Draft
Environmental Assessment
Combat Air Forces Adversary Air
Holloman Air Force Base, New Mexico

April 2020

United States Air Force
49th Wing

Holloman Air Force Base, New Mexico

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PRIVACY ADVISORY

This Environmental Assessment (EA) is provided for public comment in accordance with the National Environmental Policy Act, the President's Council on Environmental Quality National Environmental Policy Act Regulations (40 Code of Federal Regulations Parts 1500 to 1508), and 32 Code of Federal Regulations Part 989, *Environmental Impact Analysis Process (EIAP)*.

The Environmental Impact Analysis Process provides an opportunity for public input on Air Force decision-making, allows the public to offer inputs on alternative ways for the Air Force to accomplish what it is proposing, and solicits comments on the Air Force's analysis of environmental effects.

Public commenting allows the Air Force to make better, informed decisions. Letters or other written or oral comments provided may be published in the EA. As required by law, comments provided will be addressed in the EA and made available to the public. Providing personal information is voluntary. Any personal information provided will be used only to identify your desire to make a statement during the public comment portion of any public meetings or hearings or to fulfill requests for copies of the EA or associated documents. Private addresses will be compiled to develop a mailing list for those requesting copies of EA; however, only the names of the individuals making comments and specific comments will be disclosed. Personal home addresses and phone numbers will not be published in the EA.

COVER SHEET

DRAFT ENVIRONMENTAL ASSESSMENT (EA) FOR COMBAT AIR FORCES ADVERSARY AIR, HOLLOMAN AIR FORCE BASE

a. *Responsible Agency*: United States Air Force (Air Force)

b. *Cooperating Agency*: None

c. *Proposals and Actions:* The environmental assessment (EA) analyzes a Proposed Action to provide dedicated contract adversary air sorties for Combat Air Forces training at Holloman Air Force Base (AFB). The Proposed Action would include the addition of 78 contracted maintainers and 15 contracted pilots. Approximately 3,200 contracted sorties would be added to perform training activities within the Beak and Talon Military Operations Areas and to the extent available within White Sands Missile Range and McGregor Range Restricted Areas. The proposed facilities at Holloman AFB would include the required ramp space; maintenance space; operational space; petroleum, oil and lubricant storage; runway access; and associated parking to support the Proposed Action. Two alternatives in addition to the No Action Alternative were evaluated in the EA.

d. *For Additional Information:* Mr. Spencer Robison at 49 CES/CEIE, 550 Tabosa Avenue, Holloman AFB, New Mexico 88330 or by email at spencer.robison@us.af.mil.

e. *Designation:* Draft EA

f. *Abstract:* This EA has been prepared pursuant to provisions of the National Environmental Policy Act, Title 42 United States Code Sections 4321 to 4347, implemented by Council on Environmental Quality Regulations, Title 40, Code of Federal Regulations (CFR) Parts 1500 to 1508, and 32 CFR Part 989, *Environmental Impact Analysis Process*. Potentially affected environmental resources were identified in coordination with local, state, and federal agencies. Specific environmental resources with the potential for environmental consequences include airspace management and use; noise; safety; air quality; biological resources; land use; socioeconomics – income and employment; environmental justice and protection of children; and hazardous materials and waste, contaminated sites, and toxic substances.

The purpose of the Proposed Action is to provide dedicated contract adversary air (ADAIR) sorties to improve the quality of training and readiness of pilots of the 49th Wing located at Holloman AFB, New Mexico. By providing a dedicated contract ADAIR capability, F-16 trainees and instructor pilots would gain more realistic air-to-air training during their training syllabus tasks. Dedicated contract ADAIR would also allow the unit to free up resources used to self-generate ADAIR and more effectively use those available flying hours. Additionally, other Air Force units that are tasked to provide ADAIR training support at Holloman AFB could recapitalize valuable flying hours to focus on increasing their own levels of proficiency and readiness.

Contract ADAIR training scenarios would include the use of combat tactics and procedures that differ from Combat Air Forces tactics to simulate an opposing force. The elements affecting Holloman AFB include contract ADAIR aircraft, facilities, maintenance, personnel, and sorties. Elements affecting the airspace include airspace use and defensive countermeasures. The Proposed Action at Holloman AFB would include the establishment of an estimated 78 contracted maintainers and 15 contracted pilots who would operate an estimated 12 aircraft. Three aircraft types (F-5, A-4K, T-59 Hawk) have been identified which would meet the needs of the Air Force for contract ADAIR selection at Holloman AFB based on performance capabilities of the aircraft and how those capabilities best meet mission training requirements at the installation. Contracted ADAIR service providers may ultimately choose another type of aircraft to support Air Force ADAIR needs at Holloman AFB; however, any aircraft selected would need to operate within the parameters and impact levels evaluated within this EA or supplemental National Environmental Policy Act analysis would be required. The facilities proposed for use at Holloman AFB are available for use and include the required ramp space; maintenance space; operational space; petroleum, oil and lubricant storage; runway access; and associated parking to support the Proposed Action.

The analysis of the affected environment and environmental consequences of implementing the Proposed Action and alternatives concluded that by implementing standing environmental protection measures and Best Management Practices, there would be no significant adverse impacts from contract ADAIR operations at Holloman AFB or in the special use airspace on the following resources: airspace management and use; noise; safety; air quality; biological resources; land use; socioeconomics – income and employment; environmental justice and protection of children; and hazardous materials and wastes, contaminated sites, and toxic substances. Holloman AFB is an active installation with demolition and new construction actions currently underway as well as future development currently in the planning phase; however, potential impacts on air quality, noise, and socioeconomics – income and employment associated with construction would be minor and short in duration; therefore, significant cumulative impacts are not anticipated from activities associated with the Proposed Action when considered with past, present, or reasonably foreseeable future actions.

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DRAFT FINDING OF NO SIGNIFICANT IMPACT (FONSI)

COMBAT AIR FORCES ADVERSARY AIR
HOLLOMAN AIR FORCE BASE, NEW MEXICO

Pursuant to provisions of the National Environmental Policy Act (NEPA), 42 United States Code (U.S.C.) §§ 4321 to 4370h; Council on Environmental Quality (CEQ) Regulations, 40 Code of Federal Regulations (CFR) Parts 1500 to 1508; and 32 CFR Part 989, *Environmental Impact Analysis Process,* the United States Air Force (Air Force) prepared the attached Final Environmental Assessment (EA) to address the potential environmental consequences associated with providing contract adversary air (ADAIR) sorties for improving training and readiness of pilots at Holloman Air Force Base (AFB), New Mexico.

Purpose and Need

The purpose of the Proposed Action is to provide dedicated contract ADAIR sorties to improve the quality of training and readiness of 49th Wing (49 WG) pilots located at Holloman AFB, New Mexico. Contract ADAIR support would employ adversary tactics across the training spectrum from basic fighter maneuvers to higher-end, advanced, simulated, combat training missions. By providing a dedicated contract ADAIR capability, F-16 trainees and instructor pilots would gain more realistic air-to-air training during their training syllabus tasks. Dedicated contract ADAIR would also allow the unit to free up resources used to self-generate ADAIR and more effectively use those available flying hours. Additionally, other Air Force units tasked to provide ADAIR training support at Holloman AFB could recapitalize valuable flying hours to focus on increasing their own levels of proficiency and readiness.

The need for action is to provide better and more realistic training for the F-16 flight training program at Holloman AFB. Dedicated contract ADAIR is critical to improving pilot readiness as it provides realistic training opportunities to employ Combat Air Forces (CAF) tactics and procedures that optimize the training value of every mission. Contract ADAIR can be used in basic building block syllabus sorties or the very advanced and fluid environment of multiaircraft air combat required by the training syllabus.

Description of Proposed Action and Alternatives

The Proposed Action would provide dedicated contract ADAIR sorties for CAF training at Holloman AFB to address shortfalls in F-16 pilot training and production capability and to provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to higher-end, advanced training missions. Training scenarios would include the use of combat tactics and procedures that differ from CAF tactics to simulate an opposing force. The elements affecting Holloman AFB include contract ADAIR aircraft, facilities, maintenance, personnel, and sorties. The elements affecting the airspace include airspace use and defensive countermeasures.

The Proposed Action at Holloman AFB would include the establishment of an estimated 78 contracted maintainers and 15 contracted pilots who would operate an estimated 12 aircraft. Three aircraft types (F-5, A-4K, T-59 Hawk) have been identified as capable of providing contract ADAIR support to F-16 CAF aircrews stationed at Holloman AFB. One or a combination of these aircraft types may be operated by a contractor at Holloman AFB in support of ADAIR training. The facilities proposed for use at Holloman AFB are available and include the required ramp space; maintenance space; operational space; petroleum, oil and lubricant storage; runway access; and associated parking to support the Proposed Action. Approximately 3,200 sorties annually would support training activities within nearby special use airspace including the Beak and Talon Military Operations Areas (MOAs) and to the extent available within White Sands Missile Range (WSMR) and McGregor Range Restricted Areas. Contract ADAIR aircraft would employ flares in all the special use airspace and chaff in the WSMR Restricted Areas.

In addition to the No Action Alternative, two alternatives for the proposed contract ADAIR were identified for evaluation in the EA. These alternatives are described below and represent various options for facility use at Holloman AFB.

Alternative 1

Contract ADAIR capabilities would be established using an estimated 12 aircraft providing 3,200 annual sorties at Holloman AFB. Of the 3,200 annual sorties, 3,144 training sorties would occur in the WSMR and McGregor Range Restricted Areas and Beak and Talon MOAs. The remaining sorties are expected for aircraft leaving for or returning from either maintenance or other deployments. Operations and maintenance activities would be consolidated in Building 578.

Alternative 2

Alternative 2 would be the same as described in Alternative 1 except operations would be located in Building 1062 and maintenance activities would be located in Building 578.

No Action Alternative

No action means that an action would not take place, and the resulting environmental effects from taking no action would be compared with the effects of allowing the proposed activity to go forward. No action for this EA reflects the status quo, where no contract ADAIR support at Holloman AFB would occur.

Summary of Findings

Potentially affected environmental resources were identified through communications with state and federal agencies and review of past environmental documentation. Specific environmental resources with the potential for environmental consequences include airspace management and use; noise; safety; air quality; biological resources; land use; socioeconomics – income and employment; environmental justice and protection of children; and hazardous materials and wastes, contaminated sites, and toxic substances.

Under the Proposed Action, the annual number of operations would increase by 6 percent and would not impact the operational capacity or necessitate changes to the locations or dimensions of the airspace around Holloman AFB. Potential impacts on the airspace around the airfield for Alternatives 1 and 2 would be negligible. Likewise, the special use airspace proposed for use has the capacity and the dimensions necessary to support contracted sorties; therefore, potential negligible impacts on airspace are anticipated for Alternatives 1 and 2.

Safety zones around the airfield are not expected to change. Buildings associated with contract ADAIR are located outside of identified quantity-distance arcs; therefore, no impacts on explosives safety are anticipated. With an established crash-damaged or disabled aircraft recovery program and implementation of all applicable Air Force Office of Safety and Health and Occupational Safety and Health Administration requirements, no significant impacts on ground safety are expected to occur. No significant impacts are expected to flight safety under the implementation of contractor flight safety rules and bird/wildlife-aircraft strike hazard (BASH) procedures.

Proposed contract ADAIR operations would potentially increase noise impacts; however, that increase would result in minor impacts for all alternatives. The primary changes in noise contours to the existing conditions resulted in a slight elongation at the runway centerline, increasing the affected area greater than 65 A-weighted decibels (dBA) day-night sound level (DNL) by approximately 1,117 additional acres. The increases in the DNL ranged from 0 to 1 dBA above the baseline condition. There would be a slight increase in noise from additional contract ADAIR subsonic and/or supersonic flight operations in the WSMR and McGregor Restricted Areas and the Talon and Beak MOAs; however, the impact on people is expected to be negligible.

Increased air emissions resulting from contract ADAIR operations at Holloman AFB are not considered significant under Alternatives 1 and 2. The proposed project would not interfere with the region's ability to maintain compliance with National Ambient Air Quality Standards for attainment area pollutants and would not interfere with the ability to achieve compliance for pollutants that contribute to ozone nonattainment. Contract ADAIR operations would take place below 3,000 feet only in the WSMR and McGregor Restricted Areas and the Talon Low MOA. None of the criteria pollutants emission rates would exceed the 100 tons per year *de minimis* threshold; therefore, no impacts on air quality are expected from contract ADAIR operations in the airspace proposed for use.

Noise impacts from increased operations at Holloman AFB would have a negligible, short- and long-term effect on wildlife. Airfield management and risk reduction implementation measures associated with the BASH program would continue to reduce BASH resulting in a minor impact on birds and other wildlife. No federally listed species are present at the Holloman AFB airfield; therefore, no impacts are anticipated to any listed species. Low-flying aircraft could startle breeding and foraging birds and mammals; however, aircraft training has occurred in the special use airspace for decades, and most wildlife has likely become habituated to aircraft movement and noise. The use of chaff and flares may have less than significant impacts on wildlife. Contract ADAIR aircraft movement at low altitudes may affect but is not likely to adversely affect select federally and state listed bird and mammal species during training. Contract ADAIR would have no effect on federally listed reptiles, amphibians, and invertebrates. The Air Force received concurrence with its determinations from the United States Fish and Wildlife Service.

No long-term changes to the existing land use at Holloman AFB or land uses beneath the airspace proposed for use are expected from contract ADAIR operations.

Since there is no new construction proposed at Holloman AFB, the interior upgrades to facilities for contract ADAIR operations would require only a small amount of supplies and labor and therefore, would not impact the existing socioeconomic environment. The 93 contracted ADAIR maintenance personnel and pilots would represent a small increase in the 5,300 military and civilian personnel currently employed at Holloman AFB; therefore, no adverse impact on socioeconomics – income and employment would occur. An estimated annual increase in expenditures of $48 million for contract ADAIR at Holloman AFB would have a potential major, beneficial, long-term impact.

No disproportionate impacts from increased noise on minority populations or low-income communities surrounding Holloman AFB are expected.

Hazardous waste generated as a result of contract ADAIR operations would be stored and disposed in accordance with the Holloman AFB *Hazardous Waste Management Plan*; therefore, no impacts from managing hazardous waste are expected. No impacts are expected from asbestos-containing materials and lead-based paint from interior renovations of facilities proposed for use with implementation of requirements described in existing management plans. Lighting fixtures containing polychlorinated biphenyls would be disposed in accordance with federal, state, and local laws, which would result in a long-term, minor, beneficial impact. There is a low potential for radon to pose a health hazard at Holloman AFB. As such, no impacts from radon are anticipated. There is no environmental contamination known to occur within the project area.

Cumulative Impacts

The EA considered cumulative impacts that could result from the incremental impact of the proposed project when added to other past, present, or reasonably foreseeable future actions. Federal and nonfederal actions with the potential to cause cumulative impacts were described in **Table 5-1**. In particular, the proposed MQ-9 Formal Training Unit Operations Facility and the NC3 Shipping/Storage Facility, which entails construction projects at Holloman AFB, have the potential to create cumulative noise, safety, and air quality impacts. No reasonably foreseeable future nonfederal actions beyond the conceptual phase were identified in the surrounding community. Optimization of special use airspace available for pilot training use through reconfiguration of existing airspace and establishing new airspace to accommodate current and future training requirements was considered along with other proposals. No potential significant cumulative impacts were identified for Holloman AFB or special use airspace.

Increased emissions at the installation from the Proposed Action, when considered with proposed construction projects at Holloman AFB, could increase particulates equal to or less than 10 microns in diameter, but those increases in emissions would be short in duration, and the incremental impact on air quality would be negligible. With the potential modifications to the airspace under the airspace optimization proposal, there is the potential for increased emissions; however, these emissions would be widely dispersed, and impacts on air quality within the airspace proposed for use would therefore be negligible.

Mitigation

The EA analysis concluded that the Proposed Action and alternatives would not result in significant environmental impacts; therefore, no mitigation measures are required.

Best Management Practices are described and recommended in the EA where applicable.

Conclusion

Finding of No Significant Impact. After review of the EA prepared in accordance with the requirements of NEPA; CEQ regulations; and 32 CFR Part 989, *Environmental Impact Analysis Process,* and which is hereby incorporated by reference, I have determined that the proposed activities to provide dedicated contract ADAIR sorties to improve the quality of training and readiness of pilots of the 49 WG located at Holloman AFB, New Mexico, would not have a significant impact on the quality of the human or natural environment. Accordingly, an Environmental Impact Statement will not be prepared. This decision has been made after considering all submitted information, including a review of public and agency comments submitted during the 30-day public comment period, and considering a full range of practical alternatives that meet project requirements and are within the legal authority of the United States Air Force.

DEE JAY KATZER, Colonel, Air Force **Chief, Civil Engineer Division (ACC/A4C)**	**DATE**

DRAFT

ENVIRONMENTAL ASSESSMENT (EA)

FOR

COMBAT AIR FORCES ADVERSARY AIR
HOLLOMAN AIR FORCE BASE, NEW MEXICO

PREPARED FOR:

Department of the Air Force

April 2020

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TABLE OF CONTENTS

Page

TABLE OF CONTENTS

Page

TABLE OF CONTENTS

Page

TABLE OF CONTENTS

LIST OF FIGURES

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LIST OF TABLES

LIST OF TABLES

LIST OF ACRONYMS AND ABBREVIATIONS

°F	degree(s) Fahrenheit
$\mu g/m^3$	microgram(s) per cubic meter
49 CES/CEIE	49th Civil Engineer Squadron/Environmental Compliance
49 LRS	49th Logistics Readiness Squadron
49 MXG	49th Maintenance Group
49 OG	49th Operations Group
49 WG	49th Wing
54 FG	54th Fighter Group
586 FLTS	586th Flight Test Squadron
82 ATRS/Det 1	82d Aerial Targets Squadron, Detachment 1
ac	acre(s)
ACAM	Air Conformity Applicability Model
ACC	Air Combat Command
ACM	asbestos-containing materials
ADAIR	adversary air
AETC	Air Education and Training Command
AFB	Air Force Base
AFCEC	Air Force Civil Engineer Center
AFI	Air Force Instruction
AFMAN	Air Force Manual
AFOSH	Air Force Occupational Safety and Health
AFPD	Air Force Policy Directive
AGE	Aerospace Ground Equipment
AGL	above ground level
AGRS	Aggressor Squadron
AICUZ	Air Installation Compatible Use Zone
Air Force	United States Air Force
AMU	Aircraft Maintenance Unit
ANG	Air National Guard
AOC	Area of Concern
APE	Area of Potential Effects
APZ	Accident Potential Zone
AQCR	Air Quality Control Region
AST	aboveground storage tank
ATC	Air Traffic Control
BACT	Best Available Control Technologies
BASH	bird/wildlife-aircraft strike hazard
BLM	Bureau of Land Management
BMP	best management practice
C	candidate
CAA	Clean Air Act
CAD	cartridge-actuated device
CAF	Combat Air Forces
CDDAR	Crash Damaged or Disabled Aircraft Recovery
CDNL	C-weighted Day-Night Average Sound Level
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
CSAF	Chief of Staff of the Air Force
CSEL	C-Weighted Sound Exposure Level
CWA	Clean Water Act
CZ	Clear Zone

LIST OF ACRONYMS AND ABBREVIATIONS

CZN	National Environmental Policy Act Division
dB	decibel(s)
dBA	A-weighted decibel(s)
DLA	Defense Logistics Agency
DNL	Day-Night Average Sound Level
DOD	Department of Defense
E	endangered
EA	Environmental Assessment
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
EO	Executive Order
ERP	Environmental Restoration Program
ESA	Endangered Species Act
ESOHC	Environmental Safety and Occupational Health Council
FAA	Federal Aviation Administration
FL	Flight Level
FONSI	Finding of No Significant Impact
FR	Federal Register
ft	foot (feet)
ft^2	square foot (feet)
FTU	formal training unit
GHG	greenhouse gas
GWP	global warming potential
HAZMAT	hazardous material(s)
IAP	initial accumulation point
ID2	Installation Development and Design
IDP	Installation Development Plan
IFR	Instrument Flight Rules
in.	inch(es)
INRMP	Integrated Natural Resources Management Plan
LBP	lead-based paint
L_{dn}	Day-Night Average Sound Level
L_{dnmr}	Onset-Rate Adjusted Monthly Day-Night Average Sound Level
L_{eq}	Equivalent Sound Level
L_{max}	Maximum Sound Level
LTO	Landing and Takeoff
M1SS	M1 Support Services
MBTA	Migratory Bird Treaty Act
mg/m^3	milligram(s) per cubic meter
mi	mile(s)
mi^2	square mile(s)
MILCON	Military Construction
MOA	Military Operations Area
MOU	Memorandum of Understanding
MSL	mean sea level
NAAQS	National Ambient Air Quality Standards
NASA	National Aeronautics and Space Administration
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NM	nautical mile(s)
NMDGF	New Mexico Department of Game and Fish
NMED	New Mexico Environment Department
NO_2	nitrogen dioxide
NO_x	nitrogen oxides

LIST OF ACRONYMS AND ABBREVIATIONS

NPS	National Park Service
NRHP	National Register of Historic Places
O_3	ozone
OSHA	Occupational Safety and Health Administration
PAD	propellant-actuated device
Pb	lead
PCB	polychlorinated biphenyl
pCi/L	picocurie(s) per liter
$PM_{2.5}$	particulate matter equal to or less than 2.5 microns in diameter
PM_{10}	particulate matter equal to or less than 10 microns in diameter
POI	point of interest
ppb	part(s) per billion
ppm	part(s) per million
PSD	Prevention of Significant Deterioration
psf	pound(s) per square foot
PTE	potential to emit
PWS	*Performance Work Statement for the Combat Air Forces (CAF) Contracted Air Support (CAF CAS)*
Q-D	quantity-distance
RCRA	Resource Conservation and Recovery Act
ROI	Region of Influence
RONA	Record of Nonapplicability
RPA	remotely piloted aircraft
SEL	Sound Exposure Level
SER	Significant Emission Rate
SIP	State Implementation Plan
SNMEP	Southern New Mexico-El Paso
SO_2	sulfur dioxide
SO_x	sulfur oxides
SPCCP	Spill Prevention, Control, and Countermeasure Plan
T	threatened
TCP	traditional cultural property
TGO	Touch and Go
tpy	ton(s) per year
TSCA	Toxic Substances Control Act
U.S.C.	United States Code
US	United States
USACE	United States Corps of Engineers
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USSG	United States Surgeon General
UST	underground storage tank
VFR	Visual Flight Rules
VOC	volatile organic compound
WSMR	White Sands Missile Range
yd^2	square yard(s)

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CHAPTER 1 PURPOSE AND NEED FOR ACTION

1.1 INTRODUCTION

The United States Air Force (Air Force) is tasked with the defense of the United States (US) and fulfillment of its Title 10 United States Code (U.S.C.) mission. The Air Force's mission is to fly, fight, and win - in air, space, and cyberspace. In order to accomplish this mission, it is critical that combat pilots, and the Airmen supporting them, adequately train to attain proficiency on tasks they must execute during times of war and further to sustain this proficiency as they serve in the Air Force. Increasingly, fighter pilots of the Combat Air Forces (CAF) have been operating at degraded levels of proficiency and training readiness due to diminishing fiscal resources. For the purpose of this effort, the CAF includes all active duty, Air National Guard (ANG), and Air Force Reserve units in both formal training units (FTUs) and operational units.

Ideally, CAF fighter pilots would be able to maintain their proficiency by flying 200 or more hours per year, practicing training syllabus tasks, tactics, and procedures. Unfortunately, for much of the last decade, pilots of advanced weapons platforms have been falling 25 to 40 percent short of the flying hours recommended to build and sustain their proficiency on required training tasks (Venable, 2016). At the same time, increasingly complex aircraft and technologies require more time to master the full range of skills required to become proficient combat-ready pilots. Along with insufficient budgets to support the flying hours/training requirements needed by CAF pilots, they have also had to support adversary air (ADAIR) flying missions that have minimal training value to the CAF pilots themselves. ADAIR missions simulate an opposing force that provides a necessary and realistic combat environment during CAF training missions. Flying these ADAIR sorties requires the use of potential adversaries' tactics and procedures that may differ significantly from CAF tactics and procedures and therefore provides minimal CAF training while taking up valuable flying hours that could otherwise be spent on core training tasks. In many cases, minimal ADAIR missions, or none at all, have been available to support pilot training and have resulted in degraded readiness for CAF pilots who are expected to operate some of the most sophisticated weapons platforms in the world.

> A SORTIE IS DEFINED AS A SINGLE MILITARY AIRCRAFT FLIGHT FROM INITIAL TAKEOFF THROUGH FINAL LANDING.

During his confirmation hearing, Chief of Staff of the Air Force (CSAF), General David Goldfein, identified a growing crisis in the readiness of CAF pilots (Venable, 2016):

> Less than half of Air Force combat units are ready for "full-spectrum" (high threat, high intensity) combat. This lack of readiness could jeopardize the lives of aircrews and other service members who depend upon them in combat, and put mission-essential tasks at great risk.

1.1.1 Background

Aircrew readiness is currently affected by several issues including training, weapon system sustainment, and facilities. While all are critical, training in particular has become an increasing concern as worldwide commitments, high operations tempo, and fiscal and manpower limitations detract from available training resources. As an example, the Budget Control Act of 2011, as implemented in 2013, reduced flying hours by 18 percent and temporarily stood down 17 of 40 combat-coded squadrons (The Heritage Foundation, 2015). The Air Force prioritized readiness in 2014, but shortfalls in readiness were not eliminated and have persisted through the present day as indicated by the CSAF's acknowledgement of the lack of readiness in more than half of the service's combat units. In the training arena, readiness issues are manifested by multiple issues such as 1) an inability to internally support ADAIR without a corresponding sacrifice in scarce flying hours and normal training objectives; 2) a lack of advanced threat aircraft to provide representative ADAIR for realistic training; 3) a fighter pilot manning crisis, necessitating increased pilot production beyond sustainable levels; and 4) granting excessive syllabus waivers to graduates of the Air Force Weapons School due to inadequate ADAIR support during final training phases.

Lack of available ADAIR is degrading levels of pilot readiness and contributing to the overall decline in availability of proficient CAF pilots. The arrangement in which CAF ADAIR sorties are currently organized is depicted on **Figure 1-1**. At present, the current approach meets less than 50 percent of the total ADAIR requirement across the Air Force.

Self-generated ADAIR can either be “in-house” supporting daily flying schedules or via a dedicated tasking to support an external unit, both referred to as “Red Air.” In both the “in-house” and “dedicated” options, performing self-generated ADAIR is at the expense of the tasked units’ normal Air Force training objectives. These two options still result in an ADAIR capacity less than 50 percent of the Air Force-wide requirement and reduce the availability and proficiency of combat qualified pilots at a time when the Air Force is experiencing a shortfall of more than 750 CAF pilots (Venable, 2016). Furthermore, current dedicated ADAIR units in the Air Force consist of two F-16 aggressor squadrons (AGRSs) and two T-38 fighter training squadrons. The F-16 aircraft used for aggressor missions is an advanced weapons platform, but there are not enough to meet the ADAIR requirements to maintain proficiency of the CAF’s pilots. The T-38 is used for ADAIR but is a basic platform with no advanced electronics (radar and avionics) or weapons capabilities and does not adequately replicate realistic threat capabilities. In both the F-16 AGRS and T-38 ADAIR cases, the number of available aircraft and pilots are insufficient to meet the requirement.

