AFB - 99 ABW/PA

NEVADA STATE CLEARINGHOUSE
Department of Administration, Budget and Planning Division
209 East Musser Street, Room 200, Carson City, Nevada 89701-4298
(775) 684-0209 Fax (775) 684-0260
DATE: January 18, 2007

RECEIVED
JAN 26 2007
DEPARTMENT OF ADMINISTRATION
OFFICE OF THE DIRECTOR
BUDGET AND PLANNING DIVISION

State Historic Preservation Office

Nevada SAI # E2007-198
Project: DEA- Base Relignment and Closure for Nellis AFB

Follow the link below to download an Adobe PDF document concerning the above-mentioned project for your review and comment.

http://budget.state.nv.us/clearinghouse/Notice/2007/E2007-198.pdf

Please evaluate it with respect to its effect on your plans and programs; the importance of its contribution to state and/or local areawide goals and objectives; and its accord with any applicable laws, orders or regulations with which you are familiar.

Please submit your comments no later than Thursday, February 8, 2007.

Use the space below for short comments. If significant comments are provided, please use agency letterhead and include the Nevada SAI number and comment due date for our reference. Questions? Gosia Sylwestrzak, (775) 684-0209 or mailto:clearinghouse@budget.state.nv.us.

____No comment on this project ✓ Proposal supported as written

AGENCY COMMENTS:

Signature: Rebecca L Palmer Date: 1/25/07

Distribution:
Andrew Clinger, Department of Administration Sandy Quilici, Department of Conservation & Natural Resources Stephanie Martensen, Division of Emergency Management Alan Di Stefano, Economic Development Kathy Dow, Economic Development Chad Hastings, Fire Marshal Steve Robinson, Governor's Office Stan Marshall, State Health Division Skip Canfield, AICP, Division of State Lands Michael J. Stewart, Legislative Counsel Bureau John Walker, Division of Environmental Protection Anthony Grossman, Department of Wildlife, Director's Office D. Bradford Hardenbrook, Department of Wildlife, Las Vegas Robert Martinez, Division of Water Resources Lynn Haarklau, Nellis Air Force Base Eloisa Hopper, Nellis Air Force Base Deborah Stockdale, Nellis Air Force Base James D. Morefield, Natural Heritage Program Joseph C. Strolin, Agency for Nuclear Projects Steve Weaver, Division of State Parks Mark Harris, PE, Public Utilities Commission Pete Konesky, State Energy Office Rebecca Palmer, State Historic Preservation Office Alisa Huckle, UNR Library Gosia Sylwestrzak, zzClearinghouse Reese Tietje, zzClearinghouse -Reese Maud Naroll, zzClearinghouse-Maud Gosia Sylwestrzak, zzClearinghouse -Gosia

The Nevada Division of State Lands has no comment on this proposal.

-Skip Canfield, AICP

-----Original Message-----
From: Clearinghouse [mailto:clearinghouse@budget.state.nv.us]
Sent: Thursday, January 18, 2007 12:24 PM
To: Skip Canfield
Subject: E2007-198 DEA- Base Relignment and Closure for Nellis AFB - 99 ABW/PA

NEVADA STATE CLEARINGHOUSE
Department of Administration, Budget and Planning Division
209 East Musser Street, Room 200, Carson City, Nevada 89701-4298
(775) 684-0209 Fax (775) 684-0260
DATE: January 18, 2007

Division of State Lands

Nevada SAI # E2007-198
Project: DEA- Base Relignment and Closure for Nellis AFB

Follow the link below to download an Adobe PDF document concerning the above-mentioned project for your review and comment.

http://budget.state.nv.us/clearinghouse/Notice/2007/E2007-198.pdf

Please evaluate it with respect to its effect on your plans and programs; the importance of its contribution to state and/or local areawide goals and objectives; and its accord with any applicable laws, orders or regulations with which you are familiar.

Please submit your comments no later than Thursday, February 8, 2007.

Use the space below for short comments. If significant comments are provided, please use agency letterhead and include the Nevada SAI number and comment due date for our reference. Questions? Gosia Sylwestrzak, (775) 684-0209 or mailto:clearinghouse@budget.state.nv.us.

____No comment on this project ____Proposal supported as written

AGENCY COMMENTS:

Signature: Date:

Distribution:
Andrew Clinger, Department of Administration Sandy Quilici, Department of Conservation & Natural Resources Stephanie Martensen, Division of Emergency Management Alan Di Stefano, Economic Development Kathy Dow,

Economic Development Chad Hastings, Fire Marshal Steve Robinson, Governor's Office Stan Marshall, State Health Division Skip Canfield, AICP, Division of State Lands Michael J. Stewart, Legislative Counsel Bureau John Walker, Division of Environmental Protection Anthony Grossman, Department of Wildlife, Director's Office D. Bradford Hardenbrook, Department of Wildlife, Las Vegas Robert Martinez, Division of Water Resources Lynn Haarklau, Nellis Air Force Base Eloisa Hopper, Nellis Air Force Base Deborah Stockdale, Nellis Air Force Base James D. Morefield, Natural Heritage Program Joseph C. Strolin, Agency for Nuclear Projects Steve Weaver, Division of State Parks Mark Harris, PE, Public Utilities Commission Pete Konesky, State Energy Office Rebecca Palmer, State Historic Preservation Office Alisa Huckle, UNR Library Gosia Sylwestrzak, zzClearinghouse Reese Tietje, zzClearinghouse -Reese Maud Naroll, zzClearinghouse-Maud Gosia Sylwestrzak, zzClearinghouse -Gosia

APPENDIX B

NOISE

APPENDIX B

NOISE

Noise is generally described as unwanted sound. Unwanted sound can be based on objective effects (hearing loss or damage to structures) or subjective judgments (community annoyance). Noise analysis thus requires a combination of physical measurement of sound, physical and physiological effects, plus psycho- and socio-acoustic effects.

Section 1 of this appendix describes how sound is measured and summarizes noise impact in terms of community acceptability and land use compatibility. Section 2 presents detailed descriptions of the effects of noise that lead to the impact guidelines presented in Section 1. Section 3 provides a description of the specific methods used to predict aircraft noise.

1.0 NOISE DESCRIPTORS AND IMPACT

Aircraft operating in the restricted and MOA airspace generate two types of sound. One is “subsonic” noise, which is continuous sound generated by the aircraft’s engines and also by air flowing over the aircraft itself. The other is sonic booms (only in those airspace units authorized for supersonic activity), which are transient impulsive sounds generated during supersonic flight. These are quantified in different ways.

Section 1.1 describes the quantities which are used to describe sound. Section 1.2 provides the specific noise metrics used for noise impact analysis. Section 1.3 describes how environmental impact and land use compatibility are judged in terms of these quantities.

1.1 Quantifying Sound

Measurement and perception of sound involves two basic physical characteristics: amplitude and frequency. Amplitude is a measure of the strength of the sound and is directly measured in terms of the pressure of a sound wave. Because sound pressure varies in time, various types of pressure averages are usually used. Frequency, commonly perceived as pitch, is the number of times per second the sound causes air molecules to oscillate. Frequency is measured in units of cycles per second, or hertz (Hz).

Amplitude

The loudest sounds the human ear can comfortably hear have acoustic energy one trillion times the acoustic energy of sounds the ear can barely detect. Because of this vast range, attempts to represent sound amplitude by pressure are generally unwieldy. Sound is, therefore, usually represented on a logarithmic scale with a unit called the decibel (dB). Sound on the decibel scale is referred to as a sound level. The threshold of human hearing is approximately 0 dB, and the threshold of discomfort or pain is around 120 dB.

Because of the logarithmic nature of the decibel scale, sounds levels do not add and subtract directly and are somewhat cumbersome to handle mathematically. However, some simple rules of thumb are useful in dealing with sound levels. First, if a sound's intensity is doubled, the sound level increases by 3 dB, regardless of the initial sound level. For example: 60 dB + 60 dB = 63 dB and 80 dB + 80 dB = 83 dB. The total sound level produced by two sounds of different levels is usually only slightly more than the higher of the two. For example: 60.0 dB + 70.0 dB = 70.4 dB.

This addition is often referred to as "decibel addition" or "energy addition" because the addition of sound levels behaves differently than that of ordinary numbers. The latter term (energy addition) arises from the fact that combination of decibel values consists of first converting each decibel value to its corresponding acoustic energy, then adding the energies using the normal rules of addition, and finally converting the total energy back to its decibel equivalent.

The difference in dB between two sounds represents the ratio of the amplitudes of those two sounds. Because human senses tend to be proportional (i.e., detect whether one sound is twice as big as another) rather than absolute (i.e., detect whether one sound is a given number of pressure units bigger than another), the decibel scale correlates well with human response.

Under laboratory conditions, differences in sound level of 1 dB can be detected by the human ear. In the community, the smallest change in average noise level that can be detected is about 3 dB. A change in sound level of about 10 dB is usually perceived by the average person as a doubling (or halving) of the sound's loudness, and this relation holds true for loud sounds and for quieter sounds. A decrease in sound level of 10 dB actually represents a 90 percent decrease in sound *intensity* but only a 50 percent decrease in perceived *loudness* because of the nonlinear response of the human ear (similar to most human senses).

Frequency

The normal human ear can hear frequencies from about 20 Hz to about 20,000 Hz. It is most sensitive to sounds in the 1,000 to 4,000 Hz range. When measuring community response to noise, it is common to adjust the frequency content of the measured sound to correspond to the frequency sensitivity of the human ear. This adjustment is called A-weighting (American National Standards Institute [ANSI] 1988). Sound levels that have been so adjusted are referred to as A-weighted sound levels. The amplitude of A-weighted sound levels is measured in dB. It is common for some noise analysts to denote the unit of A-weighted sounds by dBA or dB(A). As long as the use of A-weighting is understood, there is no difference between dB, dBA or dB(A). It is only important that the use of A-weighting be made clear. In this study, sound levels are reported in dB and are A-weighted unless otherwise specified.

A-weighting is appropriate for continuous sounds, which are perceived by the ear. Impulsive sounds, such as sonic booms, are perceived by more than just the ear. When experienced indoors, there can be secondary noise from rattling of the building. Vibrations may also be felt. C-weighting (ANSI 1988) is applied to such sounds. This is a frequency weighting that is flat over the range of human hearing (about 20 Hz to 20,000 Hz) and rolls off above and below that range. In this study, C-weighted sound levels are used for the assessment of sonic booms. As with A-weighting, the unit is dB, but dBC or dB(C) are sometimes used. In this study, sound levels are reported in dB, and C-weighting is specified as necessary.

Time Averaging

Sound pressure of a continuous sound varies greatly with time, so it is customary to deal with sound levels that represent averages over time. Levels presented as instantaneous (i.e., as might be read from the dial of a sound level meter) are based on averages of sound energy over either 1/8 second (fast) or 1 second (slow). The formal definitions of fast and slow levels are somewhat complex, with details that are important to the makers and users of instrumentation. They may, however, be thought of as levels corresponding to the root-mean-square sound pressure measured over the 1/8-second or 1-second periods.

The most common uses of the fast or slow sound level in environmental analysis is in the discussion of the maximum sound level that occurs from the action, and in discussions of typical sound levels. Figure C-1 is a chart of A-weighted sound levels from typical sounds. Some (air conditioner, vacuum cleaner) are continuous sounds whose levels are constant for some time. Some (automobile, heavy truck) are the maximum sound during a vehicle pass by. Some (urban daytime, urban nighttime) are averages over some extended period. A variety of noise metrics have been developed to describe noise over different time periods. These are described in Section 1.2.

1.2 Noise Metrics

Maximum Sound Level

The highest A-weighted sound level measured during a single event in which the sound level changes value as time goes on (e.g., an aircraft overflight) is called the maximum A-weighted sound level or maximum sound level, for short. It is usually abbreviated by ALM, L_{max}, or L_{Amax}. The maximum sound level is important in judging the interference caused by a noise event with conversation, television, or radio listening, sleeping, or other common activities.

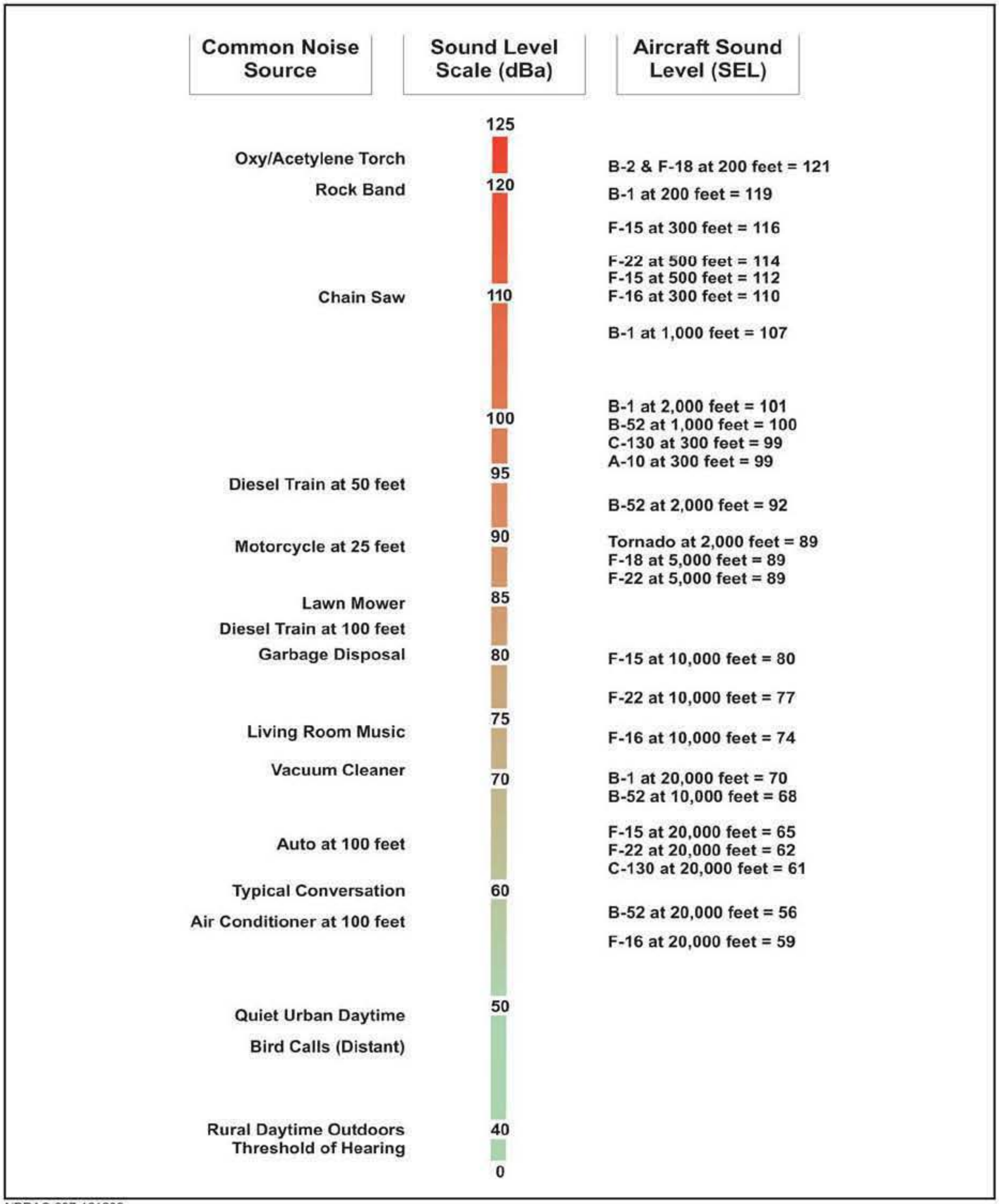

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Figure B-1 Noise Appendix - Sound level Scale

Peak Sound Level

For impulsive sounds, the true instantaneous sound pressure is of interest. For sonic booms, this is the peak pressure of the shock wave, as described in Section 3.2 of this appendix. This pressure is usually presented in physical units of pounds per square foot. Sometimes it is represented on the decibel scale, with symbol L_{pk}. Peak sound levels do not use either A or C weighting.

Sound Exposure Level

Individual time-varying noise events have two main characteristics: a sound level that changes throughout the event and a period of time during which the event is heard. Although the maximum sound level, described above, provides some measure of the intrusiveness of the event, it alone does not completely describe the total event. The period of time during which the sound is heard is also significant. The Sound Exposure Level (abbreviated SEL or L_{AE} for A-weighted sounds) combines both of these characteristics into a single metric.

SEL is a composite metric that represents both the intensity of a sound and its duration. Mathematically, the mean square sound pressure is computed over the duration of the event, then multiplied by the duration in seconds, and the resultant product is turned into a sound level. It does not directly represent the sound level heard at any given time, but rather provides a measure of the net impact of the entire acoustic event. It has been well established in the scientific community that SEL measures this impact much more reliably than just the maximum sound level.

Because the SEL and the maximum sound level are both used to describe single events, there is sometimes confusion between the two, so the specific metric used should be clearly stated.
SEL can be computed for C-weighted levels (appropriate for impulsive sounds), and the results denoted CSEL or LCE. SEL for A-weighted sound is sometimes denoted ASEL. Within this study, SEL is used for A-weighted sounds and CSEL for C-weighted.

Equivalent Sound Level

For longer periods of time, total sound is represented by the equivalent continuous sound pressure level (L_{eq}). L_{eq} is the average sound level over some time period (often an hour or a day, but any explicit time span can be specified), with the averaging being done on the same energy basis as used for SEL. SEL and L_{eq} are closely related, differing by (a) whether they are applied over a specific time period or over an event, and (b) whether the duration of the event is included or divided out.

Just as SEL has proven to be a good measure of the noise impact of a single event, L_{eq} has been established to be a good measure of the impact of a series of events during a given time period. Also, while L_{eq} is defined as an average, it is effectively a sum over that time period and is, thus, a measure of the cumulative impact of noise.

Day-Night Average Sound Level

Noise tends to be more intrusive at night than during the day. This effect is accounted for by applying a 10-dB penalty to events that occur after 10 pm and before 7 am. If L_{eq} is computed over a 24-hour period with this nighttime penalty applied, the result is the day-night average sound level (DNL or L_{dn}). DNL is the community noise metric recommended by the USEPA (USEPA 1972) and has been adopted by most federal agencies (FICON 1992). It has been well established that DNL correlates well with community response to noise (Schultz 1978; Finegold *et al.* 1994). This correlation is presented in Section 1.3 of the appendix.

While DNL carries the nomenclature "average," it incorporates all of the noise at a given location. For this reason, DNL is often referred to as a "cumulative" metric. It accounts for the total, or cumulative, noise impact.

It was noted earlier that, for impulsive sounds, C-weighting is more appropriate than A-weighting. The day-night average sound level can be computed for C-weighted noise and is denoted CDNL or L_{Cdn}. This procedure has been standardized, and impact interpretive criteria similar to those for DNL have been developed (CHABA 1981).

Onset-Adjusted Monthly Day-Night Average Sound Level

Aircraft operations in military airspace, such as restricted areas and MOAs, generate a noise environment somewhat different from other community noise environments. Overflights are sporadic, occurring at random times and varying from day to day and week to week. This situation differs from most community noise environments, in which noise tends to be continuous or patterned. Individual military overflight events also differ from typical community noise events in that noise from a low-altitude, high-airspeed flyover can have a rather sudden onset.

To represent these differences, the conventional DNL metric is adjusted to account for the "surprise" effect of the sudden onset of aircraft noise events on humans (Plotkin *et al.* 1987; Stusnick *et al.* 1992; Stusnick *et al.* 1993). For aircraft exhibiting a rate of increase in sound level (called onset rate) of from 15 to 150 dB per second, an adjustment or penalty ranging from 0 to 11 dB is added to the normal SEL. Onset rates above 150 dB per second require a 11 dB penalty, while onset rates below 15 dB per second require no adjustment. The DNL is then determined in the same manner as for conventional aircraft noise events and is designated as Onset-Rate Adjusted Day-Night Average Sound Level (abbreviated L_{dnmr}).

Because of the irregular occurrences of aircraft operations, the number of average daily operations is determined by using the calendar month with the highest number of operations. The monthly average is denoted L_{dnmr}.

1.3 Noise Impact

Community Reaction

Studies of community annoyance to numerous types of environmental noise show that DNL correlates well with impact. Schultz (1978) showed a consistent relationship between DNL and annoyance. Figure C-2 presents Shultz's original curve fit. This shows that there is a remarkable consistency in results of attitudinal surveys which relate the percentages of groups of people who express various degrees of annoyance when exposed to different DNLs.

A more recent study has reaffirmed this relationship (Fidell *et al.* 1991). Figure C-3 (FICON 1992) shows an updated form of the curve fit (Finegold *et al.* 1994) in comparison with the original. The updated fit, which does not differ substantially from the original, is the current preferred form. In general, correlation coefficients of 0.85 to 0.95 are found between the percentages of groups of people highly annoyed and the level of average noise exposure. The correlation coefficients for the annoyance of individuals are relatively low, however, on the order of 0.5 or less. This is not surprising, considering the varying personal factors that influence the manner in which individuals react to noise. Nevertheless, findings substantiate that community annoyance to aircraft noise is represented quite reliably using DNL.

As noted earlier for SEL, DNL does not represent the sound level heard at any particular time, but rather represents the total sound exposure. DNL accounts for the sound level of individual noise events, the duration of those events, and the number of events. Its use is endorsed by the scientific community (ANSI 1980; ANSI 1988; USEPA 1972; FICUN 1980; FICON 1992).

While DNL is the best metric for quantitatively assessing cumulative noise impact, it does not lend itself to intuitive interpretation by non-experts. Accordingly, it is common for environmental noise analyses to include other metrics for illustrative purposes. A general indication of the noise environment can be presented by noting the maximum sound levels which can occur and the number of times per day noise events will be loud enough to be heard. Use of other metrics as supplements to DNL has been endorsed by federal agencies (FICON 1992).

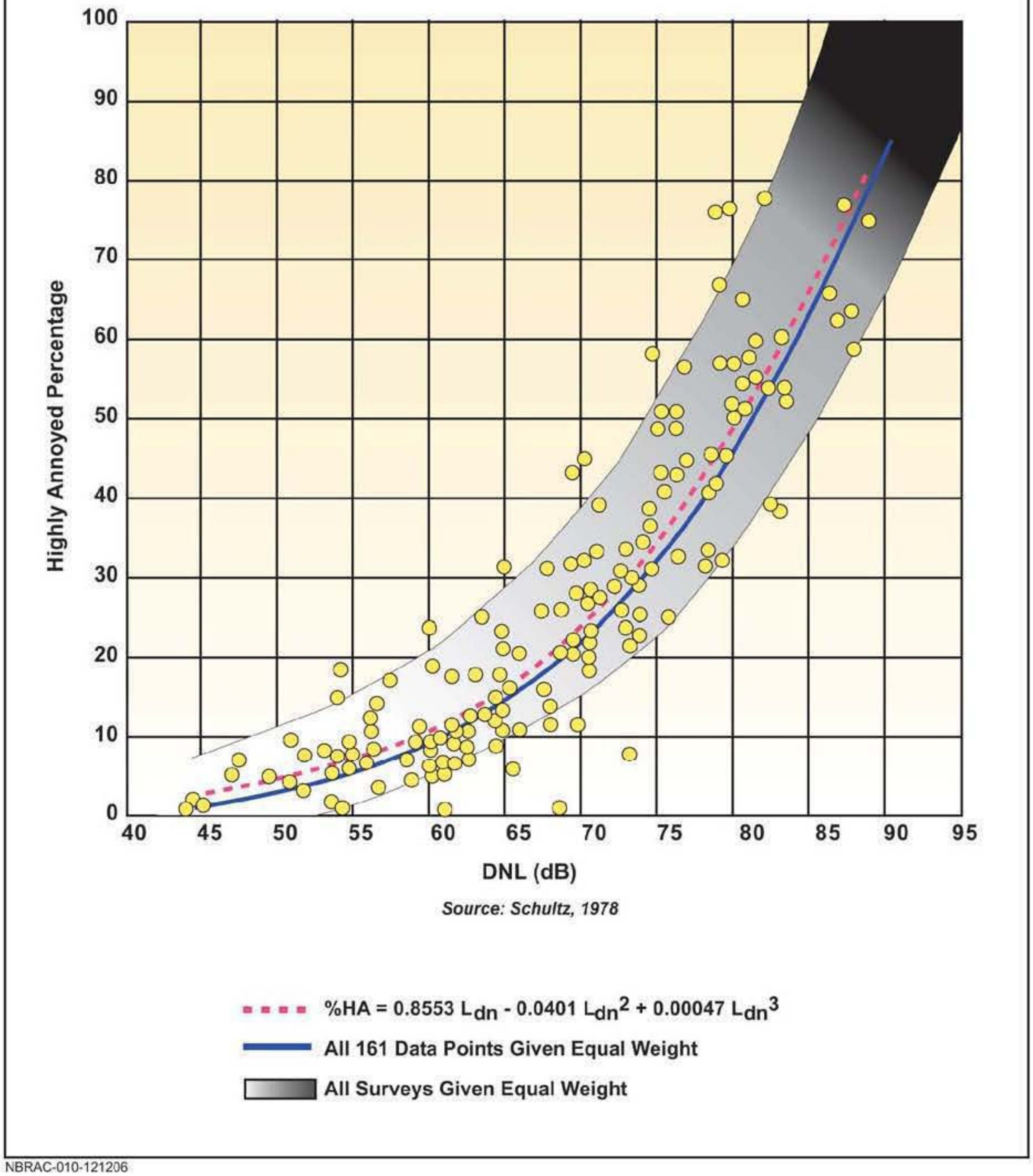
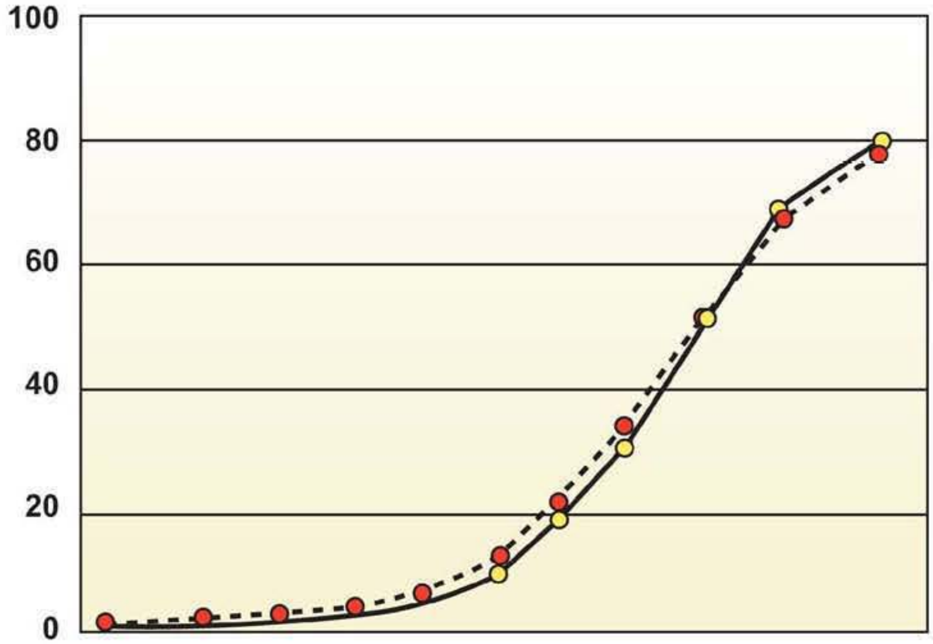


Figure B-2 Community Surveys of Noise Annoyance



Day-Night Average Sound Level in dB	40	45	50	55	60	65	70	75	80	85	90

Calculated % HA Points	FINEGOLD	0.41	0.83	1.66	3.31	6.48	12.3	22.1	36.5	53.7	70.2	82.6
	SCHULTZ	0.58	1.11	2.12	4.03	7.52	13.6	23.3	37.1	53.3	68.8	81

Finegold DATA 400 POINTS (Finegold *et al.* 1992)
%HA = 100/[1+EXP (11.13 - 0.141 LDN)]

SCHULTZ DATA 161 POINTS
%HA = 100/[1 + exp (10.43 - 0.132 LDN)]

HA = Highly Annoyed

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Figure B-3 Day-Night Average Sound Level Chart

The Schultz curve is generally applied to annual average DNL. In Section 1.2, L_{dnmr} was described and presented as being appropriate for quantifying noise in military airspace. In the current study, the Schultz curve is used with L_{dnmr} as the noise metric. L_{dnmr} is always equal to or greater than DNL, so impact is generally higher than would have been predicted if the onset rate and busiest-month adjustments were not accounted for.

There are several points of interest in the noise-annoyance relation. The first is DNL of 65 dB. This is a level most commonly used for noise planning purposes and represents a compromise between community impact and the need for activities like aviation which do cause noise. Areas exposed to DNL above 65 dB are generally not considered suitable for residential use. The second is DNL of 55 dB, which was identified by USEPA as a level below which there is effectively no adverse impact (USEPA 1972). The third is DNL of 75 dB. This is the lowest level at which adverse health effects could be credible (USEPA 1972). The very high annoyance levels make such areas unsuitable for residential land use.

Sonic boom exposure is measured by C-weighting, with the corresponding cumulative metric being CDNL. Correlation between CDNL and annoyance has been established, based on community reaction to impulsive sounds (CHABA 1981). Values of the C-weighted equivalent to the Schultz curve are different than that of the Schultz curve itself. Table B-1 shows the relation between annoyance, DNL, and CDNL.

Table B-1 Relation Between Annoyance, DNL, and CDNL

CDNL	*% Highly Annoyed*	*DNL*
48	2	50
52	4	55
57	8	60
61	14	65
65	23	70
69	35	75

Interpretation of CDNL from impulsive noise is accomplished by using the CDNL versus annoyance values in Table B-1. CDNL can be interpreted in terms of an "equivalent annoyance" DNL. For example, CDNL of 52, 61, and 69 dB are equivalent to DNL of 55, 65, and 75 dB, respectively. If both continuous and impulsive noise occurs in the same area, impacts are assessed separately for each.

Land Use Compatibility

As noted above, the inherent variability between individuals makes it impossible to predict accurately how any individual will react to a given noise event. Nevertheless, when a community is considered as a whole, its overall reaction to noise can be represented with a high degree of confidence. As described above, the best noise exposure metric for this correlation is the DNL or L_{dnmr} for military overflights.

Impulsive noise can be assessed by relating CDNL to an "equivalent annoyance" DNL, as outlined in section 1.3.1.

In June 1980, an ad hoc Federal Interagency Committee on Urban Noise (FICUN) published guidelines (FICUN 1980) relating DNL to compatible land uses. This committee was composed of representatives from Department of Defense, Transportation, and Housing and Urban Development; USEPA; and the Veterans Administration. Since the issuance of these guidelines, federal agencies have generally adopted these guidelines for their noise analyses.

Following the lead of the committee, Department of Defense and FAA adopted the concept of land-use compatibility as the accepted measure of aircraft noise effect. The FAA included the committee's guidelines in the Federal Aviation Regulations (USDOT 1984). These guidelines are reprinted in Table B-2, along with the explanatory notes included in the regulation. Although these guidelines are not mandatory (note the footnote "*" in the table), they provide the best means for determining noise impact in airport communities. In general, residential land uses normally are not compatible with outdoor DNL values above 65 dB, and the extent of land areas and populations exposed to DNL of 65 dB and higher provides the best means for assessing the noise impacts of alternative aircraft actions. In some cases, where noise change exceeds 3 dB, the 1992 FICON indicates the 60 dB DNL may be a more appropriate incompatibility level for densely populated areas.

2.0 NOISE EFFECTS

The discussion in Section 1.3 presents the global effect of noise on communities. The following sections describe particular noise effects.

2.1 Hearing Loss

Noise-induced hearing loss is probably the best defined of the potential effects of human exposure to excessive noise. Federal workplace standards for protection from hearing loss allow a time-average level of 90 dB over an 8-hour work period, or 85 dB averaged over a 16-hour period. Even the most protective criterion (no measurable hearing loss for the most sensitive portion of the population at the ear's most sensitive frequency, 4,000 Hz, after a 40-year exposure) suggests a time-average sound level of 70 dB over a 24-hour period (USEPA 1972). Since it is unlikely that airport neighbors will remain outside their homes 24 hours per day for extended periods of time, there is little possibility of hearing loss below a DNL of 75 dB, and this level is extremely conservative.

Table B-2 Land-Use Compatibility With Yearly Day-Night Average Sound Levels

Land Use	*Yearly Day-Night Average Sound Level (DNL) in Decibels*					
	Below 65	*65–70*	*70–75*	*75–80*	*80–85*	*Over 85*
Residential						
Residential, other than mobile homes and transient lodgings	Y	N(1)	N(1)	N	N	N
Mobile home parks	Y	N	N	N	N	N
Transient lodgings	Y	N(1)	N(1)	N(1)	N	N
Public Use						
Schools	Y	N(1)	N(1)	N	**N**	**N**
Hospitals and nursing homes	Y	25	30	N	N	N
Churches, auditoria, and concert halls	Y	25	30	N	N	N
Government services	Y	Y	25	30	N	N
Transportation	Y	Y	Y(2)	Y(3)	Y(4)	Y(4)
Parking	Y	Y	Y(2)	Y(3)	Y(4)	N
Commercial Use						
Offices, business and professional	Y	Y	25	30	N	N
Wholesale and retail—building materials, hardware, and farm equipment	Y	Y	Y(2)	Y(3)	Y(4)	N
Retail trade—general	Y	Y	25	30	N	N
Utilities	Y	Y	Y(2)	Y(3)	Y(4)	N
Communication	Y	Y	25	30	N	N
Manufacturing and Production						
Manufacturing, general	Y	Y	Y(2)	Y(3)	Y(4)	N
Photographic and optical	Y	Y	25	30	N	N
Agriculture (except livestock) and forestry	Y	Y(6)	Y(7)	Y(8)	Y(8)	Y(8)
Livestock farming and breeding	Y	Y(6)	Y(7)	N	N	N
Mining and fishing, resource production and extraction	Y	Y	Y	Y	Y	Y
Recreational						
Outdoor sports arenas and spectator sports	Y	Y(5)	Y(5)	N	N	N
Outdoor music shells, amphitheaters	Y	N	N	N	N	N
Nature exhibits and zoos	Y	Y	N	N	N	N
Amusements, parks, resorts, and camps	Y	Y	Y	N	N	N
Golf courses, riding stables, and water recreation	Y	Y	25	30	N	N

Numbers in parentheses refer to notes.

* The designations contained in this table do not constitute a federal determination that any use of land covered by the program is acceptable or unacceptable under federal, state, or local law. The responsibility for determining the acceptable and permissible land uses and the relationship between specific properties and specific noise contours rests with the local authorities. FAA determinations under Part 150 are not intended to substitute federally determined land uses for those determined to be appropriate by local authorities in response to locally determined needs and values in achieving noise-compatible land uses.

KEY TO TABLE D-2

SLUCM = Standard Land-Use Coding Manual.
Y (YES) = Land Use and related structures compatible without restrictions.
N (No) = Land Use and related structures are not compatible and should be prohibited.
NLR = Noise Level Reduction (outdoor to indoor) to be achieved through incorporation of noise attenuation into the design and construction of the structure.
25, 30, or 35 = Land Use and related structures generally compatible; measures to achieve NLR of 25, 30, or 35 dB must be incorporated into design and construction of structures.

NOTES FOR TABLE D-2

(1) Where the community determines that residential or school uses must be allowed, measures to achieve outdoor-to-indoor Noise Level Reduction (NLR) of at least 25 dB and 30 dB should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide an NLR of 20 dB; thus the reduction requirements are often stated as 5, 10, or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year-round. However, the use of NLR criteria will not eliminate outdoor noise problems.
(2) Measures to achieve NLR 25 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.
(3) Measures to achieve NLR 30 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.
(4) Measures to achieve NLR 35 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.
(5) Land-use compatible provided special sound reinforcement systems are installed.
(6) Residential buildings require an NLR of 25.
(7) Residential buildings require an NLR of 30.
(8) Residential buildings not permitted.

2.2 Nonauditory Health Effects

Nonauditory health effects of long-term noise exposure, where noise may act as a risk factor, have not been found to occur at levels below those protective against noise-induced hearing loss, described above. Most studies attempting to clarify such health effects have found that noise exposure levels established for hearing protection will also protect against any potential nonauditory health effects, at least in workplace conditions. The best scientific summary of these findings is contained in the lead paper at the National Institutes of Health Conference on Noise and Hearing Loss, held on January 22 through 24, 1990 in Washington, D.C., which states the following: "The nonauditory effects of chronic noise exposure, when noise is suspected to act as one of the risk factors in the development of hypertension, cardiovascular disease, and other nervous disorders, have never been proven to occur as chronic manifestations at levels below these criteria (an average of 75 dBA for complete protection against hearing loss for an eight-hour day). At the International Congress (1988) on Noise as a Public Health Problem, most studies attempting to clarify such health effects did not find them at levels below the criteria protective of noise-induced hearing loss, and even above these criteria, results regarding such health effects were ambiguous. Consequently, it can be concluded that establishing and enforcing exposure levels protecting against noise-induced hearing loss would not only solve the noise-induced hearing loss problem but also any potential nonauditory health effects in the work place (von Gierke 1990; parenthetical wording added for clarification).

Although these findings were directed specifically at noise effects in the work place, they are equally applicable to aircraft noise effects in the community environment. Research studies regarding the nonauditory health effects of aircraft noise are ambiguous, at best, and often contradictory. Yet, even those studies which purport to find such health effects use time-average noise levels of 75 dB and higher for their research.

For example, in an often-quoted paper, two University of California at Los Angeles (UCLA) researchers found a relation between aircraft noise levels under the approach path to Los Angeles International Airport (LAX) and increased mortality rates among the exposed residents by using an average noise exposure level greater than 75 dB for the "noise-exposed" population (Meecham and Shaw 1979). Nevertheless, three other UCLA professors analyzed those same data and found no relation between noise exposure and mortality rates (Frerichs *et al*. 1980).

As a second example, two other UCLA researchers used this same population near LAX to show a higher rate of birth defects during the period of 1970 to 1972 when compared with a control group residing away from the airport (Jones and Tauscher 1978). Based on this report, a separate group at the United States Centers for Disease Control performed a more thorough study of populations near Atlanta's Hartsfield International Airport for 1970 to 1972 and found no relation in their study of 17 identified categories of birth defects to aircraft noise levels above 65 dB (Edmonds 1979).

A review of health effects, prepared by a Committee of the Health Council of The Netherlands (CHCN 1996), analyzed currently available published information on this topic. The committee concluded that the threshold for possible long-term health effects was a 16-hour (6:00 am to 10:00 pm) L_{eq} of 70 dB. Projecting this to 24 hours and applying the 10 dB nighttime penalty used with DNL, this corresponds to DNL of about 75 dB. The study also affirmed the risk threshold for hearing loss, as discussed earlier.

In summary, there is no scientific basis for a claim that potential health effects exist for aircraft time-average sound levels below 75 dB.

2.3 Annoyance

The primary effect of aircraft noise on exposed communities is one of annoyance. Noise annoyance is defined by the USEPA as any negative subjective reaction on the part of an individual or group (USEPA 1972). As noted in the discussion of DNL above, community annoyance is best measured by that metric.

Because the USEPA Levels Document (USEPA 1972) identified DNL of 55 dB as ". . . requisite to protect public health and welfare with an adequate margin of safety," it is commonly assumed that 55 dB should be adopted as a criterion for community noise analysis. From a noise exposure perspective, that would be an ideal selection. However, financial and technical resources are generally not available to achieve that goal. Most agencies have identified DNL of 65 dB as a criterion which protects those most impacted by noise, and which can often be achieved on a practical basis (FICON 1992). This corresponds to about 13 percent of the exposed population being highly annoyed. Although DNL of 65 dB is widely used as a benchmark for significant noise impact, and is often an acceptable compromise, it is not a statutory limit, and it is appropriate to consider other thresholds in particular cases.

In this Draft EIS, no specific threshold is used. The noise in the affected environment is evaluated on the basis of the information presented in this appendix and in the body of the Draft EIS. Community annoyance from sonic booms is based on CDNL, as discussed in Section 1.3. These effects are implicitly included in the "equivalent annoyance" CDNL values in Table B-1, since those were developed from actual community noise impact.

2.4 Speech Interference

Speech interference associated with aircraft noise is a primary cause of annoyance to individuals on the ground. The disruption of routine activities in the home, such as radio or television listening, telephone use, or family conversation, gives rise to frustration and irritation. The quality of speech communication is also important in classrooms, offices, and industrial settings and can cause fatigue and vocal strain in those who attempt to communicate over the noise. Research has shown that the use of the SEL metric will measure speech interference successfully, and that a SEL exceeding 65 dB will begin to interfere with speech communication.

2.5 Sleep Interference

Sleep interference is another source of annoyance associated with aircraft noise. This is especially true because of the intermittent nature and content of aircraft noise, which is more disturbing than continuous noise of equal energy and neutral meaning. Sleep interference may be measured in either of two ways. “Arousal” represents actual awakening from sleep, while a change in “sleep stage” represents a shift from one of four sleep stages to another stage of lighter sleep without actual awakening. In general, arousal requires a somewhat higher noise level than does a change in sleep stage.

An analysis sponsored by the Air Force summarized 21 published studies concerning the effects of noise on sleep (Pearsons *et al*. 1989). The analysis concluded that a lack of reliable in-home studies, combined with large differences among the results from the various laboratory studies, did not permit development of an acceptably accurate assessment procedure. The noise events used in the laboratory studies and in contrived in-home studies were presented at much higher rates of occurrence than would normally be experienced. None of the laboratory studies were of sufficiently long duration to determine any effects of habituation, such as that which would occur under normal community conditions. A recent extensive study of sleep interference in people’s own homes (Ollerhead 1992) showed very little disturbance from aircraft noise.

There is some controversy associated with the recent studies, so a conservative approach should be taken in judging sleep interference. Based on older data, the USEPA identified an indoor DNL of 45 dB as necessary to protect against sleep interference (USEPA 1972). Assuming a very conservative structural noise insulation of 20 dB for typical dwelling units, this corresponds to an outdoor DNL of 65 dB as minimizing sleep interference.

A 1984 publication reviewed the probability of arousal or behavioral awakening in terms of SEL (Kryter 1984). Figure C-4, extracted from Figure 10.37 of Kryter (1984), indicates that an indoor SEL of 65 dB or lower should awaken less than 5 percent of those exposed. These results do not include any habituation over time by sleeping subjects. Nevertheless, this provides a reasonable guideline for assessing sleep interference and corresponds to similar guidance for speech interference, as noted above.

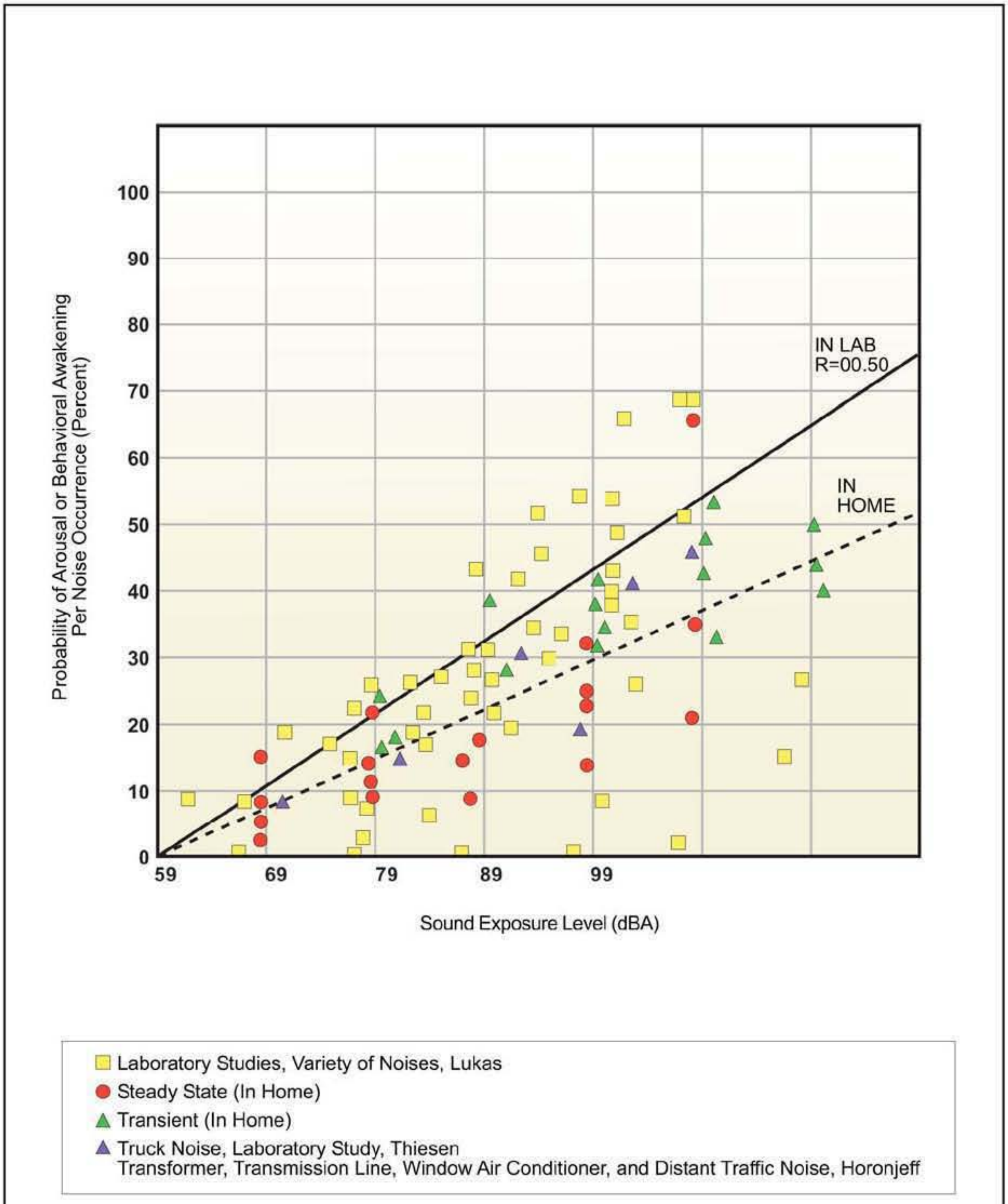

Figure B-4 Probability of Arousal or Behavioral Awakening in Terms of Sound Exposure Level

2.6 Noise Effects on Domestic Animals and Wildlife

Animal species differ greatly in their responses to noise. Each species has adapted, physically and behaviorally, to fill its ecological role in nature, and its hearing ability usually reflects that role. Animals rely on their hearing to avoid predators, obtain food, and communicate with and attract other members of their species. Aircraft noise may mask or interfere with these functions. Secondary effects may include nonauditory effects similar to those exhibited by humans: stress, hypertension, and other nervous disorders. Tertiary effects may include interference with mating and resultant population declines.