As depicted on **Figure 1-1**, contract ADAIR would provide a fourth avenue to fill ADAIR sorties and improve the quality of training and readiness of CAF pilots and allow the Air Force to recapitalize other valuable assets and training time.

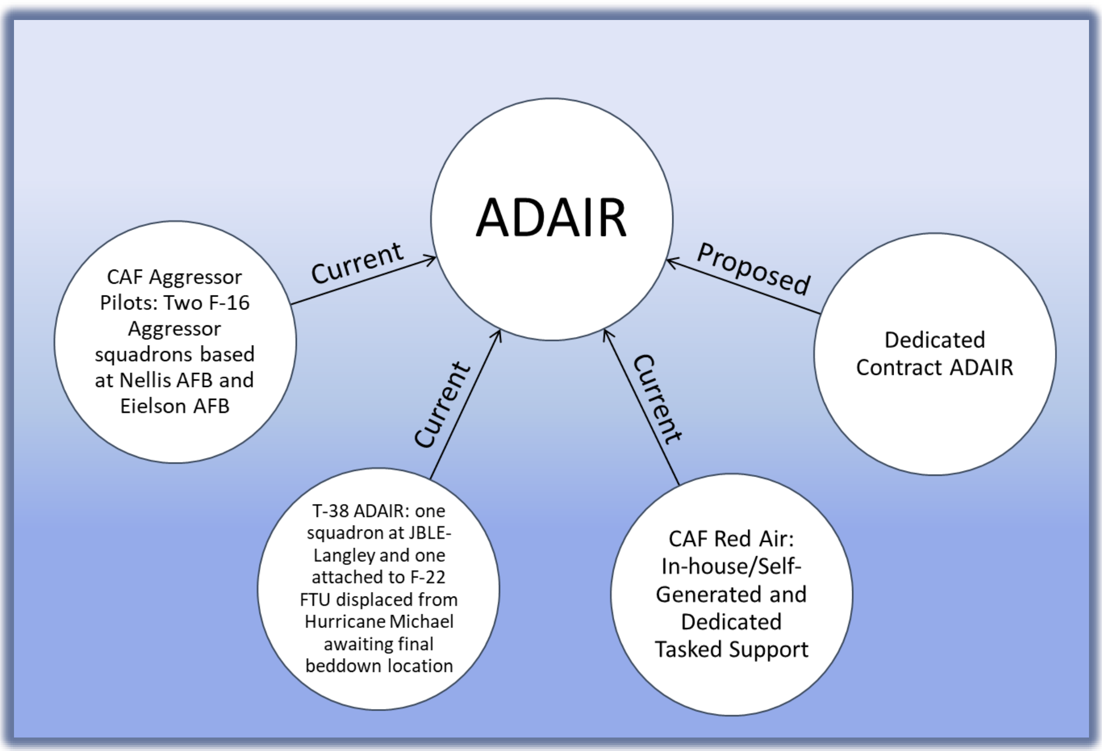

Figure 1-1. Current and Proposed Adversary Air Sortie Generation.

The nationwide contract ADAIR requirement is roughly 30,000 annual sorties. The Air Force would implement contract ADAIR in support of installations that host specific critical air-to-air training missions. Installations requiring contract ADAIR support include those bases hosting Air Force 5th generation fighter units (e.g., F-22 or F-35 aircraft), fighter FTUs, or those that support advanced fighter training. Air Force requirements for contract ADAIR exist currently at multiple installations within the continental United States and Joint Base Pearl Harbor-Hickam, Hawaii.

As discussed in **Section 1.3**, the scope of this analysis will evaluate the proposal to implement contract ADAIR at Holloman Air Force Base (AFB), New Mexico. National Environmental Policy Act (NEPA) analyses will be completed at all locations identified by the Air Force that require contract ADAIR support and that have sufficient existing facilities.

1.1.2 Location

In 1948, Alamogordo Air Field was renamed to Holloman AFB in honor of Colonel George Holloman, a pioneer in early rocket and pilot-less aircraft research. Holloman AFB is located in southern New Mexico about 95 miles (mi) north of the Texas border (**Figure 1-2**). It is in Otero County, New Mexico, 6 mi southwest of Alamogordo (**Figure 1-3**). The main base encompasses 51,813 acres (ac), is bounded to the west by the White Sands National Monument and to the south by Highway 70, and supports about 21,000 active duty Air Force, ANG, Air Force Reserve, retirees, Department of Defense (DOD) civilians and their family members.

In 2010, the 49th Fighter Wing became the 49th Wing (49 WG) with the addition of the remotely piloted aircraft (RPA). In 2018, the Wing's flying training mission was transferred to the Air Education and Training Command (AETC). The 49 WG supports the F-16 Fighting Falcon, T-38 Talon, and MQ-9 Reaper RPA. The 54th Fighter Group (54 FG) is an F-16 FTU and a unit of the 49 WG. Holloman AFB is also home to 635th Material Maintenance Group and 704th Test Group.

Fourth (4th) generation aircraft is a term applied to the previous suite of fighters such as F-15, F-16, and F/A-18. Fifth (5th) generation are the newest weapons systems such as the F-22 and F-35 fighters that contain new and enhanced levels of stealth profiles, speed, maneuverability, and advanced avionics and attack capabilities.

Holloman AFB provides support for the US Army's White Sands Missile Range (WSMR) military testing area as well as the White Sands Space Harbor for National Aeronautical and Space Administration missions. The world's longest and fastest rocket sled test track, Holloman High Speed Test Track, is located on base. From 1996 to 2019, Holloman AFB hosted the German Air Force Flying Training Center, which conducted advanced combat tactical training. The program was established in 1996 and ended in 2019.

A restricted area is typically used by the military due to safety or security concerns. Hazards include existence of unusual and often invisible threats from artillery use, aerial gunnery, or guided missiles. A military operations area (MOA) is designated airspace outside of Class A airspace to separate or segregate certain nonhazardous military activities from Instrument Flight Rules (IFR) traffic. Activities in MOAs include, but are not limited to, air combat maneuvers, air intercepts, and low altitude tactics. The defined vertical and lateral limits vary for each MOA. While MOAs generally extend from 1,200 feet (ft) above ground level (AGL) to 18,000 ft mean sea level (MSL), the floor may extend below 1,200 ft AGL if there is a mission requirement and there is minimal adverse aeronautical effect.

Class A airspace is controlled airspace of defined dimensions within which Air Traffic Control service is provided and all operations must occur under IFR. Class A airspace is generally from 18,000 ft MSL up to and including 60,000 ft MSL and includes airspace overlying waters within 12 nautical miles of the coast of the 48 contiguous United States and Alaska.

CAF training activities utilize special use airspace within and around Holloman AFB. Special use airspace includes restricted areas and Military Operations Areas (MOAs), which provide airspace for military aircraft training and serve to warn nonparticipating aircraft of potential danger. Operational airspace that would be used by contract ADAIR aircraft includes the Beak MOAs located 25 mi east, the Talon MOAs located approximately 72 mi east, and the McGregor Range Restricted Areas located 6 mi southeast of Holloman AFB (**Figure 1-4**). Other airspace available for use by contract ADAIR missions include the Restricted Area over WSMR (**Figure 1-4**). Holloman AFB is located under the WSMR Restricted Areas. **Section 2.1.6** provides a more detailed description of these MOAs and Restricted Areas.

Holloman AFB and the surrounding military airspace provide a critical venue to train F-16 pilots.

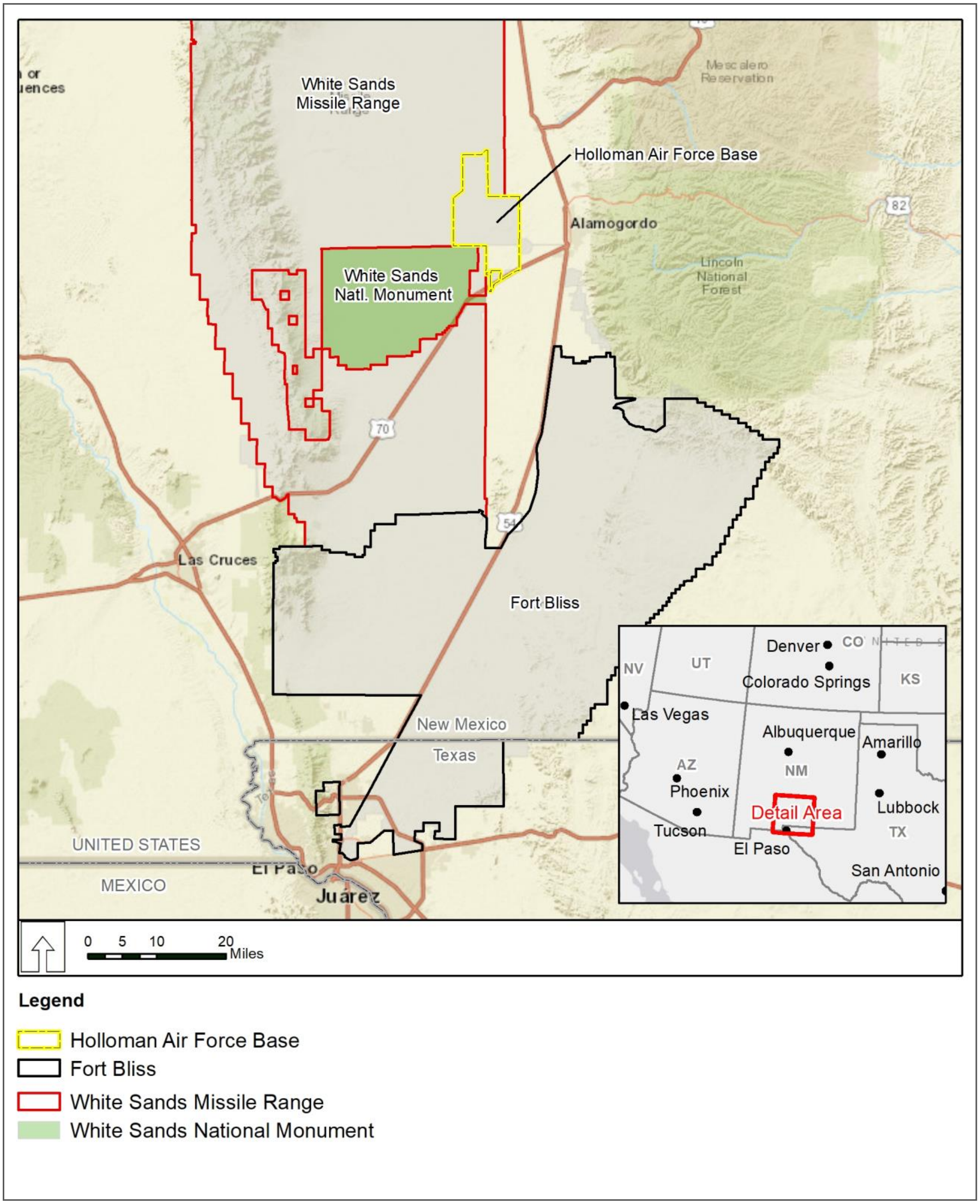

Figure 1-2. Location of Holloman Air Force Base (Regional View).

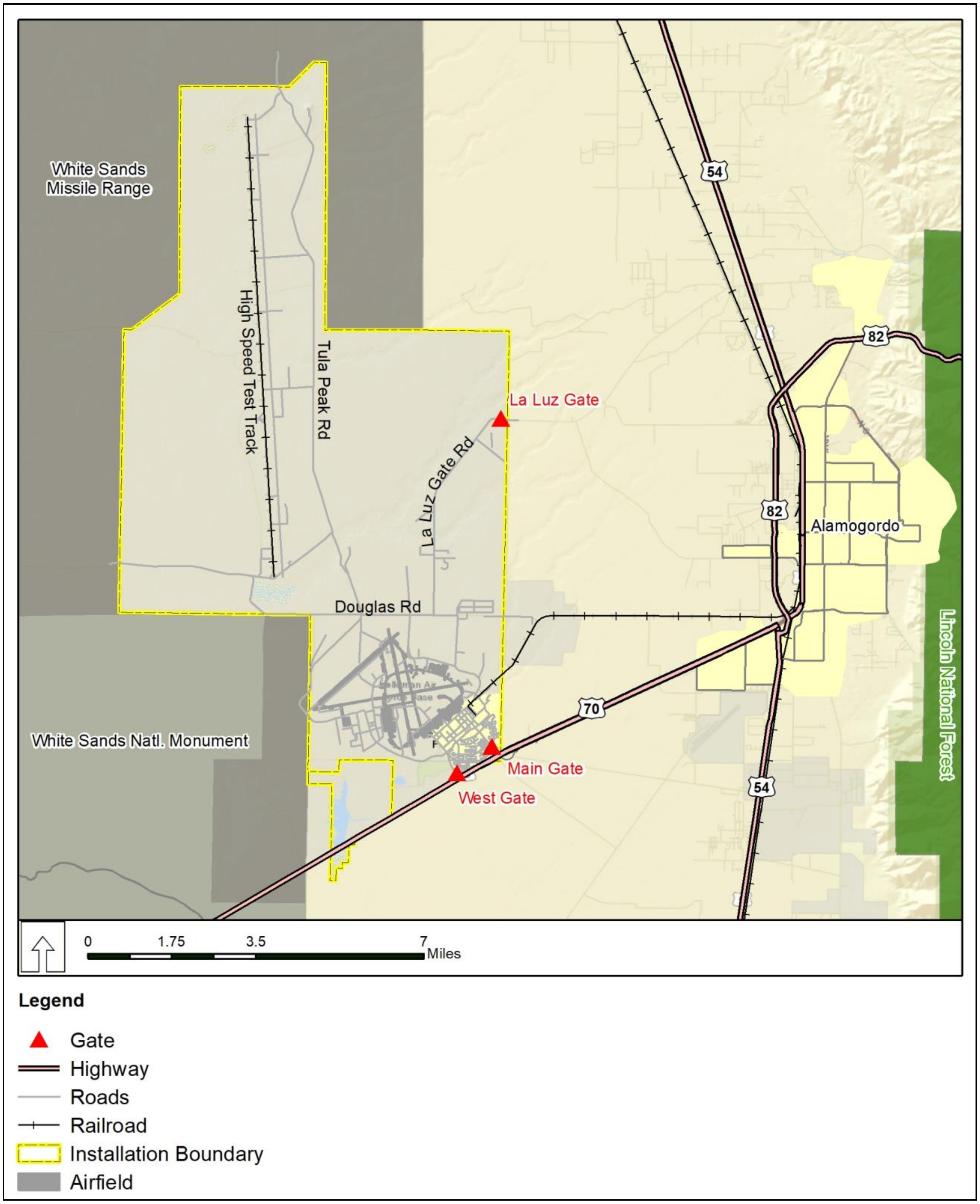

Figure 1-3. Location of Holloman Air Force Base (Local View).

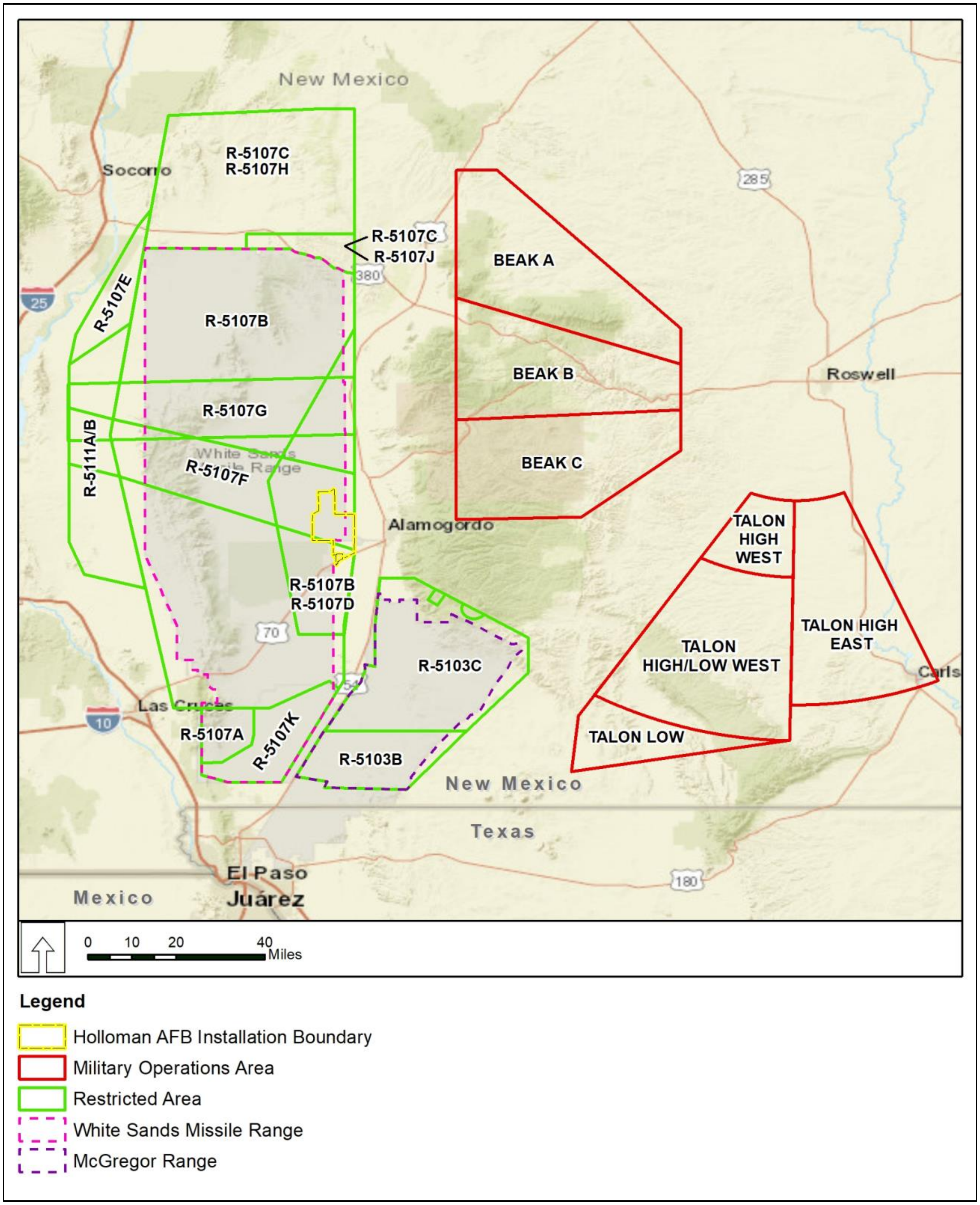

Figure 1-4. Special Use Airspace Proposed for Contract Adversary Air Sorties.[1]

[1] Existing and newly proposed special use airspace west of WSMR was considered for contract ADAIR training operations but given the travel distances involved, they were determined to not meet the selection criteria as an alternative for implementing the Proposed Action (refer to **Sections 2.2** through **2.4**).

1.2 PURPOSE OF THE ACTION

The purpose of the Proposed Action is to provide dedicated contract ADAIR sorties to improve the quality of training and readiness of pilots of the 49 WG located at Holloman AFB. Contract ADAIR support would employ adversary tactics across the training spectrum from basic fighter maneuvers to higher-end, advanced, simulated, combat training missions. The objective of the Proposed Action at Holloman AFB is to increase the quality of training for F-16 pilots by providing dedicated, realistic adversary threat aircraft during syllabus training missions. By providing a dedicated contract ADAIR capability, F-16 trainees and instructor pilots would gain more realistic air-to-air training during their training syllabus tasks. Dedicated contract ADAIR would also allow the unit to free up resources used to self-generate ADAIR and more effectively use those available flying hours. Additionally, other Air Force (4th generation) units that may have been tasked to provide ADAIR training support at Holloman AFB may now recapitalize valuable flying hours to focus on increasing their own levels of proficiency and readiness.

1.3 NEED FOR THE ACTION

The need for the action is to provide better and more realistic training for the F-16 flight training program at Holloman AFB. Dedicated contract ADAIR is critical to improving pilot readiness as it provides realistic training opportunities to employ CAF tactics and procedures that optimize the training value of every mission. Contract ADAIR can be used in basic building block syllabus sorties or the very advanced and fluid environment of multiaircraft air combat required by the training syllabus.

1.4 SCOPE OF THE ENVIRONMENTAL ANALYSIS

This environmental assessment (EA) analyzes the potential environmental consequences associated with establishing dedicated contract ADAIR support at Holloman AFB. Contract ADAIR support would employ adversary tactics across the training spectrum from basic fighter maneuvers to higher-end, advanced, simulated, combat training missions in order to increase the quality of training for F-16 fighter pilots.

This EA has been prepared in accordance with the National Environmental Policy Act (42 U.S.C. §§ 4321 to 4347), the Council on Environmental Quality (CEQ) Regulations (40 Code of Federal Regulations [CFR] Parts 1500 to 1508), and 32 CFR Part 989 et seq., *Environmental Impact Analysis Process (EIAP)*. NEPA is the basic national requirement for identifying environmental consequences of federal decisions. NEPA ensures that environmental information, including the anticipated environmental consequences of a proposed action, is available to the public, federal and state agencies, and the decision-maker before decisions are made and before actions are taken.

Consistent with the CEQ regulations, the EA is organized into the following sections:

- Chapter 1, Purpose and Need for Action, includes an introduction, background description, location, purpose and need statement, scope of environmental analysis, decision to be made, interagency and intergovernmental coordination and consultations, applicable laws and environmental regulations, and a description of public and agency review of the EA.
- Chapter 2, Description of the Proposed Action and Alternatives, includes a description of the Proposed Action, alternative selection standards, screening of alternatives, alternatives eliminated from further consideration, a description of the selected alternatives, and summary of potential environmental consequences.
- Chapter 3, Affected Environment, includes a description of the natural and man-made environments within and surrounding Holloman AFB and the airspace that may be affected by the Proposed Action and alternatives.
- Chapter 4, Environmental Consequences, includes definitions and discussions of direct and indirect impacts and best management practices (BMPs), if applicable.
- Chapter 5, Cumulative Effects, considers the potential cumulative impacts on the environment that may result from the incremental impact of the Proposed Action when added to other past, present, and reasonably foreseeable future actions.
- Chapter 6, List of Preparers, provides a list of the preparers of this EA.

- Chapter 7, References, contains references for studies, data, and other resources used in the preparation of the EA.
- Appendices, as required, provide relevant correspondence, studies, modeling results, and public review information. **Appendix A** includes all interagency and intergovernmental coordination and consultations; **Appendix B** provides noise metrics and noise models; **Appendix C** outlines methodologies, emission factors, and assumptions used for air quality emission estimates for each scenario and related activities; **Appendix D** summarizes the listed species potentially occurring in the action area; and **Appendix E** includes F-16 existing and newly proposed special use airspace figures from the Special Use Airspace Optimization Draft Environmental Impact Statement (EIS) (Air Force, 2019).

NEPA, which is implemented through the CEQ regulations, requires federal agencies to consider alternatives to the Proposed Action and to analyze potential impacts of alternative actions. Potential impacts of the Proposed Action and its alternatives described in this document will be assessed in accordance with the Air Force EIAP (32 CFR Part 989), which requires that impacts on resources be analyzed in terms of their context, duration, and intensity. To help the public and decision-makers understand the implications of impacts, they will be described in the short and long term, cumulatively, and within context. Environmental resources and the Region of Influence (ROI) analyzed in the EA are summarized in **Table 1-1**. The expected geographic scope of any potential consequences is identified as the ROI. Holloman AFB and its environs, as well as the area under the proposed airspace are considered in determining the ROI for each resource. As indicated in **Table 1-1**, Socioeconomics – Income and Employment and Hazardous Materials and Wastes, Toxic Substances, and Contaminated Sites are not described in the airspace ROI for the baseline in **Chapter 3** or considered for detailed analysis in **Chapter 4**. No construction or development is proposed under the airspace, so no impacts on Hazardous Materials and Wastes, Toxic Substances, and Contaminated Sites would occur under the airspace. Likewise, because no ground-disturbing activities are associated with the Proposed Action, Water Resources and Geology and Soils are not described in the Holloman AFB and special use airspace ROIs for the baseline in **Chapter 3** or for detailed analysis in **Chapter 4**.

Table 1-1
Environmental Resources Analyzed in the Environmental Assessment

Resource	Region of Influence: Holloman AFB and Environs	Region of Influence: WSMR and McGregor Range Restricted Areas and Beak and Talon MOAs
Airspace Management and Use	✓	✓
Noise	✓	✓
Safety	✓	✓
Air Quality	✓	✓
Biological Resources (Threatened and Endangered Species, Wetlands)	✓	✓
Land Use	✓	✓
Socioeconomics – Income and Employment	✓	
Environmental Justice and Protection of Children	✓	✓
Cultural Resources (Archaeological, Architectural, Traditional)	✓	✓
Hazardous Materials and Wastes, Toxic Substances, and Contaminated Sites	✓	

Notes:
AFB = Air Force Base; MOA = Military Operations Area; WSMR = White Sands Missile Range

1.4.1 Resource Areas Eliminated from Detailed Analysis

No public or agency concerns were raised as a result of Interagency and Intergovernmental Coordination and Consultation, and the Proposed Action is not expected to affect the following resources; therefore, they are not carried forward for detailed analysis.

1.4.1.1 Infrastructure, Transportation, and Utilities

During site selection, the support for contract ADAIR operations was determined to be very good for facilities and communication infrastructure at Holloman AFB. No new construction or infrastructure changes would occur under the Proposed Action. The level of service for utilities needed to support the contract personnel is assumed to be the same under all alternatives and would be adequate to support the Proposed Action. Because there would be only be an additional 93 contract personnel working at Holloman AFB to support the contract ADAIR operations and adequate infrastructure exists on base to support these personnel and contract ADAIR aircraft operations, including adequate capacity at Holloman AFB gates and throughout the base transportation network, there would be no impacts on infrastructure or transportation at Holloman AFB; therefore, this resource is not carried forward for further detailed analysis in this EA.

1.4.1.2 Socioeconomics - Housing, Population, and Schools

The requirement for an estimated 93 contract personnel and their families supporting the contract ADAIR sorties in Otero County, New Mexico, would have no impact on the region's population. Assuming all 93 contract personnel relocated with family members to Otero County, this would be a negligible increase in the County's population of nearly 67,000 people. There is adequate available housing and public schools to support the minor increase in population from the Proposed Action; therefore, there would be no impact on the region's population, housing, or schools from implementation of the Proposed Action, and these resources are not carried forward for more detailed analysis in this EA.

1.4.1.3 Visual Resources

There would be no potential impacts on visual resources from the proposed contract ADAIR activities because no new construction would occur. Aircraft would utilize the existing airfield; therefore, contract ADAIR activities in the areas adjacent to the proposed facilities and aircraft parking ramp would not change the existing visual setting. Likewise, the Proposed Action would not affect the visual setting of the natural areas and other lands beneath the special use airspace. Contract ADAIR activities would occur in existing airspace where training activities currently take place. While some low-altitude training would continue under the Proposed Action, this activity would be brief and would not alter the existing landscape. As such, this resource is not carried forward for further detailed analysis in this EA.

1.4.1.4 Water Resources

Under the Proposed Action, there would be no ground disturbing activities. The proposed additional contract ADAIR aircraft and personnel and associated operational and maintenance activities would not affect water quality or quantity. Under the airspace, the use of defensive countermeasures has been found to be nontoxic. Due to the rare and infrequent nature of fuel dumps as well as in-place safety precautions, these emergency procedures are not likely to adversely affect water resources. Water resources are not carried forward for detailed analysis.