2.7 Noise Effects on Structures

Subsonic Aircraft Noise

Normally, the most sensitive components of a structure to airborne noise are the windows and, infrequently, the plastered walls and ceilings. An evaluation of the peak sound pressures impinging on the structure is normally sufficient to determine the possibility of damage. In general, at sound levels above 130 dB, there is the possibility of the excitation of structural component resonance. While certain frequencies (such as 30 Hz for window breakage) may be of more concern than other frequencies, conservatively, only sounds lasting more than one second above a sound level of 130 dB are potentially damaging to structural components (NRC NAS 1977).

A recent study, directed specifically at low-altitude, high-speed aircraft showed that there is little probability of structural damage from such operations (Sutherland 1989). One finding in that study is that sound levels at damaging frequencies (e.g., 30 Hz for window breakage or 15 to 25 Hz for whole-house response) are rarely above 130 dB.

Noise-induced structural vibration may also cause annoyance to dwelling occupants because of induced secondary vibrations, or “rattle,” of objects within the dwelling, such as hanging pictures, dishes, plaques, and bric-a-brac. Window panes may also vibrate noticeably when exposed to high levels of airborne noise, causing homeowners to fear breakage. In general, such noise-induced vibrations occur at sound levels above those considered normally incompatible with residential land use. Thus assessments of noise exposure levels for compatible land use should also be protective of noise-induced secondary vibrations.

Sonic Booms

Sonic booms are commonly associated with structural damage. Most damage claims are for brittle objects, such as glass and plaster. Table B-3 summarizes the threshold of damage that might be expected at various overpressures. There is a large degree of variability in damage experience, and much damage depends on the pre-existing condition of a structure. Breakage data for glass, for example, spans a range of two to three orders of magnitude at a given overpressure. While glass can suffer damage at low overpressures, as shown in Table B-3, laboratory tests of glass (White 1972) have shown that properly installed window glass will not break at overpressures below 10 pounds per square foot (psf), even when subjected to repeated booms. In general, structural damage from sonic booms should be expected only for overpressures above 10 psf.

Table B-3 Possible Damage to Structures From Sonic Booms

Sonic Boom Overpressure Nominal (psf)	*Type of Damage*	*Item Affected*
0.5 - 2	Plaster	Fine cracks; extension of existing cracks; more in ceilings; over door frames; between some plaster boards.
	Glass	Rarely shattered; either partial or extension of existing.
	Roof	Slippage of existing loose tiles/slates; sometimes new cracking of old slates at nail hole.
	Damage to outside walls	Existing cracks in stucco extended.
	Bric-a-brac	Those carefully balanced or on edges can fall; fine glass, such as large goblets, can fall and break.
	Other	Dust falls in chimneys.
2 - 4	Glass, plaster, roofs, ceilings	Failures show that would have been difficult to forecast in terms of their existing localized condition. Nominally in good condition.
4 - 10	Glass	Regular failures within a population of well-installed glass; industrial as well as domestic greenhouses.
	Plaster	Partial ceiling collapse of good plaster; complete collapse of very new, incompletely cured, or very old plaster.
	Roofs	High probability rate of failure in nominally good state, slurry-wash; some chance of failures in tiles on modern roofs; light roofs (bungalow) or large area can move bodily.
	Walls (out)	Old, free standing, in fairly good condition can collapse.
	Walls (in)	Inside ("party") walls known to move at 10 psf.
Greater than 10	Glass	Some good glass will fail regularly to sonic booms from the same direction. Glass with existing faults could shatter and fly. Large window frames move.
	Plaster	Most plaster affected.
	Ceilings	Plaster boards displaced by nail popping.
	Roofs	Most slate/slurry roofs affected, some badly; large roofs having good tile can be affected; some roofs bodily displaced causing gale-end and will-plate cracks; domestic chimneys dislodged if not in good condition.
	Walls	Internal party walls can move even if carrying fittings such as hand basins or taps; secondary damage due to water leakage.
	Bric-a-brac	Some nominally secure items can fall; e.g., large pictures, especially if fixed to party walls.

Source: Haber and Nakaki 1989

2.8 Noise Effects on Terrain

Members of the public often believe that noise from low-flying aircraft can cause avalanches or landslides by disturbing fragile soil or snow structures in mountainous areas. There are no known instances of such effects, and it is considered improbable that such effects will result from routine, subsonic aircraft operations.

2.9 Noise Effects on Historical and Archaeological Sites

Because of the potential for increased fragility of structural components of historical buildings and other historical sites, aircraft noise may affect such sites more severely than newer, modern structures. Again, there are few scientific studies of such effects to provide guidance for their assessment.

One study involved the measurements of sound levels and structural vibration levels in a superbly restored plantation house, originally built in 1795, and now situated approximately 1,500 feet from the centerline at the departure end of Runway 19L at Washington Dulles International Airport. These measurements were made in connection with the proposed scheduled operation of the supersonic Concorde airplane at Dulles (Wesler 1977). There was special concern for the building's windows, since roughly half of the 324 panes were original. No instances of structural damage were found. Interestingly, despite the high levels of noise during Concorde takeoffs, the induced structural vibration levels were actually less than those induced by touring groups and vacuum cleaning within the building itself.

As noted above for the noise effects of noise-induced vibrations of normal structures, assessments of noise exposure levels for normally compatible land uses should also be protective of historic and archaeological sites.

3.0 NOISE MODELING

3.1 Subsonic Aircraft Noise

An aircraft in subsonic flight generally emits noise from two sources: the engines and flow noise around the airframe. Noise generation mechanisms are complex and, in practical models, the noise sources must be based on measured data. The Air Force has developed a series of computer models and aircraft noise databases for this purpose. The models include NOISEMAP (Moulton 1992) for noise around airbases, ROUTEMAP (Lucas and Plotkin 1988) for noise associated with low-level training routes, and MR_NMAP (Lucas and Calamia 1996) for use in MOAs and ranges. These models use the NOISEFILE database developed by the Air Force. NOISEFILE data includes SEL and LAmax as a function of speed and power setting for aircraft in straight flight.

Noise from an individual aircraft is a time-varying continuous sound. It is first audible as the aircraft approaches, increases to a maximum when the aircraft is near its closest point, then diminishes as it departs. The noise depends on the speed and power setting of the aircraft and its trajectory. The models noted above divide the trajectory into segments whose noise can be computed from the data in NOISEFILE. The contributions from these segments are summed.

MR_NMAP was used to compute noise levels in the MOAs and Warning Areas. The primary noise metric computed by MR_NMAP was L_{dnmr} averaged over each airspace. Supporting routines from NOISEMAP were used to calculate SEL and L_{Amax} for various flight altitudes and lateral offsets from a ground receiver position.

3.2 Sonic Booms

When an aircraft moves through the air, it pushes the air out of its way. At subsonic speeds, the displaced air forms a pressure wave that disperses rapidly. At supersonic speeds, the aircraft is moving too quickly for the wave to disperse, so it remains as a coherent wave. This wave is a sonic boom. When heard at the ground, a sonic boom consists of two shock waves (one associated with the forward part of the aircraft, the other with the rear part) of approximately equal strength and (for fighter aircraft) separated by 100 to 200 milliseconds. When plotted, this pair of shock waves and the expanding flow between them have the appearance of a capital letter “N,” so a sonic boom pressure wave is usually called an “N-wave.”

The ground pattern of a sonic boom depends on the size, shape, speed, and trajectory of the aircraft. The Air Force’s PCBoom3 computer program (Plotkin 1996) can be used to compute sonic boom for a given single event. Supersonic operations for the proposed action and four alternatives are associated with air combat training, however, which can best be described statistically. Accordingly, cumulative sonic boom impact (CDNL) was computed using the Air Force’s BOOMAP model (Frampton *et al*. 1993). This is based on measurements of sonic booms, together with analysis of tracking data, for major field studies. BOOMAP provides CDNL in a supersonic air combat arena, plus the average number of booms per day that would be heard at any given location.

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APPENDIX C

AIR QUALITY ANALYSIS

APPENDIX C

AIR QUALITY STANDARDS

As described in Section 3.3, air quality in a given location is described by the concentration of various pollutants in the atmosphere. The significance of the pollutant concentration is determined by comparing it to the federal and state ambient air quality standards. These standards (Table C-1) represent the maximum allowable atmospheric concentrations that may occur while ensuring protection of public health and welfare, with a reasonable margin of safety. The Nevada Department of Environmental Protection, Bureau of Air Quality has adopted the NAAQS, with the following exceptions and additions:

1) the state annual SO_2 standard is more stringent than the national standard;
2) a new 8-hour CO standard specific to elevations greater than 5,000 feet above mean sea level; and
3) the state of Nevada maintains an hourly ambient air quality standard for hydrogen sulfide.

The state ambient air quality standards are summarized in Table C-1.

Table C-1 State and National Ambient Air Quality Standards[a]

	Nevada Standards[b]		*National Standards[c]*	
	AVERAGING TIME	CONCENTRATION	PRIMARY[d]	SECONDARY[d,e]
Ozone	1 Hour	235 $\mu g/m^3$ (0.12 ppm)	235 $\mu g/m^3$ (0.12 ppm)	Same as Primary
Carbon Monoxide less than 5,000 ft above MSL	8 Hours	10,500 $\mu g/m^3$ (9.0 ppm)	10 mg/m^3 (9.0 ppm)	None
Carbon Monoxide at or greater than 5,000 ft above MSL		7,000 $\mu g/m^3$ (6.0 ppm)		
Carbon Monoxide at any elevation	1 Hour	40,500 $\mu g/m^3$ (35 ppm)	40 mg/m^3 (35 ppm)	
Nitrogen Dioxide	Annual Arithmetic Mean	100 $\mu g/m^3$ (0.053 ppm)	100 $\mu g/m^3$ (0.053 ppm)	Same as Primary
Sulfur Dioxide	Annual Arithmetic Mean	80 $\mu g/m^3$ (0.03 ppm)	80 $\mu g/m^3$ (0.03 ppm)	None
	24 Hours	365 $\mu g/m^3$ (0.14 ppm)	365 $\mu g/m^3$ (0.14 ppm)	
	3 Hours	1,300 $\mu g/m^3$ (0.5 ppm)	None	1,300 $\mu g/m3$ (0.5 ppm)
Particulate Matter as PM_{10}[f]	24 Hours	150 $\mu g/m^3$	150 $\mu g/m^3$	Same as Primary
Particulate Matter as $PM_{2.5}$[g]	Annual		15 $\mu g/m^3$	Same as Primary
	24 Hours		65 $\mu g/m^3$	---
Lead (Pb)	Quarterly Arithmetic Mean	1.5 $\mu g/m^3$	1.5 $\mu g/m^3$	Same as Primary
Hydrogen sulfide	1 hour	112 $\mu g/m^3$ 0.08 ppm	--	--

Source: U.S. EPA 2006 and Nevada Administrative Code.

Notes: a: These standards, other than for ozone and those based on annual averages, must not be exceeded more than once per year. The ozone standard is attained when the expected number of days per calendar year with a maximum hourly average concentration above the standard is equal to or less than one.

b: These standards must not be exceeded in areas where the general public has access.

c: National primary standards are the levels of air quality necessary, with an adequate margin of safety, to protect the public health.

d: Concentration is expressed first in units in which it was adopted and is based upon a reference temperature of 25° C and a reference pressure of 760 mm of mercury. All measurements of air quality must be corrected to a reference temperature of 25° C and a reference pressure of 760 mm of Hg (1,013.2 millibars); ppm in this table refers to ppm by volume, or micromoles of regulated air pollutant per mole of gas.

e: National secondary standards are the levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a regulated air pollutant.

f: USEPA promulgated new standards for Particulate Matter, including removal of the PM_{10} annual standard. This revision went into immediate effect in September 2006.

g: USEPA promulgated new standards for Particulate Matter, including a reduction in the $PM_{2.5}$ 24-hour standard, from 65 ug/m^3 to 35 ug/m^3. This revision will go into effect in April 2010.

Air quality impacts from proposed construction activities were estimated from: 1) combustion emissions due to the use of fossil fuel-powered equipment; 2) fugitive dust emissions (PM_{10} and $PM_{2.5}$) during demolition activities, earth-moving activities, and the operation of equipment on bare soil; and 3) emissions from application of asphalt materials during paving operations. Additionally, ACAM 4.3 was used for the post-BRAC alternative to estimate emissions from F-16 operations at the airfield.

BRAC Action: Air emissions from implementation of the BRAC action are due to construction activities during years FY07-FY09, as follows:

Table C-2. Disturbed Area from Implementation of the BRAC Action Due to Construction Activities During FY07-FY09

	Construction	*Square Feet*	*Total Disturbed Area*
FY07	Combined Squad Ops (65 AGRS)	13,740	187,300
	65 AGRS AMU Hangar	17,370	196,000
	Hangar	23,940	47,880
	Fuel Cell Hangar	18,200	36,400
	Armament	19,000	88,800
	Sound Suppressor	4,000	8,000
	Flight Simulator	16,000	174,150
	926th Wing HQ Facility	8,000	16,000
	Parking Pavement[1]	70,000	NA
	Building demolition	8,643	NA
	Total	***198,893***	***754,530***
FY08	AGE Complex	6,900	13,800
	Engine Shop	9,000	18,000
	Total	***15,900***	***31,000***
FY09	Ramp	375,000	375,000
	Total	***375,000***	***375,000***

[1] Pavement associated with facilities and not a separate project.

Post-BRAC: Air emissions from implementation of the post-BRAC alternative in 2011 are due to a combination of actions: construction and the addition of 1,400 sorties flown annually due to an additional eight F-16s being assigned to the 64 AGRS.

Table C-3. Disturbed Area from Implementation of the Post-BRAC Action Due to Construction Activities in FY11

FY11	*Construction*	*Square Feet*	*Total Disturbed Area*
	64th AGRS AMU Hangar	17,370	196,000
	AGE Complex	6,900	13,800
	Combined Squad Ops (64 AGRS)	13,740	187,300
	Armament	19,000	88,800
	Fuel Cell Hangar	18,200	36,400
	Parking Pavement	20,000	NA
	Ramp	375,000	375,000
	Roads and Utilities	70,000	70,000
	Total	***540,210***	***987,300***

Aircraft Operations
1,400 Sorties Flown Annually
AGE for 8 F-16 Aircraft
Jet Engine Test Cell Usage

Factors needed to derive the construction source emission rates were obtained from *Compilation of Air Pollution Emission Factors, AP-42, Volume I* (USEPA 1995); *Median Life, Annual Activity, and Load Factor Values for Nonroad Engine Emissions Modeling* (USEPA 2004a); *Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling—Compression-Ignition* (USEPA 2004b); *Nonroad Engine and Vehicle Emission Study—Report* (USEPA 1991); *Exhaust Emission Factors for Nonroad Engine Modeling—Spark-Ignition* (USEPA 2004c); *Conversion Factors for Hydrocarbon Emission Components* (USEPA 2004d); *Comparison of Asphalt Paving Emission Factors* (CARB 2005); *WRAP Fugitive Dust Handbook* (WRAP 2004); and *EMFAC 2002* (v2.2) *Emission Factors (On-Road)* (CARB 2002).

The analysis assumed that all construction equipment was manufactured before 2000. This approach over-estimates emissions from proposed construction equipment, as the future equipment fleet would include a substantial amount of newer, lower-emitting equipment compared to 2000 vintage equipment. The analysis also inherently reduced PM_{10} fugitive dust emissions from earth-moving activities by 50 percent as this control level is included in the emission factor itself.

Emission rates for fugitive dust were estimated using guidelines outlined in the Western Regional Air Partnership (WRAP) fugitive dust handbook (WRAP 2004). These guidelines were developed for use in western states, they assume standard dust mitigation best practices activities of 50 percent from wetting. The WRAP handbook offers several options for selecting factors for PM_{10} (coarse PM) depending on what information is known. Table C-3 shows the possible emission factors and basis for choosing them.

After PM_{10} is estimated, the fraction of fugitive dust emitted as $PM_{2.5}$ is estimated, the most recent WRAP study (MRI 2005) recommends the use of a fractional factor of 0.10 to estimate the $PM_{2.5}$ portion of the PM_{10}.

Diesel exhaust is a primary, well-documented source of $PM_{2.5}$ emissions. The vast majority of PM emissions in diesel exhaust is $PM_{2.5}$. Therefore, all calculated PM is assumed to be $PM_{2.5}$. A corollary result of this is that the PM_{10} fraction of diesel exhaust is estimated very conservatively as only a small fraction of PM_{10} is present in the exhaust. However, ratios of PM_{10} to $PM_{2.5}$ in diesel exhaust are not yet published and therefore for the purposes of the EA calculations, all PM emissions are equally distributed as PM_{10} and $PM_{2.5}$.

Mobile source emissions were calculated for construction workers for each of the construction years. These emissions assumed that each worker drove their own car, and that the average mileage driven each workday within the Nellis AFB fenceline, was 6 miles (to include driving during lunch break) and at a rate not exceeding 30 miles per hour. Emission factors were derived from the California Air Resources Board (CARB) EMFAC 2002 mobile emissions model, Scenario Year: 2006 – Passenger Vehicle Model Years: 1965 to 2006.

For the post-BRAC alternative, the USAF Air Conformity Applicability Model (ACAM) 4.3 was used to estimate emissions from 8 F-16s with F100-PW-220 engines, each performing 175 sorties per year (for a total of 1,400 sorties annually) and using the model default settings for the selected aircraft and associated AGE.

For both the proposed action, commuting by additional personnel was calculated. A 20 mile round trip was assumed for each individual. However, a proportion of these personnel would live on base, thus reducing overall emissions.

After listing the references cited in this appendix, emissions factors and calculations are provided in a series of worksheets.

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USAF Air Conformity Applicability Model

Emissions Summary Information

Scenario: Post BRAC Action
Installation: NELLIS AFB

Emissions Summary Report For 2008

	Emissions, Ton/Year					
SOURCE CATEGORY	**CO**	**NOX**	**SO2**	**VOC**	**PM10**	**PM2.5**
Mobile Sources						
Aircraft Ground Ops (Trim Checks) - MI	0.12	4.09	0.14	0.25	0.19	0.00
Aircraft Ground Ops (Trim Checks) - IN	0.07	1.84	0.08	0.24	0.17	0.00
Aircraft Ground Ops (Trim Checks) - ID	1.41	0.18	0.04	0.32	0.08	0.00
Aircraft Ground Ops (Trim Checks) - AP	0.32	2.08	0.17	0.85	0.44	0.00
Aircraft Ground Ops (Trim Checks) - AB	2.40	1.67	0.20	0.31	0.23	0.00
Aircraft Flying Operations - MI	0.25	8.63	0.29	0.53	0.39	0.00
Aircraft Flying Operations - ID	25.58	3.34	0.72	5.75	1.49	0.00
Aircraft Flying Operations - AP	0.98	6.39	0.51	2.61	1.34	0.00
Aircraft Flying Operations - AB	7.60	5.30	0.63	0.97	0.73	0.00
AGE	5.91	3.01	0.23	0.49	0.16	0.00
Total	44.63	36.54	3.02	12.32	5.22	0.00
Point Sources						
Aircraft Engine Test Cells - MI	0.01	0.26	0.01	0.02	0.01	0.00
Aircraft Engine Test Cells - IN	0.00	0.12	0.01	0.02	0.01	0.00
Aircraft Engine Test Cells - ID	0.09	0.01	0.00	0.02	0.01	0.00
Aircraft Engine Test Cells - AP	0.02	0.13	0.01	0.05	0.03	0.00
Aircraft Engine Test Cells - AB	0.15	0.10	0.01	0.02	0.01	0.00
Total	0.27	0.62	0.04	0.12	0.07	0.00
Grand Total	44.90	37.15	3.06	12.44	5.29	0.00

BRAC

FY07

F-15C Aggressor Squadron Ops 13,740 SF

Site prep (grading, compacting, drainage, etc.) 187,300 SF

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	**VOC** g/hp-hr	**CO** g/hp-hr	**NOx** g/hp-hr	**SO2** g/hp-hr	**PM** g/hp-hr	**VOC** lb	**CO** lb	**NOx** lb	**SO2** lb	**PM** lb
Dozer	2	8	5	299	0.58	0.68	2.7	8.38	0.93	0.402	20.80	82.58	256.31	28.45	12.30
Backhoe/loader	3	8	45	98	0.21	0.99	3.49	6.9	0.85	0.722	48.51	171.01	338.11	41.65	35.38
Grader	3	8	8	135	0.58	0.68	2.7	8.38	0.93	0.402	22.54	89.49	277.74	30.82	13.32
Small generator	3	8	45	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	7.81	42.11	53.54	9.52	4.58
Dump truck (12 CY)	32	1	45	275	0.21	0.68	2.7	8.38	0.89	0.402	124.67	495.01	1536.37	163.17	73.70
										Subtotal	224.33	880.20	2462.07	273.61	139.28

Foundation (slab)

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	**VOC** g/hp-hr	**CO** g/hp-hr	**NOx** g/hp-hr	**SO2** g/hp-hr	**PM** g/hp-hr	**VOC** lb	**CO** lb	**NOx** lb	**SO2** lb	**PM** lb
Skid steer loader	2	2	3	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	0.21	0.96	2.28	0.38	0.19
Concrete truck	4	1	7	250	0.21	0.68	2.7	8.38	0.89	0.402	2.20	8.75	27.16	2.88	1.30
Dump truck	6	1	3	275	0.21	0.68	2.7	8.38	0.89	0.402	1.56	6.19	19.20	2.04	0.92
Delivery truck	6	6	3	180	0.21	0.68	2.7	8.38	0.89	0.402	6.12	24.30	75.42	8.01	3.62
Backhoe/loader	1	8	3	98	0.21	0.99	3.49	6.9	0.85	0.722	1.08	3.80	7.51	0.93	0.79
Small generator	2	2	16	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.46	2.50	3.17	0.56	0.27
										Subtotal	11.64	46.50	134.75	14.80	7.09