1.4.1.5 Soil Resources

Protection of soils was considered when evaluating potential impacts of the Proposed Action in terms of alteration of soil composition, structure, or function and any accumulation of chaff material. Effects on soils would be adverse if they alter the soil composition, structure, or function within the environment or accumulate in the soil. Under the Proposed Action, there would be no ground disturbing activities to affect soil resources. Under the airspace, the nontoxic defensive countermeasures and emergency procedures stated in **Section 1.4.1.5** are not likely to adversely affect soil resources; therefore, soil resources are not carried forward for detailed analysis

1.5 DECISION TO BE MADE

This EA evaluates the potential environmental consequences of implementing the proposed or alternative actions to provide dedicated contract ADAIR sorties at Holloman AFB to improve the readiness and proficiency of pilots of the 49 WG, other supported units, and the CAF at large. Based on the analysis in this EA, the Air Force will make one of three decisions regarding the Proposed Action: 1) choose the alternative action that best meets the purpose of and need for this project and sign a Finding of No Significant Impact (FONSI), allowing implementation of the selected alternative; 2) initiate preparation of an EIS if it is determined that significant impacts would occur through implementation of the proposed or alternative actions; or 3) select the No Action Alternative, whereby the Proposed Action would not be implemented. As required by NEPA and its implementing regulations, preparation of an environmental document must precede final decisions regarding the proposed project and be available to inform decision-makers of the potential environmental impacts.

1.6 INTERAGENCY AND INTERGOVERNMENTAL COORDINATION AND CONSULTATIONS

1.6.1 Interagency/Intergovernmental Coordination and Consultation

The environmental analysis process, in compliance with NEPA guidance, includes public and agency review of information pertinent to the proposed and alternative actions. Scoping is an early and open process for developing the breadth of issues to be addressed in an EA and for identifying significant concerns related to an action. Per the requirements of Executive Order (EO) 12372, *Intergovernmental Review of Federal Programs*, as amended by EO 12416, federal, state, and local agencies with jurisdiction that could potentially be affected by the proposed and alternative actions were notified during the development of this EA. Those Interagency and Intergovernmental Coordination for Environmental Planning letters and responses are included in **Appendix A**.

1.6.2 Agency Consultations

Implementation of the Proposed Action involves coordination with several organizations and agencies. Compliance with Section 7 of the Endangered Species Act (ESA), and implementing regulations (50 CFR Part 402), requires communication with the US Fish and Wildlife Service (USFWS) in cases where a federal action could affect listed threatened or endangered species, species proposed for listing, or candidates for listing. The primary focus of this coordination is to request a determination of whether any of these species occur in the proposal area. If any of these species is present, a determination would be made of any potential adverse effects on the species. Should no species protected by the ESA be affected by the Proposed Action or alternatives, no additional consultation is required. Letters were sent to the appropriate USFWS offices as well as relevant state agencies informing them of the proposal, requesting data regarding applicable protected species, and subsequently requesting concurrence with the Air Force's determination of may affect but is not likely to adversely affect select federally and state listed bird and mammal species during training. Contract ADAIR would have no effect on federally listed reptiles, amphibians, and invertebrates. The Air Force received concurrence with its determinations.

Coordination with appropriate New Mexico state government agencies and planning districts will occur for review and comment. Compliance with Section 106 of the National Historic Preservation Act (NHPA) and implementing regulations (36 CFR Part 800) was accomplished by consultation with the State Historic Preservation Officer. Similarly, the New Mexico Environment Department (NMED) would be included for air quality, and the New Mexico State Parks Division and the Department of Game and Fish (NMDGF) would be included in this coordination on sensitive habitats and species of concern.

All agency correspondence is included in **Appendix A**.

1.6.3 Government-to-Government Consultation

The NHPA and its regulations in 36 CFR Part 800 direct federal agencies to consult with federally recognized Indian tribes when a proposed or alternative action may have an effect on tribal lands or on properties of religious and cultural significance to a tribe. Consistent with the NHPA, DOD Instruction 4710.02, *Interactions with Federally-Recognized Tribes*, and Air Force Instruction (AFI) 90-2002, *Air Force Interaction with Federally-Recognized Tribes*, federally recognized tribes that are historically affiliated with lands in the vicinity of the proposed and alternative actions have been invited to consult on all proposed undertakings that have a potential to affect properties of cultural, historical, or religious significance to the tribes. The tribal consultation process is distinct from NEPA consultation or the interagency coordination process, and it requires separate notification of all relevant tribes. The timelines for tribal consultation are also distinct from those of other consultations. The Holloman AFB point of contact for Native American tribes is the Base Commander. The point of contact for consultation with the Tribal Historic Preservation Officer and the Advisory Council on Historic Preservation is the Holloman AFB Installation Support Team Cultural Resources Manager. Government-to-government consultation is included in **Appendix A.**

1.7 APPLICABLE LAWS AND ENVIRONMENTAL REGULATIONS

Implementation of the Proposed Action would involve coordination with several organizations and agencies. Adherence to the requirements of specific laws, regulations, BMPs, and necessary permits are described in detail in each resource section in **Chapter 3**.

1.7.1 National Environmental Policy Act

NEPA requires that federal agencies consider potential environmental consequences of proposed actions. The law's intent is to protect, restore, or enhance the environment through well-informed federal decisions. The CEQ was established under NEPA for the purpose of implementing and overseeing federal policies as they relate to this process. In 1978, the CEQ issued *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act* (40 CFR Parts 1500 to 1508). These regulations specify that an EA be prepared to

- briefly provide sufficient analysis and evidence for determining whether to prepare an EIS or a FONSI;
- aid in an agency's compliance with NEPA when no EIS is necessary; and
- facilitate preparation of an EIS when one is necessary.

Further, to comply with other relevant environmental requirements (e.g., the ESA and NHPA) in addition to NEPA and to assess potential environmental impacts, the EIAP and decision-making process for the proposed and alternative actions involves a thorough examination of environmental issues potentially affected by government actions subject to NEPA.

1.7.2 The Environmental Impact Analysis Process

The EIAP is the process by which the Air Force facilitates compliance with environmental regulations (32 CFR Part 989), including NEPA, which is the primary legislation affecting the agency's decision-making process.

1.8 PUBLIC AND AGENCY REVIEW OF ENVIRONMENTAL ASSESSMENT

A Notice of Availability of the Draft EA and FONSI announcing the availability of the EA to the public for review and comment was published in the *Alamogordo Daily News* and *Las Cruces Sun-News* on 3 May 2020 and the *Sierra County Sentinel* on 1 May 2020. The public and agency review period will end on 2 June 2020.

The Draft EA and FONSI were made available for review online at https://www.holloman.af.mil/Environmental-Information/. Those who were unable to access these documents online were asked to call Holloman AFB Public Affairs at (575) 572-7381 or email spencer.robison@us.af.mil to arrange alternate access.

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CHAPTER 2 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

2.1 PROPOSED ACTION

The Air Force is proposing to provide dedicated contract ADAIR sorties for CAF training at Holloman AFB, New Mexico, to address shortfalls in F-16 pilot training and production capability and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to higher-end, advanced combat training missions. Training scenarios would include the use of combat tactics and procedures that differ from CAF tactics to simulate an opposing force. The Proposed Action includes elements affecting the base and military training airspace. The elements affecting Holloman AFB include contract ADAIR aircraft, facilities, maintenance, personnel, and sorties. The elements affecting the airspace include airspace use and defensive countermeasures.

Numbers of contract ADAIR aircraft, maintenance personnel, and pilots were estimated and informed through multiple meetings with active duty and civilian Air Force functional area experts and were based on sortie requirements developed by the end user at the base. Numbers of aircraft and personnel were then used to define facility requirements, which were estimated using planning factors from Air Force Manual (AFMAN) 32-1084, *Facility Requirements*.

2.1.1 Contract Adversary Air Aircraft

Contract ADAIR would have multiple aircraft available with acceptable capabilities to support training requirements. Contract ADAIR proposed aircraft specifications are described in **Table 2-1**; all aircraft listed are capable of providing contract ADAIR support to F-16 CAF aircrews stationed at Holloman AFB. One or a combination of these aircraft types may be operated by a contractor at Holloman AFB in support of ADAIR training. The Proposed Action at Holloman AFB would include the establishment of an estimated 78 contracted maintainers and 15 contracted pilots who would operate an estimated 12 aircraft.

Table 2-1
Contract Adversary Air Potential Aircraft Specifications

Aircraft	Wingspan (feet)	Length (feet)	Height (feet)	Number of Engines
F-5	27	48	14	2
A-4K	28	41	15	1
T-59 Hawk	31	37	14	1

2.1.2 Facilities

Holloman AFB has existing facilities to support the Proposed Action. The proposed facilities are available for use and require minimal modification. They are located around the existing airfield and runway and include the necessary ramp space; maintenance space; operational space; petroleum, oil, and lubricants storage; runway access; and associated parking to support the contract ADAIR mission. In addition, the 49th Maintenance Group (49 MXG) Munitions Storage Area has sufficient facilities to store the necessary increase in training countermeasure allocations (chaff/flares; discussed further in **Section 2.1.7**). A summary of estimated facilities requirements needed to satisfy the Proposed Action is provided in **Table 2-2**.

Table 2-2
Holloman Air Force Base Facilities Requirements

Ramp Required (yd^2)	Number Maintenance Personnel[1]	Number Pilots[1]	Aircraft Maintenance Unit space (ft^2)	Stand-Alone Operations Space (ft^2)	Integrated Operations Space (ft^2)
8,400	78	15	3,100	1,200	2,000

Notes:
[1] The number of personnel is estimated, and the final number may be slightly higher or lower depending on operational needs.
ft^2 = square feet; yd^2 = square yards

Holloman AFB has two options for proposed contract ADAIR operations and maintenance facilities. Under Option 1, both Operations and the Aircraft Maintenance Unit (AMU) would be located in Building 578, which is the current T-38 depot hangar (**Figure 2-1**). The ADAIR aircraft would be parked on the ramp adjacent to the Building 578. The building and ramp would be vacated by the T-38 depot maintenance function as they transition to the German Air Force Flying Training Center facilities.

Under Option 2, contractor operations would share Building 1062, which is being renovated by AETC to house two F-16 FTU squadrons (**Figure 2-2**). The ADAIR AMU would be located in Building 578. Contract ADAIR aircraft would be parked on the ramp adjacent to Building 578.

THE AIRCRAFT MAINTENANCE UNIT (AMU) IS THE SUPPORT FUNCTION RESPONSIBLE FOR THE DIRECT SUPPORT AND MAINTENANCE OF AIRCRAFT TO ENSURE THEY ARE MISSION CAPABLE. AMU SPACE INCLUDES DEDICATED FACILITIES FOR CONTRACT MAINTENANCE PERSONNEL AND OFFICE AND ADMINISTRATIVE SPACE, PLUS SPECIAL USE SPACE FOR A TOOL CRIB, PARTS STORAGE, AND SECURE STORAGE. THE CONTRACT ADVERSARY AIR (ADAIR) AMU IS INTENDED, FOR ACCOUNTABILITY PURPOSES, TO REMAIN PHYSICALLY SEPARATED FROM ANY AIR FORCE MAINTENANCE ORGANIZATION. CONVERSELY, CONTRACT ADAIR OPERATIONS SPACE MAY, AT THE DISCRETION OF THE HOST UNIT, BE A SEPARATE STAND-ALONE FACILITY OR BE INTEGRATED INTO AN EXISTING AIR FORCE OPERATIONS FACILITY. STAND-ALONE OPERATIONS SPACE INCLUDES OFFICE AND ADMINISTRATIVE SPACE, PLUS SPECIAL USE SPACE FOR AIRCREW FLIGHT EQUIPMENT, MISSION PLANNING, AND SECURE STORAGE. INTEGRATED OPERATIONS SPACE INCLUDES REDUCED AMOUNTS OF OFFICE, ADMINISTRATIVE, AND SPECIAL USE SPACE BECAUSE OF ANTICIPATED ECONOMIES OF SCALE REALIZED WHEN FACILITIES ARE SHARED WITH ANOTHER ORGANIZATION.

Under both options, contract ADAIR AMU activities are proposed to occur out of Building 578. This facility would provide office space and covered aircraft maintenance space, if required. The parking ramp adjacent to Building 578 would provide at least 8,400 square yards of aircraft parking space.

Following training sorties, contract ADAIR pilots would land and park their aircraft at Holloman AFB on the ramp area adjacent to Building 578 (**Figure 2-1**). Contract pilots would then participate in debriefs with pilots of the 49 WG and other units as required. Debriefs would occur at facilities on Holloman AFB.

Contract ADAIR aircraft would use the Defense Logistics Agency's (DLA) Jet A aircraft fuel that would be delivered in fuel trucks owned and operated by the 49th Logistics Readiness Squadron (49 LRS). Contract ADAIR personnel would be responsible for all aircraft fuel and defuel operations. An additional one to two personnel may be required in the 49 LRS to meet the increased workload.

Contract ADAIR aircraft would also use Air Force chaff and flares (refer to **Section 2.1.7** for additional information on defensive countermeasures). The ADAIR contractor would receive an allocation for chaff and flares through the 49 MXG, Munitions Flight. 49 MXG munitions personnel would store, account for, inspect, maintain, assemble, and deliver chaff and flares to ADAIR aircraft; contract personnel would be responsible for loading and unloading chaff and flares on aircraft. In addition, some minor support for egress system munitions (i.e., cartridge-actuated devices [CADs] and propellant-actuated devices [PADs]) may be necessary; however, the level of support is expected to be minor and infrequent. The additional munitions functions would not require additional munitions personnel. Contractor maintenance personnel would be responsible for the inspection and maintenance of all external stores (e.g., captive air training missiles, electronic countermeasure pods, external fuel tanks). The ejector cartridges required for external stores would be considered as contractor-furnished equipment and would not require support from the base Munitions Flight.

Figure 2-1. Proposed Location for Combined Contract Adversary Air Operations, Aircraft Maintenance Unit, and Maintenance Space in Building 578 and Aircraft Parking on the Adjacent Aircraft Ramp.

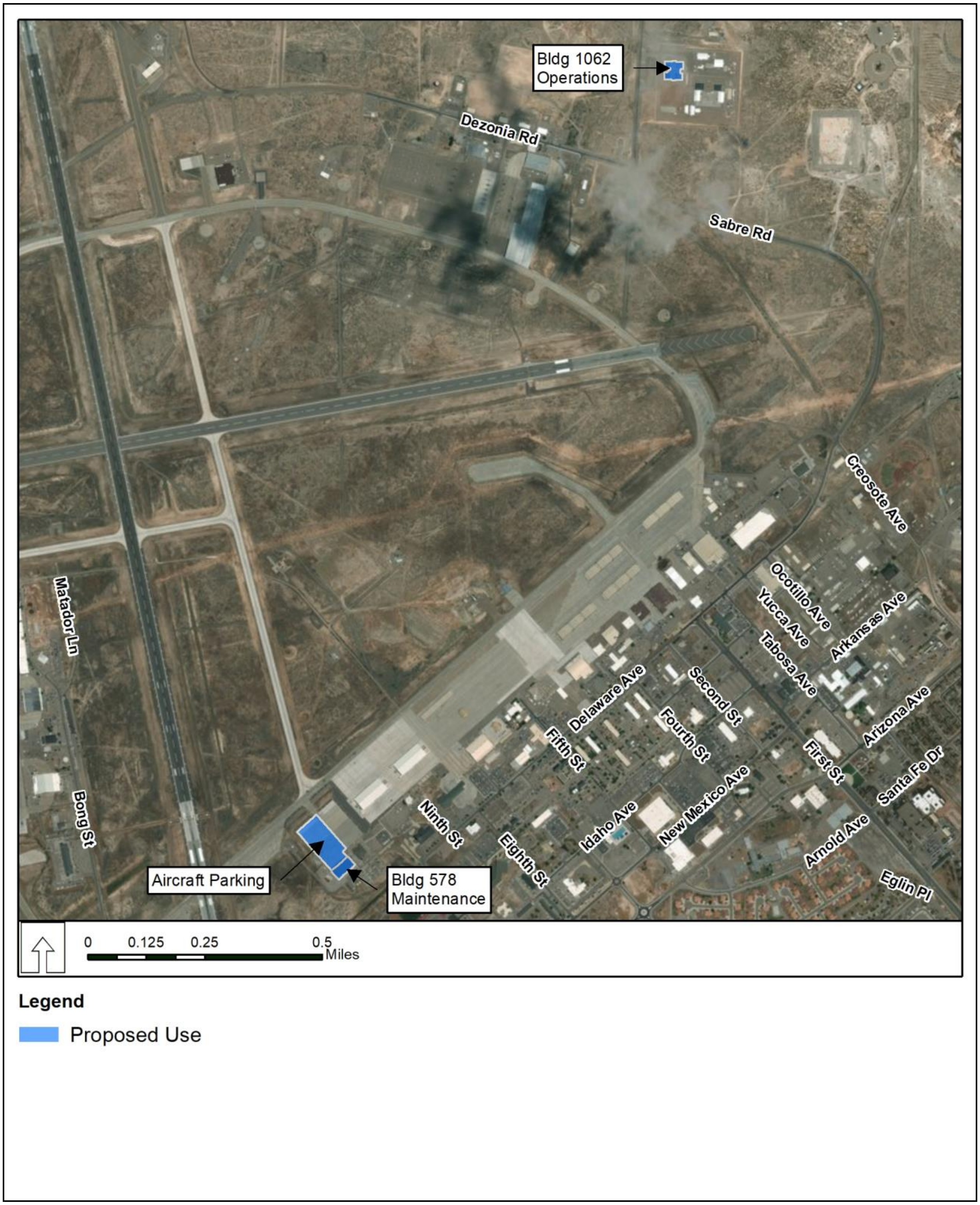

Figure 2-2. Proposed Location for Contract Adversary Air Operations in Building 1062, Aircraft Maintenance Unit and Maintenance Space in Building 578, and Aircraft Parking on the Aircraft Ramp Adjacent to Building 578.

All required Aerospace Ground Equipment (AGE) would be owned and maintained by contract ADAIR. Gas and diesel fuel for AGE would be obtained by contract ADAIR personnel from the base DLA fuel station through an account established with 49 LRS.

AEROSPACE GROUND EQUIPMENT (AGE) IS SUPPORT EQUIPMENT REQUIRED FOR AIRCRAFT MAINTENANCE AND SORTIE GENERATION AND IS COMPOSED OF EQUIPMENT SUCH AS GENERATORS, AIR COMPRESSORS, PORTABLE LIGHT SOURCES, TOW BARS, AND MOBILE LIQUID OXYGEN AND NITROGEN SOURCES.

2.1.3 Maintenance

As discussed above, contractor maintenance would use hangar space and AMU facilities in Building 578 to perform limited maintenance operations on contract ADAIR aircraft. Contract ADAIR aircraft maintenance would include routine inspections and minor unscheduled repairs on the flightline. Aircraft requiring major scheduled (depot level maintenance) or unscheduled maintenance would be expected to be flown back to the contractor's home base for repairs. For the rare occasions when an aircraft is not flyable, the contractor would dispatch a temporary field repair team to Holloman AFB to repair the aircraft. Any additional maintenance support requirements (e.g., aircraft fuel cell, defueling, aircraft structural assets, nondestructive inspection Joint Oil Analysis Program tests) would be coordinated with 49 MXG, 849th Aircraft Maintenance Squadron, or 49 LRS, as appropriate, on a noninterference basis.

2.1.4 Personnel

Contract ADAIR at Holloman AFB would be staffed by an estimated 78 contracted maintainers and 15 contracted pilots who would operate an estimated 12 aircraft. It is expected that the initial personnel would arrive about 3 months after a contractor is selected, and the estimated arrival on Holloman AFB is targeted for July 2020 but may occur any time after December 2019.

2.1.5 Sorties

The Proposed Action includes contracting for the support of an estimated 12 contractor aircraft to fly an estimated 3,200 ADAIR sorties annually in support of the 49 WG at Holloman AFB. This number of sorties also includes sorties expected for contractor training activities (refer to **Section 2.1.6**) and aircraft leaving for or returning from either maintenance or other deployments.

Air Force convention is to describe daily flying schedules in terms of total sorties and a "flight turn pattern." A flight turn pattern allows the CAF to fly available aircraft multiple times per day to maximize available flying opportunities for assigned pilots. Flight turn patterns are designed to allow aircraft to fly, land, complete appropriate post flight inspections, get refueled, and fly again. The maximum flight turn pattern to be flown at Holloman AFB, by contract ADAIR support, would be an 8 x 6.

A TURN PATTERN OF 8 X 6 DOES NOT REQUIRE 14 AIRCRAFT TO EXECUTE BUT RATHER COULD BE FILLED WITH ONLY EIGHT AIRCRAFT (NOTWITHSTANDING IMPACTS OF BROKEN AIRCRAFT AND AIRSPACE SCHEDULES). THE TURN PATTERN AND TOTAL DAILY SORTIES ARE THE SAME FOR ENVIRONMENTAL PURPOSES, BECAUSE THEY BOTH INDICATE THE NUMBER OF TAKEOFFS AND LANDINGS FOR ANY GIVEN DAY. AN 8 X 6 REPRESENTS 14 TOTAL SORTIES FOR THE DAY EVEN THOUGH THOSE SORTIES MAY HAVE BEEN FLOWN WITH ONLY EIGHT TOTAL AIRCRAFT.

Contract ADAIR pilots may fly very few additional traffic patterns at Holloman AFB to maintain their currency and proficiency as required. Additional traffic patterns would be anticipated on no more than 5 percent of the annual daytime sortie total, about 144 sorties. There would be an estimated three closed patterns performed for each of these sorties.

Implementation of the Proposed Action would result in an increase of approximately 6 percent in the number of operations at Holloman AFB. Refer to **Section 2.1.6** for more information on training operations. Contract ADAIR would follow the local squadron's nighttime flying window with 5 percent of departures and 7 percent of arrivals occurring during environmental night (10:00 pm to 7:00 am local time; refer to Air Force Handbook 32-7084, *AICUZ Program Manager's Guide*). This would increase Holloman AFB operations at night by approximately 224 operations per year, an increase of approximately 4 percent of existing night operations. Contractor night sorties would be flown during the 49 WG's approved flying window.

2.1.6 Airspace Use

The locations of the airspace that would be used for contract ADAIR are depicted on **Figure 1-4** (**Section 1.1.2**). Current and projected annual contract ADAIR training activities in the airspace are estimated to be 3,144 sorties and are summarized in **Table 2-3**. Contract ADAIR sorties would generally consist of the following five steps: depart from Holloman AFB runway, transit from Holloman AFB airfield to airspace, perform ADAIR training, transit back to Holloman AFB, and land at Holloman AFB. Contract ADAIR aircraft would spend 10 to 20 minutes in transit each way between the airfield and airspace. Time spent within the airspace (WSMR and McGregor Range Restricted Areas and Beak and Talon MOAs) would depend upon the specific training mission performed but would typically last 45 to 60 minutes. Contractor operations would occur in these MOAs and Restricted Areas concurrent to the 49 WG or other supported Air Force units. No airspace modifications would be required for contract ADAIR as part of the Proposed Action.

Table 2-3
Current and Projected Annual Training Activities by Holloman Air Force Base

<table>
<tr><th>Airspace</th><th>Current Altitude[1]</th><th>Baseline Training Sorties</th><th>Projected Contract ADAIR Training Sorties</th><th>Projected Total Sorties</th></tr>
<tr><td>WSMR Restricted Areas (R-5107 and R-5111)[2]</td><td>Surface to Unlimited</td><td>4,962</td><td>1,761</td><td>6,723</td></tr>
<tr><td>Beak MOAs</td><td>12,500 ft MSL to, but not including FL180</td><td>2,569</td><td>1,038</td><td>3,607</td></tr>
<tr><td>Talon High East/West MOA</td><td>12,500 ft MSL to, but not including FL180</td><td rowspan="2">831[3]</td><td rowspan="2">314</td><td rowspan="2">1,145</td></tr>
<tr><td>Talon Low MOA</td><td>300 ft AGL to, but not including 12,500 ft MSL</td></tr>
<tr><td>McGregor Range Restricted Areas (R-5103B and C)[4]</td><td>Surface to Unlimited</td><td>648</td><td>31</td><td>679</td></tr>
<tr><td colspan="2">Total Proposed Airspace Sorties</td><td>9,010</td><td>3,144</td><td>12,154</td></tr>
</table>

Notes:
1 No change to current minimum flight altitude is proposed. Source: Federal Aviation Administration Order JO 7400.10, *Special Use Airspace*.
2 Includes Restricted Areas R-5107A, B, C, D, E, H, J, and K; and R-5111A/B. Restricted Areas R-5107F and G are not used but scheduled to preclude potential conflicts. Contract ADAIR would avoid all No Fly Areas within WSMR Restricted Airspace, which includes the White Sands National Monument.
3 Noise modeling (refer to **Chapter 3**) was completed with 1,581 sorties to include transient sorties.
4 The majority of sorties are expected to be flown in the Centennial Flying Area located in the eastern portion of the McGregor Range Restricted Areas.

ADAIR = adversary air; AGL = above ground level; FL = flight level (vertical altitude expressed in hundreds of feet); ft = feet; MSL= mean sea level; MOA = Military Operations Area; WSMR = White Sands Missile Range

WSMR is a US Army military testing range located adjacent to Holloman AFB (see **Figure 1-2**), and due to its proximity, is a preferred training location for Holloman AFB. As the largest military installation in the United States, WSMR provides national priority research, development, test, and evaluation (programs for the Army, Navy, Air Force, and other customers). Training within WSMR is only allowed when it does not conflict with the frequent research, development, test, and evaluation activities. Above WSMR are designated Restricted Areas that support air-to-ground testing and training activities that would be hazardous to nonparticipating aircraft (i.e., live ordnance use). Holloman AFB currently uses WSMR for air-to-ground training that must be conducted in restricted areas. Holloman AFB also uses WSMR for air-to-air missions. All Holloman training on WSMR occurs only when WSMR is not scheduled for higher priority missions or testing activities. The Air Force and Army have established a Joint Test and Training Operations

Center to maximize usage of WSMR. Should the WSMR Restricted Areas be unavailable for F-16 and contract ADAIR training, the Air Force would schedule sorties in the Beak or Talon MOAs.

2.1.7 Defensive Countermeasures

While contract ADAIR aircraft would not carry or employ live or inert munitions, aircraft would operate with advanced radar and electronic targeting systems during engagements. Contract ADAIR aircraft would employ chaff and flares (e.g., RR-188 chaff and M206 flares or similar) during training sortie operations within the specific airspace and at altitudes as authorized by Federal Aviation Administration (FAA) permit, as well as following seasonal restrictions on the use of flares. Countermeasures currently authorized for use in each airspace are indicated in **Table 2-4**. Specific current restrictions governing countermeasure altitude and seasonal restrictions are discussed in greater detail in **Section 3.3.** Chaff and flares are the principal defensive countermeasure dispensed by military aircraft to avoid detection or attack by enemy air defense systems.

Table 2-4
Existing and Proposed Defensive Countermeasure Use

Special Use Airspace	Countermeasure Type[2]	Current Baseline Use[3]	Total Estimated Future Use[4]
WSMR Restricted Areas (R-5107 and R-5111)[1]	Chaff Bundles	76,260	80,420
	Flares	54,264	57,224
Beak MOAs	Flares	31,977	33,721
Talon MOAs (High East/West and Low)	Flares	9,690	10,219
McGregor Range Restricted Areas (R-5103B and C)[5]	Flares	969	1,022

Notes:
1. Includes the Restricted Areas R-5107A, B, C, D, E, H, J, and K and R-5111A/B.
2. Chaff would only be used within airspace as authorized by the Federal Aviation Administration permit. Flare is authorized for use within all airspace but is subject to altitude and seasonal restrictions based on specific location and the fire danger level.
3. Baseline countermeasure use is based on the FY18 use and includes chaff and flares used by CAF self-generated Red Air support.
4. This reflects contract ADAIR estimated countermeasure use added to the baseline use. With the addition of contract ADAIR, there would be an estimated 25 percent savings in the amount of chaff and flares used by the CAF due to no longer being tasked to fly CAF self-generated Red Air support.
5. The majority of sorties are expected to be flown in the Centennial Flying Area located in the eastern portion of the McGregor Range Restricted Areas.

ADAIR = adversary air; CAF = Combat Air Forces; MOA = Military Operations Area; WSMR = White Sands Missile Range

Chaff is an electronic countermeasure designed to reflect radar waves and obscure aircraft, ships, and other equipment from radar tracking sources. Chaff bundles consist of millions of nonhazardous aluminum-coated glass fibers. When ejected from the aircraft, these fibers disperse widely in the air, forming an electromagnetic screen that temporarily hides the aircraft from radar and forms a radar decoy, allowing the aircraft to defensively maneuver or leave the area. Flares are magnesium pellets ejected from military aircraft and provide high-temperature heat sources that act as decoys for heat-seeking weapons targeting the aircraft. These defensive countermeasures are utilized to keep aircraft from being successfully targeted by or escape from weapons such as surface-to-air missiles, air-to-air missiles, antiaircraft artillery, and in the case of the Proposed Action, other aircraft.

The existing and estimated additional chaff and flare use are presented in **Table 2-4**. Frequent training in use of chaff and flares by aircrews to master the timing of deployment and the capabilities of the devices is a critical component of ADAIR training. Chaff and flares (similar to RR-188 chaff and M206 flares) are proposed for annual use in contract ADAIR training. While 100 percent of the requirement may not be allocated or expended, this amount is carried forward to determine potential impact associated with defensive countermeasures. Chaff would only be used within airspace as authorized by FAA permit, and flares are authorized for use within all airspace but is subject to altitude and seasonal restrictions based on specific location and the fire danger level.

2.2 Selection Standards

In order to assess viable alternatives for the contract ADAIR implementation at Holloman AFB, the following selection standards were applied:

1. Mission: In addition to supporting Air Force prioritized missions as described in **Section 1.1.1**, contract ADAIR alternatives must not displace, interfere with, detract from, or reduce other Air Force missions or combat operations worldwide.
2. Airspace Capacity: Alternatives must have the airspace capacity to support force-on-force training engagements and must be able to safely support the contract ADAIR sorties in the airspace. Airspace must be large enough to effectively support realistic air-to-air training. Viable alternatives should not require establishing new military airspace but should occur within existing surrounding military airspace.
3. Facilities: Alternatives must leverage existing facilities that support the contract ADAIR requirements with minimal short duration, low-cost renovations, if any are needed. Alternatives must have existing
    a. operations work/office space;
    b. aircraft parking and hangar space;
    c. maintenance work/office space;
    d. munitions storage space;
    e. fuel storage capacity and delivery capability; and
    f. a runway of sufficient length for takeoff and landing of applicable aircraft, with appropriate safety features, infrastructure, and clear zones (CZs) to ensure safe operations.
4. Cost and Time: Contract ADAIR locations would need to support costs of facilities renovations from within their existing Operations and Maintenance budgets. Viable alternatives must not require major renovations or funding to implement. Furthermore, as CAF pilot readiness is currently an urgent need, viable ADAIR alternatives must be able to support ADAIR activities in the near term. Solutions that cannot be implemented within the next 2 years, therefore, do not meet the purpose and need for the initiative.

2.3 Screening of Alternatives

The following potential alternatives were considered:

- Alternative 1 – Establish contract ADAIR capabilities (an estimated 12 aircraft) providing 3,200 annual training sorties at Holloman AFB for support in the WSMR and McGregor Range Restricted Areas and Beak and Talon MOAs. Operations and AMU activities would be consolidated in Building 578, and aircraft parking would be located adjacent to Building 578. No military construction (MILCON) is anticipated for this action.
- Alternative 2 – Establish contract ADAIR capabilities (an estimated 12 aircraft) providing 3,200 annual training sorties at Holloman AFB for support in the WSMR and McGregor Range Restricted Areas and Beak and Talon MOAs. Operations would be located in Building 1062 in shared space with the F-16 FTU squadrons. The AMU would be located in Building 578, and aircraft parking would be located adjacent to Building 578. No MILCON is anticipated for this action.
- Alternative 3 – Establish an additional Air Force AGRS of military pilots to fly CAF ADAIR aircraft (an estimated 12 aircraft) providing 3,200 annual training sorties at Holloman AFB for support in the WSMR and McGregor Range Restricted Areas and Beak and Talon MOAs.
- Alternative 4 – Establish contract ADAIR capabilities (an estimated 12 aircraft) providing 3,200 annual training sorties at Holloman AFB for support in the WSMR and McGregor Range Restricted Areas and Beak and Talon MOAs. New hangars and operations and maintenance facilities would be constructed.

- Alternative 5 – Establish dedicated CAF ADAIR by tasking organic CAF units to provide the capability.
- Alternative 6 – Use other existing or newly proposed airspace for the ADAIR training. Instead of WSMR, McGregor Range, and Beak and Talon MOAs, use the existing Pecos, Bronco, or Valentine MOAs or use newly proposed airspace in western New Mexico (creation of Lobos MOA and Krista and Kendra Air Traffic Control Assigned Airspace and modification of Cato/Smitty MOAs) when the Holloman AFB Special Use Airspace Optimization EIS is finalized, if the western New Mexico airspace alternative is selected. Refer to **Appendix E** for special use airspace figures from the Special Use Airspace Optimization Draft EIS.

The selection standards described in **Section 2.2** were applied to these alternatives to determine which could support contract ADAIR requirements and fulfill the purpose and need for the Proposed Action. The six alternatives considered above are compared in **Table 2-5**.

Table 2-5
Comparison of Alternatives

Alternative Actions	Selection Standard				Meets Purpose and Need
	1. Mission	2. Airspace	3. Facilities	4. Cost and Time	
Alternative 1	Yes	Yes	Yes	Yes	**YES**
Alternative 2	Yes	Yes	Yes	Yes	**YES**
Alternative 3	No	Yes	Yes	No	**NO**
Alternative 4	Yes	Yes	No	No	**NO**
Alternative 5	No	Yes	Yes	Yes	**NO**
Alternative 6	Yes	No	Yes	Yes	**NO**

2.4 Alternative Actions Eliminated From Further Consideration

Four alternatives were considered and eliminated from further consideration because they would not meet the purpose and need for the action or the selection standards (refer to **Section 2.2**). These alternatives included the following:

- Alternative 3: Establishing a new Air Force AGRS of military pilots and 4th generation aircraft would meet many of the selection standards; however, it would take a large amount of time to implement. It takes more than a decade to train an Air Force pilot. Establishing another organic AGRS would require intensive planning, budgeting, and training of Air Force pilots before they would be ready to execute their mission. Rapid stand-up and manning of additional AGRS squadrons would be possible but not without reducing both manpower and combat platforms available to support combat operations. Due to the timeframe and/or reductions in combat mission capacity involved, this alternative fails to meet Selection Standards 1 and 4 and does not meet the purpose and need for the Proposed Action.
- Alternative 4: Establish contract ADAIR capabilities (an estimated 12 aircraft) providing 3,200 annual training sorties at Holloman AFB and constructing new hangars and operations and maintenance facilities. Establishing the contract ADAIR mission with new facilities construction was considered but not carried forward as the alternative requires the construction of new facilities and does not provide support in the timely manner needed to address the pilot readiness crisis, and as such does not meet Selection Standards 3 and 4. It would take 4 to 5 years to plan, program, budget, appropriate, design, and construct new facilities. This would not support the purpose and need for the Proposed Action.

- Alternative 5: Establish dedicated CAF ADAIR by tasking organic CAF units to provide the capability. Tasking organic 4th generation assets to provide dedicated ADAIR support to Holloman AFB would result in both a reduction of combat power applied worldwide as well as continued degradation of the unit's own readiness. The units employing 4th generation aircraft, such as the F-16, are heavily engaged in deployments and overseas missions. Under this alternative, these units would continue to struggle with providing for their own proficiency, while maintaining support for both combat operations and CAF ADAIR. Such an alternative does not meet Selection Standard 1 or the overarching purpose and need for the Proposed Action.
- Alternative 6: Use other existing or newly proposed airspace for the ADAIR training such as proposed airspace in Western New Mexico when the Holloman AFB Special Use Airspace Optimization EIS is finalized if it selects the Western New Mexico airspace alternative. Instead of WSMR, McGregor Range, Beak and Talon MOAs, use existing Pecos, Bronco or Valentine MOAs or use newly proposed Holloman AFB Special Use Airspace Optimization Draft EIS airspace (refer to **Appendix E**) over Western New Mexico (creation of Lobos MOA and Krista and Kendra Air Traffic Control Assigned Airspace, and modification of Cato/Smitty MOAs). The travel distance from Holloman AFB to the center of Valentine MOA is 156 nautical miles (NM) and the travel distance to the Pecos MOA is 113 NM if the aircraft travels through the Beak MOA. If the aircraft travels around the Beak MOA, the travel distance increases to 130 NM. The travel distance from Holloman AFB to the center of the Bronco MOA is 155 NM. The Cato and Smitty MOAs are located west of Holloman AFB and on the western side of WSMR. Holloman AFB pilots scheduling use of these MOAs need to obtain permission from WSMR to fly through R-5107 (making the travel distance to the center of the MOAs approximately 117 NM), or they must fly around the northern boundary making the travel distance 200 NM or greater. Travel distance to the center of the proposed Lobos MOA through WSMR is 110 NM. These distances are all much greater than distances to WSMR, McGregor Range, and Talon and Beak MOAs. For example, the travel distance to the center of Talon MOA from Holloman AFB is 70 NM and the Beak MOAs are located 23 NM east of Holloman AFB. The McGregor Range is located 5 NM southeast of Holloman AFB and WSMR airspace is connected to Holloman AFB.

  Alternative 6 does not meet Selection Standard 2 for airspace because the airspace is not practically available. The contract ADAIR aircraft proposed for use do not have sufficient operational capabilities to use the alternate airspace. Contract ADAIR aircraft cannot fly as far or as fast as the F-16s they would train with; therefore, they would not be capable of flying the additional distance or would have insufficient training time over potential western New Mexico airspace or the existing Bronco or Valentine MOAs. The western airspace is especially ill suited to air-to-air training with contract ADAIR for syllabus training that requires predictable, effective student sorties and closer proximity to the base due to the lack of effective range.

2.5 Detailed Description of the Selected Alternative Actions

NEPA and the CEQ regulations mandate the consideration of reasonable alternatives to the Proposed Action. "Reasonable alternatives" are those that also could be utilized to meet the purpose of and need for the Proposed Action. The NEPA process is intended to support flexible, informed decision-making; the analysis provided by this EA and feedback from the public and other agencies will inform decisions made about whether, when, and how to execute the Proposed Action. Two alternative actions meet the purpose of and need for the action, satisfy the criteria set forth in the selection standards, and were carried forward for further detailed analysis in this EA. The No Action Alternative provides a benchmark used to compare potential impacts of the Proposed Action. Alternatives carried forward for evaluation are described in **Sections 2.5.1** through **2.5.3**.

2.5.1 Alternative 1: Contract Adversary Air Operating Out of Building 578

Under Alternative 1, CAF would establish contract ADAIR capabilities (an estimated 12 aircraft) providing 3,200 annual training sorties at Holloman AFB (refer to **Figure 2-1**). Operations and the AMU would be located in Building 578, and aircraft parking would be located on the adjacent ramp. The contract ADAIR aircraft, maintenance, personnel, sorties, airspace use, and defensive countermeasures would be as described under Proposed Action.

2.5.2 Alternative 2: Contract Adversary Air Operating Out of Building 1062 and 578

Under Alternative 2, CAF would establish contract ADAIR capabilities (an estimated 12 aircraft) providing 3,200 annual training sorties at Holloman AFB. Operations would be located in Building 1062 in shared space with the F-16 FTU squadrons (refer to **Figure 2-2**). The AMU would be located in Building 578, and aircraft parking would be located on the adjacent ramp. The contract ADAIR aircraft, maintenance, personnel, sorties, airspace use, and defensive countermeasures would be as described under Proposed Action.

2.5.3 No Action Alternative

Analysis of the No Action Alternative provides a benchmark, enabling decision-makers to compare the magnitude of the potential environmental effects of the Proposed Action. NEPA requires an EA to analyze the No Action Alternative. No action means that an action would not take place at this time, and the resulting environmental effects from taking no action would be compared with the effects of allowing the proposed activity to go forward. No action for this EA reflects the status quo, where no contract ADAIR assets would be established at Holloman AFB. Organic Holloman AFB ADAIR support would result in further declines in fielded pilot proficiency or combat operations. Holloman AFB self-generated ADAIR support, the status quo following calendar year 2017 pilot increases, is causing declining quality of pilot production which consequently results in unsustainable operations posing an unacceptable threat to national security. Aircraft tasked to support ADAIR missions organically from within CAF would continue to experience their own readiness and proficiency challenges due to the lost training time they are experiencing.

2.6 Mitigation and Best Management Practices

Agencies are required to identify and include all relevant and reasonable mitigation measures that could reduce potential significant impacts. The CEQ regulations (40 CFR § 1508.20) define mitigation as

- avoiding the impact altogether by not taking a certain action or parts of an action;
- minimizing impacts by limiting the degree or magnitude of the action and its implementation;
- rectifying the impact by repairing, rehabilitating, or restoring the affected environment;
- reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and
- compensating for the impact by replacing or providing substitute resources or environments.

As summarized in **Section 2.7**, there are no significant impacts as a result of the Proposed Action or alternatives. Mitigation measures are not included in this EA; however, BMPs are described, when applicable, in the environmental consequences discussion for each resource in **Chapter 4**. Holloman AFB follows applicable Air Force regulations and BMPs as well as federal, state, and local regulations and directives.

2.7 Summary of Potential Environmental Consequences

The potential impacts associated with Alternatives 1 and 2 and the No Action Alternative are summarized in **Table 2-6**. The summary is based on information discussed in detail in **Chapter 4** (**Environmental Consequences**) of the EA and includes a concise definition of the issues addressed and the potential environmental impacts associated with each alternative action.

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Table 2-6
Comparison of Potential Environmental Consequences of the Proposed Action

Alternative	Resource								
	Airspace Management and Use	**Noise**	**Safety**	**Air Quality**	**Biological Resources**	**Land Use**	**Socioeconomics – Income and Employment**	**Environmental Justice - Protection of Children**	**Hazardous Materials and Wastes, Contaminated Sites, and Toxic Substances**
Alternative 1: **Contract ADAIR operations with 3,200 contracted sorties** **Operations and maintenance activities consolidated Building 578**	**Holloman AFB** Negligible impacts **MOAs/Restricted Areas** Negligible impacts	**Holloman AFB** Minor impacts **MOAs/Restricted Areas** Impacts associated with sonic booms would be negligible to minor	**Holloman AFB** No impacts on ground, explosive, or flight safety **MOAs/Restricted Areas** No impacts on ground, explosive, or flight safety	**Holloman AFB** Moderate increase in criteria pollutant emissions No impact on the region's ability to comply with the NAAQS for regulated pollutants Will not hamper efforts to achieve compliance with ozone NAAQS **MOAs/Restricted Areas** No impact in special use airspace No impact on the region's ability to meet NAAQS for all regulated pollutants	**Holloman AFB** No impacts on vegetation communities or habitat Negligible, short- and long-term impacts on wildlife from increased noise Minor impacts on birds from potential aircraft/bird collisions No impacts on federally listed species **MOAs/Restricted Areas** No impacts on vegetation communities or habitat. Less than significant impacts on wildlife from the ingestion of residual plastic chaff and flare components. Moderate adverse impact on birds and mammals in low-altitude airspace No impacts on wildlife from noise, including sonic booms	**Holloman AFB** No changes to existing land use **MOAs/Restricted Areas** No changes to existing land use beneath the airspace	**Holloman AFB** Potential major, beneficial impact from an estimated $48 million in possible annual expenditures **MOAs/Restricted Areas** No impacts on income or employment	**Holloman AFB** No disproportionate impact on minority or low-income populations No disproportionate impacts on children **MOAs/Restricted Areas** No disproportionate impact on minority or low-income populations No disproportionate impacts on children	**Holloman AFB** No impacts on hazardous waste management No impacts on asbestos-containing materials and lead-based paint management Long-term, minor beneficial impact on managing and disposal of polychlorinated biphenyls No impacts from radon No environmental contamination **MOAs/Restricted Areas** N/A
Alternative 2: **Contract ADAIR operations with 3,200 contracted sorties** **Operations activities in Building 1062** **Maintenance activities in Building 578**	**Holloman AFB** Same as Alternative 1 **MOAs/Restricted Areas** Same as Alternative 1	**Holloman AFB** Same as Alternative 1 **MOAs/Restricted Areas** Same as Alternative 1	**Holloman AFB** Same as Alternative 1 **MOAs/Restricted Areas** Same as Alternative 1	**Holloman AFB** Same as Alternative 1 **MOAs/Restricted Areas** Same as Alternative 1	**Holloman AFB** Same as Alternative 1 **MOAs/Restricted Areas** Same as Alternative 1	**Holloman AFB** Same as Alternative 1 **MOAs/Restricted Areas** Same as Alternative 1	**Holloman AFB** Same as Alternative 1 **MOAs/Restricted Areas** Same as Alternative 1	**Holloman AFB** Same as Alternative 1 **MOAs/Restricted Areas** Same as Alternative 1	**Holloman AFB** Same as Alternative 1 **MOAs/Restricted Areas** N/A

Table 2-6
Comparison of Potential Environmental Consequences of the Proposed Action

Alternative	Resource								
	Airspace Management and Use	**Noise**	**Safety**	**Air Quality**	**Biological Resources**	**Land Use**	**Socioeconomics – Income and Employment**	**Environmental Justice - Protection of Children**	**Hazardous Materials and Wastes, Contaminated Sites, and Toxic Substances**
No Action Alternative	No change to airspace management and use at Holloman AFB or in the MOAs/Restricted Areas	No change to noise setting at Holloman AFB or in the MOAs/ Restricted Areas	No change to ground, flight, or explosive safety at Holloman AFB or in the MOAs/Restricted Areas	No change to air quality at Holloman AFB or in the MOAs/Restricted Areas	No change to biological resources at Holloman AFB or in the MOAs/ Restricted Areas	No change to land use at Holloman AFB or in the MOAs/Restricted Areas	No change to income and employment at Holloman AFB or in the MOAs/Restricted Areas	No disproportionate impacts on minority and low-income populations, or children in the community at Holloman AFB or in the MOAs/ Restricted Areas	No change to hazardous materials and wastes, contaminated sites, and toxic substances at Holloman AFB or in the MOAs/Restricted Areas

Notes:

No, minor, or negligible impact Moderate impact but not significant Major, significant impact

* Where applicable, mitigation was included in the potential impacts summary.

ADAIR = adversary air; AFB = Air Force Base; MOA = Military Operations Area; N/A = not applicable; NAAQS = National Ambient Air Quality Standards

CHAPTER 3 AFFECTED ENVIRONMENT

Existing environmental conditions could be affected by the Proposed Action and alternatives. The existing conditions for relevant resources are defined to provide a meaningful baseline from which to compare potential future effects. In this chapter, each resource is defined and the geographic scope is identified, followed by a description of the existing conditions for that resource. The expected geographic scope of potential consequences is referred to as the ROI. The ROI boundaries will vary depending on the nature of each resource. For example, the ROI for some resources, such as air quality, extends over a larger jurisdiction unique to the resource. In addition, some resources discuss the available baseline data, installation (base) and airspace (restricted areas and MOAs), in the same section and some discuss these elements separately, depending on the complexity of the ROI.

3.1 AIRSPACE MANAGEMENT AND USE

3.1.1 Definition of the Resource

Airspace management involves the direction, control, and handling of flight operations in the airspace that overlies the borders of the United States and its territories. Under 49 U.S.C. § 40103, *Sovereignty and Use of Airspace,* and Public Law No. 103-272, the US government has exclusive sovereignty over the nation's airspace. The FAA has the responsibility to plan, manage, and control the structure and use of all airspace over the United States. FAA rules govern the national airspace system, and FAA regulations establish how and where aircraft may fly. Collectively, the FAA uses these rules and regulations to make airspace use as safe, effective, and compatible as possible for all types of aircraft, from private propeller-driven planes to large, high-speed commercial and military jets.

Aircraft use different kinds of airspace according to the specific rules and procedures defined by the FAA for each type of airspace. For the Proposed Action, the airspace used are Restricted Areas and MOAs over land. Restricted areas are typically used by the military due to safety or security concerns. Hazards include existence of unusual and often invisible threats from artillery use, aerial gunnery, or guided missiles. A MOA is designated airspace outside of Class A airspace used to separate or segregate certain nonhazardous military activities from Instrument Flight Rules (IFR) traffic and to identify for Visual Flight Rules (VFR) traffic where these activities are conducted (14 CFR § 1.1). Activities in MOAs include, but are not limited to, air combat maneuvers, air intercepts, and low-altitude tactics. The defined vertical and lateral limits vary for each MOA. While MOAs generally extend from 1,200 feet (ft) above ground level (AGL) to 18,000 ft above mean sea level (MSL), the floor may extend below 1,200 ft AGL if there is a mission requirement and minimal adverse aeronautical effect. MOAs allow military aircraft to practice maneuvers and tactical flight training at airspeeds in excess of 250 knots indicated airspeed (approximately 285 mi per hour). The FAA requires publication of the hours of operation for any MOA so that all pilots, both military and civilian, are aware of when other aircraft could be in the airspace. Each military organization responsible for a MOA develops a daily use schedule. Although the FAA designates MOAs for military use, other pilots may transit the airspace under VFR. MOAs exist to notify civil pilots under VFR where heavy volumes of military training exist which increases the chance of conflict and are generally avoided by VFR traffic. MOAs in the vicinity of busy airports may have specific avoidance procedures that also apply to small private and municipal airfields. Such avoidance procedures are maintained for each MOA, and both civil and military aircrews build them into daily flight plans.

In addition to the lower limits of charted airspace, all aircrews adhere to FAA avoidance rules. Aircraft must avoid congested areas of a city, town, settlement, or any open-air assembly of persons by 1,000 ft above the highest obstacle within a horizontal radius of 2,000 ft of the aircraft. Outside of congested areas, aircraft must avoid any person, vessel, vehicle, or structure by 500 ft. Operational commanders may establish additional avoidance restrictions under MOAs and restricted areas.

The ROI for airspace use and management includes the Holloman AFB airfield and environs as well as the Restricted Areas and MOAs depicted on **Figure 1-4**.

3.1.2 Existing Conditions – Holloman Air Force Base

The Holloman AFB airfield is operated by the 54 FG supporting military operations conducted by units stationed at the base. Military training has occurred in the vicinity of Holloman AFB since 1942. The majority of operations at Holloman AFB are performed by the 54 FG F-16C aircraft.

Air Traffic Control (ATC) for Holloman AFB is provided by the Air Force. Controlled Class D airspace, extending upward from the surface up to and including 2,500 ft AGL within a 4-NM radius of Holloman AFB, has been established around the airfield to support managing air traffic.

A variety of factors can influence the annual level of operational activity at an airfield, including economics, national emergencies, and maintenance requirements. Operations consist of arrivals and departures (itinerant) by primarily military aircraft, with a smaller amount of general aviation traffic flights. Military aircraft use makes up 96 percent of the airfield use, with the remaining amount used by general aviation and transient aircraft flights (**Table 3-1**).

Table 3-1
Annual Operations at Holloman Air Force Base

Use	Annual Operations	Percentage of Use
54 FG	67,200	77
49 OG	6,400	7
82 ATRS/Det 1	3,080	4
586 FLTS	5,415	6
Army	1,640	2
General Aviation	1,152	1
Transient	2,740	3
Total	**87,627**	**100**

Notes:
49 OG = 49th Operations Group; 54 FG = 54th Fighter Group; 586 FLTS = 586th Flight Test Squadron; 82 ATRS/Det 1 = 82d Aerial Targets Squadron, Detachment 1

3.1.3 Existing Conditions – Airspace

The affected environment for airspace management includes Restricted Areas and MOAs where aircraft based at Holloman AFB perform training operations. Holloman AFB F-16C aircraft primarily train in the WSMR Restricted Areas, Beak MOAs, Talon MOAs, and McGregor Range Restricted Areas described **Chapters 1** and **2**. As described in **Chapter 2**, Air Force training on WSMR occurs only when it is not scheduled for higher priority missions or testing activities.

3.2 NOISE

3.2.1 Definition of the Resource

Sound is a physical phenomenon consisting of minute vibrations that travel through a medium, such as air or water, and are sensed by the human ear. Sound becomes noise when it is unwelcome and interferes with normal activities, such as sleep or conversation. Noise is generally described as unwanted sound. Unwanted sound can be based on objective effects (such as hearing loss or damage to structures) or subjective judgments (community annoyance). The response of different individuals to similar noise events is diverse and influenced by the type of noise, the perceived importance of the noise, its appropriateness in the setting,

the time of day, the type of activity during which the noise occurs, and the sensitivity of the individual. Noise also may affect wildlife through disruption of nesting, foraging, migration, and other life-cycle activities.
Sound is expressed in logarithmic units of decibels (dB). A sound level of 0 dB is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. Normal speech has a sound level of approximately 60 dB; sound levels above 120 dB begin to be felt inside the human ear as discomfort. Sound levels between 130 to 140 dB are felt as pain (Berglund and Lindvall, 1995). The minimum change in the sound level of individual events that an average human ear can detect is about 3 dB.

All sounds have a spectral content, which means their magnitude or level changes with frequency, where frequency is measured in cycles per second, or hertz. To mimic the human ear's nonlinear sensitivity and perception of different frequencies of sound, the spectral content is weighted. For example, environmental noise measurements usually employ an "A-weighted" scale that filters out very low and very high frequencies to replicate human sensitivity. It is common to add the "A" to the measurement unit to identify that the measurement was made with this filtering process, for instance dBA. In this document, the dB unit refers to A-weighted sound levels unless otherwise noted.