Structure

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	**VOC** g/hp-hr	**CO** g/hp-hr	**NOx** g/hp-hr	**SO2** g/hp-hr	**PM** g/hp-hr	**VOC** lb	**CO** lb	**NOx** lb	**SO2** lb	**PM** lb
Small generator	2	4	3	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.17	0.94	1.19	0.21	0.10
Delivery truck	1	2	7	180	0.21	0.68	2.7	8.38	0.89	0.402	0.79	3.15	9.78	1.04	0.47
Skid steer loader	2	4	10	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	1.42	6.43	15.22	2.53	1.29
Dump truck	2	1	2	275	0.21	0.68	2.7	8.38	0.89	0.402	0.35	1.38	4.27	0.45	0.20
Crane	1	8	7	120	0.43	0.3384	0.8667	5.6523	0.93	0.2799	2.16	5.52	36.01	5.92	1.78
										Subtotal	4.89	17.41	66.46	10.16	3.84

Aircraft Maintenance Unit 17,370 SF

Site prep (grading, compacting, drainage, etc.) 196,000 SF

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	g/hp-hr	g/hp-hr	g/hp-hr	g/hp-hr	g/hp-hr	lb	lb	lb	lb	lb
Dozer	2	8	5	299	0.58	0.68	2.7	8.38	0.93	0.402	20.80	82.58	256.31	28.45	12.30
Backhoe/loader	3	8	47	98	0.21	0.99	3.49	6.9	0.85	0.722	50.67	178.61	353.13	43.50	36.95
Grader	3	8	8	135	0.58	0.68	2.7	8.38	0.93	0.402	22.54	89.49	277.74	30.82	13.32
Small generator	3	8	47	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	8.16	43.98	55.92	9.94	4.78
Dump truck (12 CY)	32	1	47	275	0.21	0.68	2.7	8.38	0.89	0.402	130.21	517.01	1604.65	170.42	76.98
										Subtotal	232.37	911.67	2547.76	283.14	144.33

Foundation (slab)

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	**VOC** g/hp-hr	**CO** g/hp-hr	**NOx** g/hp-hr	**SO2** g/hp-hr	**PM** g/hp-hr	**VOC** lb	**CO** lb	**NOx** lb	**SO2** lb	**PM** lb
Skid steer loader	2	2	6	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	0.43	1.93	4.57	0.76	0.39
Concrete truck	4	1	9	250	0.21	0.68	2.7	8.38	0.89	0.402	2.83	11.25	34.92	3.71	1.68
Dump truck	4	1	6	275	0.21	0.68	2.7	8.38	0.89	0.402	2.08	8.25	25.61	2.72	1.23
Delivery truck	6	6	6	180	0.21	0.68	2.7	8.38	0.89	0.402	12.24	48.60	150.84	16.02	7.24
Backhoe/loader	1	8	6	98	0.21	0.99	3.49	6.9	0.85	0.722	2.16	7.60	15.03	1.85	1.57
Small generator	2	2	31	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.90	4.83	6.15	1.09	0.53
										Subtotal	20.63	82.47	237.11	26.15	12.62

Structure

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	**VOC** g/hp-hr	**CO** g/hp-hr	**NOx** g/hp-hr	**SO2** g/hp-hr	**PM** g/hp-hr	**VOC** lb	**CO** lb	**NOx** lb	**SO2** lb	**PM** lb
Small generator	2	4	5	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.29	1.56	1.98	0.35	0.17
Delivery truck	1	2	14	180	0.21	0.68	2.7	8.38	0.89	0.402	1.59	6.30	19.55	2.08	0.94
Skid steer loader	2	4	23	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	3.26	14.79	35.00	5.81	2.96
Dump truck	2	1	5	275	0.21	0.68	2.7	8.38	0.89	0.402	0.87	3.44	10.67	1.13	0.51
Crane	1	8	8	120	0.43	0.3384	0.8667	5.6523	0.93	0.2799	2.46	6.31	41.15	6.77	2.04
										Subtotal	8.46	32.39	108.36	16.15	6.61

Hangar - 4 Bay 23,940 SF

Site prep (grading, compacting, drainage, etc.) 47,880 SF

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	**VOC** g/hp-hr	**CO** g/hp-hr	**NOx** g/hp-hr	**SO2** g/hp-hr	**PM** g/hp-hr	**VOC** lb	**CO** lb	**NOx** lb	**SO2** lb	**PM** lb
Dozer	2	8	2	299	0.58	0.68	2.7	8.38	0.93	0.402	8.32	33.03	102.52	11.38	4.92
Backhoe/loader	3	8	11	98	0.21	0.99	3.49	6.9	0.85	0.722	11.86	41.80	82.65	10.18	8.65
Grader	3	8	2	135	0.58	0.68	2.7	8.38	0.93	0.402	5.63	22.37	69.44	7.71	3.33
Small generator	3	8	11	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	1.91	10.29	13.09	2.33	1.12
Dump truck (12 CY)	32	1	11	275	0.21	0.68	2.7	8.38	0.89	0.402	30.47	121.00	375.56	39.89	18.02
										Subtotal	58.20	228.50	643.25	71.48	36.03

Foundation (slab)

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	**VOC** g/hp-hr	**CO** g/hp-hr	**NOx** g/hp-hr	**SO2** g/hp-hr	**PM** g/hp-hr	**VOC** lb	**CO** lb	**NOx** lb	**SO2** lb	**PM** lb
Skid steer loader	2	2	16	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	1.13	5.14	12.17	2.02	1.03
Concrete truck	5	1	10	250	0.21	0.68	2.7	8.38	0.89	0.402	3.94	15.63	48.50	5.15	2.33
Dump truck	6	1	6	275	0.21	0.68	2.7	8.38	0.89	0.402	3.12	12.38	38.41	4.08	1.84
Delivery truck	1	1	34	180	0.21	0.68	2.7	8.38	0.89	0.402	1.93	7.65	23.74	2.52	1.14
Backhoe/loader	1	8	6	98	0.21	0.99	3.49	6.9	0.85	0.722	2.16	7.60	15.03	1.85	1.57
Small generator	2	2	43	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	1.24	6.71	8.53	1.52	0.73
										Subtotal	13.51	55.10	146.38	17.14	8.64

Structure

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	**VOC** g/hp-hr	**CO** g/hp-hr	**NOx** g/hp-hr	**SO2** g/hp-hr	**PM** g/hp-hr	**VOC** lb	**CO** lb	**NOx** lb	**SO2** lb	**PM** lb
Small generator	2	4	18	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	1.04	5.61	7.14	1.27	0.61
Delivery truck	1	2	22	180	0.21	0.68	2.7	8.38	0.89	0.402	2.49	9.90	30.73	3.26	1.47
Skid steer loader	2	4	70	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	9.92	45.00	106.52	17.69	9.00
Concrete truck	4	2	10	250	0.21	0.68	2.7	8.38	0.89	0.402	6.30	25.00	77.59	8.24	3.72
Crane	1	8	11	120	0.43	0.3384	0.8667	5.6523	0.93	0.2799	3.39	8.68	56.58	9.31	2.80
										Subtotal	23.14	94.20	278.56	39.78	17.61

Fuel Cell Maintenance Hangar 18,200 SF
Site prep (grading, compacting, drainage, etc.) 36,400 SF

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	**VOC** g/hp-hr	**CO** g/hp-hr	**NOx** g/hp-hr	**SO2** g/hp-hr	**PM** g/hp-hr	**VOC** lb	**CO** lb	**NOx** lb	**SO2** lb	**PM** lb
Dozer	2	8	2	299	0.58	0.68	2.7	8.38	0.93	0.402	8.32	33.03	102.52	11.38	4.92
Backhoe/loader	3	8	8	98	0.21	0.99	3.49	6.9	0.85	0.722	8.62	30.40	60.11	7.40	6.29
Grader	3	8	2	135	0.58	0.68	2.7	8.38	0.93	0.402	5.63	22.37	69.44	7.71	3.33
Small generator	3	8	8	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	1.39	7.49	9.52	1.69	0.81
Dump truck (12 CY)	32	1	8	275	0.21	0.68	2.7	8.38	0.89	0.402	22.16	88.00	273.13	29.01	13.10
										Subtotal	46.13	181.30	514.72	57.19	28.46

Foundation (slab)

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	**VOC** g/hp-hr	**CO** g/hp-hr	**NOx** g/hp-hr	**SO2** g/hp-hr	**PM** g/hp-hr	**VOC** lb	**CO** lb	**NOx** lb	**SO2** lb	**PM** lb
Skid steer loader	2	2	7	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	0.50	2.25	5.33	0.88	0.45
Concrete truck	4	1	9	250	0.21	0.68	2.7	8.38	0.89	0.402	2.83	11.25	34.92	3.71	1.68
Dump truck	7	1	4	275	0.21	0.68	2.7	8.38	0.89	0.402	2.42	9.63	29.87	3.17	1.43
Delivery truck	6	6	5	180	0.21	0.68	2.7	8.38	0.89	0.402	10.20	40.50	125.70	13.35	6.03
Backhoe/loader	1	8	4	98	0.21	0.99	3.49	6.9	0.85	0.722	1.44	5.07	10.02	1.23	1.05
Small generator	2	2	31	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.90	4.83	6.15	1.09	0.53
										Subtotal	18.29	73.53	211.99	23.44	11.16

Structure

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	**VOC** g/hp-hr	**CO** g/hp-hr	**NOx** g/hp-hr	**SO2** g/hp-hr	**PM** g/hp-hr	**VOC** lb	**CO** lb	**NOx** lb	**SO2** lb	**PM** lb
Small generator	2	4	6	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.35	1.87	2.38	0.42	0.20
Delivery truck	1	2	14	180	0.21	0.68	2.7	8.38	0.89	0.402	1.59	6.30	19.55	2.08	0.94
Skid steer loader	2	4	23	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	3.26	14.79	35.00	5.81	2.96
Dump truck	2	1	12	275	0.21	0.68	2.7	8.38	0.89	0.402	2.08	8.25	25.61	2.72	1.23
Crane	1	8	9	120	0.43	0.3384	0.8667	5.6523	0.93	0.2799	2.77	7.10	46.30	7.62	2.29
										Subtotal	10.04	38.31	128.83	18.65	7.62

Armament 19,000 SF
Site prep (grading, compacting, drainage, etc.) 88,800 SF

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	**VOC** g/hp-hr	**CO** g/hp-hr	**NOx** g/hp-hr	**SO2** g/hp-hr	**PM** g/hp-hr	**VOC** lb	**CO** lb	**NOx** lb	**SO2** lb	**PM** lb
Dozer	2	8	4	299	0.58	0.68	2.7	8.38	0.93	0.402	16.64	66.07	205.05	22.76	9.84
Backhoe/loader	3	8	20	98	0.21	0.99	3.49	6.9	0.85	0.722	21.56	76.01	150.27	18.51	15.72
Grader	3	8	4	135	0.58	0.68	2.7	8.38	0.93	0.402	11.27	44.74	138.87	15.41	6.66
Small generator	3	8	20	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	3.47	18.71	23.80	4.23	2.04
Dump truck (12 CY)	32	1	20	275	0.21	0.68	2.7	8.38	0.89	0.402	55.41	220.00	682.83	72.52	32.76
										Subtotal	108.35	425.54	1200.82	133.43	67.01

Foundation (slab)

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	**VOC** g/hp-hr	**CO** g/hp-hr	**NOx** g/hp-hr	**SO2** g/hp-hr	**PM** g/hp-hr	**VOC** lb	**CO** lb	**NOx** lb	**SO2** lb	**PM** lb
Skid steer loader	2	2	8	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	0.57	2.57	6.09	1.01	0.51
Concrete truck	4	1	10	250	0.21	0.68	2.7	8.38	0.89	0.402	3.15	12.50	38.80	4.12	1.86
Dump truck	4	1	8	275	0.21	0.68	2.7	8.38	0.89	0.402	2.77	11.00	34.14	3.63	1.64
Delivery truck	6	6	6	180	0.21	0.68	2.7	8.38	0.89	0.402	12.24	48.60	150.84	16.02	7.24
Backhoe/loader	1	8	8	98	0.21	0.99	3.49	6.9	0.85	0.722	2.87	10.13	20.04	2.47	2.10
Small generator	2	2	33	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.95	5.15	6.54	1.16	0.56
										Subtotal	22.55	89.95	256.45	28.41	13.91

Structure

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	**VOC** g/hp-hr	**CO** g/hp-hr	**NOx** g/hp-hr	**SO2** g/hp-hr	**PM** g/hp-hr	**VOC** lb	**CO** lb	**NOx** lb	**SO2** lb	**PM** lb
Small generator	2	4	7	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.40	2.18	2.78	0.49	0.24
Delivery truck	1	2	14	180	0.21	0.68	2.7	8.38	0.89	0.402	1.59	6.30	19.55	2.08	0.94
Skid steer loader	2	4	24	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	3.40	15.43	36.52	6.07	3.09
Dump truck	3	4	12	275	0.21	0.68	2.7	8.38	0.89	0.402	12.47	49.50	153.64	16.32	7.37
Crane	1	8	10	120	0.43	0.3384	0.8667	5.6523	0.93	0.2799	3.08	7.89	51.44	8.46	2.55
										Subtotal	20.94	81.30	263.93	33.42	14.18

Hush House slab

Site prep (grading, compacting, drainage, etc.) 8,000 SF

Equipment	Number	Hr/day	# days	Hp	LF	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Dozer	2	8	2	299	0.58	0.68	2.7	8.38	0.93	0.402	8.32	33.03	102.52	11.38	4.92
Backhoe/loader	3	8	10	98	0.21	0.99	3.49	6.9	0.85	0.722	10.78	38.00	75.13	9.26	7.86
Grader	3	8	2	135	0.58	0.68	2.7	8.38	0.93	0.402	5.63	22.37	69.44	7.71	3.33
Small generator	3	8	10	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	1.74	9.36	11.90	2.12	1.02
Dump truck (12 CY)	32	1	10	275	0.21	0.68	2.7	8.38	0.89	0.402	27.70	110.00	341.41	36.26	16.38
										Subtotal	54.17	212.77	600.41	66.72	33.51

Grading/Gravel

Equipment	Number	Hr/day	# days	Hp	LF	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Grader	2	4	9	135	0.58	0.68	2.7	8.38	0.93	0.402	8.45	33.56	104.15	11.56	5.00
Skid steer loader	2	6	9	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	1.91	8.68	20.54	3.41	1.74
Small generator	2	4	9	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.52	2.81	3.57	0.63	0.31
Dump truck	5	0.5	9	275	0.21	0.68	2.7	8.38	0.89	0.402	1.95	7.73	24.01	2.55	1.15
										Subtotal	12.83	52.78	152.27	18.16	8.19
Small diesel engines	4	3	18	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	1.56	8.42	10.71	1.90	0.92

Concrete Work

Equipment	Number	Hr/day	# days	Hp	LF	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Skid steer loader	1	2	54	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	1.91	8.68	20.54	3.41	1.74
Concrete truck	3	1	63	250	0.21	0.68	2.7	8.38	0.89	0.402	14.88	59.06	183.32	19.47	8.79
Dump truck	2	0.5	36	275	0.21	0.68	2.7	8.38	0.89	0.402	3.12	12.38	38.41	4.08	1.84
Delivery truck	4	1	18	180	0.21	0.68	2.7	8.38	0.89	0.402	4.08	16.20	50.28	5.34	2.41
Backhoe/loader	2	2	36	98	0.21	0.99	3.49	6.9	0.85	0.722	6.47	22.80	45.08	5.55	4.72
										Subtotal	30.45	119.12	337.63	37.85	19.50

Flight Simulator 16,000 SF

Site prep (grading, compacting, drainage, etc.) 174,150 SF

Equipment	Number	Hr/day	# days	Hp	LF	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Dozer	2	8	5	299	0.58	0.68	2.7	8.38	0.93	0.402	20.80	82.58	256.31	28.45	12.30
Backhoe/loader	3	8	42	98	0.21	0.99	3.49	6.9	0.85	0.722	45.28	159.61	315.57	38.87	33.02
Grader	3	8	7	135	0.58	0.68	2.7	8.38	0.93	0.402	19.72	78.30	243.03	26.97	11.66
Small generator	3	8	42	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	7.29	39.30	49.97	8.89	4.28
Dump truck (12 CY)	32	1	42	275	0.21	0.68	2.7	8.38	0.89	0.402	116.36	462.01	1433.94	152.29	68.79
										Subtotal	209.44	821.81	2298.82	255.47	130.04

Foundation (slab)

Equipment	Number	Hr/day	# days	Hp	LF	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Skid steer loader	2	2	6	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	0.43	1.93	4.57	0.76	0.39
Concrete truck	4	1	8	250	0.21	0.68	2.7	8.38	0.89	0.402	2.52	10.00	31.04	3.30	1.49
Dump truck	6	1	4	275	0.21	0.68	2.7	8.38	0.89	0.402	2.08	8.25	25.61	2.72	1.23
Delivery truck	6	6	4	180	0.21	0.68	2.7	8.38	0.89	0.402	8.16	32.40	100.56	10.68	4.82
Backhoe/loader	1	8	4	98	0.21	0.99	3.49	6.9	0.85	0.722	1.44	5.07	10.02	1.23	1.05
Small generator	2	2	27	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.78	4.21	5.35	0.95	0.46
										Subtotal	15.40	61.86	177.14	19.64	9.43

Structure

Equipment	Number	Hr/day	# days	Hp	LF	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Small generator	2	4	5	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.29	1.56	1.98	0.35	0.17
Delivery truck	1	2	12	180	0.21	0.68	2.7	8.38	0.89	0.402	1.36	5.40	16.76	1.78	0.80
Skid steer loader	2	4	20	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	2.83	12.86	30.43	5.06	2.57
Dump truck	2	2	10	275	0.21	0.68	2.7	8.38	0.89	0.402	3.46	13.75	42.68	4.53	2.05
Crane	1	8	8	120	0.43	0.3384	0.8667	5.6523	0.93	0.2799	2.46	6.31	41.15	6.77	2.04
										Subtotal	10.41	39.88	133.01	18.49	7.63

Addition for 926th Wing HQ 8,000 SF

Site prep (grading, compacting, drainage, etc.) 16,000 SF

Equipment	Number	Hr/day	# days	Hp	LF	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Dozer	2	8	4	299	0.58	0.68	2.7	8.38	0.93	0.402	16.64	66.07	205.05	22.76	9.84
Backhoe/loader	3	8	20	98	0.21	0.99	3.49	6.9	0.85	0.722	21.56	76.01	150.27	18.51	15.72
Grader	3	8	4	135	0.58	0.68	2.7	8.38	0.93	0.402	11.27	44.74	138.87	15.41	6.66
Small generator	3	8	20	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	3.47	18.71	23.80	4.23	2.04
Dump truck (12 CY)	32	1	20	275	0.21	0.68	2.7	8.38	0.89	0.402	55.41	220.00	682.83	72.52	32.76
										Subtotal	108.35	425.54	1200.82	133.43	67.01

Foundation (slab)

Equipment	Number	Hr/day	# days	Hp	LF	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Skid steer loader	2	2	3	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	0.21	0.96	2.28	0.38	0.19
Concrete truck	4	1	4	250	0.21	0.68	2.7	8.38	0.89	0.402	1.26	5.00	15.52	1.65	0.74
Dump truck	6	1	2	275	0.21	0.68	2.7	8.38	0.89	0.402	1.04	4.13	12.80	1.36	0.61
Delivery truck	6	6	2	180	0.21	0.68	2.7	8.38	0.89	0.402	4.08	16.20	50.28	5.34	2.41
Backhoe/loader	1	8	2	98	0.21	0.99	3.49	6.9	0.85	0.722	0.72	2.53	5.01	0.62	0.52
Small generator	2	2	13	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.38	2.03	2.58	0.46	0.22
										Subtotal	7.69	30.85	88.47	9.80	4.71

Structure

Equipment	Number	Hr/day	# days	Hp	LF	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Small generator	2	4	3	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.17	0.94	1.19	0.21	0.10
Delivery truck	1	2	6	180	0.21	0.68	2.7	8.38	0.89	0.402	0.68	2.70	8.38	0.89	0.40
Skid steer loader	2	4	10	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	1.42	6.43	15.22	2.53	1.29
Dump truck	2	2	5	275	0.21	0.68	2.7	8.38	0.89	0.402	1.73	6.88	21.34	2.27	1.02
Crane	1	8	4	120	0.43	0.3384	0.8667	5.6523	0.93	0.2799	1.23	3.16	20.58	3.39	1.02
										Subtotal	5.23	20.10	66.70	9.28	3.83

Parking Pavement 70,000 SF

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	**VOC** g/hp-hr	**CO** g/hp-hr	**NOx** g/hp-hr	**SO2** g/hp-hr	**PM** g/hp-hr	**VOC** lb	**CO** lb	**NOx** lb	**SO2** lb	**PM** lb
Grader	1	4	5	135	0.58	0.68	2.7	8.38	0.93	0.402	2.35	9.32	28.93	3.21	1.39
Roller	2	4	5	30	0.59	1.8	5	6.9	1	0.8	2.81	7.80	10.77	1.56	1.25
Paver	1	8	5	107	0.59	0.68	2.7	8.38	0.93	0.402	3.79	15.03	46.65	5.18	2.24
Concrete truck	4	3	12	250	0.21	0.68	2.7	8.38	0.89	0.402	11.33	45.00	139.67	14.83	6.70
Delivery truck	1	2	12	180	0.21	0.68	2.7	8.38	0.89	0.402	1.36	5.40	16.76	1.78	0.80
Small diesel engines	4	6	23	25	0.43	1.7	5	8.5	0.93	0.9	22.24	65.41	111.20	12.17	11.77
										Total	43.88	147.97	353.98	38.73	24.15

Volume of hot mix asphalt	23310	ft^3
Average density of HMA	145	lb/ft^3
CARB EF for HMA	0.04	lb/ton
VOC emissions from HMA paving	68	lb

Pavement

Marking 2,100 LF

Solid Line= 215 ft/gal VOC content of paint = 1.3 lb/gal

VOC
lb
13

Demo

Armament/Engine 8,643 SF

Building demolition

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	**VOC** g/hp-hr	**CO** g/hp-hr	**NOx** g/hp-hr	**SO2** g/hp-hr	**PM** g/hp-hr	**VOC** lb	**CO** lb	**NOx** lb	**SO2** lb	**PM** lb
Dozer	2	8	6	90	0.59	0.99	3.49	6.9	0.93	0.722	11	39.22	77.54	10.45	8.11
Skid steer loader	2	8	6	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	2	7.71	18.26	3.03	1.54
										Subtotal	13	46.94	95.80	13.48	9.66