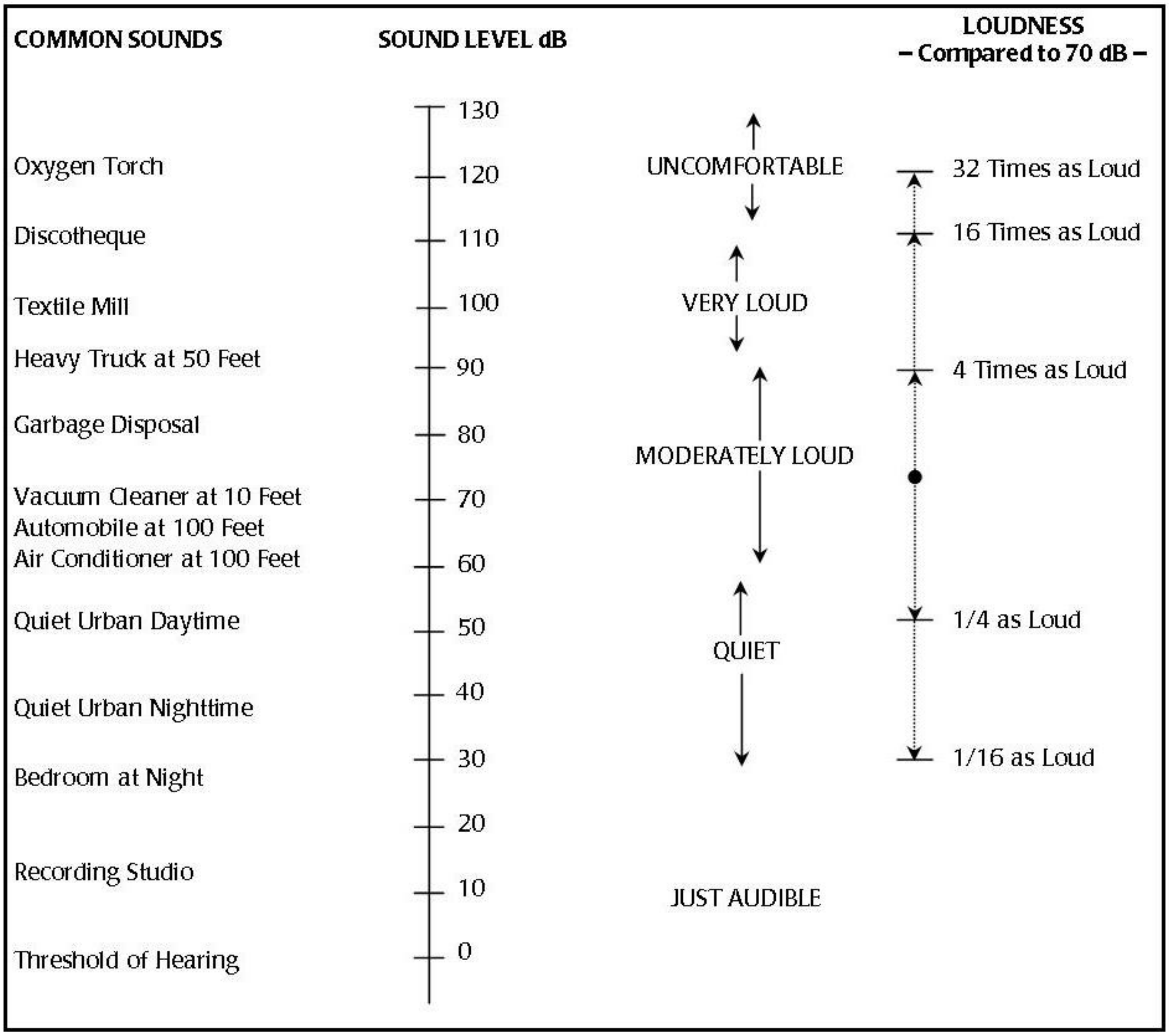
A-weighted sound levels from common sources are given on **Figure 3-1**. Some sources, like the air conditioner and vacuum cleaner, are continuous sounds whose levels are constant for some time. Some sources, like the automobile and heavy truck, are the maximum sound during an intermittent event like a vehicle pass-by. Some sources like "urban daytime" and "urban nighttime" are averages over extended periods. A variety of noise metrics have been developed to describe noise over different time periods.

Military aircraft 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. Subsonic noise occurs at the airfields and in the airspace. The other type is supersonic noise consisting of sonic booms. Sonic booms are transient, impulsive sounds generated during supersonic flight. Supersonic flight must occur only within authorized airspace. These two types of noise differ in terms of characteristics.

Aircraft subsonic noise consists of two major types of sound events: flight events (including takeoffs, landings, and flyovers) and stationary events, such as engine maintenance run-ups. Noise from aircraft overflights typically occurs beneath main approach and departure paths and in local air traffic patterns around the airfield. Noise from stationary events typically occurs in areas near aircraft parking ramps and staging areas. As aircraft climb, the noise received on the ground drops to lower levels, eventually fading into the background or ambient levels.

Aircraft in supersonic flight (i.e., exceeding the speed of sound, Mach 1) cause sonic booms. A sonic boom is characterized by a rapid increase in pressure, followed by a decrease before a second rapid return to normal atmospheric levels. This change occurs very quickly, usually within a few tenths of a second. It is usually perceived as a "bang-bang" sound. The amplitude of a sonic boom is measured by its peak overpressure, in pounds per square foot (psf). The amplitude depends on the aircraft's size, weight, geometry, Mach number, and flight altitude. Altitude is usually the biggest single factor. Maneuvers (turns, dives, etc.) also affect the amplitude of particular booms.

Not all supersonic flights cause sonic booms that are heard at ground level. As altitude increases, air temperature and sound speed decrease. These sound speed changes cause booms to be turned upward as they travel toward the ground. Depending on the altitude of the aircraft and the Mach number, many sonic booms can be bent upward such that they never reach the ground. This phenomenon, referred to as "cutoff," also acts to limit the width (area covered) of the sonic booms that do reach the ground. The overpressures of booms that reach the ground are well below those that would begin to cause physical injury to humans or animals. They can, however, be annoying and can cause startle reaction in humans and animals. On occasion, sonic booms can cause physical damage (e.g., to a window) if the overpressure is of sufficient magnitude. The condition of the structure is a major factor when damage occurs, the probability of which, tends to be low. For example, the probability of a 1-psf boom (average pressure in airspace) cracking plaster or breaking a window falls in the range of 1 in 10,000 to 1 in 10 million.



Source: Harris, 1979.

Figure 3-1. Typical A-weighted Sound Levels of Common Sounds.

3.2.1.1 Noise Metrics

Noise metrics quantify sounds so they can be compared with each other, and with their effects, in a standard way. There are a number of metrics that can be used to describe a range of situations, from a particular individual event to the cumulative effect of all noise events over a long time. This section summarizes the metrics relevant to environmental noise analysis. Noise metrics and noise models are described in **Appendix B**.

Single Event Metrics

Maximum Sound Level

The highest A-weighted sound level measured during a single event in which the sound changes with time is called the maximum A-weighted sound level or Maximum Sound Level and is abbreviated L_{max}. The L_{max} is depicted for a sample event in **Figure 3-2**.

L_{max} is the maximum level that occurs over a fraction of a second. For aircraft noise, the "fraction of a second" is one-eighth of a second, denoted as "fast" response on a sound level measuring meter (American National Standards Institute, 1988). Slowly varying or steady sounds are generally measured over 1 second, denoted as "slow" response. L_{max} is important in judging if a noise event will interfere with conversation, television or radio listening, or other common activities. Although it provides some measure of the event, it does not fully describe the noise because it does not account for how long the sound is heard.

Sound Exposure Level

Sound Exposure Level (SEL) combines both the intensity of a sound and its duration. For an aircraft flyover, SEL includes the maximum and all lower noise levels produced as part of the overflight, together with how long each part lasts. It represents the total sound energy in the event. **Figure 3-2** indicates the SEL for an example event, representing it as if all the sound energy were contained within 1 second.

Because aircraft noise events last more than a few seconds, the SEL value is larger than L_{max}. It does not directly represent the sound level heard at any given time, but rather the entire event. SEL provides a much better measure of aircraft flyover noise exposure than L_{max} alone.

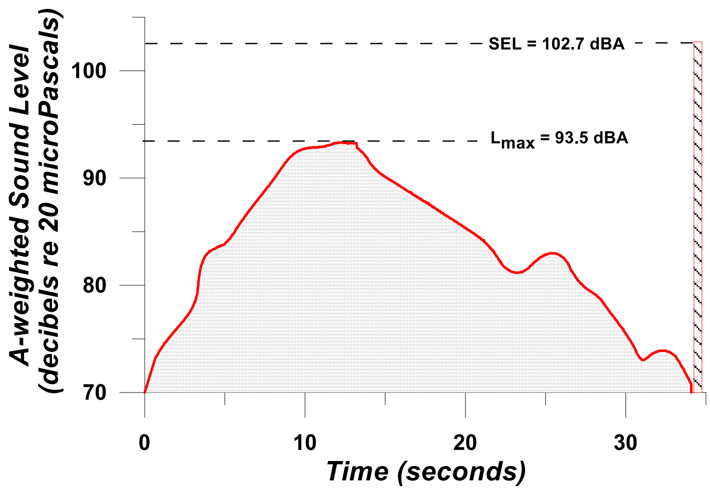


Figure 3-2. Example of Maximum Sound Level and Sound Exposure Level from an Individual Event.

Overpressure

The single event metrics commonly used to assess supersonic noise are overpressure in psf and C-Weighted Sound Exposure Level (CSEL). Overpressure is the peak pressure at any location within the sonic boom footprint.

C-Weighted Sound Exposure Level

CSEL is SEL computed with C frequency weighting, which is similar to A-weighting (discussed in **Section 3.2.1**) except that C-weighting places more emphasis on low frequencies below 1,000 hertz.

Cumulative Metrics

Equivalent Sound Level

Equivalent Sound Level (L_{eq}) is a "cumulative" metric that combines a series of noise events over a period of time. L_{eq} is the sound level that represents the decibel average SEL of all sounds in the time period. Just as SEL has proven to be a good measure of a single event, L_{eq} has proven to be a good measure of series of events during a given time period.

The time period of an L_{eq} measurement is usually related to some activity and is given along with the value. The time period is often shown in parenthesis (e.g., $L_{eq(24)}$ for 24 hours). The L_{eq} from 7:00 a.m. to 3:00 p.m. may give exposure of noise for a school day.

An example of $L_{eq(24)}$ using notional hourly average noise levels ($L_{eq[h]}$) for each hour of the day is given on **Figure 3-3**. The $L_{eq(24)}$ for this example is 61 dBA.

Day-Night Average Sound Level

Day-Night Average Sound Level (DNL or L_{dn}) is a cumulative metric that accounts for all noise events in a 24-hour period; however, unlike $L_{eq(24)}$, DNL contains a nighttime noise penalty. To account for our increased sensitivity to noise at night, DNL applies a 10-dBA penalty to events during the nighttime period, defined as 10:00 p.m. to 7:00 a.m. The notations DNL and L_{dn} are both used for Day-Night Average Sound Level and are equivalent. For airports and military airfields, DNL represents the average sound level for annual average daily aircraft events.

An example of DNL using notional hourly average noise levels ($L_{eq[h]}$) for each hour of the day is given on **Figure 3-3**. Note the $L_{eq(h)}$ for the hours between 10:00 p.m. and 7:00 a.m. (i.e., environmental night) have a 10-dBA penalty assigned. DNL for the example noise distribution shown on **Figure 3-3** is 65 dBA.

DNL does not represent a noise level heard at any given time but represents long-term exposure. Scientific studies have found good correlation between the percentages of groups of people highly annoyed and the level of average noise exposure measured in DNL (Schultz, 1978; US Environmental Protection Agency [USEPA], 1978).

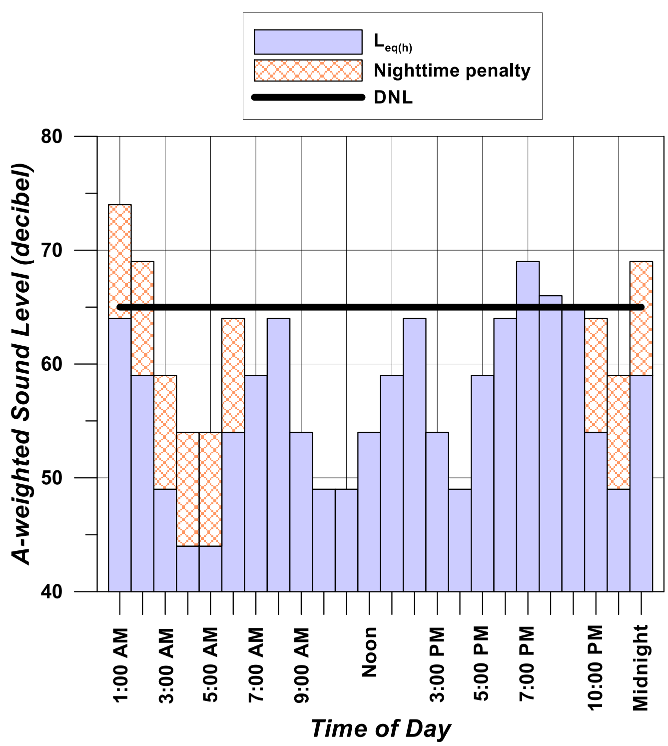


Figure 3-3. Example of Day-Night Average Sound Level Computed from Hourly Average Sound Levels.

Onset-Rate Adjusted Monthly Day-Night Average Sound Level

Military aircraft utilizing special use airspace such as military training routes, MOAs, and restricted areas generate a noise environment that is somewhat different from that around airfields. Rather than regularly occurring operations like at airfields, activity in special use airspace is highly sporadic. It is often seasonal, ranging from 10 per hour to less than one per week. 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, with rates of up to 150 dBA per second.

The cumulative daily noise metric devised to account for the "surprise" effect of the sudden onset of aircraft noise events on humans and the sporadic nature of special use airspace activity is the Onset-Rate Adjusted Monthly Day-Night Average Sound Level (L_{dnmr}). Onset rates between 15 and 150 dBA per second require an adjustment of 0 to 11 dBA to the event's SEL while onset rates below 15 dBA per second require no adjustment to the event's SEL (Stusnick et al., 1992). The term 'monthly' in L_{dnmr} refers to the noise assessment being conducted for the month with the most operations or sorties, the busiest month.

3.2.1.2 Noise Models

This section summarizes the analysis tools used to calculate the noise levels for the EIAP.

NOISEMAP

Analyses of aircraft noise exposure and compatible land uses around DOD airfield-like facilities are normally accomplished using a group of computer-based programs, collectively called NOISEMAP (Czech and Plotkin, 1998; Wasmer and Maunsell, 2006a, 2006b). The core computational program of the NOISEMAP suite is NMAP. In this report, NMAP Version 7.3 was used to analyze aircraft operations and generate noise contours.

MR_NMAP

When the aircraft flight tracks are not well defined and are distributed over a wide area, such as in Military Training Routes with wide corridors or MOAs, the Air Force uses the DOD-approved MR_NMAP program (Lucas and Calamia, 1996). In this report, MR_NMAP Version 3.0 was used to model subsonic aircraft noise in special use airspace. For airspace environments where noise levels are calculated to be less than 45 dB, the noise levels are stated as "<45 dB."

PCBoom

Environmental analysis of supersonic aircraft operations requires calculation of sonic boom amplitudes. For the purposes of this study, the Air Force and DOD-approved PCBoom program was used to assess sonic boom exposure due to military aircraft operations in supersonic airspace. In this report, PCBoom Version 4 was used to calculate sonic boom ground signatures and overpressures from supersonic vehicles performing steady, level flight operations (Plotkin, 2002).

BooMap

For cumulative sonic boom exposure under supersonic air combat training arenas, the Air Force and DOD-approved BooMap program was used. In this report, BooMap96 was used to calculate cumulative C-weighted DNL (CDNL) exposure based on long-term measurements in a number of airspaces (Plotkin, 1993).

The ROI for noise includes the Holloman AFB airfield and environs as well as the MOAs and Restricted Areas depicted on **Figure 1-4**. Noise analysis at Holloman AFB was conducted to update the airfield noise contours and the MOAs and Restricted Areas described in **Section 3.1.2**, in order to reflect the most recent and accurate aircraft operations and flying conditions.

3.2.2 Existing Conditions – Holloman Air Force Base

As is normal for military installations with a flying mission, the primary driver of noise at Holloman AFB is aircraft operations. Standard aircraft operations include take-offs, landings, closed patterns, and static run-ups.

In addition to aviation noise, some additional noise results from the day-to-day activities associated with operations, maintenance, and the industrial functions associated with the operations of the airfield. These noise sources include the operations of ground-support equipment, and other transportation noise from vehicular traffic. Noise resulting from aircraft operations remains the dominant noise source.

Aircraft operations at Holloman AFB consist of based military aircraft, civilian aircraft, and a variety of transient aircraft. Existing annual aircraft operations at Holloman AFB total 87,627, as summarized in **Table 3-2**. An operation is defined as a single takeoff or landing. Closed patterns consist of two operations, one departure and one arrival (e.g., two closed pattern circuits consist of four total operations). The table pattern numbers are operation counts, not pattern circuit counts. Holloman AFB's Runways 16 and 25 are used for the majority of aircraft operations. The majority of aircraft operations at Holloman AFB are performed by the based F-16C aircraft. A more detailed existing annual aircraft operations table can be found in **Appendix B**.

Table 3-2
Existing Annual Aircraft Operations Summary at Holloman Air Force Base

Aircraft	Departures		Arrivals		Closed Patterns		Total Operations		
	Day	Night	Day	Night	Day	Night	Day	Night	Total
Military	20,419	2,876	21,977	1,318	36,452	693	78,848	4,887	83,735
Civilian	576	0	576	0	0	0	1,152	0	1,152
Transient	1,370	0	1,370	0	0	0	2,740	0	2,740
Grand Total	**22,365**	**2,876**	**23,923**	**1,318**	**36,452**	**693**	**82,740**	**4,887**	**87,627**

The resultant 65- to 85-dBA DNL contours in 5-dBA increments for the existing daily flight events at Holloman AFB are shown on **Figure 3-4**. In accordance with Air Force Handbook 32-7084, the 65-dBA DNL is the noise level below which generally all land uses are compatible with noise from aircraft operations. It should be emphasized that these noise levels, which are often shown graphically as contours on maps, are not discrete lines that sharply divide louder areas from land largely unaffected by noise. Instead, they are part of a planning tool that depicts the general noise environment around the installation based on typical aviation activities. Areas beyond the 65-dBA DNL can also experience levels of appreciable noise depending upon training intensity or weather conditions. In addition, DNL noise contours may vary from year to year due to fluctuations in operational tempo due to unit deployments, funding levels, and other factors. Static run-up operations, such as maintenance and pre/postflight run-ups, were also modeled. A more detailed discussion of static operations at Holloman AFB can be found in **Appendix B**.

The prominent features from **Figure 3-4** are the extents of the DNL contours along the extended centerline of Runway 16/34. The 65-dBA DNL contour extends beyond the base boundary, approximately 2.9 mi to the north and 2.8 mi to the south from the end of the runway. The 70-dBA DNL contour extends approximately 1.4 mi to the north and 1.8 mi to the south from the end of the runway. The 75-dBA DNL contour extends approximately 0.5 mi to the north and 0.9 mi to the south from the end of the runway. Along the extended centerline of Runway 07/25, the 65-dBA DNL contour extends approximately 1.6 mi to the west and 0.3 mi to the east from the end of the runway. The 70- and 75-dBA DNL contours extend less than 0.9 mi from both the western and eastern ends of the runway. The area within each DNL noise contour for the existing conditions as shown on **Figure 3-4** are shown in **Table 3-3**.

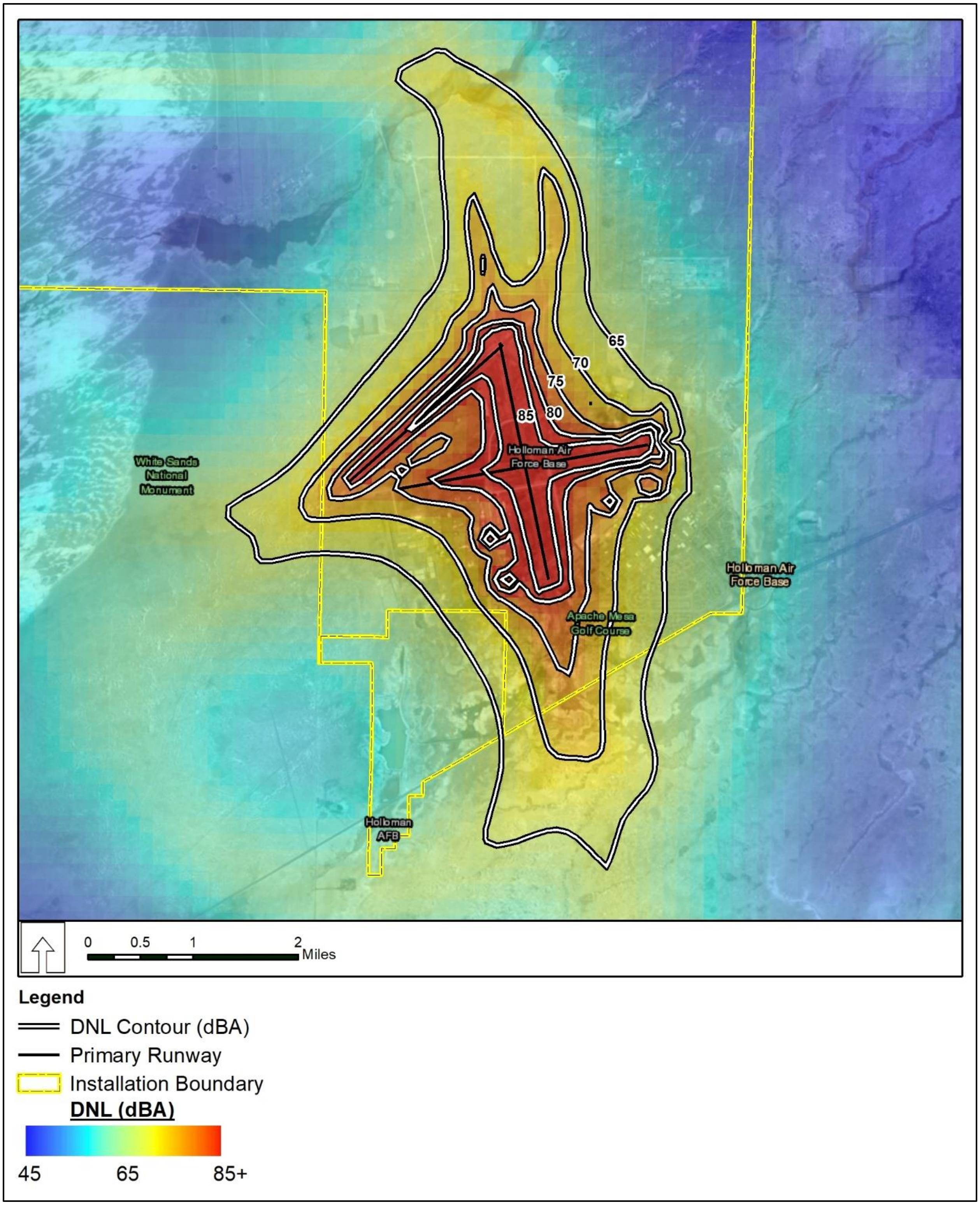


Figure 3-4. Existing Day-Night Average Sound Level Contours at Holloman Air Force Base.

Table 3-3
Existing Day-Night Average Sound Level Area Affected at Holloman Air Force Base

Noise Level (dBA DNL)	Area Within Noise Contour (acres)
>65	9,590
>70	4,866
>75	2,764
>80	1,503
>85	762

Notes:
Area (on- and off-base) was based off NOISEMAP modeled noise contours and used to calculate the amount of land within each noise contour. The amounts shown are cumulative, i.e., the acreage within the >85-dBA contour is also within all the lower noise level contours.

dBA = A-weighted decibel; DNL = Day-Night Average Sound Level

THE FIRST STEP IN IDENTIFYING NOISE SENSITIVE RECEPTORS, ALSO REFERRED TO AS POINTS OF INTEREST (POIS) AROUND MILITARY AIRFIELDS IS TO REVIEW PUBLISHED NATIONAL ENVIRONMENTAL POLICY ACT AND/OR AIR INSTALLATION COMPATIBLE USE ZONE REPORTS TO DETERMINE PREVIOUSLY IDENTIFIED POIS. THESE TYPICALLY INCLUDE SCHOOLS, PLACES OF WORSHIP, AND RESIDENTIAL AREAS AROUND THE AIRFIELD. IN ADDITION, INSTALLATION PERSONNEL WORK WITH THE COMMUNITY TO IDENTIFY AREAS AROUND THE AIRFIELD THAT SHOULD BE CONSIDERED FOR NOISE ANALYSIS.

A number of points of interest (POIs) have been identified in the vicinity of Holloman AFB. These POIs are made up of noise sensitive receptors such as historic sites, schools, and places of worship. **Table 3-4** shows the DNL as a result of aircraft operations at Holloman AFB at the seven POI for the existing conditions. Six of the seven POIs are exposed to DNL between 60 and 65 dBA, and two POIs are exposed to DNL higher than 65 dBA.

Table 3-4
Existing Day-Night Average Sound Level at Points of Interest at Holloman Air Force Base

Points of Interest		DNL (dBA)
ID	Description	
H01	White Sands National Monument Historic Visitor Center	49
S01	Child Development Center 1	66
S02	Child Development Center 2	64
S03	Embry-Riddle Aeronautical University	66
S04	Holloman Elementary School	65
S05	Holloman Middle School	64
W01	Holloman Chapel	65

Notes:
Affected POIs based on NOISEMAP-modeled noise contours and used to calculate the POIs within each noise contour.

dBA = A-weighted decibel; DNL = Day-Night Average Sound Level; POI = point of interest

3.2.3 Existing Conditions – Airspace

The primary special use airspace used by Holloman AFB–based aircraft are WSMR Restricted Areas, Beak MOAs, Talon MOAs, and McGregor Range Restricted Areas. WSMR receives approximately 55 percent of all airspace operations originating from Holloman AFB while Beak receives 29 percent, Talon receives 9 percent, and McGregor Range receives 7 percent. These airspaces are all over land. A summary of Holloman AFB's annual airspace operations is presented in **Table 3-5**.

The existing L_{dnmr} noise levels, calculated using MR_NMAP, from the subsonic aircraft operations detailed in **Table 3-5** underneath the WSMR Restricted Areas, Beak MOAs, and McGregor Range Restricted Areas are shown on **Table 3-6**; the existing L_{dnmr} noise levels for the Talon MOAs are based on the F-16C operations shown on **Table 3-6** as well as transient aircraft operations.

Table 3-5
Existing Annual Airspace Operations Summary by Holloman Air Force Base in the Restricted Areas and Military Operations Areas

Aircraft	White Sands Missile Range Restricted Areas		Beak MOAs		Talon MOAs		McGregor Restricted Areas		Total Operations		
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Total
F-16C	4,615	347	2,389	180	748	83	603	45	8,355	655	9,010

Note:
MOA = Military Operations Area

Table 3-6
Existing Noise Levels in Airspace

Airspace	Noise Level (L_{dnmr} dB)
White Sands Missile Range Restricted Areas	52
Beak Military Operations Areas	37
Talon East Military Operations Areas	<45
Talon West Military Operations Areas	47
Talon Low Military Operations Areas	54
McGregor Range Restricted Areas	55

Note:
dB = decibel(s); L_{dnmr} = Onset-Rate Adjusted Monthly Day-Night Average Sound Level

Supersonic operations are allowed in the WSMR Restricted Areas (R-5107 and R-5111) above 10,000 ft MSL, in the Beak MOAs above 23,000 ft MSL, and in the McGregor Range Restricted Areas (R-5103B and C) above 10,000 ft MSL. Airspace sorties require aircraft to exceed Mach 1.0 (supersonic) for brief periods of time for approximately 10 percent of total flight time. This is equivalent to less than 5 minutes of supersonic flight activity per sortie.