Demo debris removal

Equipment	*Number*	*Hr/day*	*# days*	*Hp*		**VOC** g/hp-hr	**CO** g/hp-hr	**NOx** g/hp-hr	**SO2** g/hp-hr	**PM** g/hp-hr	**VOC** lb	**CO** lb	**NOx** lb	**SO2** lb	**PM** lb
Backhoe/loader	2	8	4	98	0.21	0.99	3.49	6.9	0.85	0.722	3	10.13	20.04	2.47	2.10
Skid steer loader	2	8	4	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	1	5.14	12.17	2.02	1.03
Dump truck	8	2	4	275	0.21	0.68	2.7	8.38	0.89	0.402	6	22.00	68.28	7.25	3.28
										Subtotal	10	37.28	100.49	11.74	6.40

Fugitive Dust Emissions:

PM_{10} tons/acre/mo	acres	days of disturbance	**PM_{10}** Total Tons	**$PM_{2.5}/PM_{10}$** Ratio	**$PM_{2.5}$** Total Tons
0.42	9.6	200	27	0.1	3

833,173

POV Emissions from Construction Workers

Assume 6 miles per day per vehicle (one vehicle per worker)

On-base POV emissions

# vehicles	# days	mi/day	**VOC** lb/mi	**CO** lb/mi	**NOx** lb/mi	**SOx** lb/mi	**PM** lb/mi	**VOC** lb	**CO** lb	**NOx** lb	**SOx** lb	**PM** lb
82	250	6	0.001497	0.013925	0.001489	0	0.000080	184.13	1712.78	183.15	1.107	9.80
							Subtotal	184	1,713	183	1	10

Construction emissions in 2007 (t/yr):

VOC	**CO**	**NOx**	**SO2**	**PM_{10}**	**$PM_{2.5}$**
0.4	1.9	3.0	0.3	27.0	2.9

FY08

AGE Facility 6,900 SF

Site prep (grading, drainage, utilities etc.) 13,800 SF

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	**VOC** g/hp-hr	**CO** g/hp-hr	**NOx** g/hp-hr	**SO2** g/hp-hr	**PM** g/hp-hr	**VOC** lb	**CO** lb	**NOx** lb	**SO2** lb	**PM** lb
Dozer	1	6	6	299	0.58	0.68	2.7	8.38	0.93	0.402	9.36	37.16	115.34	12.80	5.53
Skid steer loader	2	4	20	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	2.83	12.86	30.43	5.06	2.57
Backhoe/loader	2	6	14	98	0.21	0.99	3.49	6.9	0.85	0.722	7.55	26.60	52.59	6.48	5.50
Small generator	1	4	20	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.58	3.12	3.97	0.71	0.34
Dump truck	6	1	8	275	0.21	0.68	2.7	8.38	0.89	0.402	4.16	16.50	51.21	5.44	2.46
										Subtotal	24.47	96.24	253.55	30.48	16.40

Foundation (slab)

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	**VOC** g/hp-hr	**CO** g/hp-hr	**NOx** g/hp-hr	**SO2** g/hp-hr	**PM** g/hp-hr	**VOC** lb	**CO** lb	**NOx** lb	**SO2** lb	**PM** lb
Skid steer loader	2	2	6	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	0.43	1.93	4.57	0.76	0.39
Concrete truck	4	1	8	250	0.21	0.68	2.7	8.38	0.89	0.402	2.52	10.00	31.04	3.30	1.49
Dump truck	6	1	4	275	0.21	0.68	2.7	8.38	0.89	0.402	2.08	8.25	25.61	2.72	1.23
Delivery truck	6	6	4	180	0.21	0.68	2.7	8.38	0.89	0.402	8.16	32.40	100.56	10.68	4.82
Backhoe/loader	1	8	4	98	0.21	0.99	3.49	6.9	0.85	0.722	1.44	5.07	10.02	1.23	1.05
Small generator	2	2	27	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.78	4.21	5.35	0.95	0.46
										Subtotal	15.40	61.86	177.14	19.64	9.43

Structure

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	**VOC** g/hp-hr	**CO** g/hp-hr	**NOx** g/hp-hr	**SO2** g/hp-hr	**PM** g/hp-hr	**VOC** lb	**CO** lb	**NOx** lb	**SO2** lb	**PM** lb
Small generator	2	4	5	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.29	1.56	1.98	0.35	0.17
Delivery truck	1	2	12	180	0.21	0.68	2.7	8.38	0.89	0.402	1.36	5.40	16.76	1.78	0.80
Skid steer loader	2	4	20	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	2.83	12.86	30.43	5.06	2.57
Dump truck	1	2	5	275	0.21	0.68	2.7	8.38	0.89	0.402	0.87	3.44	10.67	1.13	0.51
Crane	1	8	4	120	0.43	0.3384	0.8667	5.6523	0.93	0.2799	1.23	3.16	20.58	3.39	1.02
										Subtotal	6.58	26.41	80.42	11.71	5.08
Small diesel engines	2	2	45	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	1.30	7.02	8.92	1.59	0.76

Engine Shop 9,000 SF

Site prep (grading, drainage, utilities etc.) 18,000 SF

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	**VOC** g/hp-hr	**CO** g/hp-hr	**NOx** g/hp-hr	**SO2** g/hp-hr	**PM** g/hp-hr	**VOC** lb	**CO** lb	**NOx** lb	**SO2** lb	**PM** lb
Dozer	1	6	8	299	0.58	0.68	2.7	8.38	0.93	0.402	12.48	49.55	153.79	17.07	7.38
Skid steer loader	2	4	26	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	3.68	16.72	39.56	6.57	3.34
Backhoe/loader	2	6	18	98	0.21	0.99	3.49	6.9	0.85	0.722	9.70	34.20	67.62	8.33	7.08
Small generator	1	4	26	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.75	4.05	5.16	0.92	0.44
Dump truck	6	1	10	275	0.21	0.68	2.7	8.38	0.89	0.402	5.19	20.63	64.02	6.80	3.07
										Subtotal	31.81	125.15	330.14	39.68	21.31

Foundation (slab)

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	**VOC** g/hp-hr	**CO** g/hp-hr	**NOx** g/hp-hr	**SO2** g/hp-hr	**PM** g/hp-hr	**VOC** lb	**CO** lb	**NOx** lb	**SO2** lb	**PM** lb
Skid steer loader	2	2	5	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	0.35	1.61	3.80	0.63	0.32
Concrete truck	4	1	5	250	0.21	0.68	2.7	8.38	0.89	0.402	1.57	6.25	19.40	2.06	0.93
Dump truck	7	1	2	275	0.21	0.68	2.7	8.38	0.89	0.402	1.21	4.81	14.94	1.59	0.72
Delivery truck	6	6	5	180	0.21	0.68	2.7	8.38	0.89	0.402	10.20	40.50	125.70	13.35	6.03
Backhoe/loader	1	8	2	98	0.21	0.99	3.49	6.9	0.85	0.722	0.72	2.53	5.01	0.62	0.52
Small generator	2	2	24	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.69	3.74	4.76	0.85	0.41
										Subtotal	14.75	59.45	173.61	19.09	8.93

Structure

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	**VOC** g/hp-hr	**CO** g/hp-hr	**NOx** g/hp-hr	**SO2** g/hp-hr	**PM** g/hp-hr	**VOC** lb	**CO** lb	**NOx** lb	**SO2** lb	**PM** lb
Small generator	2	4	7	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.40	2.18	2.78	0.49	0.24
Delivery truck	1	2	16	180	0.21	0.68	2.7	8.38	0.89	0.402	1.81	7.20	22.35	2.37	1.07
Skid steer loader	2	4	27	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	3.83	17.36	41.09	6.82	3.47
Dump truck	2	1	7	275	0.21	0.68	2.7	8.38	0.89	0.402	1.21	4.81	14.94	1.59	0.72
Crane	1	8	5	120	0.43	0.3384	0.8667	5.6523	0.93	0.2799	1.54	3.94	25.72	4.23	1.27
										Subtotal	8.80	35.50	106.87	15.51	6.77
Small diesel engines	2	2	60	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	1.74	9.36	11.90	2.12	1.02

Fugitive Dust Emissions:

PM 10 tons/acre/mo	acres	days of disturbance	**PM 10** Total Tons	**PM 2.5/PM 10** Ratio	**PM 2.5** Total Tons
0.42	0.7	75	0.8	0.1	0

POV Emissions from Construction Workers 15,900

Assume 6 miles per day per vehicle (one vehicle per worker)

On-base POV emissions

# vehicles	# days	mi/day	**VOC** lb/mi	**CO** lb/mi	**NOx** lb/mi	**SOx** lb/mi	**PM** lb/mi	**VOC** lb	**CO** lb	**NOx** lb	**SOx** lb	**PM** lb
12	100	6	0.001497	0.013925	0.001489	0	0.000080	10.78	100.26	10.72	0.0648	0.57
							Subtotal	11	100	11	0	1

Construction emissions in 2008 (t/yr):

VOC	**CO**	**NOx**	**SO2**	**PM 10**	**PM 2.5**
0.1	0.3	0.6	0.1	0.8	0.1

FY09

Airfield Pavement (inc. ramp) 375,000 SF

Site prep (grading, compacting, drainage, etc.)

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	**VOC** g/hp-hr	**CO** g/hp-hr	**NOx** g/hp-hr	**SO2** g/hp-hr	**PM** g/hp-hr	**VOC** lb	**CO** lb	**NOx** lb	**SO2** lb	**PM** lb
Dozer	2	8	10	299	0.58	0.68	2.7	8.38	0.93	0.402	41.60	165.17	512.62	56.89	24.59
Backhoe/loader	3	8	90	98	0.21	0.99	3.49	6.9	0.85	0.722	97.02	342.03	676.21	83.30	70.76
Grader	3	8	15	135	0.58	0.68	2.7	8.38	0.93	0.402	42.26	167.79	520.77	57.79	24.98
Small generator	3	8	90	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	15.62	84.21	107.09	19.04	9.16
Dump truck (12 CY)	32	1	90	275	0.21	0.68	2.7	8.38	0.89	0.402	249.34	990.02	3072.73	326.34	147.40
										Subtotal	445.84	1749.22	4889.43	543.37	276.90

Concrete apron construction

Equipment	Number	Hr/day	# days	Hp	LF	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Skid steer loader	4	4	90	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	25.50	115.72	273.90	45.50	23.14
Concrete truck (9 CY)	24	1	64	250	0.21	0.68	2.7	8.38	0.89	0.402	120.89	480.01	1489.81	158.23	71.47
Dump truck (12 CY)	2	0.5	24	275	0.21	0.68	2.7	8.38	0.89	0.402	2.08	8.25	25.61	2.72	1.23
Delivery truck	2	1	21	180	0.21	0.68	2.7	8.38	0.89	0.402	2.38	9.45	29.33	3.12	1.41
Backhoe/loader	2	8	90	98	0.21	0.99	3.49	6.9	0.85	0.722	64.68	228.02	450.81	55.53	47.17
										Subtotal	215.53	841.45	2269.46	265.09	144.42

Fugitive Dust Emissions:

PM_{10} tons/acre/mo	acres	days of disturbance	PM_{10} Total Tons	$PM_{2.5}/PM_{10}$ Ratio	$PM_{2.5}$ Total Tons
0.42	4.3	180	10.8	0.1	1

POV Emissions from Construction Workers

Assume 6 miles per day per vehicle (one vehicle per worker)

On-base POV emissions

# vehicles	# days	mi/day	VOC lb/mi	CO lb/mi	NOx lb/mi	SOx lb/mi	PM lb/mi	VOC lb	CO lb	NOx lb	SOx lb	PM lb
45	215	6	0.001497	0.013925	0.001489	0	0.000080	86.90	808.35	86.44	0.52245	4.62
							Subtotal	87	808	86	1	5

Construction emissions in 2009 (t/yr):

VOC	CO	NOx	SO2	PM_{10}	$PM_{2.5}$
0.4	1.7	3.6	0.4	11.1	1.3

Post BRAC

FY11

64th AGRS AMU/Hangar 17,370 SF

Site prep (grading, compacting, drainage, etc.) 196,000 SF

Equipment	Number	Hr/day	# days	Hp	LF	g/hp-hr	g/hp-hr	g/hp-hr	g/hp-hr	g/hp-hr	lb	lb	lb	lb	lb
Dozer	2	8	5	299	0.58	0.68	2.7	8.38	0.93	0.402	20.80	82.58	256.31	28.45	12.30
Backhoe/loader	3	8	47	98	0.21	0.99	3.49	6.9	0.85	0.722	50.67	178.61	353.13	43.50	36.95
Grader	3	8	8	135	0.58	0.68	2.7	8.38	0.93	0.402	22.54	89.49	277.74	30.82	13.32
Small generator	3	8	47	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	8.16	43.98	55.92	9.94	4.78
Dump truck (12 CY)	32	1	47	275	0.21	0.68	2.7	8.38	0.89	0.402	130.21	517.01	1604.65	170.42	76.98
										Subtotal	232.37	911.67	2547.76	283.14	144.33

Foundation (slab)

Equipment	Number	Hr/day	# days	Hp	LF	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Skid steer loader	2	2	14	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	0.99	4.50	10.65	1.77	0.90
Concrete truck	8	1	10	250	0.21	0.68	2.7	8.38	0.89	0.402	6.30	25.00	77.59	8.24	3.72
Dump truck	6	1	10	275	0.21	0.68	2.7	8.38	0.89	0.402	5.19	20.63	64.02	6.80	3.07
Delivery truck	1	1	32	180	0.21	0.68	2.7	8.38	0.89	0.402	1.81	7.20	22.35	2.37	1.07
Backhoe/loader	1	8	10	98	0.21	0.99	3.49	6.9	0.85	0.722	3.59	12.67	25.04	3.09	2.62
Small generator	2	2	55	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	1.59	8.58	10.91	1.94	0.93
										Subtotal	19.48	78.57	210.56	24.21	12.32

Structure

Equipment	Number	Hr/day	# days	Hp	LF	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Small generator	2	4	17	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.98	5.30	6.74	1.20	0.58
Delivery truck	1	2	21	180	0.21	0.68	2.7	8.38	0.89	0.402	2.38	9.45	29.33	3.12	1.41
Skid steer loader	2	4	65	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	9.21	41.79	98.91	16.43	8.36
Concrete truck	4	2	13	250	0.21	0.68	2.7	8.38	0.89	0.402	8.19	32.50	100.87	10.71	4.84
Crane	1	8	17	120	0.43	0.3384	0.8667	5.6523	0.93	0.2799	5.24	13.41	87.45	14.39	4.33
										Subtotal	25.99	102.45	323.30	45.85	19.51

AGE Facility 6,900 SF

Site prep (grading, drainage, utilities etc.) 13,800 SF

Equipment	Number	Hr/day	# days	Hp	LF	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Dozer	1	6	6	299	0.58	0.68	2.7	8.38	0.93	0.402	9.36	37.16	115.34	12.80	5.53
Skid steer loader	2	4	20	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	2.83	12.86	30.43	5.06	2.57
Backhoe/loader	2	6	14	98	0.21	0.99	3.49	6.9	0.85	0.722	7.55	26.60	52.59	6.48	5.50
Small generator	1	4	20	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.58	3.12	3.97	0.71	0.34
Dump truck	6	1	8	275	0.21	0.68	2.7	8.38	0.89	0.402	4.16	16.50	51.21	5.44	2.46
										Subtotal	24.47	96.24	253.55	30.48	16.40

Foundation (slab)

Equipment	Number	Hr/day	# days	Hp	LF	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Skid steer loader	2	2	3	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	0.21	0.96	2.28	0.38	0.19
Concrete truck	4	1	4	250	0.21	0.68	2.7	8.38	0.89	0.402	1.26	5.00	15.52	1.65	0.74
Dump truck	6	1	2	275	0.21	0.68	2.7	8.38	0.89	0.402	1.04	4.13	12.80	1.36	0.61
Delivery truck	6	6	2	180	0.21	0.68	2.7	8.38	0.89	0.402	4.08	16.20	50.28	5.34	2.41
Backhoe/loader	1	8	2	98	0.21	0.99	3.49	6.9	0.85	0.722	0.72	2.53	5.01	0.62	0.52
Small generator	2	2	12	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.35	1.87	2.38	0.42	0.20
										Subtotal	7.66	30.69	88.27	9.77	4.69

Structure

Equipment	Number	Hr/day	# days	Hp	LF	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Small generator	2	4	2	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.12	0.62	0.79	0.14	0.07
Delivery truck	1	2	5	180	0.21	0.68	2.7	8.38	0.89	0.402	0.57	2.25	6.98	0.74	0.34
Skid steer loader	2	4	9	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	1.28	5.79	13.70	2.27	1.16
Dump truck	3	2	5	275	0.21	0.68	2.7	8.38	0.89	0.402	2.60	10.31	32.01	3.40	1.54
Crane	1	8	4	120	0.43	0.3384	0.8667	5.6523	0.93	0.2799	1.23	3.16	20.58	3.39	1.02
										Subtotal	5.79	22.13	74.06	9.94	4.11

64th AGRS Squad Ops 13,740 SF

Site prep (grading, compacting, drainage, etc.) 187,300 SF

Equipment	Number	Hr/day	# days	Hp	LF	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Dozer	2	8	5	299	0.58	0.68	2.7	8.38	0.93	0.402	20.80	82.58	256.31	28.45	12.30
Backhoe/loader	3	8	45	98	0.21	0.99	3.49	6.9	0.85	0.722	48.51	171.01	338.11	41.65	35.38
Grader	3	8	8	135	0.58	0.68	2.7	8.38	0.93	0.402	22.54	89.49	277.74	30.82	13.32
Small generator	3	8	45	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	7.81	42.11	53.54	9.52	4.58
Dump truck (12 CY)	32	1	45	275	0.21	0.68	2.7	8.38	0.89	0.402	124.67	495.01	1536.37	163.17	73.70
										Subtotal	224.33	880.20	2462.07	273.61	139.28

Foundation (slab)

Equipment	Number	Hr/day	# days	Hp	LF	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Skid steer loader	2	2	18	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	1.28	5.79	13.70	2.27	1.16
Concrete truck	4	1	8	250	0.21	0.68	2.7	8.38	0.89	0.402	2.52	10.00	31.04	3.30	1.49
Dump truck	8	1	4	275	0.21	0.68	2.7	8.38	0.89	0.402	2.77	11.00	34.14	3.63	1.64
Delivery truck	6	6	4	180	0.21	0.68	2.7	8.38	0.89	0.402	8.16	32.40	100.56	10.68	4.82
Backhoe/loader	1	8	4	98	0.21	0.99	3.49	6.9	0.85	0.722	1.44	5.07	10.02	1.23	1.05
Small generator	2	2	18	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.52	2.81	3.57	0.63	0.31
										Subtotal	16.68	67.06	193.02	21.75	10.46

Structure

Equipment	Number	Hr/day	# days	Hp	LF	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Small generator	2	4	10	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.58	3.12	3.97	0.71	0.34
Delivery truck	1	1	28	180	0.21	0.68	2.7	8.38	0.89	0.402	1.59	6.30	19.55	2.08	0.94
Skid steer loader	2	4	41	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	5.81	26.36	62.39	10.36	5.27
Dump truck	2	1	10	275	0.21	0.68	2.7	8.38	0.89	0.402	1.73	6.88	21.34	2.27	1.02
Crane	1	8	8	120	0.43	0.3384	0.8667	5.6523	0.93	0.2799	2.46	6.31	41.15	6.77	2.04
										Subtotal	12.17	48.96	148.40	22.18	9.61
Small diesel engines	2	2	78	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	2.26	12.16	15.47	2.75	1.32

Infrastructure - roads, utilities 70,000 SF

Grading/Gravel

Equipment	Number	Hr/day	# days	Hp	LF	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Grader	2	6	17	135	0.58	0.68	2.7	8.38	0.93	0.402	23.95	95.08	295.10	32.75	14.16
Skid steer loader	3	4	17	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	3.61	16.39	38.80	6.45	3.28
Small generator	3	4	17	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	1.48	7.95	10.11	1.80	0.87
Dump truck (12 CY)	5	0.5	25	275	0.21	0.68	2.7	8.38	0.89	0.402	5.41	21.48	66.68	7.08	3.20
										Subtotal	34.45	140.91	410.70	48.08	21.50
Small diesel engines	6	3	25	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	3.25	17.54	22.31	3.97	1.91

Parking Pavement 70,000 SF

Equipment	Number	Hr/day	# days	Hp	LF	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Grader	1	4	5	135	0.58	0.68	2.7	8.38	0.93	0.402	2.35	9.32	28.93	3.21	1.39
Roller	2	4	5	30	0.59	1.8	5	6.9	1	0.8	2.81	7.80	10.77	1.56	1.25
Paver	1	8	5	107	0.59	0.68	2.7	8.38	0.93	0.402	3.79	15.03	46.65	5.18	2.24
Concrete truck	4	3	12	250	0.21	0.68	2.7	8.38	0.89	0.402	11.33	45.00	139.67	14.83	6.70
Delivery truck	1	2	12	180	0.21	0.68	2.7	8.38	0.89	0.402	1.36	5.40	16.76	1.78	0.80
Small diesel engines	4	6	23	25	0.43	1.7	5	8.5	0.93	0.9	22.24	65.41	111.20	12.17	11.77
										Total	43.88	147.97	353.98	38.73	24.15

Volume of hot mix asphalt	23,333	ft^3
Average density of HMA	145	lb/ft^3
CARB EF for HMA	0.04	lb/ton
VOC emissions from HMA paving	68	lb

Pavement Marking 2,800 LF

Solid Line= 215 ft/gal   VOC content of paint = 1.3 lb/gal

VOC
lb
17

Armament 19,000 SF

Site prep (grading, compacting, drainage, etc.) 88,800 SF

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	**VOC** g/hp-hr	**CO** g/hp-hr	**NOx** g/hp-hr	**SO2** g/hp-hr	**PM** g/hp-hr	**VOC** lb	**CO** lb	**NOx** lb	**SO2** lb	**PM** lb
Dozer	2	8	4	299	0.58	0.68	2.7	8.38	0.93	0.402	16.64	66.07	205.05	22.76	9.84
Backhoe/loader	3	8	20	98	0.21	0.99	3.49	6.9	0.85	0.722	21.56	76.01	150.27	18.51	15.72
Grader	3	8	4	135	0.58	0.68	2.7	8.38	0.93	0.402	11.27	44.74	138.87	15.41	6.66
Small generator	3	8	20	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	3.47	18.71	23.80	4.23	2.04
Dump truck (12 CY)	32	1	20	275	0.21	0.68	2.7	8.38	0.89	0.402	55.41	220.00	682.83	72.52	32.76
										Subtotal	108.35	425.54	1200.82	133.43	67.01

Foundation (slab)