The BooMap program was to compute cumulative sonic boom exposure under supersonic air combat training arenas. Under the existing conditions, the cumulative CDNL exposure in the various MOAs and Restricted Areas used by based Holloman AFB aircraft do not exceed the 45-dB CDNL under any primary use airspace.

Single event sonic boom levels estimated for supersonic flights in the airspace above the WSMR Restricted Areas (R-5107 and R-5111) are shown in **Table 3-7**. Overpressure (psf) and CSEL (decibels) were estimated directly under the flight path for the F-16C aircraft at various altitudes and Mach numbers. Overpressure levels estimated for the WSMR Restricted Areas range from 6.7 to 0.9 psf depending on the flight conditions. The F-16C cannot attain Mach 1.5 at 10,000 ft MSL; therefore, levels are not reported.

Single event sonic boom levels estimated for supersonic flights in the Beak MOAs are shown in **Table 3-8**. Overpressure (psf) and CSEL (decibels) were estimated directly under the flight path for the F-16C aircraft at various altitudes (ft MSL) and Mach numbers. Overpressure levels estimated for the Beak MOAs range from 2.2 to 1.0 psf depending on the flight conditions. Similarly, single event sonic boom levels estimated for supersonic flights in the McGregor Range Restricted Areas are shown in **Table 3-9**. Overpressure levels estimated for the F-16C aircraft in the McGregor Range Restricted Areas range from 6.7 to 0.9 psf depending on the flight conditions.

When sonic booms reach the ground, they impact an area that is referred to as a “carpet.” The size of the carpet depends on the supersonic flight path and on atmospheric conditions. The width of the boom carpet beneath the aircraft is about 1 mi for each 1,000 ft of altitude (National Aeronautics and Space

Administration [NASA], 2017). Sonic booms are loudest near the center of the carpet, having a sharp “bang-bang” sound. Near the edges, they are weak and have a rumbling sounding like distant thunder. The boom levels shown in **Tables 3-7** through **3-9** are the loudest levels computed at the center of the carpet, directly under the flight path, for the constant Mach, level flight conditions indicated. The location of these booms will vary with changing flight paths and weather conditions, so it is unlikely that any given location will experience these undertrack levels more than once over multiple events. Public reaction is expected to occur with overpressures above 1 psf, and in rare instances, damage to structures have occurred at overpressures between 2 and 5 psf (NASA, 2017). People located farther away from the supersonic flight paths, who are still within the primary boom carpet, might also be exposed to levels that may be startling or annoying, but the probability of this decreases the farther away they are from the flight path. People located beyond the edge of the boom carpet are not expected to be exposed to sonic boom although postboom rumbling sounds may be heard.

Table 3-7
White Sands Missile Range Restricted Areas (R-5107 and R-5111): Sonic Boom Levels Undertrack for Based Aircraft in Level Flight at Mach 1.2 and 1.5

Aircraft	Altitude (feet above mean sea level)		
	10,000[1]	35,000	50,000
Mach 1.2			
Overpressure (pound[s] per square foot)			
F-16C	6.7	1.3	1.0
CSEL (decibels)[2]			
F-16C	118	104	101
Mach 1.5			
Overpressure (pound[s] per square foot)			
F-16C	-	1.5	0.9
CSEL (decibels)[2]			
F-16C	-	105	101

Note:
[1] The F-16C cannot attain Mach 1.5 at an altitude of 10,000 feet above mean sea level.
[2] C-weighted Sound Exposure Level (CSEL) – Sound Exposure Level with frequency weighting that places more emphasis on low frequencies below 1,000 hertz

Table 3-8
Beak Military Operations Areas: Sonic Boom Levels Undertrack for Based Aircraft in Level Flight at Mach 1.2 and 1.5

Aircraft	Altitude (feet above mean sea level)		
	25,000	40,000	50,000
Mach 1.2			
Overpressure (pound[s] per square foot)			
F-16C	2.2	1.2	1.1
CSEL (decibels)*			
F-16C	109	103	102
Mach 1.5			
Overpressure (pound[s] per square foot)			
F-16C	2.5	1.3	1.0
CSEL (decibels)*			
F-16C	110	104	102

Note:
* C-weighted Sound Exposure Level (CSEL) – Sound Exposure Level with frequency weighting that places more emphasis on low frequencies below 1,000 hertz

Table 3-9
McGregor Range Restricted Areas R-5103B and C:
Sonic Boom Levels Undertrack for Based Aircraft in Level Flight at Mach 1.2 and 1.5

Aircraft	Altitude (feet above mean sea level)		
	10,000[1]	35,000	50,000
Mach 1.2			
Overpressure (pound[s] per square foot)			
F-16C	6.7	1.3	1.0
CSEL (decibels)[2]			
F-16C	118	104	101
Mach 1.5			
Overpressure (pound[s] per square foot)			
F-16C	-	1.5	0.9
CSEL (decibels)[2]			
F-16C	-	105	101

Note:
[1] The F-16C cannot attain Mach 1.5 at an altitude of 10,000 feet above mean sea level.
[2] C-weighted Sound Exposure Level (CSEL) – Sound Exposure Level with frequency weighting that places more emphasis on low frequencies below 1,000 hertz

3.3 SAFETY

3.3.1 Definition of the Resource

Safety concerns associated with ground, explosive, and flight activities are considered in this section. Ground safety considers issues associated with ground operations and maintenance activities that support unit operations including arresting gear capability, jet blast/maintenance testing, and safety danger. Aircraft maintenance testing occurs in designated safety zones. Ground safety also considers the safety of personnel and facilities on the ground that may be placed at risk from flight operations in the vicinity of the airfield and in the airspace. CZs and Accident Potential Zones (APZs) around the airfield restrict the public's exposure to areas where there is a higher accident potential. Although ground and flight safety are addressed separately, in the immediate vicinity of the runway, risks associated with safety-of-flight issues are interrelated with ground safety concerns.

Explosives safety relates to the management and safe use of ordnance and munitions. Flight safety considers aircraft flight risks such as midair collision, bird/wildlife-aircraft strike hazard (BASH), and in-flight emergency. Contract ADAIR aircraft will follow Air Force safety procedures and aircraft specific emergency procedures based on the design which are produced by the original equipment manufacturer of the aircraft. Basic airmanship procedures also exist for handling any deviations to ATC procedures due to an in-flight emergency; these procedures are defined in AFI 11-202 (Volume 3), *General Flight Rules*, and established aircraft flight manuals. The Flight Crew Information File is a safety resource for aircrew day-to-day operations which is composed of air and ground operation rules and procedures.

Existing conditions are organized by ground, explosive, and flight safety. The ROI includes Holloman AFB and areas immediately adjacent to the base where ground and explosive safety concerns are described, as well as the airfield and airspace where flight safety is discussed.

3.3.2 Existing Conditions – Holloman Air Force Base and Airspace

3.3.2.1 Ground Safety

Ground safety includes several categories including ground and industrial operations, operational activities, and motor vehicle use. Ground mishaps can occur from the use of equipment or materials and maintenance functions. Day-to-day operations and maintenance activities conducted by the 49 WG are performed in accordance with applicable Air Force safety regulations, published Air Force Technical Orders, and standards prescribed by Air Force Occupational Safety and Health (AFOSH) requirements identified within AFI 91-202, *The US Air Force Mishap Prevention Program*, and Air Force Manual 91-203, *Air Force Occupational Safety, Fire and Health Standards*.

Emergency Response

For emergency response, the Air Force provides emergency responders trained on the applicable mission design series they are providing. For crash response, the DOD provides on-field aircraft Crash Damaged or Disabled Aircraft Recovery (CDDAR). Due to its large size, Holloman AFB has three fire stations manned during normal fight operations to ensure responders can access any portion of the airfield quickly. For events occurring off-base, civilian authorities will be first on scene; once on-scene, the Air Force will provide site management for security and safety investigation purposes.

Safety Zones

Safety zones around airfields that restrict incompatible land uses are designated to reduce exposure to aircraft safety hazards. These include the CZs, which are areas immediately beyond the ends of a runway, and APZ I and APZ II, which are areas beyond the CZs. The standards for CZs and APZs are established by DOD Instruction 4165.57, *Air Installations Compatible Use Zones*. Within the CZs, which covers a 3,000-by-3,000-ft area at the end of each runway, the overall accident risk is the highest. APZ I, which extends for 5,000 ft beyond the CZ, is an area of reduced accident potential. In APZ II, which is 7,000 ft long, accident potential is the lowest among the three zones.

Open space (undeveloped) and agricultural uses (excluding raising of livestock) are the only uses deemed compatible in a CZ. Land use within APZs is based on the concept of limiting density of land use, and uses such as residential development, educational facilities, and medical facilities are considered incompatible and are strongly discouraged. At Holloman AFB, there is no incompatible land use within the CZs or APZs (Holloman AFB, 2016b). The safety zones are shown on **Figure 3-5**.

Quantity-distance (Q-D) arcs are an additional safety zone, described in **Section 3.3.2.2**, **Explosive Safety**, and shown on **Figure 3-5**.

Arresting Gear Capability

Per AFI 32-1043, *Managing Aircraft Arresting Systems*, criteria for siting aircraft arresting systems vary according to the type of system and operational requirement. The best location for runways used extensively during instrument meteorological conditions is 2,200 to 2,500 ft from the threshold; however, if aircraft that are not compatible with the arresting system must operate on the same runway, the installation commander may shift the installation site as close to the threshold as possible. The critical factor in this case is assurance that the runout area for an aircraft engaging the system in an aborted takeoff scenario is large enough to safely accommodate other arresting systems or equipment such as light fixtures. Holloman AFB is equipped with nine BAK-12 arresting systems and two BAK-15 net barriers. Each runway is equipped with BAK-12s approximately 1,500 ft from each runway threshold. Additionally, Runway 16/34 has BAK-12s located approximately 60 ft into their respective overruns, and Runway 22 has a mid-field BAK-12. Runways 25 and 16 both have departure end BAK-15s. Cable configuration varies daily based on runways in use but generally all three runways will have a departure end cable strung and the secondary runway (based on prevailing winds) will be configured with an approach end cable. BAK-15s are tower-controlled and raised on request.

3.3.2.2 Explosive Safety

The 49 WG's Munitions Flight is assigned to the 49 MXG and located at Holloman AFB. Personnel assigned to the 49 MXG Munitions Flight currently support the 49 WG flying mission with munitions support, including storage, inspection, maintenance, and accountability as well as delivery and pick-up of aircraft munitions to the airfield.

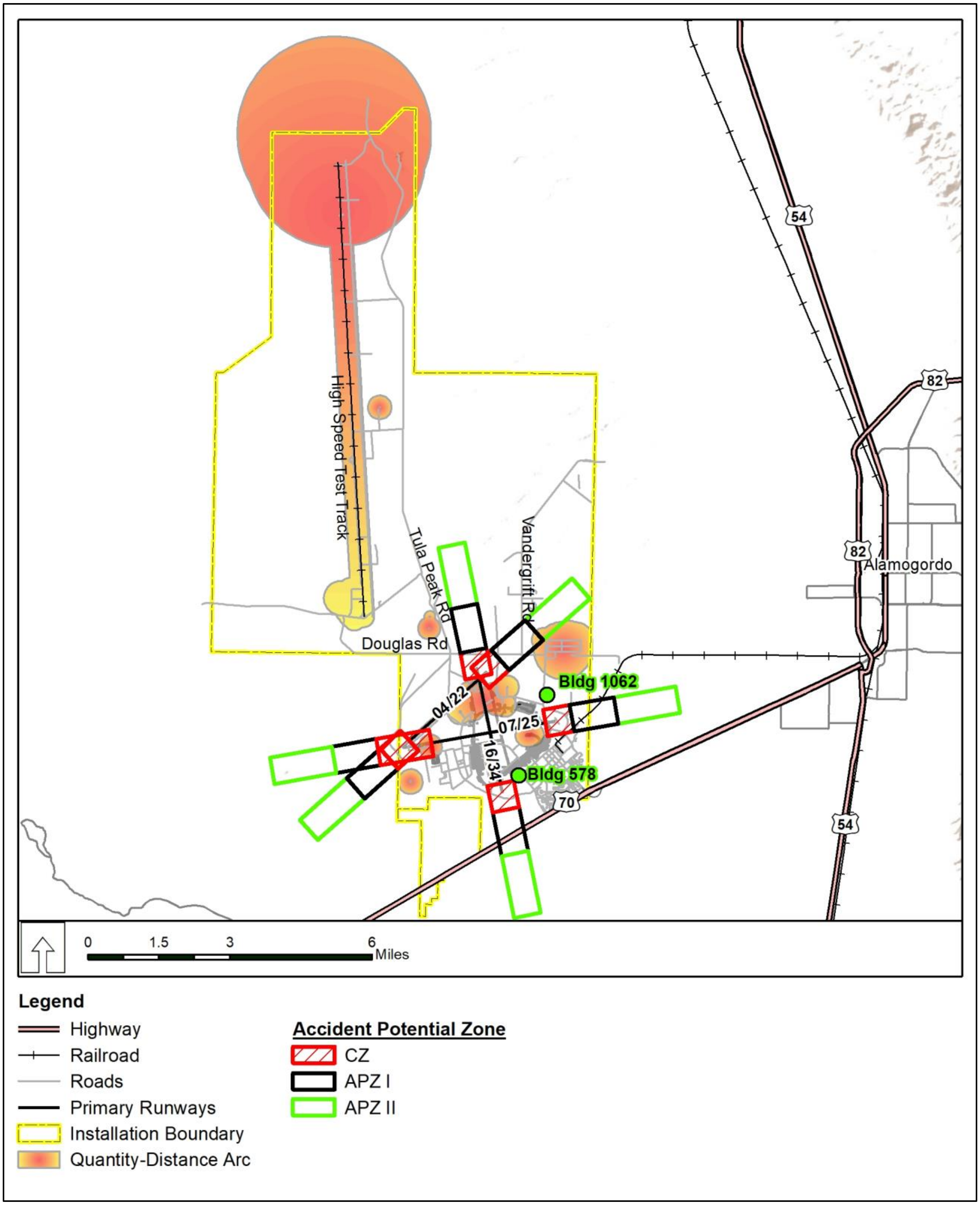


Figure 3-5. Field Clear Zones, Accident Potential Zones, and Quantity-Distance Arcs.

Aircraft munitions include ammunition, propellants (solid and liquid), pyrotechnics, warheads, explosive devices, and chemical agent substances and associated components that present real or potential hazards to life, property, or the environment. AFMAN 91-201, *Explosives Safety Standards*, defines the guidance and procedures dealing with munition storage and handling.

During typical training operations, aircraft are not loaded with high-explosive ordnance. Training munitions usually include captive air-to-air training missiles, countermeasure chaff and flares, and cannon ammunition with inert projectiles. All munitions are stored and maintained in the munitions storage area within facilities sited for the allowable types and amounts of explosives. All storage and handling of munitions is carried out by trained and qualified munitions systems personnel and in accordance with Air Force-approved technical orders.

Defined distances are maintained between munitions storage areas and a variety of other types of facilities. These distances, called Q-D arcs, are determined by the type and quantity of explosive material to be stored. Each explosive material storage or handling facility has Q-D arcs extending outward from its sides and corners for a prescribed distance. Within these Q-D arcs, development is either restricted or prohibited altogether to ensure personnel safety and to minimize potential for damage to other facilities in the event of an accident. In accordance with AFMAN 91-201, paragraphs 12.47.2 and 12.47.3, the ramp is authorized for chaff and flare operations (Hazard Class 1.3). The Q-D arcs on Holloman AFB are shown on **Figure 3-5**.

3.3.2.3 Flight Safety

One control tower located center-field between Holloman AFB's three runways supports the training and readiness of pilots of the 49 WG, 704th Test Group, and other units supported by Holloman AFB including WSMR, Basic Expeditionary Airfield Resources Base, transient aircraft and distinguished visitor aircraft flying missions. The control tower manages the aircraft flying within a range of approximately 5 mi of the base; when aircraft fly beyond this range, control is transferred to radar approach control.

The potential for aircraft accidents is a primary public concern with regard to flight safety. Such accidents may occur as a result of mid-air collisions, collisions with manmade structures or terrain, mechanical failure, weather-related accidents, pilot error, BASH, or strikes from defensive countermeasures used during training.

Midair Collision

Midair collision accidents involve two or more aircraft coming in contact with each other during flight. Navigation errors, miscommunications, deviations from flight plans, and lack of collision avoidance systems all increase the potential for midair collisions. Aircraft mishaps and their prevention represent a paramount concern for the Air Force. Air Force Policy Directive (AFPD) 91-2, *Safety Programs*, defines four major categories of reportable mishaps based on total cost of property damage or the degree of injury: Class A, B, C, and D mishaps. Mishap types range from loss of life or destruction of an aircraft (Class A) to a minor, reportable injury or property damage less than $50,000 (Class D). Reporting and investigation requirements for aviation mishaps are defined in AFI 91-204, *Safety Investigation and Hazard Reporting*, and AFMAN 91-223, *Safety: Aviation Safety Investigations and Reports*.

In-Flight Emergency

Each aircraft type has different emergency procedures based on the aircraft design which are produced by the original equipment manufacturer of the aircraft. Basic airmanship procedures also exist for handling any deviations to ATC procedures due to an in-flight emergency; these procedures are defined in AFI 11-202 (Volume 3) and established aircraft flight manuals.

Bird/Wildlife-Aircraft Strike Hazards

BASH presents a safety concern for aircraft operations because of the potential for damage to aircraft or injury to aircrews or local populations if a crash should occur. Aircraft can encounter birds at nearly all altitudes up to 30,000 ft MSL; however, most birds fly close to the ground. According to the Air Force Safety Center, BASH statistics, about 52 percent of strikes occur from birds flying below 400 ft, and 88 percent occur at less than 2,000 ft AGL (Air Force Safety Center, 2018).

The Air Force BASH program was established to minimize the risk for collisions of birds/wildlife with aircraft and the subsequent loss of life and property. In accordance with AFI 91-202, each flying unit in the Air Force is required to develop a BASH plan to reduce hazardous bird/wildlife activity relative to airport flight operations. The intent of each plan is to reduce BASH issues at the airfield by creating an integrated hazard abatement program through monitoring, avoidance, and actively controlling bird and animal population movements. Holloman AFB experiences occasional runway encroachment by animals such as coyotes (*Canis latrans*), oryx, rabbits, and various reptiles such as snakes. Qualified individuals within Airfield Management personnel, Flight Safety personnel, US Department of Agriculture-Wildlife Services, and 49th Civil Engineer Squadron/Environmental Compliance (49 CES/CEIE) use screamer and sirens to scare wildlife from the airfield or will take actions as necessary to remove wildlife. In the event of a wildlife strike, after receiving notification from Maintenance Operation Control, an Air Force Form 853, *Air Force Wildlife Strike Report*, is generated, and a sample is collected and mailed to the Smithsonian's Feather Identification Lab for identification. On average, Holloman AFB has four bird strikes per year (Holloman AFB, 2018b).

3.4 Air Quality

3.4.1 Definition of the Resource

Under the authority of the Clean Air Act (CAA) and subsequent regulations, the USEPA has divided the country into geographical regions known as Air Quality Control Regions (AQCRs) to evaluate compliance with the National Ambient Air Quality Standards (NAAQS). Holloman AFB is located in Otero County within the city limits of Alamogordo. Otero County is in the El Paso-Las Cruces-Alamogordo Interstate AQCR (40 CFR § 81.82) which also includes the following New Mexico counties: Doña Ana, Sierra, and Lincoln (40 CFR § 81.82).

For air quality there are two ROIs, one in the immediate vicinity of Holloman AFB that coincides with the New Mexico portion of the El Paso-Las Cruces-Alamogordo Interstate AQCR and one coinciding with the airspace associated with multiple AQCRs. For consideration of potential air quality impacts, it is the volume of air extending up to the mixing height (3,000 ft AGL) and coinciding with the spatial distribution of the ROIs that is considered. Pollutants that are released above the mixing height typically will not disperse downward and thus will have little or no effect on ground level concentrations of pollutants. The mixing height is the altitude at which the lower atmosphere will undergo mechanical or turbulent mixing, producing a nearly uniform air mass. The height of the mixing level determines the volume of air within which pollutants can disperse. Mixing heights at any one location or region can vary by the season and time of day, but for air quality applications an average mixing height of 3,000 ft AGL is an acceptable default value (40 CFR § 93.153[c][2]). The proposed contract ADAIR training at Holloman AFB is projected to occur within multiple MOAs or Restricted Areas coinciding with five separate AQCRs. Of these, the WSMR Restricted Areas, the McGregor Range Restricted Areas, and the Talon Low MOA, coinciding with the Southwestern Mountains-Augustine Plains intrastate AQCR, the El Paso-Las Cruces-Alamogordo Interstate AQCR, the Northeastern Plains Intrastate AQCR and the Albuquerque-Mid Rio Grande Intrastate AQCR, are a concern because these are the only AQCRs where the ADAIR sortie altitudes are proposed to extend below 3,000 ft AGL.

3.4.1.1 Criteria Pollutants

In accordance with CAA requirements, the air quality in a given region or area is measured by the concentration of various pollutants in the atmosphere. Measurements of these "criteria pollutants" in ambient air are expressed in units of parts per million (ppm) or in units of micrograms per cubic meter ($\mu g/m^3$). Regional air quality is a result of the types and quantities of atmospheric pollutants and pollutant sources in an area as well as surface topography, the size of the "air basin," and prevailing meteorological conditions.

The CAA directed the USEPA to develop, implement, and enforce strong environmental regulations that would ensure clean and healthy ambient air quality. To protect public health and welfare, the USEPA developed numerical concentration-based standards, NAAQS, for pollutants that have been determined to impact human health and the environment and established both primary and secondary NAAQS under the provisions of the CAA. NAAQS are currently established for six criteria air pollutants: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), respirable particulate matter (including particulates equal to or less than 10 microns in diameter (PM_{10}) and particulates equal to or less than 2.5 microns in diameter ($PM_{2.5}$), and lead (Pb). The primary NAAQS represent maximum levels of background air pollution that are considered safe, with an adequate margin of safety to protect public health. Secondary NAAQS represent the maximum pollutant concentration necessary to protect vegetation, crops, and other public resources in addition to maintaining visibility standards. The primary and secondary NAAQS are presented in **Table 3-10**.

Table 3-10
National Ambient Air Quality Standards

Pollutant	NMAAQS	NAAQS		
		Standard Value[6]		Standard Type
Carbon Monoxide (CO)				
8-hour average	8.7 ppm	9 ppm	(10 mg/m^3)	Primary
1-hour average	13.1 ppm	35 ppm	(40 mg/m^3)	Primary
Nitrogen Dioxide (NO_2)				
Annual arithmetic mean	0.05 ppm	0.053 ppm	(100 µg/m^3)	Primary and Secondary
1-hour average[1]		0.100 ppm	(188 µg/m^3)	Primary
24-hour	0.10 ppm			
Ozone (O_3)				
8-hour average[2]		0.070 ppm	(137 µg/m^3)	Primary and Secondary
Lead (Pb)				
3-month average[3]			0.15 µg/m^3	Primary and Secondary
Particulate <10 Micrometers (PM_{10})				
24-hour average[4]			150 µg/m^3	Primary and Secondary
Particulate <2.5 Micrometers ($PM_{2.5}$)				
Annual arithmetic mean[4]			12 µg/m^3	Primary
Annual arithmetic mean[4]			15 µg/m^3	Secondary
24-hour average[4]			35 µg/m^3	Primary and Secondary
Sulfur Dioxide (SO_2)				
1-hour average[5]		0.075 ppm	(196 µg/m^3)	Primary
3-hour average[5]		0.5 ppm	(1,300 µg/m^3)	Secondary
24-hour average	0.10 ppm			
Annual arithmetic mean[4]	0.02 ppm			

Notes:
1 In February 2010, the USEPA established a new 1-hour standard for NO_2 at a level of 0.100 ppm, based on the 3-year average of the 98th percentile of the yearly distribution concentration, to supplement the then-existing annual standard.
2 In October 2015, the USEPA revised the level of the 8-hour standard to 0.070 ppm, based on the annual 4th highest daily maximum concentration, averaged over 3 years; the regulation became effective on 28 December 2015. The previous (2008) standard of 0.075 ppm remains in effect for some areas the country, but not in New Mexico. A 1-hour standard no longer exists.
3 In November 2008, USEPA revised the primary lead standard to 0.15 µg/m^3. USEPA revised the averaging time to a rolling 3-month average.
4 In October 2006, USEPA revised the level of the 24-hour $PM_{2.5}$ standard to 35 µg/m^3 and retained the level of the annual $PM_{2.5}$ standard at 15 µg/m^3. In 2012, USEPA split standards for primary and secondary annual $PM_{2.5}$. All are averaged over 3 years, with the 24-hour average determined at the 98th percentile for the 24-hour standard. USEPA retained the 24-hour primary standard and revoked the annual primary standard for PM_{10}.
5 In 2012, the USEPA retained a secondary 3-hour standard, which is not to be exceeded more than once per year. In June 2010, USEPA established a new 1-hour SO_2 standard at a level of 75 ppb, based on the 3-year average of the annual 99th percentile of 1-hour daily maximum concentrations.
6 Parenthetical value is an approximately equivalent concentration for NO_2, O_3, and SO_2.

µg/m^3 = microgram(s) per cubic meter; mg/m^3 = milligram(s) per cubic meter; ppb = part(s) per billion; ppm = part(s) per million; USEPA = United States Environmental Protection Agency

The criteria pollutant O_3 is not usually emitted directly into the air but is formed in the atmosphere by photochemical reactions involving sunlight and previously emitted pollutants, or "O_3 precursors." These O_3 precursors consist primarily of nitrogen oxides (NO_x) and volatile organic compounds (VOCs) that are directly emitted from a wide range of emissions sources. For this reason, regulatory agencies limit atmospheric O_3 concentrations by controlling VOC pollutants (also identified as reactive organic gases) and NO_x.

The USEPA has recognized that particulate matter emissions can have different health affects depending on particle size and, therefore, developed separate NAAQS for coarse particulate matter (PM_{10}) and fine particulate matter ($PM_{2.5}$). The pollutant $PM_{2.5}$ can be emitted from emission sources directly as very fine dust and/or liquid mist or formed secondarily in the atmosphere as condensable particulate matter, typically forming nitrate and sulfate compounds. Secondary (indirect) emissions vary by region depending upon the predominant emission sources located there and thus which precursors are considered significant for $PM_{2.5}$ formation and identified for ultimate control.

The CAA and USEPA delegated responsibility for ensuring compliance with NAAQS to the states and local agencies. As such, each state must develop air pollutant control programs and promulgate regulations and rules that focus on meeting NAAQS and maintaining healthy ambient air quality levels. When a region or area fails to meet a NAAQS for a pollutant, that region is classified as "nonattainment" for that pollutant. In such cases the affected State must develop a State Implementation Plan (SIP) that is subject to USEPA review and approval. A SIP is a compilation of regulations, strategies, schedules, and enforcement actions designed to move the state into compliance with all NAAQS. Any changes to the compliance schedule or plan (e.g., new regulations, emissions budgets, controls) must be incorporated into the SIP and approved by USEPA. In New Mexico, it should be noted that prior to the adoption of the NAAQS in 1971, the state of New Mexico developed its own ambient air quality standards, known as the New Mexico Ambient Air Quality Standards (NMAAQS), which were adopted in 1969. These standards are at least as stringent as the NAAQS are and contained in 20.2.3 New Mexico Administrative Code (NMAC).

The CAA required that USEPA draft general conformity regulations that are applicable in nonattainment areas, or in designated maintenance areas (attainment areas that were reclassified from a previous nonattainment status and are required to prepare a maintenance plan for air quality). These regulations are designed to ensure that federal actions do not impede local efforts to achieve or maintain attainment with the NAAQS. The General Conformity Rule and the promulgated regulations found in 40 CFR Part 93 exempt certain federal actions from conformity determinations (e.g., contaminated site cleanup and natural disaster response activities). Other federal actions are assumed to conform if total indirect and direct project emissions are below *de minimis* levels presented in 40 CFR § 93.153. The threshold levels (in tons of pollutant per year) depend upon the nonattainment status that USEPA has assigned to a region. Once the net change in nonattainment pollutants is calculated, the federal agency must compare them to the *de minimis* thresholds.

Title V of the CAA Amendments of 1990 requires state and local agencies to implement permitting programs for major stationary sources. A major stationary source is a facility (plant, base, activity, etc.) that has the potential to emit (PTE) more than 100 tons annually of any one criteria air pollutant, 10 tons per year (tpy) of a hazardous air pollutant, or 25 tpy of any combination of hazardous air pollutants; however, lower pollutant-specific "major source" permitting thresholds apply in nonattainment areas. The purpose of the permitting rule is to establish regulatory control over large, industrial-type activities and monitor their impact on air quality.

Federal Prevention of Significant Deterioration (PSD) regulations also define air pollutant emissions from proposed major stationary sources or modifications to be "significant" if a proposed project's net emission increase meets or exceeds the rate of emissions listed in 40 CFR § 52.21(b)(23)(i); or 1) a proposed project is within 10 kilometers of any Class I area (wilderness area greater than 5,000 ac or national park greater than 6,000 ac), and 2) regulated pollutant emissions would cause an increase in the 24-hour average concentration of any regulated pollutant in the Class I area of 1 µg/m^3 or more (40 CFR § 52.21[b][23][iii]). PSD regulations also define ambient air increments, limiting the allowable increases to any area's baseline air contaminant concentrations, based on the area's designation as Class I, II, or III (40 CFR § 52.21[c]).

The Air Quality Bureau of the NMED is responsible for enforcing compliance with air quality regulations, including NMAAQS and NAAQS. The air quality rules and standards are codified at Title 20 (*Environmental Protection*), Chapter 2 (*Air Quality*) of the NMAC. Numerous parts of the regulations codified into 20.2 NMAC necessary for implementing and enforcing the NAAQS have been adopted into the SIP. The USEPA has delegated enforcement of the PSD and Title V programs to the Air Quality Bureau. The NMED has adopted the federal NAAQS and the state NMAAQS, thereby requiring the use of these standards within the State of New Mexico.

3.4.1.2 Greenhouse Gases

Greenhouse gases (GHGs) are gases that trap heat in the atmosphere. These emissions are generated by both natural processes and human activities. The accumulation of GHGs in the atmosphere helps regulate the earth's temperature and are believed to contribute to global climate change. GHGs include water vapor, carbon dioxide (CO_2), methane, nitrous oxide, O_3, and several hydrocarbons and chlorofluorocarbons. Each GHG has an estimated global warming potential (GWP), which is a function of its atmospheric lifetime and its ability to absorb and radiate infrared energy emitted from the earth's surface. The GWP of a particular gas provides a relative basis for calculating its carbon dioxide equivalent (CO_2e) or the amount of CO_2e to the emissions of that gas. CO_2 has a GWP of 1 and is, therefore, the standard by which all other GHGs are measured. Potential impacts associated with GHG emissions are discussed in **Section 4.3**.

On 13 May 2010, the USEPA issued the final GHG Tailoring Rule. This rule established thresholds for GHG emissions that define when permits under the PSD and Title V Operating Permit programs are required for new and existing industrial facilities. The Rule was implemented using a phased-in approach, effective January 2011. The salient features of the Rule are as follows (USEPA, 2011):

- The Tailoring Rule generally defines a major source of GHGs as one that has PTE GHG emissions equal to or greater than 100,000 tpy CO_2e. An installation that is a major source and has not already applied for a Title V permit had to apply for a Title V permit by 1 July 2012 or within 1 year after having a PTE of at least 100,000 tpy or more of GHGs as CO_2e.
- An installation has to obtain a PSD permit and apply Best Available Control Technologies (BACT) for GHGs if the PTE is 100,000 tpy or more of CO_2e for a new source (and for a modification, if the modification also results in a 75,000 tpy increase or more in CO_2e). A PSD permit and BACT for GHGs also applies if an installation is already subject to PSD for non-GHG pollutants and has a PTE of 75,000 tpy or more of CO_2e (new sources) or an increase of 75,000 tpy or more of CO_2e for modifications.
- PSD and BACT requirements apply if a source is an existing minor source for PSD, and the modification alone has actual or PTE GHG emissions equal to or greater than 100,000 tpy CO_2e.
- The USEPA had planned to propose rules for smaller sources of GHG (i.e., with less than 50,000 tpy of GHG on a CO_2e basis) by 30 April 2016. As of April 2019, no such rules have been promulgated or proposed. Until this time, the USEPA cannot take action to make such sources subject to GHG regulation.

On 19 August 2015, the USEPA published regulations that removed several provisions pertaining to Step 2 of the PSD Tailoring Rule. Effectively, GHGs are no longer treated as an air pollutant for the specific purpose of determining whether a source (or modification) is required to obtain a PSD or Title V permit. In other words, a stationary source would not need to obtain a PSD or Title V permit solely because the source emits or has the PTE GHGs above the applicable major source thresholds (80 Federal Register [FR] 50199).

On 26 August 2016, the USEPA proposed regulations that revise provisions to determine whether a source must obtain a permit. In addition, the USEPA proposed a 75,000-tpy CO_2e Significant Emission Rate for GHGs. The Significant Emission Rate establishes a *de minimis* level below which BACT is not required for this pollutant (81 FR 81711). The final rule has not been promulgated.

In addition to the GHG Tailoring Rule in 2009, the USEPA promulgated a rule requiring sources to report their GHG emissions if they emit more than 25,000 metric tons or more of CO_2e per year (40 CFR § 98.2[a][2]).

3.4.2 Existing Conditions – Holloman Air Force Base

3.4.2.1 Regional Climate

The regional climate of Alamogordo in South-Central New Mexico, where Holloman AFB is located, is classified as a tropical and subtropical Steppe climate which is characterized by semi-arid, desert-like climate with cold winters and dry, hot summers (Weatherbase, 2019). The warmest month in the region is July, with average high and low temperatures of 95 degree(s) Fahrenheit (°F) and 65°F. January is the coldest month with an average high temperature of 56°F and average low temperature of 29°F. The wettest month by average precipitation is August with an average of 1.9 inches (in.) of rain. The driest month is April with an average of 0.4 in. of precipitation. Overall, July, August, September and October are the wettest months and November through June are the driest months. The region has an average annual snowfall of 10.6 in. The month with the most snow is February, with an average of 3.9 in. of snow (Weatherbase, 2019).

3.4.2.2 Baseline Air Emissions

Holloman AFB is located within Otero County, New Mexico, which is part of the El Paso-Las Cruces-Alamogordo Interstate AQCR. Each AQCR has regulatory areas that are designated as an attainment area or nonattainment area for each of the criteria pollutants depending on whether it meets or fails to meet the NAAQS for the pollutant. Otero County is designated as an unclassifiable/attainment area for all criteria pollutants (40 CFR § 81.332). Unclassifiable areas are those areas that have not had ambient air monitoring and are assumed to be in attainment with NAAQS.

The El Paso-Las Cruces-Alamogordo Interstate AQCR is designated as an unclassifiable/attainment area for all criteria pollutants except for two nonattainment areas, both located in southern Doña Ana County (NMED, 2019a). The area known as Anthony, located on the border of Texas and New Mexico, is designated as a PM_{10} nonattainment area. This area was designated nonattainment for PM_{10} by the USEPA in 1991 (40 CFR § 81.332). Also, in October of 2015, the USEPA lowered the NAAQS for ozone from 0.075 to 0.070 ppm. Due to the lowering of the ozone standard, a portion of southern Doña Ana County (Sunland Park) was determined to be in nonattainment of the new 2015 ozone standard (70 parts per billion of ground level ozone). On 4 June 2018, the USEPA designated the Sunland Park area in Doña Ana County as marginal ozone nonattainment, with an effective date of 3 August 2018 (83 FR 25776). All remaining areas of the state are classified as unclassifiable/attainment area for all criteria pollutants, including ozone (40 CFR § 81.332). None of the nonattainment designations have a regulatory effect on the analysis described in **Section 4.2.2**. As a result of the attainment/unclassifiable designation for Otero County, General Conformity will not be applicable in the vicinity of Holloman AFB.

Holloman AFB is classified as a major source of emissions and as a result has a CAA Title V permit to operate. Holloman AFB is not classified as a major source for PSD and is not located within 10 kilometers of any of the 156 USEPA-designated Class I areas protected by the Regional Haze Rule. The nearest PSD Class I area is the White Mountain Wilderness Area, located approximately 43 mi northeast of Holloman AFB. Other Class I areas within approximately 200 mi of Holloman AFB include Bosque del Apache National Wilderness Refuge, Guadalupe Mountains National Park, Carlsbad Caverns National Park, and the Salt Creek and Gila wilderness areas.

As shown in **Table 3-11**, Holloman AFB accounts for less than 0.25 percent of NO_x emissions in Otero County and less than 2 percent of Otero County emissions for each of the other criteria pollutants.

Table 3-11
Holloman Air Force Base Emission Summary

	CO	NO_X	PM_{10}	$PM_{2.5}$	SO_2	VOC
Holloman Air Force Base[1] (tpy)	12.19	8.88	1.03	0.91	0.77	37.61
Otero County [2] (tpy)	31,892	3,606	17,260	2,314	43	89,348
Percent of County Emissions	0.04	0.25	0.01	0.04	1.79	0.04

Notes:
[1] NMED, 2019b
[2] USEPA, 2014
CO = carbon monoxide; NO_x = nitrogen oxide; $PM_{2.5}$ = particulate matter with a diameter of less than 2.5 micrometers; PM_{10} = particulate matter with a diameter of less than 10 micrometers; SO_2 = sulfur dioxide; USEPA = United States Environmental Protection Agency; VOC = volatile organic compound

Stationary emissions sources at Holloman AFB include natural gas boilers and heaters, jet engine test cells, paint spray booths, open burn/open detonation activities, fuel dispensing operations, refueling operations, and emergency power generators. Mobile sources, such as vehicle and aircraft emissions, are generally not regulated and are not covered under existing stationary source permitting requirements.

An Air Conformity Applicability Analysis is discussed in **Section 4.3**. An overview of the CAA and the State of New Mexico air quality regulations as well as assumptions used for the air quality analysis and a Draft Record of Nonapplicability (RONA), General Conformity RONA is provided in **Appendix C**. The RONA documents that an air conformity applicability analysis is not required for this project.

3.4.3 Existing Conditions – Airspace

3.4.3.1 Regional Climate

The primary operational airspace that is proposed for use for this project is the WSMR Restricted Areas, for which the regional climate is discussed. The WSMR Restricted Areas are located almost due west of Alamogordo and has the same climatic conditions as Holloman AFB (see **Section 3.4.2.1**).

Other airspace available for use by contract ADAIR missions includes the Beak MOAs located 25 mi east, the Talon MOAs located approximately 72 mi east, and the McGregor Range Restricted Areas located 6 mi southeast of Holloman AFB. Ground level air quality impacts in the Beak and Talon High MOAs are not expected as ADAIR training exercises in these areas are proposed to occur above 3,000 ft AGL.

3.4.3.2 Baseline Emissions

The MOAs and Restricted Areas are within several AQCRs and counties (**Table 3-12**). All AQCRs listed in **Table 3-12**, except for a small portion in Doña Ana County (El Paso-Las Cruces-Alamogordo Interstate AQCR) are in attainment or unclassifiable for all criteria pollutants (NMED, 2019c). Much of the nonattainment problem in Doña Ana County lies only in the southern portion of the county where proposed contract ADAIR training is not expected to take place. No nonattainment areas occur under the airspace proposed for contract ADAIR training and therefore are not subject to the General Conformity Rule.

Portions of airspace proposed for use by contract ADAIR are close to, or in some cases above, some of the Class I areas established for New Mexico under 40 CFR § 81.421.

Note that although the Talon High East/West and Beak MOAs fall outside the ROI as discussed in **Section 3.4.1**, they are included in the table below for a complete listing of the MOAs and Restricted Areas and associated counties and AQCRs.

Table 3-12
Military Operations Areas or Restricted Areas by County and Air Quality Control Region

MOA/Restricted Area	County Name(s)	Air Quality Control Region
WSMR Restricted Areas (R-5107 and R-5111)	Lincoln, Otero, Doña Ana, Sierra, Socorro, Torrance	El Paso-Las Cruces-Alamogordo Interstate
Beak MOAs	Lincoln, Otero, Chaves	Northeastern Plains Intrastate
Talon High East/West MOAs	Chaves, Eddy, Otero	Southwestern Mountains-Augustine Plains Intrastate
Talon Low MOA	Eddy, Otero	The Pecos-Permian Basin Intrastate
McGregor Range Restricted Areas (R-5103B and C)	Otero	El Paso-Las Cruces-Alamogordo Interstate

Note:
MOA = Military Operations Area

The WSMR Restricted Areas is spread over six different counties in the state and has by far the most criteria pollutant emissions of all MOAs or Restricted Areas. The combined criteria pollutant emissions for Otero County, in which Holloman AFB airfield is located, is equivalent to just the CO emissions from the six counties that comprise the WSMR airspace alone, as illustrated in **Table 3-13**. Because of the rural nature of the counties in the vicinity of the Talon Low MOA, the air emissions within the region are low.

Table 3-13
Holloman Air Force Base and Special Use Airspace Emissions Comparison (Tons per Year)

Pollutant	Otero County[1] (Holloman Air Force Base Airfield)	Lincoln, Otero, Doña Ana, Sierra, Socorro, Torrance (White Sands Missile Range Restricted Areas)	Eddy, Otero (Talon Low MOA)	Otero (McGregor Restricted Areas)
NO_2	3,606	28,805	14,372	3,606
VOC	89,348	347,969	212,133	89,348
CO	31,892	142,140	66,299	31,892
$PM_{2.5}$	2,314	11,551	5,010	2,314
PM_{10}	17,260	88,010	33,610	17,260
SO_2	43	274	1,841	43

Notes:
[1] USEPA, 2014

CO = carbon monoxide; MOA = Military Operations Area; NO_2 = nitrogen dioxide; PM_{10} = particulate matter with a diameter of less than 10 micrometers; $PM_{2.5}$ = particulate matter with a diameter of less than 2.5 micrometers; SO_2 = sulfur dioxide; tpy = ton(s) per year; VOC = volatile organic compound

3.5 Biological Resources

3.5.1 Definition of the Resources

Biological resources include native or invasive plants and animals; sensitive and protected floral and faunal species; and the habitats, such as wetlands, forests, and grasslands, in which they exist. Habitat can be defined as the resources and conditions in an area that support a defined suite of organisms. The following is a description of the primary federal statutes that form the regulatory framework for the evaluation of biological resources.

The ROI for biological resources on the installation includes the land surrounding the facilities proposed for use and the land within the airfield noise contours and safety zones (see **Figures 3-4** and **3-5**). The ROI for biological resources in the special use airspace is the land beneath the Beak and Talon MOAs and the WSMR and McGregor Range Restricted Areas proposed for contract ADAIR training (see **Figure 1-4**).

3.5.1.1 Endangered Species Act

The ESA of 1973 (16 U.S.C. § 1531 et seq.) established protection over and conservation of threatened and endangered species and the ecosystems upon which they depend. Sensitive and protected biological resources include plant and animal species listed as threatened, endangered, or special status by the USFWS and the National Marine Fisheries Service. Under the ESA (16 U.S.C. § 1536), an "endangered species" is defined as any species in danger of extinction throughout all, or a large portion, of its range. A "threatened species" is defined as any species likely to become an endangered species in the foreseeable future. The USFWS maintains a list of species considered to be candidates for possible listing under the ESA. The ESA also allows the designation of geographic areas as critical habitat for threatened or endangered species. Although candidate species receive no statutory protection under the ESA, the USFWS has attempted to advise government agencies, industry, and the public that these species are at risk and may warrant protection under the ESA. Section 9 of the ESA prohibits the take of federally listed species. "Take" as defined under the ESA means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct."

3.5.1.2 Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) of 1918 makes it unlawful for anyone to take migratory birds or their parts, nests, or eggs unless permitted to do so by regulations. Per the MBTA, "take" is defined as "pursue, hunt, shoot, wound, kill, trap, capture, or collect" (50 CFR § 10.12). Migratory birds include nearly all species in the United States, with the exception of some upland game birds and nonnative species.

EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, requires all federal agencies undertaking activities that may negatively impact migratory birds to follow a prescribed set of actions to further implement the MBTA. EO 13186 directs federal agencies to develop a Memorandum of Understanding (MOU) with the USFWS that promotes the conservation of migratory birds. On 5 September 2014, the DOD signed a 5-year MOU with the USFWS. In accordance with the MOU, and to the extent possible as per law and budgetary considerations, EO 13186 encourages agencies to implement a series of conservation measures aimed at reinforcing and strengthening the MBTA.

The National Defense Authorization Act for Fiscal Year 2003 (Public Law 107-314, 116 Stat. 2458) provided the Secretary of the Interior the authority to prescribe regulations to exempt the armed forces from the incidental take of migratory birds during authorized military readiness activities. Congress defined military readiness activities as all training and operations of the US armed forces that relate to combat and the adequate and realistic testing of military equipment, vehicles, weapons, and sensors for proper operation and suitability for combat use.

In December 2017, the US Department of the Interior issued M-Opinion 37050, which concluded that the take of migratory birds from an activity is not prohibited by the MBTA when the underlying purpose of that activity is not the take of a migratory bird. The USFWS interprets the M-Opinion to mean that the MBTA's prohibition on take does not apply when the take of birds, eggs, or nests occurs as a result of an activity, the purpose of which is not to take birds, eggs or nests.

3.5.1.3 Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act of 1940 (16 U.S.C. § 668-668c) prohibits the "take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald (*Haliaeetus leucocephalus*) or golden eagle (*Aquila chrysaetos*), alive or dead, or any part, nest, or egg thereof." "Take" is defined as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb," and "disturb" is defined as "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, injury to an eagle, a decrease in productivity by substantially interfering with the eagle's normal breeding, feeding or sheltering behavior, or nest abandonment by substantially interfering with the eagle's normal breeding, feeding or sheltering behavior." The Bald and Golden Eagle Protection Act also prohibits activities around an active or inactive nest site that could result in an adverse impact on the eagle.

3.5.1.4 Wetlands

The Clean Water Act (CWA) of 1972 (33 U.S.C. § 1251 et seq.) regulates discharges of pollutants in surface waters of the United States. Section 404 of the CWA establishes a program to regulate the discharge of dredged and fill material into waters of the United States, including wetlands. The US Army Corps of Engineers (USACE) defines wetlands as "those areas that are inundated or saturated with ground or surface water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated soil conditions" (US 20Environmental Laboratory, 1987). Wetlands generally include swamps, marshes, bogs, and similar areas (33 CFR Part 328).

3.5.2 Existing Conditions – Holloman Air Force Base

The information presented in this section was primarily gathered from the Holloman AFB *Integrated Natural Resources Management Plan* (INRMP; Holloman AFB, 2018b) and from the USFWS, USEPA, and NMDGF (USFWS, 2019; NMDGF, 2019).

Vegetation and Wildlife

The ecosystems represented on Holloman AFB are part of more extensive systems extending beyond the borders of the base known as the Chihuahuan Desert ecoregion (NMDGF, 2016). Terrestrial habitats of this ecoregion include 27 naturally vegetated types and 3 unvegetated land covers as well as agricultural land (NMDGF, 2016). The ecoregion is dominated by two upland habitat types: Chihuahuan Semi-desert Grassland (34 percent) and Chihuahuan Desert Scrub (51 percent) (NMDGF, 2016). Holloman AFB land includes both of these upland habitats as well as dunelands (Great Plains Sand Grassland and Shrubland and Intermountain Saltbrush Shrubland), Playa (Intermountain Saltbrush Shrubland), Arroyo Riparian (Warm Desert Arroyo Riparian Scrub), and Wetlands (Holloman AFB, 2018b).

The undeveloped areas of Holloman AFB are dominated by xerophytic shrubland and grassland communities having plant assemblages biogeographically related to the Chihuahuan Desert and Great Basin. The Administrative area contains the greatest total number of acres and continuous extent of Alkali Sacaton Grasslands within Holloman AFB. Shrublands dominated by fourwing saltbush (*Atriplex canescens*) cover approximately one-quarter of the Administrative area. Pickleweed Shrubland and Gyp Dropseed Grassland make up the majority of the remainder of undeveloped plant assemblages within the Administrative area (Holloman AFB, 2018b).

The Duneland ecosystem is primarily located in the northwestern portion of Holloman AFB. The Rosemary Mint Dune Shrubland Association occurs on slopes and summits of shifting and semistabilized gypsum dunes. The Barren Duneland mapping unit contains nonvegetated, shifting gypsum dunes that may have inclusions of hoary rosemary mint/sandhill muhly on semistabilized portions of the dune field. Within the interdune, swale grasses, small shrubs (subshrubs), and forbs create a high diversity mosaic of gypsum-tolerant plants. The Gyp Dropseed Grassland mapping unit borders the dunelands in a long, narrow band and extends to broader regions at the far northwestern corner of the base (Holloman AFB, 2018b).

The plant composition of the Arroyo Riparian Ecosystem has a high potential for flux considering the disturbances caused by seasonal flooding. Three of the pervasive vegetation mapping units represented within the draws include Pickleweed Shrubland, Semi-riparian Alkali Sacaton Grassland, and Salt Cedar Woodland. Occasional wetland plants such as inland saltgrass (*Distichlis spicata*) and Mojave seablite (*Suaeda moquinii*) are distributed within the reaches of the draw that receive more permanent ponding or may be situated closer to a high water table. Pickleweed (*Salicornia* spp.) often occurs with fourwing saltbush within the playa-like reaches of the arroyos (Holloman AFB, 2018b).

Mixed Shrub-Grasslands North of Douglas Road is dominated by shrubland communities with extensive patches of grassland communities. Holloman AFB development, disturbance, and roads cover about 8 percent of the area, with the remaining communities associated with riparian habitat within the draws or rock outcrops on Tularosa Peak (Holloman AFB, 2018b).

Fluctuating water levels, topographic variation, and proximity to military facilities have resulted in a diverse mix of natural and introduced vegetation types at the Lake Holloman Wetland Complex area. The Playa and Upland Ecosystem each contribute to approximately 30 percent of cover types, followed by Constructed Wetland with 16 percent. Arroyo Riparian Ecosystem, including saltcedar woodlands; development and disturbance cover; and variation in gyp dropseed grasslands comprise the remaining cover types (Holloman AFB, 2018b).

Considering its relatively small size, Holloman AFB provides a large diversity of habitats for aquatic and terrestrial species. Throughout the Tularosa Basin, suitable wildlife habitat is limited, due to ranching, farming, and urban and rural development. Within this patchwork, wildlife is typically left to survive in increasingly smaller pockets of native habitat further fragmented by roads and fences. Mammals range from small bat and rodent species to medium carnivores and large artiodactyla such as the nonnative gemsbok (*Oryx gazelle*). Common wildlife in the area include coyote, desert cottontail (*Sylvilagus audubon*i), and black-tailed jackrabbit (*Lepus californicus*). Holloman AFB manages land used for at least 16 different species of bats, including the pale Townsend's big-eared bat *(Corynorhinus townsendii*) and spotted bat (*Euderma maculatum*). A 2011 bat survey using mist-nets and acoustic monitoring identified at least six different bat species on base, including the most commonly detected species the Mexican free-tailed bat (*Tadarida brasiliensis*) (Holloman AFB, 2018b).

Other mammal species observed on Holloman AFB include Ord's kangaroo rat (*Dipodomys ordii*), desert pocket mouse (*Chaetodipus penicillatus*), plains pocket mouse (*Perognathus flavescens gypsi*), White Sands woodrat (*Neotoma micropus leucophaea*), porcupine (*Erethizon dorsatum*), coyote, kit fox (*Vulpes macrotis neomexicanus*), long-tailed weasel (*Mustela frenata*), ringtail (*Bassariscus astutus*), Rocky Mountain mule deer (*Odocoileus hemionus*), and the desert mule deer (*Odocoileus hemionus crooki*).

During the course of previous surveys, at least 264 bird species have been inventoried on Holloman AFB and the Boles Wells Water System Annex, and 81 of these species are currently listed by at least one agency or organization as a species of concern. Some species that have been more commonly observed include northern shoveler (*Anas clypeata*), ruddy duck (*Oxyura jamaicensis*), Swainson's hawk (*Buteo swainsoni*), prairie falcon (*Falco mexicanus*), eastern and western meadowlark (*Sturnella magna* and *S. neglecta*), western burrowing owl (*Athene cunicularia hypugaea*), black-throated sparrow (*Amphispiza bilineata*), Scott's oriole (I*cterus parisorum*), cactus wren (*Campylorhynchus brunneicapillus*), northern mockingbird (*Mimus polyglottos*), blue grosbeak (*Passerina caerulea*), Bullock's oriole (*Icterus bullockii*), Gambel's quail (*Callipepla gambelii*), black-tailed gnatcatcher (*Polioptila melanura*), Crissal thrasher (*Toxostoma crissale*), loggerhead shrike (*Lanius ludovicianus*), scaled quail (*Callipepla chukar*), black-chinned hummingbird (*Archilochus alexandri*), cactus wren (*Campylorhynchus brunneicapillus*), rock wren (*Salpinctes obsoletus*), and canyon towhee (*Pipilo fuscus*) (Holloman AFB, 2018b).

Holloman AFB manages habitat for a variety of amphibians, lizard, and snake species, and according to previous surveys, Holloman AFB is home to at least 3 amphibian, 11 lizard, and 9 snake species. This includes the desert massasauga (*Sistrurus tergeminus*) and Texas horned lizard (*Phrynosoma cornutum*) (Holloman AFB, 2018b).

The White Sands pupfish (*Cyprinodon tularosa*) is endemic to the Tularosa Basin and the two translocated populations were introduced in 1970 at Mound Springs on WSMR and Lost River on Holloman AFB. The mosquito fish (*Gambusia affinis*) is the most common fish species on base and was introduced by NMDGF into ditches, lagoons, and Lake Holloman to control mosquito populations (Holloman AFB, 2018b).

Threatened and Endangered Species and/or Species of Concern

A list of species that could potentially be found in the action area and potentially affected by aircraft movement, aircraft noise, and the use of defensive countermeasures was obtained from the USFWS

Information for Planning and Consultation website and NMDFG's BISON-M database and are provided in **Table 3-14**. A comprehensive species list of all federally and state listed species that could occur in the action area is provided in **Appendix D**.