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	**VOC** g/hp-hr	**CO** g/hp-hr	**NOx** g/hp-hr	**SO2** g/hp-hr	**PM** g/hp-hr	**VOC** lb	**CO** lb	**NOx** lb	**SO2** lb	**PM** lb
Skid steer loader	2	2	15	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	1.06	4.82	11.41	1.90	0.96
Concrete truck	4	1	8	250	0.21	0.68	2.7	8.38	0.89	0.402	2.52	10.00	31.04	3.30	1.49
Dump truck	8	1	4	275	0.21	0.68	2.7	8.38	0.89	0.402	2.77	11.00	34.14	3.63	1.64
Delivery truck	1	1	15	180	0.21	0.68	2.7	8.38	0.89	0.402	0.85	3.38	10.48	1.11	0.50
Backhoe/loader	1	8	4	98	0.21	0.99	3.49	6.9	0.85	0.722	1.44	5.07	10.02	1.23	1.05
Small generator	2	2	15	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.43	2.34	2.97	0.53	0.25
										Subtotal	9.07	36.60	100.06	11.69	5.90

Structure

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	**VOC** g/hp-hr	**CO** g/hp-hr	**NOx** g/hp-hr	**SO2** g/hp-hr	**PM** g/hp-hr	**VOC** lb	**CO** lb	**NOx** lb	**SO2** lb	**PM** lb
Small generator	2	4	11	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.64	3.43	4.36	0.78	0.37
Delivery truck	1	1	23	180	0.21	0.68	2.7	8.38	0.89	0.402	1.30	5.18	16.06	1.71	0.77
Skid steer loader	2	4	38	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	5.38	24.43	57.82	9.60	4.89
Dump truck	2	1	11	275	0.21	0.68	2.7	8.38	0.89	0.402	1.90	7.56	23.47	2.49	1.13
Crane	1	8	11	120	0.43	0.3384	0.8667	5.6523	0.93	0.2799	3.39	8.68	56.58	9.31	2.80
										Subtotal	12.62	49.28	158.31	23.89	9.96
Small diesel engines	2	2	87	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	2.52	13.57	17.25	3.07	1.48

Parking Pavement 20,000 SF

Grading/Gravel

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	**VOC** g/hp-hr	**CO** g/hp-hr	**NOx** g/hp-hr	**SO2** g/hp-hr	**PM** g/hp-hr	**VOC** lb	**CO** lb	**NOx** lb	**SO2** lb	**PM** lb
Grader	2	6	5	135	0.58	0.68	2.7	8.38	0.93	0.402	7.04	27.96	86.79	9.63	4.16
Skid steer loader	3	4	5	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	1.06	4.82	11.41	1.90	0.96
Small generator	3	4	5	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.43	2.34	2.97	0.53	0.25
Dump truck (12 CY)	5	0.5	8	275	0.21	0.68	2.7	8.38	0.89	0.402	1.73	6.88	21.34	2.27	1.02
										Subtotal	10.27	42.00	122.52	14.32	6.41
Small diesel engines	10	3	8	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	1.74	9.36	11.90	2.12	1.02

Paving

	Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	**VOC** g/hp-hr	**CO** g/hp-hr	**NOx** g/hp-hr	**SO2** g/hp-hr	**PM** g/hp-hr	**VOC** lb	**CO** lb	**NOx** lb	**SO2** lb	**PM** lb
	Grader	1	6	2	150	0.59	0.68	2.7	8.38	0.93	0.402	1.59	6.32	19.62	2.18	0.94
	Roller	2	6	2	30	0.59	1.8	5	6.9	1	0.8	1.69	4.68	6.46	0.94	0.75
	Paver	1	8	2	107	0.59	0.68	2.7	8.38	0.93	0.402	1.51	6.01	18.66	2.07	0.90
	Delivery truck	2	1	5	180	0.21	0.68	2.7	8.38	0.89	0.402	0.57	2.25	6.98	0.74	0.34
											Subtotal	5.36	19.27	51.73	5.93	2.92

Volume of hot mix asphalt	10000	ft^3
Average density of HMA	145	lb/ft^3
CARB EF for HMA	0.04	lb/ton
VOC emissions from HMA paving	29	lb

Pavement
Marking 531 LF
Solid Line= 215 ft/gal VOC content of paint = 1.3 lb/gal

VOC lb
3

Airfield Pavements 375,000 SF

Grading/Gravel

	Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	**VOC** g/hp-hr	**CO** g/hp-hr	**NOx** g/hp-hr	**SO2** g/hp-hr	**PM** g/hp-hr	**VOC** lb	**CO** lb	**NOx** lb	**SO2** lb	**PM** lb
	Dozer	2	8	10	299	0.58	0.68	2.7	8.38	0.93	0.402	41.60	165.17	512.62	56.89	24.59
	Backhoe/loader	3	8	90	98	0.21	0.99	3.49	6.9	0.85	0.722	97.02	342.03	676.21	83.30	70.76
	Grader	3	8	15	135	0.58	0.68	2.7	8.38	0.93	0.402	42.26	167.79	520.77	57.79	24.98
	Small generator	3	8	90	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	15.62	84.21	107.09	19.04	9.16
	Dump truck (12 CY)	32	1	90	275	0.21	0.68	2.7	8.38	0.89	0.402	249.34	990.02	3072.73	326.34	147.40
											Subtotal	445.84	1749.22	4889.43	543.37	276.90

Concrete apron construction

	Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	**VOC** g/hp-hr	**CO** g/hp-hr	**NOx** g/hp-hr	**SO2** g/hp-hr	**PM** g/hp-hr	**VOC** lb	**CO** lb	**NOx** lb	**SO2** lb	**PM** lb
	Skid steer loader	4	4	90	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	25.50	115.72	273.90	45.50	23.14
	Concrete truck (9 CY)	24	1	64	250	0.21	0.68	2.7	8.38	0.89	0.402	120.89	480.01	1489.81	158.23	71.47
	Dump truck (12 CY)	2	0.5	24	275	0.21	0.68	2.7	8.38	0.89	0.402	2.08	8.25	25.61	2.72	1.23
	Delivery truck	2	1	21	180	0.21	0.68	2.7	8.38	0.89	0.402	2.38	9.45	29.33	3.12	1.41
	Backhoe/loader	2	8	90	98	0.21	0.99	3.49	6.9	0.85	0.722	64.68	228.02	450.81	55.53	47.17
											Subtotal	215.53	841.45	2269.46	265.09	144.42

Fuel Cell (1 Bay) 18,200 SF

Site prep (grading, compacting, drainage, etc.) 36,400 SF

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	**VOC** g/hp-hr	**CO** g/hp-hr	**NOx** g/hp-hr	**SO2** g/hp-hr	**PM** g/hp-hr	**VOC** lb	**CO** lb	**NOx** lb	**SO2** lb	**PM** lb
Dozer	2	8	2	299	0.58	0.68	2.7	8.38	0.93	0.402	8.32	33.03	102.52	11.38	4.92
Backhoe/loader	3	8	8	98	0.21	0.99	3.49	6.9	0.85	0.722	8.62	30.40	60.11	7.40	6.29
Grader	3	8	2	135	0.58	0.68	2.7	8.38	0.93	0.402	5.63	22.37	69.44	7.71	3.33
Small generator	3	8	8	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	1.39	7.49	9.52	1.69	0.81
Dump truck (12 CY)	32	1	8	275	0.21	0.68	2.7	8.38	0.89	0.402	22.16	88.00	273.13	29.01	13.10
										Subtotal	46.13	181.30	514.72	57.19	28.46

Foundation (slab)

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	**VOC** g/hp-hr	**CO** g/hp-hr	**NOx** g/hp-hr	**SO2** g/hp-hr	**PM** g/hp-hr	**VOC** lb	**CO** lb	**NOx** lb	**SO2** lb	**PM** lb
Skid steer loader	2	2	15	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	1.06	4.82	11.41	1.90	0.96
Concrete truck	5	1	6	250	0.21	0.68	2.7	8.38	0.89	0.402	2.36	9.38	29.10	3.09	1.40
Dump truck	9	1	4	275	0.21	0.68	2.7	8.38	0.89	0.402	3.12	12.38	38.41	4.08	1.84
Delivery truck	1	1	15	180	0.21	0.68	2.7	8.38	0.89	0.402	0.85	3.38	10.48	1.11	0.50
Backhoe/loader	1	8	3	98	0.21	0.99	3.49	6.9	0.85	0.722	1.08	3.80	7.51	0.93	0.79
Small generator	2	2	15	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.43	2.34	2.97	0.53	0.25
										Subtotal	8.90	36.09	99.88	11.63	5.75

Structure

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	**VOC** g/hp-hr	**CO** g/hp-hr	**NOx** g/hp-hr	**SO2** g/hp-hr	**PM** g/hp-hr	**VOC** lb	**CO** lb	**NOx** lb	**SO2** lb	**PM** lb
Small generator	2	4	12	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.69	3.74	4.76	0.85	0.41
Delivery truck	1	1	22	180	0.21	0.68	2.7	8.38	0.89	0.402	1.25	4.95	15.36	1.63	0.74
Skid steer loader	2	4	35	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	4.96	22.50	53.26	8.85	4.50
Dump truck	2	1	12	275	0.21	0.68	2.7	8.38	0.89	0.402	2.08	8.25	25.61	2.72	1.23
Crane	1	8	12	120	0.43	0.3384	0.8667	5.6523	0.93	0.2799	3.70	9.47	61.73	10.16	3.06
										Subtotal	12.67	48.91	160.72	24.20	9.93

Small diesel engines	2	2	105	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	3.04	16.37	20.82	3.70	1.78

Hangar/Squad Ops/AMU 1,572 sf + depth contaminated soil 100 CY

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	**VOC** g/hp-hr	**CO** g/hp-hr	**NOx** g/hp-hr	**SO2** g/hp-hr	**PM** g/hp-hr	**VOC** lb	**CO** lb	**NOx** lb	**SO2** lb	**PM** lb
Skid steer loader	1	8	2	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	0.28	1.29	3.04	0.51	0.26
Dump truck	4	1	2	710	0.59	0.68	2.7	8.38	0.89	0.402	5.02	19.95	61.91	6.58	2.97
Backhoe/loader	1	5	2	98	0.21	0.99	3.49	6.9	0.85	0.722	0.45	1.58	3.13	0.39	0.33
Excavator	1	4	1	513	0.59	0.68	2.7	8.38	0.93	0.402	1.81	7.21	22.37	2.48	1.07
Dozer	1	4	1	620	0.59	0.68	2.7	8.38	0.93	0.402	2.19	8.71	27.03	3.00	1.30
Small generator	2	8	5	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.58	3.12	3.97	0.71	0.34
										Subtotal	10.34	41.85	121.45	13.65	6.26

Fugitive Dust Emissions:

PM $_{10}$ tons/acre/mo	acres	days of disturbance	**PM $_{10}$** Total Tons	**PM $_{2.5}$/PM $_{10}$** Ratio	**PM $_{2.5}$** Total Tons
0.42	5.7	321	25.5	0.1	3

POV Emissions from Construction Workers

Assume 6 miles per day per vehicle (one vehicle per worker)

On-base POV emissions

# vehicles	# days	mi/day	**VOC** lb/mi	**CO** lb/mi	**NOx** lb/mi	**SOx** lb/mi	**PM** lb/mi	**VOC** lb	**CO** lb	**NOx** lb	**SOx** lb	**PM** lb
250	250	6	0.001497	0.013925	0.001489	0	0.000080	561.38	5221.88	558.38	3.375	29.87
							Subtotal	561	5,222	558	3	30

Construction emissions in 2011 (t/yr):

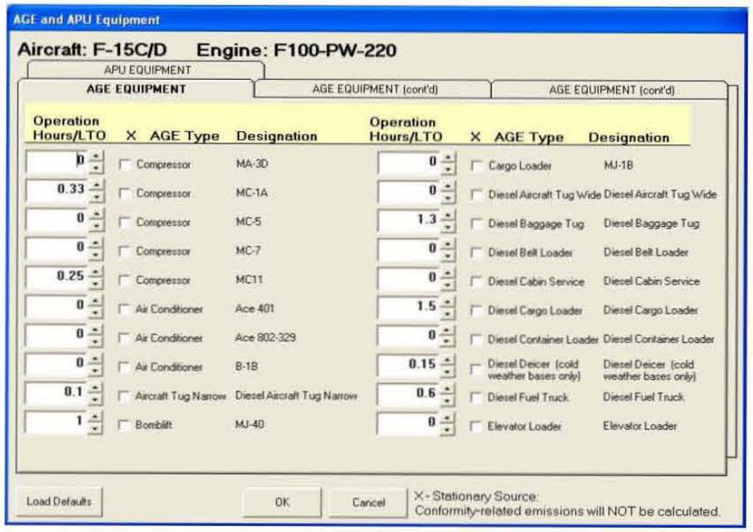
VOC	**CO**	**NOx**	**SO2**	**PM $_{10}$**	**PM $_{2.5}$**
0.98	5.14	7.30	0.81	25.89	2.97

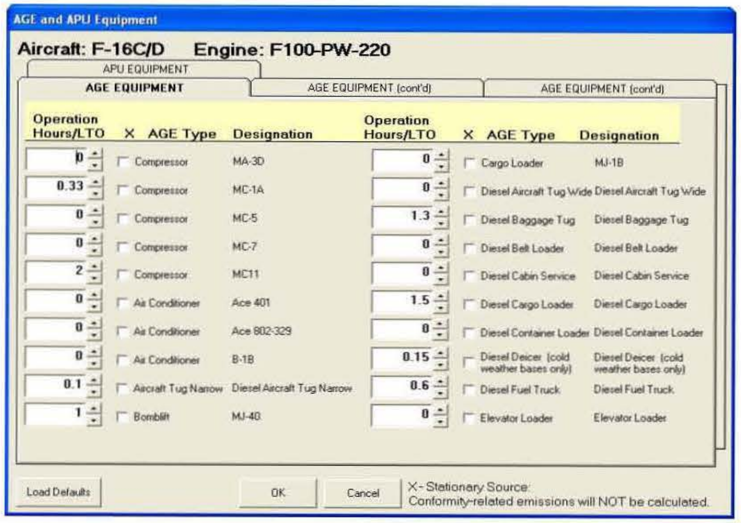
Personnel Commuters

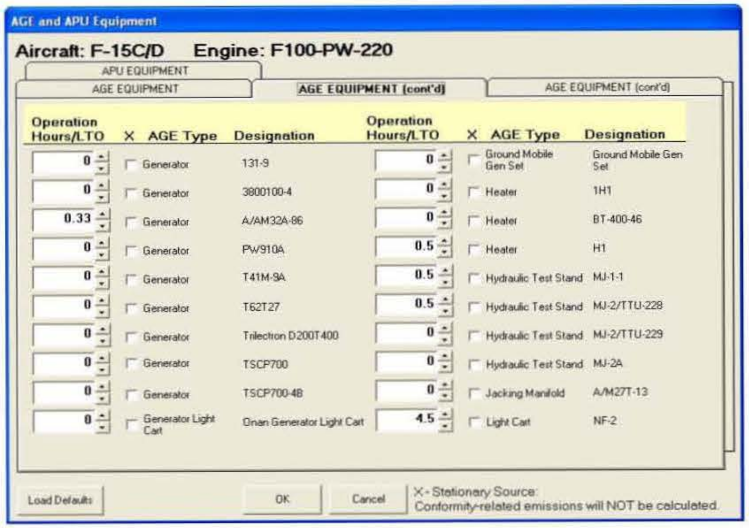
Operational Emissions - Transportation																		
Commuting Personnel from Surrounding Communities																		
Total Commuters		464	BRAC															
		509	Post BRAC															
POV Emissions from Comuting Working Military and Civilians																		
Assume 20 miles per day per vehicle (one vehicle per worker)																		
BRAC																		
Commuting POV emissions														**BRAC Commuter TOTAL**				
			VOC	**CO**	**NOx**	**SOx**	**PM**	**VOC**	**CO**	**NOx**	**SOx**	**PM**		**VOC**	**CO**	**NOx**	**SOx**	**PM**
# vehicles	# days	mi/day	lb/mi	lb/mi	lb/mi	lb/mi	lb/mi	lb	lb	lb	lb	lb		Tons	Tons	Tons	Tons	Tons
464	250	20	0.001497	0.013925	0.001489	0.000009	0.000080	3473.04	32306.00	3454.48	20.88	184.81		1.74	16.15	1.73	0.01	0.09
								1.74	16.15	1.73	0.01	0.09						
POST BRAC																		
Commuting POV emissions														**Post-BRAC Commuter TOTAL**				
			VOC	**CO**	**NOx**	**SOx**	**PM**	**VOC**	**CO**	**NOx**	**SOx**	**PM**		**VOC**	**CO**	**NOx**	**SOx**	**PM**
# vehicles	# days	mi/day	lb/mi	lb/mi	lb/mi	lb/mi	lb/mi	lb	lb	lb	lb	lb		Tons	Tons	Tons	Tons	Tons
45	250	20	0.001497	0.013925	0.001489	0.000009	0.000080	336.83	3133.13	335.03	2.025	17.92		0.17	1.57	0.17	0.00	0.01
								0.17	1.57	0.17	0.00	0.01						
CUMULATIVE TOTAL (BRAC plus Post BRAC)																		
Commuting POV emissions														**Commuter TOTAL**				
			VOC	**CO**	**NOx**	**SOx**	**PM**	**VOC**	**CO**	**NOx**	**SOx**	**PM**		**VOC**	**CO**	**NOx**	**SOx**	**PM**
# vehicles	# days	mi/day	lb/mi	lb/mi	lb/mi	lb/mi	lb/mi	lb	lb	lb	lb	lb		Tons	Tons	Tons	Tons	Tons
509	250	20	0.001497	0.013925	0.001489	0.000009	0.000080	3809.87	35439.13	3789.51	22.905	202.74		1.90	17.72	1.89	0.01	0.10

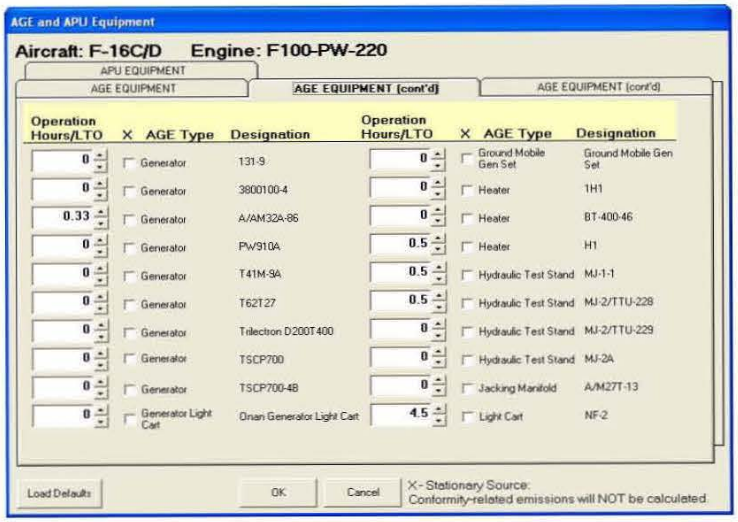
SOURCE_CATEGORY	CO	NOx	SO	VOC	PM
AGE	3.55	1.72	0.13	0.22	0.08

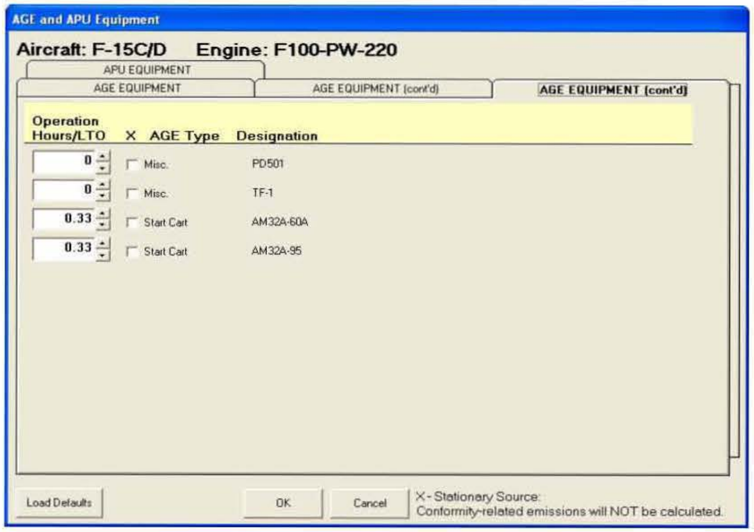
Source: Air Force Air Conformity Applicability Model 4.2.2 using default AGE modes for F-15C and F-16C/D aircraft.

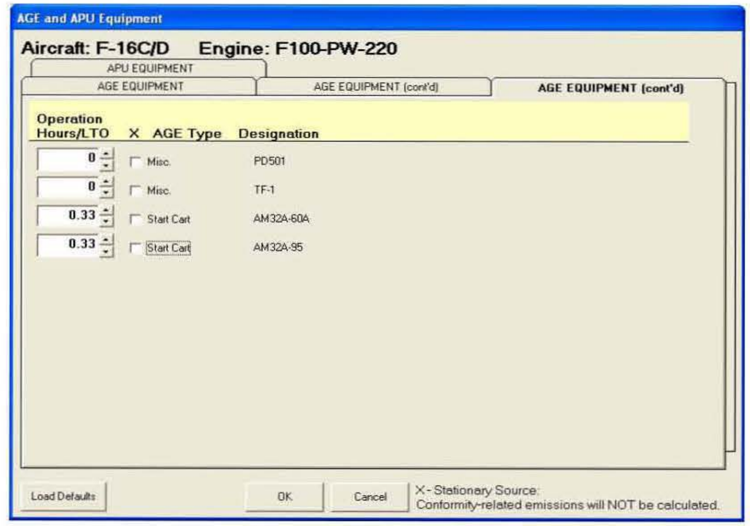





AGE and APU Equipment
Aircraft: F-15C/D Engine: F100-PW-220
APU EQUIPMENT
AGE EQUIPMENT
AGE EQUIPMENT (cont'd)
AGE EQUIPMENT (cont'd)
Operation Hours/LTO X AGE Type Designation
0 Generator 131-9
0 Generator 3800100-4
0.33 Generator A/AM32A-86
0 Generator PW910A
0 Generator T41M-9A
0 Generator T62T27
0 Generator Trilectron D200T400
0 Generator TSCP700
0 Generator TSCP700-48
0 Generator Light Cart Onan Generator Light Cart
Operation Hours/LTO X AGE Type Designation
0 Ground Mobile Gen Set Ground Mobile Gen Set
0 Heater 1H1
0 Heater BT-400-46
0.5 Heater H1
0.5 Hydraulic Test Stand MJ-1-1
0.5 Hydraulic Test Stand MJ-2/TTU-228
0 Hydraulic Test Stand MJ-2/TTU-229
0 Hydraulic Test Stand MJ-2A
0 Jacking Manifold A/M27T-13
4.5 Light Cart NF-2
Load Defaults
OK
Cancel
X - Stationary Source:
Conformity-related emissions will NOT be calculated.


AGE and APU Equipment
Aircraft: F-16C/D Engine: F100-PW-220
APU EQUIPMENT
AGE EQUIPMENT
AGE EQUIPMENT (cont'd)
AGE EQUIPMENT (cont'd)
Operation Hours/LTO X AGE Type Designation
0 Generator 131-9
0 Generator 3800100-4
0.33 Generator A/AM32A-86
0 Generator PW910A
0 Generator T41M-9A
0 Generator T62T27
0 Generator Trilectron D200T400
0 Generator TSCP700
0 Generator TSCP700-4B
0 Generator Light Cart Onan Generator Light Cart
Operation Hours/LTO X AGE Type Designation
0 Ground Mobile Gen Set Ground Mobile Gen Set
0 Heater 1H1
0 Heater BT-400-46
0.5 Heater H1
0.5 Hydraulic Test Stand MJ-1-1
0.5 Hydraulic Test Stand MJ-2/TTU-228
0 Hydraulic Test Stand MJ-2/TTU-229
0 Hydraulic Test Stand MJ-2A
0 Jacking Manifold A/M27T-13
4.5 Light Cart NF-2
Load Defaults
OK
Cancel
X - Stationary Source:
Conformity-related emissions will NOT be calculated.


AGE and APU Equipment
Aircraft: F-15C/D Engine: F100-PW-220
APU EQUIPMENT
AGE EQUIPMENT
AGE EQUIPMENT (cont'd)
AGE EQUIPMENT (cont'd)
Operation Hours/LTO
X
AGE Type
Designation
0
Misc.
PD501
0
Misc.
TF-1
0.33
Start Cart
AM32A-60A
0.33
Start Cart
AM32A-95
Load Defaults
OK
Cancel
X - Stationary Source:
Conformity-related emissions will NOT be calculated.


AGE and APU Equipment
Aircraft: F-16C/D Engine: F100-PW-220
APU EQUIPMENT
AGE EQUIPMENT
AGE EQUIPMENT (cont'd)
AGE EQUIPMENT (cont'd)
Operation Hours/LTO
X
AGE Type
Designation
0
Misc.
PD501
0
Misc.
TF-1
0.33
Start Cart
AM32A-60A
0.33
Start Cart
AM32A-95
Load Defaults
OK
Cancel
X - Stationary Source:
Conformity-related emissions will NOT be calculated.

			BRAC Realignment							POST BRAC							
FY	Emission Source	Factor	VOC	CO	NOx	SO2	PM10	PM2.5	FY	Emission Source	Factor	VOC	CO	NOx	SO2	PM10	PM2.5
07	Construction		0.40	1.90	3.00	0.30	27.00	2.90	07	Operations/AGE for 8 F-16s		44.90	37.15	3.06	12.44	5.29	0.00
	AGE for Beddown of 5 F-16s		0.05	0.78	0.38	0.03	0.02										
	Personnel Commute	22%	0.38	3.55	0.38	0.00	0.02			Personnel Commute	100%	0.17	1.57	1.73	0.00	0.01	
Total			**0.83**	**6.23**	**3.76**	**0.33**	**27.04**	**2.90**	**Total**			**45.07**	**38.72**	**4.79**	**12.44**	**5.30**	**0.00**
08	Construction		0.10	0.30	0.60	0.10	0.80	0.10	08	Operations/AGE for 8 F-16s		44.90	37.15	3.06	12.44	5.29	0.00
	AGE for Beddown of 5 F-16s		0.05	0.78	0.38	0.03	0.02										
	Personnel Commute	22%	0.38	3.55	0.38	0.00	0.02			Personnel Commute	100%	0.17	1.57	1.73	0.00	0.01	
Total			**0.53**	**4.63**	**1.36**	**0.13**	**0.84**	**0.10**	**Total**			**45.07**	**38.72**	**4.79**	**12.44**	**5.30**	**0.00**
09	Construction		0.40	1.70	3.60	0.40	11.10	1.30	09	Operations/AGE for 8 F-16s		44.90	37.15	3.06	12.44	5.29	0.00
	AGE for Bedown of 5 F-16s		0.05	0.78	0.38	0.03	0.02										
	Personnel Commute	22%	0.38	3.55	0.38	0.00	0.02			Personnel Commute	100%	0.17	1.57	1.73	0.00	0.01	
Total			**0.83**	**6.03**	**4.36**	**0.43**	**11.14**	**1.30**	**Total**			**45.07**	**38.72**	**4.79**	**12.44**	**5.30**	**0.00**
10	AGE for Bedown of 5 F-16s/6 F-15Cs		0.11	1.70	0.83	0.06	0.04		10	Operations/AGE for 8 F-16s		44.90	37.15	3.06	12.44	5.29	0.00
	Personnel Commute	48%	0.84	7.75	0.83	0.00	0.04			Personnel Commute	100%	0.17	1.57	1.73	0.00	0.01	
Total			**0.94**	**9.46**	**1.66**	**0.07**	**0.08**	**0.00**	**Total**			**45.07**	**38.72**	**4.79**	**12.44**	**5.30**	**0.00**
11	AGE for Bedown of 5 F-16s/6 F-15Cs		0.22	3.55	1.72	0.13	0.08		11	Operations/AGE for 8 F-16s		44.90	37.15	3.06	12.44	5.29	0.00
	Personnel Commute	100%	1.74	16.15	1.73	0.01	0.09			Personnel Commute	100%	0.17	1.57	1.73	0.00	0.01	
										Construction		0.98	5.14	7.30	0.81	24.89	2.97
Total			**1.96**	**19.70**	**3.45**	**0.14**	**0.17**	0.00	**Total**			**46.05**	**43.86**	**12.09**	**13.25**	**30.19**	**2.97**

	Total Commute Emissions					
Proportion of Personnel - BRAC	1.74	16.15	1.73	0.01	0.09	From transportation spreadsheet
22%	0.38	3.55	0.38	0.00	0.02	
48%	0.84	7.75	0.83	0.00	0.04	
Proportion of Aircraft	Total AGE Emissions					
	0.22	3.55	1.72	0.13	0.08	From ACAM
22%	0.05	0.78	0.38	0.03	0.02	
48%	0.11	1.70	0.83	0.06	0.04	

Total/FY	VOC	CO	NOx	SO2	PM10	PM2.5
07	45.90	44.95	8.55	12.77	32.34	2.90
08	45.60	43.35	6.15	12.57	6.14	0.10
09	45.90	44.75	9.15	12.87	16.44	1.30
10	46.01	48.18	6.45	12.51	5.38	0.00
11	48.01	63.56	15.54	13.39	30.36	2.97

APPENDIX D

STATE AND FEDERAL LISTED SPECIES POTENTIALLY FOUND ON NELLIS AIR FORCE BASE (AFB) OR WITHIN THE NEVADA TEST AND TRAINING RANGE (NTTR)

APPENDIX D

STATE AND FEDERAL LISTED SPECIES POTENTIALLY FOUND ON NELLIS AIR FORCE BASE (AFB) OR WITHIN THE NEVADA TEST AND TRAINING RANGE (NTTR)

The following provides a list of all state and federally listed plant species potentially found on Nellis AFB or within the NTTR. These lists include the common and scientific names, state and federal rankings, and brief description of potential habitat where the species in commonly found.

Table D-1. Special Status Plant Species Known or Likely to Occur on Nellis AFB and NTTR (page 1 of 3)

Scientific Name Common Name	***Regulatory Status[1]***	***Heritage Rank[2]***	***Description, Flowering, Period***	***Distribution and Habitat (reference)***
Arctomecon californica Las Vegas bearpoppy	SOC, CE		Cespitose perennial herb, with 6-20 yellow flowers on each stalk; flowers April-May	On barren slopes, flats, and hummocks, often on gypsum soils, in creosote bush scrub, 1,310-2,760 feet.
Artomecon merriami Merriam’s bearpoppy	SOC, BLM	G3S2	Clumped perennial herb, with white flowers borne singly on stalks; flowers April-June	Shallow gravelly soils, limestone outcrops, flats and dry lake beds, in various Mojave Desert scrub communities, 2,000-6,300 feet.
Eriogonum corymbosum Las Vegas buckwheat	SOC	G5T2S2	Leaves and flowering branches with silvery tufts of cobwebby hairs flowers August-November	On and near gypsum soils, or outcrops in washes and drainages, in areas of generally low relief, 1900-3839 feet.
Asclepias eastwoodiana Eastwood milkweed	SOC, BLM	G2S2	Low, few-stemmed perennial herb from woody caudex; flowers May-June	Occurs in low alkaline clay hills or shallow, gravelly drainages, in shadscale scrub, 5,300-6,900 feet.
Astragalus amphioxus var. *musimonum* Sheep Range milkvetch	SOC, BLM	G5T2S2	Low tufted perennial herb; flowers April-June	On dry limestone bajadas, gentle slopes, disturbed areas, in mixed Mojave Desert scrub and pinyon-juniper woodland, 4,400-6,400 feet.
Astragalus beatleyae Beatly milkvetch	SOC, CE	G2S2	Dwarf, cespitose perennial herb; flowers in May	On shallow, gravelly rhyolitic tuff soil, in barren areas, mixed scrub, and pinyon-juniper woodland, 5,600-6,800 feet.
Astragalus funereus Black wollypod	SOC, BLM	G2S2	Mat-forming perennial herb; flowers March-May	On steep, gravelly slopes of volcanic tuff, occasionally on limestone screes, in barren areas and shadscale scrub, 3,200-7,680 feet.
Astragalus mohavensis var. *hemigyrus* Half-ring pod milkvetch	SOC, CE	G3T2S2	Bushy perennial herb; flowers April-June	On limestone ledges and gravelly hillsides, with creosote, juniper, 3,400-6,070 feet.

Table D-1. Special Status Plant Species Known or Likely to Occur on Nellis AFB and NTTR (page 2 of 3)				
Scientific Name Common Name	***Regulatory Status***[1]	***Heritage Rank***[2]	***Description, Flowering, Period***	***Distribution and Habitat (reference)***
Astragalus oophorus var. *clokeyanus* Clokey eggvetch	SOC		Low, slender perennial herb; flowers June-July	On NTTR in washes bordering pinyon-juniper; elsewhere on ridges and slopes in gravelly limestone soil, in sagebrush scrub, pinyon-juniper woodland, and montane forest, 6,800-9,100 feet.
Camissonia megalantha Cane Spring evening primrose	SOC	G1S2	Annual herb; flowers in May or June-October	In washes on volcanic soils and on a talus seepage slope at Cane Spring, in shadscale scrub.
Castilleja martinii var. *clokeyi* Clokey paintbrush	SOC	G3T2S2	Perennial herb; flowers June-July	On mountains in sagebrush scrub, pinyon-juniper woodland, ponderosa pine-white fir forest, 6,200-9,000 feet.
Cymopterus ripleyi var. *saniculoides* Sanicle biscuitroot	SOC, BLM	G1S1	Perennial herb; flowers in April-June	On sand dunes, sandy soil, volcanic tuff, in shadscale scrub, 3,900-6,800 feet.
Erigeron ovinus Sheep fleabane	SOC, BLM	G1S1	Perennial herb from taproot; flowers in June	On limestone outcrops in pinyon-juniper woodland, 6,200-8,400 feet.
Erigonium corymbostem var. *glutinosum* Golden buckwheat	SOC	G5T3 S1S2	Large yellow-flowered shrub; flowers July-October	On fire or sandy soils in mixed desert shrub communities.
Frasera pahutensis Pahute green gentian	SOC, BLM	G2S2	Low, spreading perennial herb arising from woody rootstocks; flowers May-July	On gravelly slopes and valley bottoms, in pinyon-juniper woodland, 7,200-7,900 feet.
Galium hilendiae ssp. kingstonense Kingston bedstraw	SOC, BLM	G4T2S2	Dioecious, mat-forming, weak-stemmed perennial subshrub; flowers in June	On loose, rocky soil in ravines and gullies, in sagebrush scrub, pinyon-juniper woodland, 5,500-6,500 feet.
Penstemon pahutensis Pahute Mesa beardtongue	SOC, BLM	G2S2	Perennial herb arising from root crown; flowers June-July	On loose soil, rock areas; in barren areas and pinyon-juniper woodland, 5,800-7,500 feet.
Perityle megalocephala var. *intricata* Delicate Rock Daisy	SOC, BLM	G3S3	Perennial shrub flowers April-September	Creosote bush shrub, crevices or rubble of carbonate outcrops, 2,600-6,000 feet.
Phacelia beatleyae Beatley's phacelia	SOC, BLM	G2S2	Diminutive annual herb; flowers April-May	On gravel or volcanic tuff, along washes and in canyons, also on slopes. In barren areas, creosote bush scrub, shadscale scrub, 2,500-5,800 feet.

Table D-1. Special Status Plant Species Known or Likely to Occur on Nellis AFB and NTTR (page 3 of 3)

Scientific Name ***Common Name***	***Regulatory Status***[1]	***Heritage Rank***[2]	***Description, Flowering, Period***	***Distribution and Habitat (reference)***
Phacelia parishii Parish's phacelia	SOC, BLM		Low-spreading annual herb; flowers in May	Playas, shadscale scrub, 3,000-3,200 feet.

Source: Air Force 1999a

[1] Status abbreviated as follows:

Federal Status

FC = Candidate for federal listing as threatened or endangered.
SOC = Federal Species of Concern, indicating former candidate status and potential for reconsideration in the future.
BLM = Listed on Nevada BLM Sensitive Species List (4/97).

State Status

CE = Listed as Critically Endangered by the Nevada Division of Forestry

[2] TNC Rankings (TNC 1997) abbreviated as follows:

G = Global rank indicator, based on worldwide distribution at the species level.
T = Trinomial rank indicator, based on worldwide distribution at the infraspecific level.
S = State rank indicator, based on distribution within Nevada at the lowest taxonomic level.

1 = Critically imperiled due to extreme rarity, imminent threats, or biological factors.
2 = Imperiled due to rarity or other demonstrable factors.
3 = Rare and local throughout its range, or with very restricted range, or otherwise vulnerable to extinction.
4 = Apparently secure, though frequently quite rare in parts of its range, especially at the periphery.
5 = Demonstrably secure, though frequently quite rare in parts of its range, especially at the periphery.

Table D-2. Special Status Wildlife Species Known or Likely to Occur on Nellis AFB and NTTR (page 1 of 2)

Species	***Status***		***Occurrence on Range, Overflight Areas***
	Federal	*State*	
Threatened or Endangered Species			
Desert tortoise *(Gopherus agassizii)*	T	T	Present in low densities throughout Mojave Desert scrub habitat.
Special Status Species			
Pygmy rabbit *(Brachylagus idahoensis)*	SOC		Found in sagebrush communities where stands are dense, alluvial habitat is preferred. Potentially occurs on NTTR.
Spotted bat *(Euderma maculatum)*	SOC	T	Found in various habitats from desert to mountain coniferous forest but always in association with nearby high cliff faces. Observed on the NTS and potentially occurs on NTTR.
Peregrine falcon *(Falco peregrinus)*	SOC		Expected as a rare transient. No records of breeding on NTTR.
Western small-footed myotis *(Myotis ciliolabrum)*	SOC, BLM		Occurs in a variety of habitats but most common in arid environments. Roosts primarily in caves, buildings, mines, or crevices. Observed on the NTS and potentially occurs on NTTR.
Long-eared myotis *(Myotis evotis)*	SOC, BLM		Occurs primarily in forests by also less frequently in sage and chaparral habitats. Roosts in cracks in cliffs, hollow trees, caves, mines and buildings. Observed on the NTS and potentially occurs on NTTR.
Fringed myotis *(Myotis thysanodes)*	SOC, BLM		Found in desert scrub, shrub-steppe, oak-pinyon and coniferous forest habitats. Roosts in caves, rock crevices and buildings. Observed on NTTR.
Long-legged myotis *(Myotis volans)*	SOC, BLM		Typically associated with montane forests but also found in riparian and desert habitats. Roosts in rock crevices in cliffs, cracks in ground, behind loose bark on trees, and buildings. Observed on NTTR.
Townsend's big-eared bat *(Corynorhinus townsendii pallescens)*	SOC, BLM		Roosts in caves, mines and buildings.
Least bittern *(Ixobrychus exilis hesperis)*	SOC		Observed in wetlands of Pahranagat Valley. Expected in small ponds on NTTR infrequently in small numbers.
White-faced ibis *(Plegadis chihi)*	SOC		Observed in wetlands of Pahranagat Valley. Expected in small ponds on NTTR infrequently in small numbers.
Ferruginous hawk *(Buteo regalis)*	SOC		Spring and fall migrant and winter visitor in low numbers. No records of breeding on NTTR.

Table D-2. Special Status Wildlife Species Known or Likely to Occur on Nellis AFB and NTTR (page 2 of 2)

Species	***Status***		***Occurrence on Range, Overflight Areas***
	Federal	*State*	
Black tern *(Childonias niger)*	SOC, BLM		Observed at wetlands in Pahranagat Valley. Spring and fall migrant and summer visitor to the region and possibly the NTTR.
Burrowing owl *(Athene cunicularia)*	SOC	P	A spring and fall migrant and breeder on the NTTR. Recorded on NTTR in Great Basin desert scrub and expected in slightly disturbed areas. Observed and/or occurs on Nellis AFB.
Phainopepla *(Phainopepla nitens)*	BLM	P	A permanent resident of Mojave Desert scrub and desert spring habitats. Observed on NTTR. Observed and/or occurs on Nellis AFB.
Chuckwalla *(Sauromalus obesus)*	SOC, BLM		Expected in rocky hillsides and rock outcrops within the Mojave Desert scrub community. Observed and/or occurs on Nellis AFB.

Notes: E = Endangered
T = Threatened
SOC = Federal Species of Concern
BLM= Nevada BLM Sensitive Species List
CE = Listed as Critically Endangered by Nevada Department of Wildlife
P = Protected by the Nevada Department of Wildlife

Source: Air Force 1999a

APPENDIX E

ERP CONSTRUCTION WAIVER

From: Schmidt Bernd A GS-12 99 CES/CEVR [mailto:Bernd.Schmidt@nellis.af.mil]
Sent: Thursday, January 04, 2007 9:57 AM
To: Campe, James P.
Subject: FW: EU//A7yV Sign and relase//Nellis AFB - HQ ACC/A7V Construction Waiver Request at ERP Site SS-28

From: Barrett Robert C Civ ACC/A7V
Sent: Wednesday, January 03, 2007 2:12 PM
To: 99 CES/CE-2 Deputy Base Civil Engineer
Cc: Stringham Stephen D Col 99 CES/CC (IMA); McMullin Paul E GS - 13 99 CES/CEC; Hopper Eloisa V GS - 14 99 CES/CEV; Schmidt Bernd A GS-12 99 CES/CEVR; Roche Michael A Civ 99 CES/CEVA; ACC/A7D Design & Construction Division; Long Dennis W Civ ACC/A7DW; Clark Dale LtCol ACC/A7Z; Fitzpatrick, Douglas C Civ AFCEE/ICM; Roldan, Julio E Civ AFCEE/ICC; Lozano, Joy Contr AFCEE/ICC; Barrett Robert C Civ ACC/A7V; Chavis Alton Civ ACC/A7V; Shifflett David L Civ ACC/A7VR; Gravette Jim Civ ACC/A7VR; Seagraves Jeannette A Ctr ACC/A7VR; Walker Sandra B Civ ACC/A7V
Subject: FW: EU//A7yV Sign and relase//Nellis AFB - HQ ACC/A7V Construction Waiver Request at ERP Site SS-28

MEMORANDUM FOR 99 CES/CC

FROM: HQ ACC/A7V

SUBJECT: Request HQ ACC/A7V Waiver Approval to proceed with demo/construct Base Realignment and Closure Aggressor Aircraft Maintenance Unit at Environmental Restoration Program (ERP) Site SS-28, Nellis AFB, NV

1. ACC/A7V approves your attached waiver request (atch 1 and 2) to proceed with demo/construction.

2. The request indicates that the proposed work will neither result in spreading ERP contamination nor result in an increased risk to site workers. However, the proposed work will result in temporary partial shutdowns of active cleanup systems at Site SS-28 (i.e., bioventing and free product extraction) that are being operated under the performance-based contract (PBC). The request indicates that partial ERP system shutdowns will be limited to approximately two months during the demo phase and six months during the construction phase. Be aware that ACC/A7V approval is based on meeting all stipulations included in the waiver request package (6a-6l) including minimizing partial ERP system shutdowns and reconnecting/confirming these systems are fully operational at phase completion per ERP PBC contractor's requirements.

3. A7VR point of contact is Mr. Jim Gravette, DSN 574-1198, COMM 757-764-1198 or jim.gravette@langley.af.mil.

// signed //
ROBERT C. BARRETT
Chief, Environmental Division (A7V)

2 Attachments
1. Nellis Waiver Request - Text

2. Nellis Waiver Request – Figures

Atch 1

Nellis ERP Waiver Request 27 D…

Atch 2

Nellis ERP Waiver Request 27 D…

DEPARTMENT OF THE AIR FORCE
99TH CIVIL ENGINEER SQUADRON (ACC)
NELLIS AIR FORCE BASE, NEVADA 89191

MEMORANDUM FOR HQ ACC/A7VR
129 Andrews St., Suite 102
Langley AFB, VA 23665-2769

27 DEC 2006

FROM: 99 CES/CE-2
6020 Beale Ave.
Nellis AFB, NV 89191-7260

Subject: Request Waiver Approval to Construct Base Realignment and Closure (BRAC) Aggressor Aircraft Maintenance Unit (AMU) Hangar at Environmental Restoration Program (ERP) Site SS-28

1. Nellis AFB requests a waiver to construct a BRAC-funded Aggressor AMU/hangar on ERP Site SS-28. The site selected for the AMU/hangar is the old Nellis AFB flightline fuel yard which is currently under active remediation by the 4 Base Performance Based Restoration (PBR) contract.

2. Background: Site SS-28 is comprised of a dissolved phase/floating product jet fuel plume at the shallow groundwater aquifer located approximately 60 ft below ground surface (attachments 1 and 2). SS-28 has undergone soil vapor extraction (SVE) since 2001 (attachment 3) and groundwater extraction (i.e. pump and treat) since 1995 (attachment 4). In December 2006, the SVE system was converted to a bio-venting application utilizing existing piping (attachment 3). Both the bio-venting and groundwater extraction/treatment systems are expected to be in operation until the end of the PBR contract in September 2010.

3. The BRAC Aggressor AMU/hangar project has 2 phases:

a. Phase I: Beginning 8 January 2007, with a total project duration of three months, the Phase I project will demolish the old flightline fuel yard in preparation for the Phase II AMU/hangar construction. The Phase I project includes the demolition/removal of the following:

- Three remaining 50K gallon underground storage tanks (USTs) and fuel dispensing island
- Non-restoration associated piping, valves, and electrical appurtenances
- Capping, cleaning, and removal of the oil/water separator
- Asphalt and possibly fuel impacted soil

b. Phase II: The Phase II project includes the construction of the AMU/hangar and is scheduled to begin August 2007.

4. The Phase I demolition work will include the temporary shut down and disconnection of the bio-venting system section located in close proximity to the USTs. All other portions of the bio-venting system will remain in operation during the Phase I project. At the completion of the Phase I project, the bio-venting piping will be reconnected and section of the bio-venting system will be turned back on. Similarly, groundwater extraction well 28EW-36 will be taken out of service and reconnected to full operational status upon completion of Phase I. The construction contractor, to the greatest extent possible, will afford the 4 Base PBR contractor access to the groundwater remediation systems within the construction zone.

5. The Phase II portion of the project includes the construction of the AMU/hangar on the "heart" of the plume where benzene concentrations are at their highest and where key groundwater monitoring and extraction wells exist. The 4 Base PBR contractor has tentatively approved two options for the restoring the extraction/monitoring wells and bio-venting system in the AMU/hangar project site:

a. Keep existing extraction/monitoring wells in current locations resulting in those wells being installed in the floor of the aircraft maintenance bay.

b. Abandon groundwater/extraction wells located within the construction footprint and relocate new wells outside the hangar footprint. Slant drilling would be the method utilized to re-establish connection to the groundwater plume "hot spot."

6. In accordance with guidance from HQ ACC/A7VR, the following stipulations for construction on/near ERP sites when known contamination is present, will be met:

a. The ERP systems will never be "fully turned off" during the construction projects, and all partial shutdowns (Phase I - approximately 2 months; Phase II - approximately 6 months) will be minimized to the greatest extent possible.

b. If the Phase I or Phase II construction phase is significantly delayed (i.e. 4 weeks beyond projected outage) or for any reason the contractor plans to demobilize prior to phase completion, the contractor will reconnect the ERP system per PBR contract requirements and confirm the fully operational status of all EPR systems and wells.

c. This project will comply with NDEP guidance for disposal of contaminated soils/materials.

d. Contaminated materials identified during construction will be removed and disposed using project funds. All soil removed from any ERP site shall require sampling and analysis for disposal purposes. Additionally, the exposed remaining soil (new surface layer) will require sampling and analysis as well. The restoration program manager (RPM) will assist in determining sampling requirements. Note: any sampling and analysis conducted will be a construction cost. Any excavated area will be backfilled with clean fill, and graded to meet existing conditions.

e. Construction contractor and site workers will be informed of the potential for encountering contaminated material on the job site. Safety observers currently certified with OSHA 1910.120 Hazardous Waste Operation and Emergency Response (HAZWOPER) training will be on site during construction activities, as necessary.

f. The contractor will ensure a monitoring program is in place during construction.

g. The contractor will be financially responsible for damages to ERP wells or system due to negligence or improper construction methods. Repairs necessary will be IAW with PBR contractor requirements.

h. The contractor will use certified well drillers to conduct all ERP well work (i.e., well installations, repairs, replacements, and abandonment's). All well work will meet Federal, State, and ERP requirements.

i. The contractor will document in writing and with photographs all work on the ERP wells and systems (i.e. well installation, repairs, replacement, and abandonment). The documentation will be provided to the Nellis AFB ERP at completion of each construction phase.

j. The contractor will ensure procedures for decontamination of heavy equipment are established.

k. The contractor will ensure provisions for safeguarding base personnel and the public (i.e., conspicuous signage, security, air monitoring, etc.) are enforced.

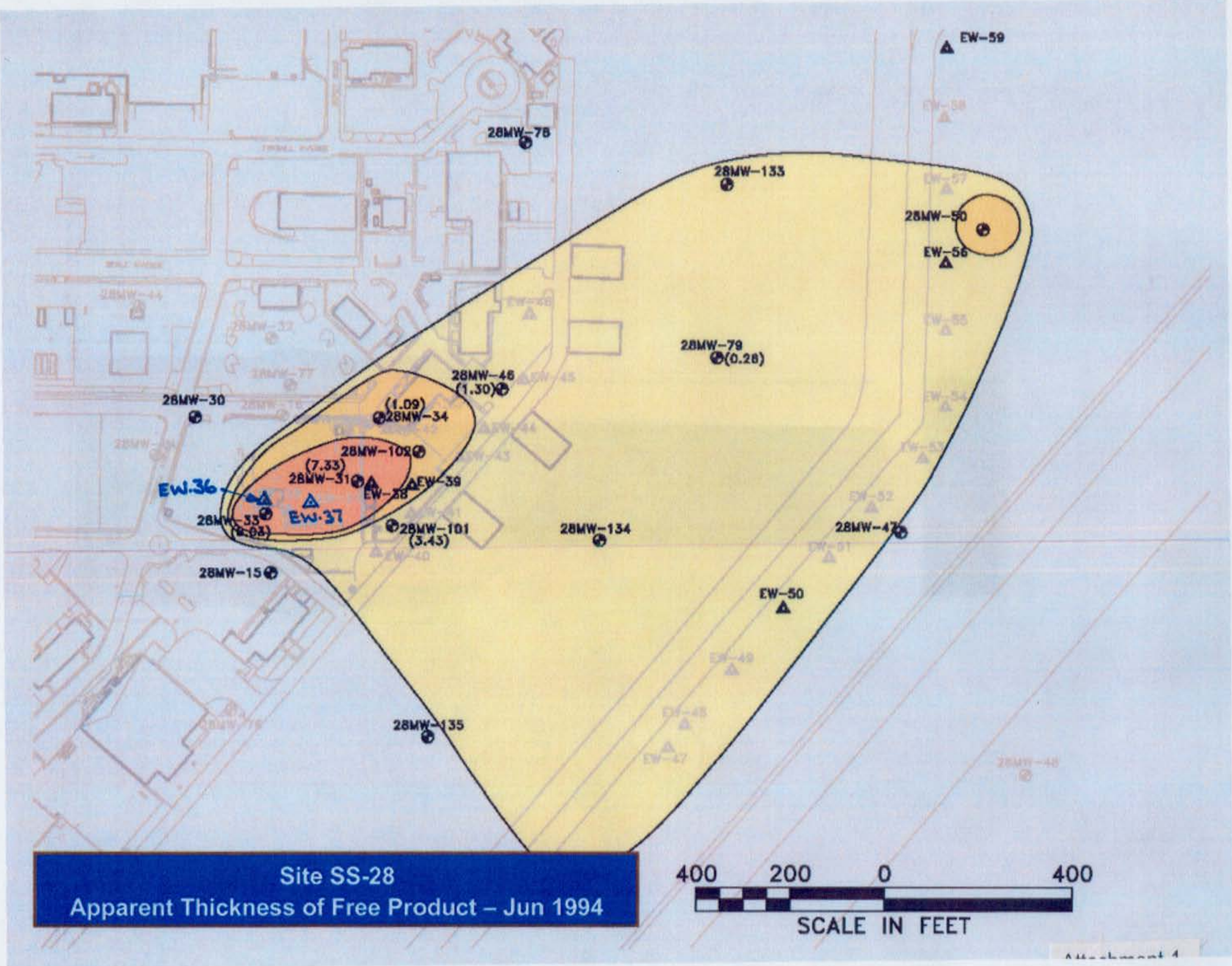
l. The contractor will ensure an AF Form 103 (Base Civil Engineering Work Clearance Request) is coordinated through 99CES/CEVR prior to project start up.

7. If you have any questions concerning this request, contact Mr Bernd Schmidt at 702-652-2882 (DSN 682-2882).

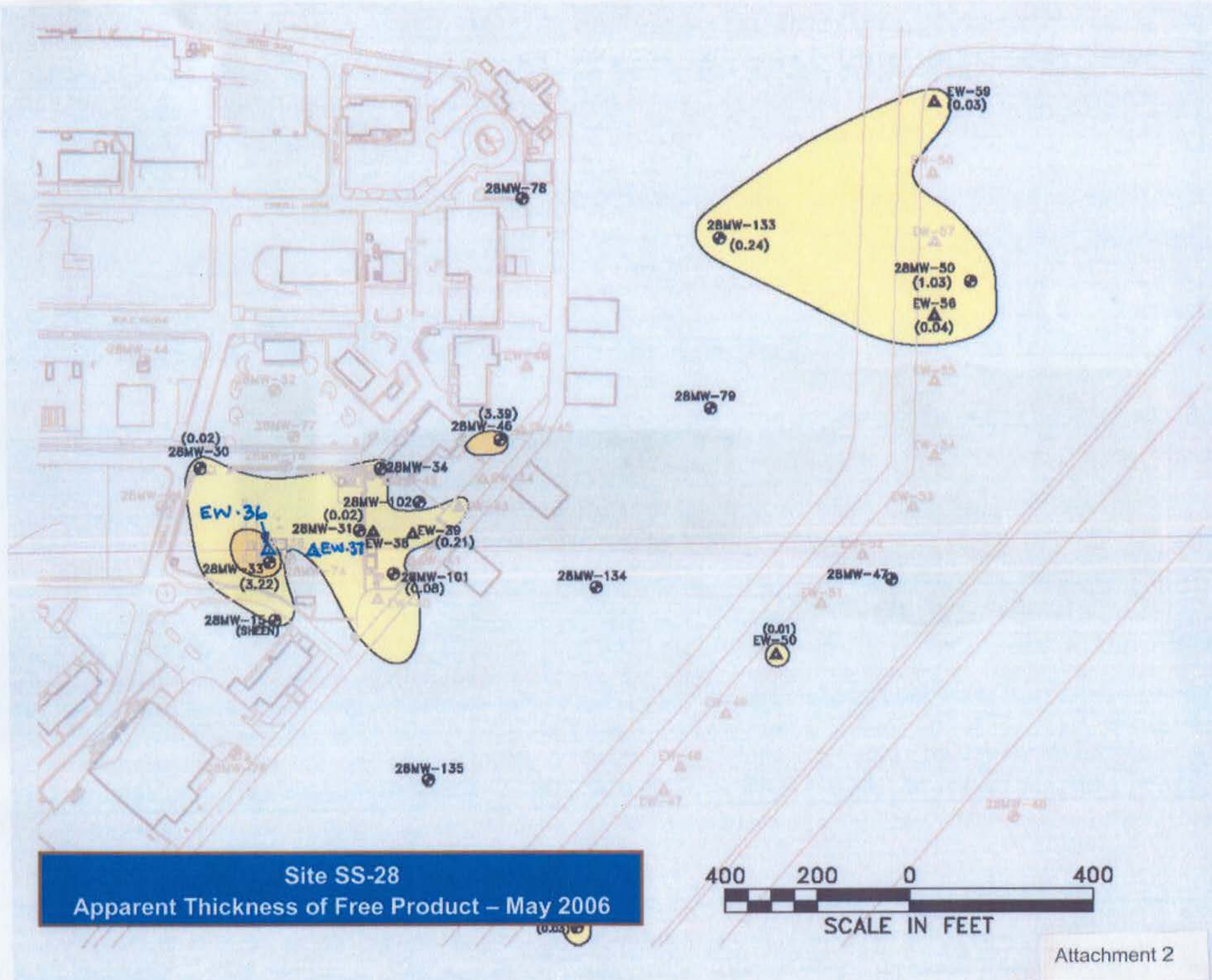
STEPHEN D. STRINGHAM, Colonel, USAFR
IMA to the Base Civil Engineer

Attachments:
1. SS-28 Groundwater Plume, 1994
2. SS-28 Groundwater Plume, 2006
3. Site Map: Hangar Footprint and Bioventing Underground Piping
4. Site Map: Groundwater extraction System Underground Piping

cc:
Ms. Sara Arav-Piper, NDEP, Bureau of Corrective Actions
Mr. Jon Ritterling, URS Corporation
Ms. Joy Lozano, Booz Allen Hamilton
Mr. Paul McMullin, U.S. Army Corps of Engineers (Los Angeles District)



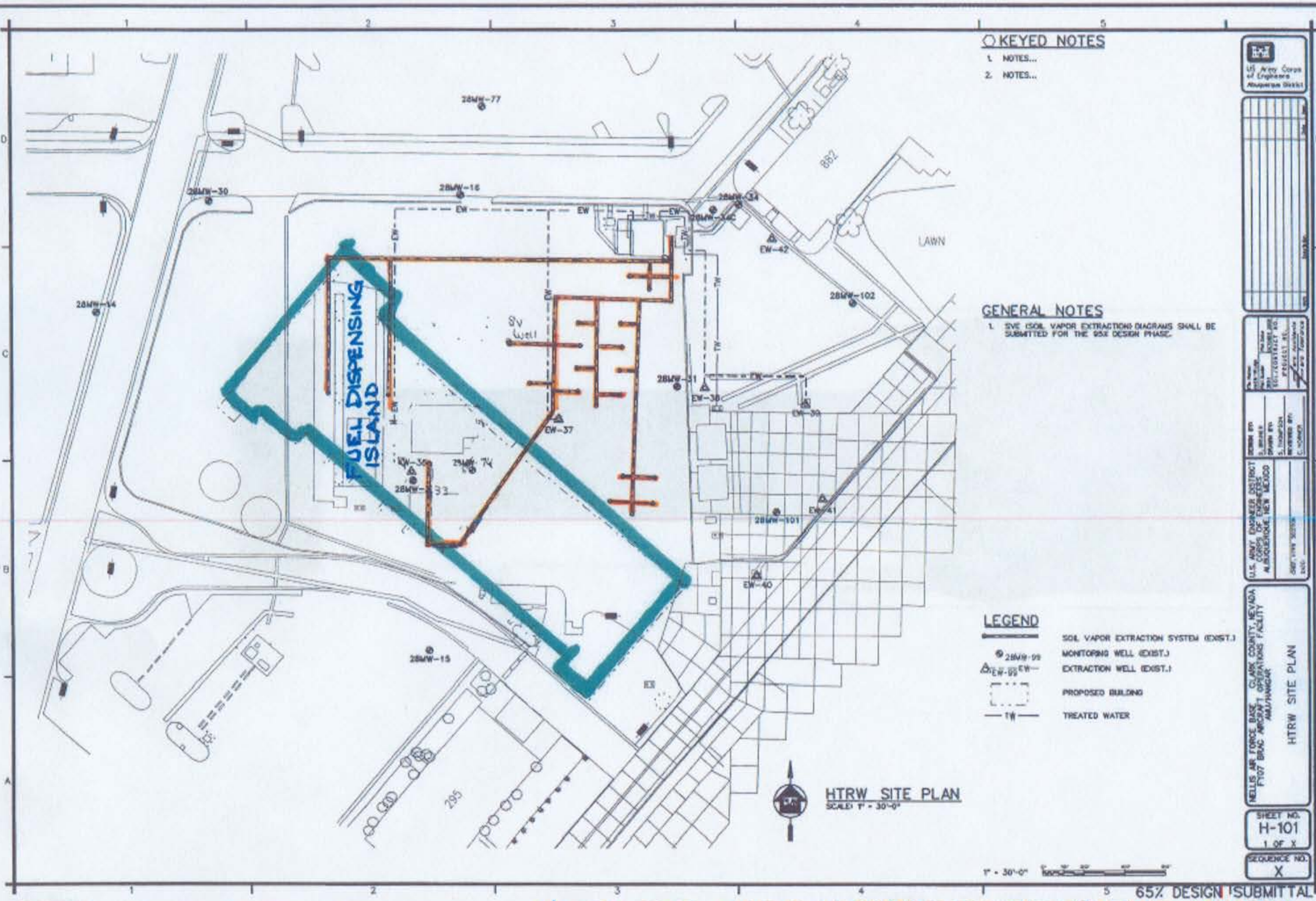
Site SS-28
Apparent Thickness of Free Product – Jun 1994



Site SS-28
Apparent Thickness of Free Product – May 2006

Attachment 2

HANGAR FOOTPRINT AND BIOVENT PIPING

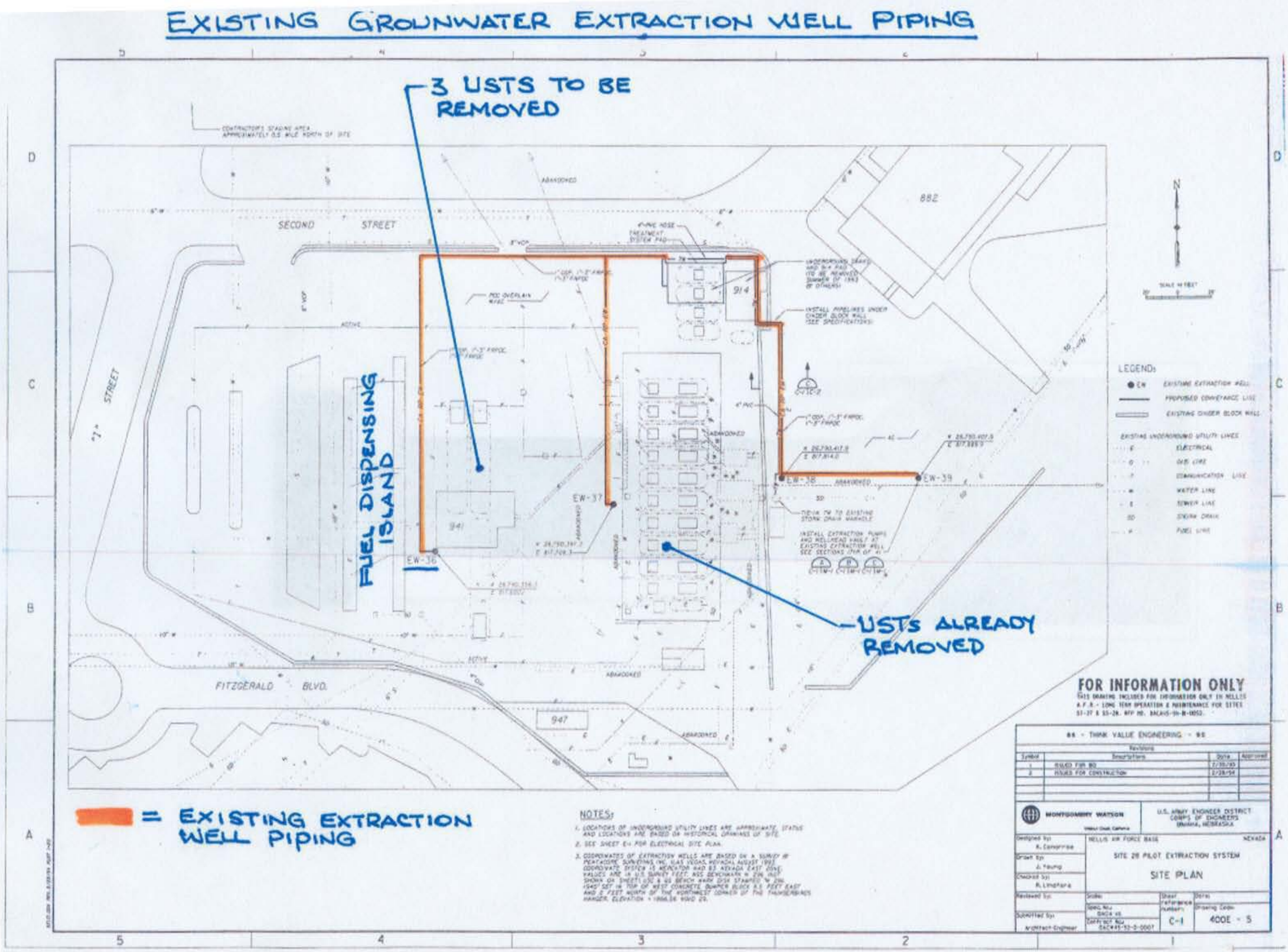


= HANGAR FOOTPRINT

= EXISTING SVE PIPING

NOTE: SVE WAS CONVERTED TO BIO VENTING SYSTEM UTILIZING EXISTING PIPING

Attachment 3



Attachment 4

APPENDIX F

SHPO CONSULTATION

STATE OF NEVADA
DEPARTMENT OF CULTURAL AFFAIRS
Nevada State Historic Preservation Office
100 N. Stewart Street
Carson City, Nevada 89701
(775) 684-3448 • Fax (775) 684-3442
www.nvshpo.org

KENNY C. GUINN
Governor

SCOTT K. SISCO
Interim Director

RONALD M. JAMES
State Historic Preservation Officer

CEVN–

December 1, 2006

Eloisa V. Hopper
Chief, Environmental Flight
99 CES/CEV
4349 Duffer Drive, suite 1601
Nellis Air Force Base, NV 89191

Re: Report Titled 'Nellis Air Force Base (Nellis) – Historic Evaluation of Nine (9) Buildings (October 2006)' by Geo-Marine, Inc. and Determinations of Eligibility and Effect.

Dear Ms. Hopper:

Thank you for submitting the requested information. The Nevada State Historic Preservation Office (SHPO) has reviewed the subject undertaking for compliance with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended. Nellis proposes the demolition and replacement of the following buildings:

#	Name	Location	Built
1	Building #250	Nellis AFB	1956
2	Building #258	Nellis AFB	1956
3	Building #264	Nellis AFB	1971
4	Building #265	Nellis AFB	1956
5	Building #415	Nellis AFB	1953
6	Building #839	Nellis AFB	1955
7	Building #841	Nellis AFB	1956
8	Building #941	Nellis AFB	1951
9	Building #67	Creech AFB	1952

Area of Potential Effect (APE) for Nellis AFB (formerly Las Vegas Army Airfield)

Based on the information included in "Figure 3 – Evaluated Buildings within Areas I and III of the main base of Nellis AFB", the SHPO accepts the outlined APE for the evaluation of Buildings 250, 258, 264, 265, 415, 839, 841, and 941. Subject buildings are located within an area containing a high number of buildings and/or structures built after 1962.

Area of Potential Effect (APE) for Creech AFB (formerly Indian Springs AFB)

Based on the information included in "Figure 4 – Evaluated Buildings at Creech AFB', the SHPO accepts the APE.

Determinations of Eligibility

The SHPO concurs with the following Nellis' determinations of eligibility for the subject buildings:

#	Name	Current Function	Built	Eligibility
1	Building #250	HQ, 64th and 65th Aggressor Squadron	1956	Not Eligible
2	Building #258	HQ, 57th Equipment Maintenance Squadron	1956	Not Eligible
3	Building #264	Weapons and Release Systems Shop	1971	Not Eligible
4	Building #265	Aircraft Maintenance Organizational Shop	1956	Not Eligible
5	Building #415	Aerospace Ground Equipment Facility	1953	Not Eligible
6	Building #839	Communication Facility (Laundry Facility)	1955	Not Eligible
7	Building #841	Base Cold Storage	1956	Not Eligible
8	Building #941	Pump Station, Liquid Fuel	1951	Not Eligible
9	Building #67	Administration Building	1952	Not Eligible

Determinations of Effect

The SHPO concurs with Nellis' determination of 'No Adverse Effect' for the subject undertaking.

If you have any questions, please contact me at 775-684-3444 or Rebecca R. Ossa, Architectural Historian at 775-687-3441 or via email at: rrossa@clan.lib.nv.us.

Sincerely,

Alice M. Baldrica

Alice M. Baldrica, Deputy
State Historic Preservation Officer