Of the federally and state listed species known or with suitable habitat in Otero County, New Mexico, Baird's sparrow (*Ammodramus bairdii*), bald eagle, least tern (*Sternula antillarum athalassos*), neotropic cormorant (*Phalacrocorax brasilianus*), peregrine falcon (*Falco peregrinus*), and White Sands pupfish could potentially occur or are known to occur on Holloman AFB; however, only the White Sands pupfish is a known resident species with a translocated population on Holloman AFB. Numerous species considered Species of Greatest Conservation Need occur on Holloman AFB, and although not listed under the ESA or the New Mexico Wildlife Conservation Act, Holloman AFB does survey and manage for these species, including the western burrowing owl, which has the potential to be found in maintained grasslands near airfields.

Invasive Species

Saltcedar is a concern in wetland areas at Holloman AFB. It has been planted on base in the past as a wind break and for dune stabilization. Five-horn smotherweed (*Bassia hyssopifolia*) is native to Europe and Asia, has a high salinity tolerance, and has become invasive at Lagoon G and Ponds 3 and 4. Other invasive plant species such as African rue (*Peganum harmala*) and Russian thistle (*Salsola kali*) are common in grasslands on Holloman AFB and degrade habitat for native wildlife species (Holloman AFB, 2018b).

Wetlands

Wetlands are an important natural system and habitat because of the diverse biologic and hydrologic functions they perform. These functions include water quality improvement, groundwater recharge and discharge, pollution mitigation, nutrient cycling, wildlife habitat detention, and erosion protection. Wetlands are protected as a subset of the "the waters of the United States" under Section 404 of the CWA. The term "waters of the United States" has a broad meaning under the CWA and besides navigable waters, incorporates deep-water aquatic habitats and wetlands. Section 404(b)(1) of the CWA directs the USEPA to develop guidelines for the placement of dredged or fill material (33 U.S.C. § 1341[b]). These guidelines developed by USEPA are known as the "404(b)(1) Guidelines" and are located at 40 CFR Part 230. The stated purpose of the Guidelines is to "restore and maintain the chemical, physical, and biological integrity of waters of the United States through the control of discharges of dredged or fill material" (40 CFR § 230.1[a]). In New Mexico, activities occurring within a wetland are regulated by the USACE.

Less than 1 percent of Holloman AFB is considered wetlands; however, there are no jurisdictional waters of the United States, including jurisdictional wetlands, on Holloman AFB. The Lake Holloman Wetland Complex area is located in the southernmost part of Holloman AFB. This area comprises approximately 1,341 ac north and 110 ac south of US Highway 70. The area is a remnant of a naturally occurring playa environment created by depositional processes. Lake Holloman and Stinky Playa, both modified from former large alkali playa lakes, are the dominant physical features within the unit. This area is also used for wastewater and stormwater management, which provides high-quality wildlife habitat particularly for migrating and breeding wetland birds (Holloman AFB, 2018b).

3.5.3 Existing Conditions – Airspace

Ecoregion Description

The Beak and Talon MOAs and WSMR and McGregor Range Restricted Areas are located within three Level III Ecoregions (**Figure 3-6**). Ecoregions are used to describe areas of similar type, quality, and quantity of environmental resources (USEPA, 2018). Ecoregions are assigned hierarchical levels to delineate ecosystems spatially based on different levels of planning and reporting needs. Level I is the broadest ecoregion level, dividing North America into 15 ecological regions. Level II includes 50 ecoregions, and Level III divides the continental United States into 105 ecoregions. Level IV further subdivides the Level III ecoregions (USEPA, 2018).

Table 3-14
Federally and State Listed Species with the Potential to be Affected by Aircraft Operations at Holloman Air Force Base and the Special Use Airspace

Species	Federal Status[1]	State Status[2]	Holloman AFB	Special Use Airspace			
				Beak MOAs	Talon MOAs	WSMR Restricted Areas	McGregor Range Restricted Areas
Birds							
Northern aplomado falcon (*Falco femoralis*)	NEP	E		X	X	X	X
Baird's sparrow (*Centronyx bairdii*)	-	T	X	X	X	X	X
Bald eagle (*Haliaeetus leucocephalus*)	-	T	X	X	X	X	X
Bell's vireo (*Vireo bellii*)	-	T		X	X	X	X
Brown pelican (*Pelecanus occidentalis*)	-	E		X	X	X	X
Broad-billed hummingbird (*Cynanthus latirostris*)	-	T		X	X	X	X
Common black hawk (*Buteogallus anthracinus*)	-	T		X	X	X	X
Common ground-dove (*Columbina passerina*)	-	E		X	X	X	X
Costa's hummingbird (*Calypte costae*)	-	T				X	
Elegant trogon (*Trogon elegans*)	-	E		X	X	X	X
Gray vireo (*Vireo vicinior*)	-	T		X	X	X	X
Least tern (*Sternula antillarum*)	E	E	X	X	X	X	X
Lucifer hummingbird (*Calothorax lucifer*)	-	T			X	X	
Mexican spotted owl (*Strix occidentalis lucida*)	T	-		X	X	X	X
Neotropic cormorant (*Phalacrocorax brasilianus*)	-	T	X	X	X	X	X
Northern beardless-tyrannulet (*Camptostoma imberbe*)	-	E			X		
Peregrine falcon (*Falco peregrinus*)	-	T	X	X	X	X	

Table 3-14
Federally and State Listed Species with the Potential to be Affected by Aircraft Operations at Holloman Air Force Base and the Special Use Airspace

Species	Federal Status[1]	State Status[2]	Holloman AFB	Special Use Airspace			
				Beak MOAs	Talon MOAs	WSMR Restricted Areas	McGregor Range Restricted Areas
Piping plover (*Charadrius melodus*)	T	T		X	X	X	
Southwestern willow flycatcher (*Empidonax traillii extimus*)	E	E		X	X	X	X
Thick-billed kingbird (*Tyrannus crassirostris*)	-	E			X	X	
Yellow-billed cuckoo (*Bartramia longicauda*)	T	-		X	X	X	
Yellow-eyed junco (*Junco phaeonotus*)	-	T		X	X	X	X
Varied bunting (*Passerina versicolor*)	-	T		X	X	X	X
Violet-crowned hummingbird (*Amazilia violiceps*)	-	T				X	
White-eared hummingbird (*Hylocharis leucotis*)	-	T		X	X	X	X
Mammals							
Least shrew (*Cryptotis parvus*)	-	T		X	X		
New Mexico meadow jumping mouse (*Zapus luteus luteus*)	E	E		X	X	X	X
Mexican gray wolf (*Canis lupus baileyi*)	E	E				X	
Organ Mountains Colorado chipmunk (*Eutamias quadrivittatus australis*)	-	T				X	
Oscura Mountains Colorado chipmunk (*Neotamias quadrivittatus oscuraensis*)	-	T		X		X	
Penasco least chipmunk (*Neotamias minimus atristriatus*)	C	E		X	X	X	X
Spotted bat (*Euderma maculatum*)	-	T		X	X		X
Western yellow bat (*Dasypterus xanthinus*)	-	T				X	

Sources: [1] USFWS, 2019; [2] NMDGF, 2019

Notes:
AFB = Air Force Base; C = Candidate; E = Endangered; MOA = Military Operations Area; NEP = Nonessential Experimental Population; T = Threatened; WSMR = White Sands Missile Range

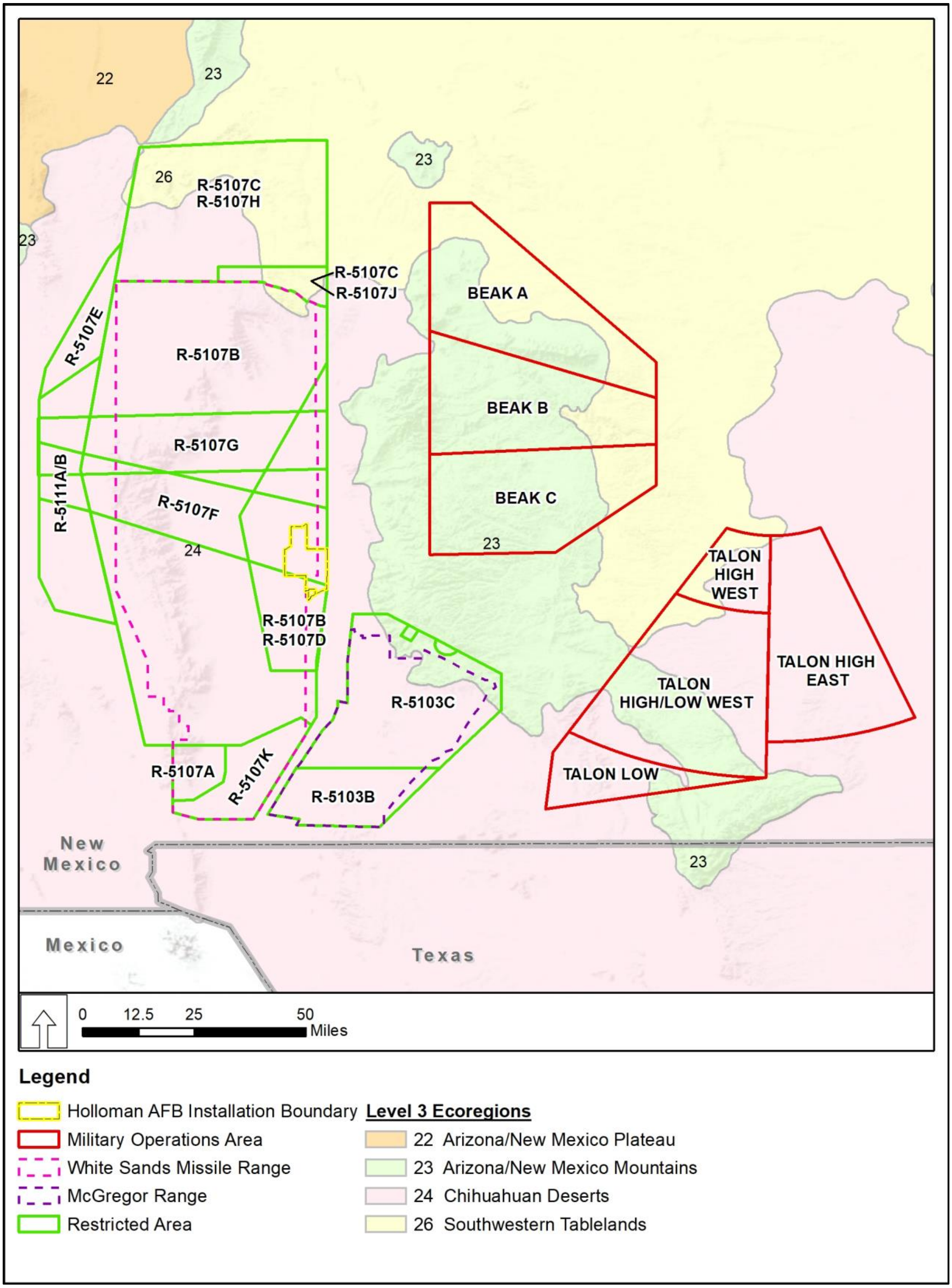


Figure 3-6. Ecoregions in the Special Use Airspace Federally Listed Species Descriptions.

To describe the ecosystems within the airspace, Level III Ecoregions are used. Level III ecoregion descriptions provide a regional perspective and are more specifically oriented for environmental monitoring, assessment and reporting, and decision-making (Commission for Environmental Cooperation, 1997). The vegetation and wildlife common within the ecoregions are described below. The following are the Level III ecoregions that occur in the MOAs and Restricted Areas:

Beak MOAs

- Arizona/New Mexico Mountains
- Chihuahuan Deserts
- Southwestern Tablelands

Talon MOAs

- Arizona/New Mexico Mountains
- Chihuahuan Deserts
- Southwestern Tablelands

WSMR Restricted Areas

- Chihuahuan Deserts
- Southwestern Tablelands

McGregor Range Restricted Areas

- Arizona/New Mexico Mountains
- Chihuahuan Deserts

Descriptions of the Ecoregions in New Mexico were adapted from the *New Mexico State Wildlife Action Plan* (NMDGF, 2016).

Arizona/New Mexico Mountains. The Arizona/New Mexico Mountains Ecoregion in New Mexico is comprised of nine separate mountain complexes totaling 18,097 square miles (mi^2). Elevations range from 4,300 to 12,400 ft and terrain consists of steep mountains and some deeply dissected plateaus with desert, midlatitude steppe, and subarctic climatic conditions. The Arizona/New Mexico Mountains Ecoregion supports 26 naturally vegetated habitats, 4 unvegetated habitats, and cultivated land. Vegetation consists of chaparral at lower elevations, piñon-juniper and oak woodlands (including Madrean Evergreen Woodland in the south) at midelevations, and coniferous forests of ponderosa pine (*Pinus ponderosa*) and Douglas fir (*Pseudotsuga menziesii*) at higher elevations. The Arizona/New Mexico Ecoregion also supports the southernmost extent of spruce-fir forest at elevations above 10,800 ft (NMDGF, 2016).

Chihuahuan Deserts. The Chihuahuan Desert Ecoregion encompasses 26,989 mi^2 of the southern third of New Mexico and is the northern portion of contiguous warm desert extending into central Mexico. Elevations range from 2,800 to 8,550 ft, and the terrain consists of broad basins bordered by isolated, rugged mountains. This Ecoregion is arid, marked by hot summers and mild winters. There are 27 naturally vegetated habitat types, 3 unvegetated land covers, and agricultural land in the Chihuahuan Desert Ecoregion in New Mexico, mostly comprised of two habitats, Chihuahuan Semi-Desert Grassland and Chihuahuan Desert Scrub. Except in small patches of high elevation woodlands of oak (*Quercus* spp.) and piñon-juniper above 7,050 ft, dominant plant species are blue grama (*Bouteloua gracilis*) and black grama (*Bouteloua eriopoda*), creosote (*Larrea tridentata*), American tarwort (*Flourensia cernua*), mesquite (*Prosopis* spp.), and yuccas (*Yucca* spp.) (NMDGF, 2018).

Southwestern Tablelands. The Southwestern Tablelands ecoregion encompasses much of eastern New Mexico and is part of a contiguous, 382,070-mi^2 semiarid prairie that extends across most of Kansas and Oklahoma, eastern Colorado, northern and western Texas, southeastern Wyoming, and southern Nebraska. In New Mexico, elevations range from 2,500 to 6,600 ft, and the terrain is smooth to slightly irregular with intermittent mesas and plateaus. The climate is marked by hot summers and cold winters. Terrestrial habitats include 26 naturally vegetated types, 3 unvegetated land covers, and cultivated lands, with Great Plains Shortgrass Prairie and Rocky Mountain Piñon-Juniper Woodland being the most common habitats in the Ecoregion. Common plant species of the shortgrass prairie include blue grama, buffalograss (*Buchloe dactyloides*), and fringed sage (*Artemisia frigida*); and mixed grass prairie species include sideoats grama (*Bouteloua curtipendia*), western wheatgrass (*Pascopyrum smithii*), and little bluestem (*Schizachyrium scoparium*) (NMDGF, 2016).

Because there would be no ground-disturbing activities from the contract ADAIR Proposed Action in the Beak and Talon MOAs and the WSMR and McGregor Range Restricted Areas and proposed activities are limited to aircraft overflights and use of defensive countermeasures in the airspace where noise and visual cues could cause behavioral changes in birds and mammals, there would be no impacts on listed plants, aquatic species (i.e., fish), reptiles and amphibians, invertebrates, or crustaceans; therefore, of the listed species potentially occurring in the project area, 25 listed birds (six of which are federally listed) and 8 listed mammals (two of which are federally listed and one is a federal Candidate species) could potentially be affected by aircraft movement. Species descriptions for the federally listed species are provided below. Species descriptions for state listed species are provided in **Appendix D**.

There is designated Critical Habitat for the Mexican spotted owl (*Strix occidentalis lucida*) in the Beak MOAs and Restricted Area R-5103C. There is also designated Critical Habitat for the meadow jumping mouse (*Zapus luteus luteu*) in Beak C MOA (**Figure 3-7**).

Northern Aplomado Falcon. The state Endangered northern aplomado falcon (*Falco femoralis*) is federally listed as a Nonessential Experimental Population in New Mexico due to releases from a captive breeding program. The northern aplomado falcon is a slender, moderate-sized, long-tailed falcon that is distinct in pattern and coloration. The northern aplomado falcon breeds and forages in desert grasslands. In New Mexico, the northern aplomado falcon nests in yuccas within intact grassland habitats and appropriates the nests of other birds, laying eggs in old stick nests. Aplomado falcons are known to breed periodically and are observed nearly annually in select grasslands of southern New Mexico including on the McGregor Range. There is the potential for this species to occur in grasslands in the MOAs and Restricted Areas (NMDGF, 2019).

Least Tern. The least tern (*Sterna antillarum*) is the smallest of North American terns. The federal and state Endangered interior least tern (*Sterna antillarum athalassos*) is one of three subspecies of least tern in the United States and nests on bare or sparsely vegetated sand, shell, and gravel beaches, sandbars, islands, and salt flats associated with rivers and reservoirs. The interior least tern is migratory, breeding along inland river systems and wintering along the Central American and South American coasts. The interior least tern is known to nest on sandbars and islands along the Pecos River during the breeding season (early April to early August) and a summer resident at or near Bitter Lake National Wildlife Refuge. It is highly unlikely that the least tern occurs in the MOAs or Restricted Areas as suitable nesting and foraging habitat is not present (NMDGF, 2019).

Mexican Spotted Owl. The Mexican spotted owl (*Strix occidentalis lucida*) is federally Threatened and is a medium-sized brown owl with a loud voice that carries long distances, are typically very curious, and can be relatively easily approached. The Mexican spotted owl is most often found in old-growth mixed-conifer forests, usually more than 200 years old. Habitat characteristics include forests with high canopy closure, high stand density, a multilayered canopy, uneven-aged stands, numerous snags, and downed woody material. Mexican spotted owls are permanent residents of higher elevation forests in MOAs and Restricted Areas; there is designated Critical Habitat in the action area, and owls are known to be present year-round in the Sacramento Mountains of Lincoln National Forest (NMDGF, 2019).

Piping Plover. Piping plovers (*Charadrius melodus*) are federally and state listed as Threatened. The piping plover is similar in appearance to many other small shorebirds and sandpipers but are more compactly built and thicker-necked. At all seasons, the piping plover occurs on sandflats or along bare shorelines of rivers, lakes, or coasts. This species breeds from Alberta and Manitoba, Canada, south to Nebraska, in the Great Lakes region, and along the Atlantic Coast from New Brunswick, Canada, south to North Carolina. In New Mexico, the piping plover is a rare migrant and has been occasionally observed on the shorelines of reservoirs (NMDGF, 2019). It is highly unlikely to occur in the MOAs and Restricted Areas, and if it would occur, its presence would only be as a stray migrant.

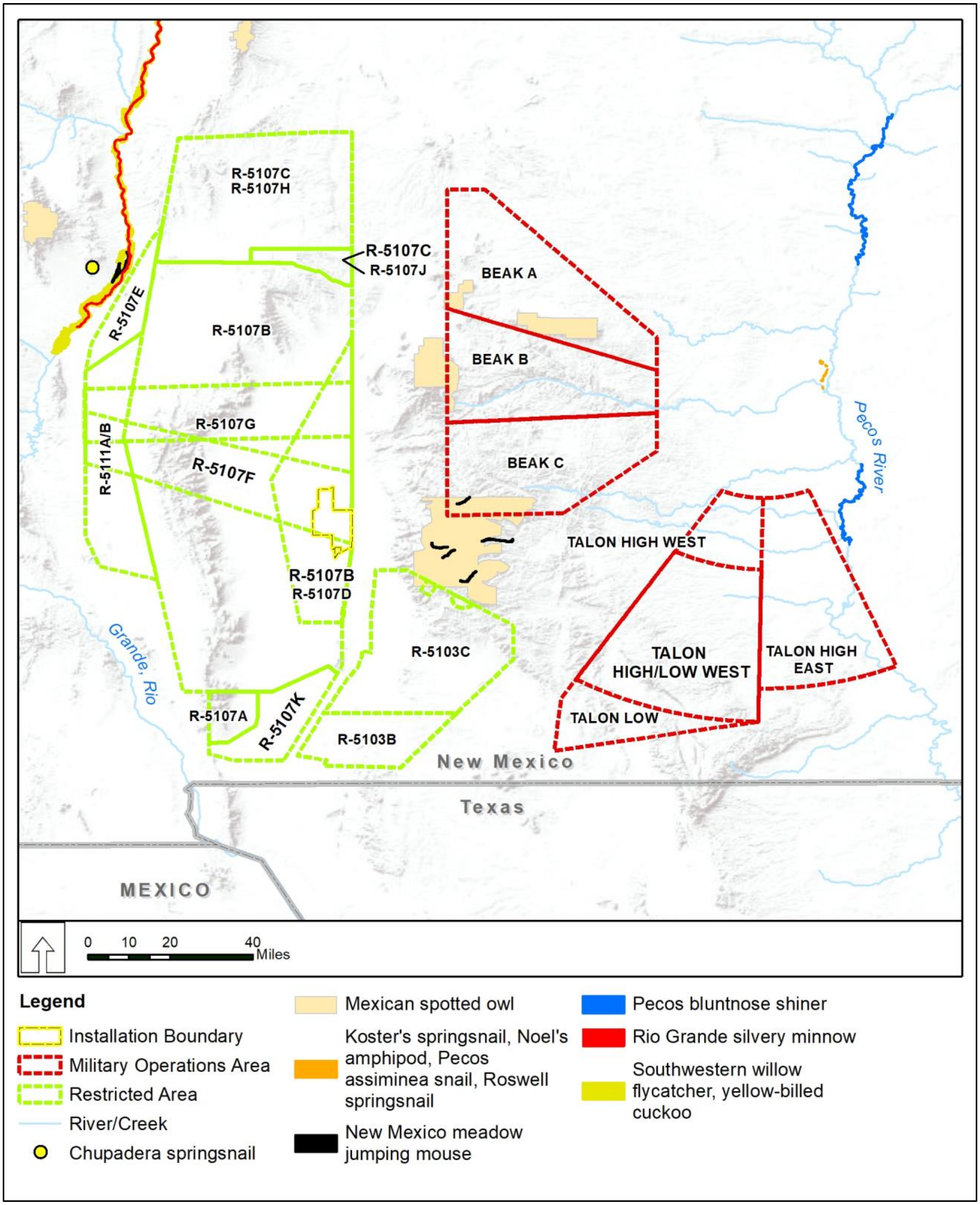


Figure 3-7. Designated Critical Habitat in the Military Operations Areas and Restricted Areas.

Southwestern Willow Flycatcher. The Southwestern willow flycatcher (*Empidonax traillii extimus*), federally and state listed as Endangered, breeds in riparian habitats from southern California to Arizona and New Mexico and in southern Utah and Nevada; it may also be found in southwest Colorado and western Texas. The Southwestern willow flycatcher occurs in the United States only during the breeding season from May until September and migrates to Central and South America in the winter. It nests in riparian habitats primarily with mature native trees. They have been observed nesting in riparian areas dominated by saltcedar (*Tamarix* spp.). Although its occurrence in New Mexico is rare, it potentially occurs in mature riparian corridors in the MOAs and Restricted Areas during the breeding season.

Yellow-Billed Cuckoo. The yellow-billed cuckoo (*Bartramia longicauda*) is federally listed as Threatened and is found in deciduous woodlands, low scrubby vegetation, abandoned farmland, and dense riparian thickets. In the western United States, it is listed as a federally threatened species. The greatest threat to the species has been reported to be loss of riparian habitat. It has been estimated that 90 percent of the cuckoo's stream-side habitat has been lost. Habitat loss in the western United States is attributed to agriculture, dams, and river flow management, overgrazing and competition from exotic plants such as tamarisk. The yellow-billed cuckoo is known to occur in riparian corridors in New Mexico, including those of the Pecos, Rio Grande, and Gila Rivers (NMGFD, 2019). There is the potential for the yellow-billed cuckoo to occur in riparian areas in the MOAs and Restricted Areas.

New Mexico Meadow Jumping Mouse. The New Mexico meadow jumping mouse (*Zapus hudsonius luteus*) is listed as federally Endangered. It is a small nocturnal rodent that is primarily associated with riparian habitats in New Mexico and found in areas with high soil moisture. It typically hibernates for all but the summer months and is relatively short-lived. There are only 29 documented residual populations in Colorado, New Mexico, and Arizona (NMDGF, 2019). There is designated Critical Habitat for the New Mexico meadow jumping mouse in the action area and suitable habitat occurs in the Sacramento Mountains under the Beak MOAs.

Mexican Gray Wolf. The Mexican gray wolf (*Canis lupus baileyi*) is listed as Endangered under the ESA and Endangered by the State of New Mexico. The Mexican gray wolf is the largest wild member of the dog family in New Mexico and is dark overall in coloration, varying from grayish-brown to blackish. This subspecies occurs only in New Mexico and Arizona and has been observed in the Gila, Lincoln, Cibola, and Coronado National Forests. It is primarily found in higher elevation woodlands and savannas (NMDGF, 2019). The Mexican gray wolf could occur in the action area, primarily in the higher elevation areas of the Lincoln National Forest in the Beak MOAs as well as higher elevation areas of the Restricted Areas.

Penasco Least Chipmunk. The Penasco least chipmunk (*Neotamias minimus atristriatus*) is federally listed as a Candidate species and is listed as Endangered by the State of New Mexico. The Penasco least chipmunk has the southernmost distribution of the known least chipmunks, and the population located east of Cloudcroft in the Sacramento Mountains of Otero County occurs between 6,800 and 8,000 ft in elevation in ponderosa pine forest. It is believed to be endemic to the White Mountains in Otero and Lincoln Counties and the Sacramento Mountains of Otero County (NMDFG, 2019). This species is known to occur in the MOAs and Restricted Areas.

Invasive Species

Overflight activities from contract ADAIR training in the MOAs and Restricted Areas would have no impacts on invasive species; therefore, invasive species in the MOAs and Restricted Areas are not described further.

Wetlands

Overflight activities from contract ADAIR training in the MOAs and Restricted Areas would have no impacts on wetlands or waters of the United States; therefore, since there would be no possibility of fill activities or indirect impacts on wetlands from contract ADAIR training, wetlands in the MOAs and Restricted Areas are not described further.

3.6 LAND USE

3.6.1 Definition of the Resource

The term "land use" refers to real property classifications that indicate either natural conditions or the types of human activity occurring on a parcel. In many cases, land use descriptions are codified in local zoning laws; however, no nationally recognized convention or uniform terminology has been adopted for describing land use categories. As a result, the meanings of various land use descriptions, labels, and definitions vary among jurisdictions. This section addresses potential land impacts from implementation of the Proposed Action on Holloman AFB and discusses land use categories identified on the base:

- Administrative – headquarters, security operations, offices
- Airfield pavements – runways, taxiways, aprons, overruns
- Aircraft operations and maintenance – hangars, aircraft maintenance units, squadron operations
- Community (commercial) – commissary, base exchange, dining
- Community (service) – gym, recreation center, theater
- Housing (accompanied) – family housing
- Housing (unaccompanied) – airman housing, visitor housing, temporary lodging
- Manufacturing and production
- Open space – conservation area, buffer space
- Outdoor recreation – ballfields; outdoor courts; and golf course

Three development plans provide guidance on future development at Holloman AFB. The *Installation Development Plan* (IDP) is the master plan for future development for the entire base and outlines the planning strategies and goals for future development at the installation (Holloman AFB, 2016b). The second document, the *Installation Development and Design (ID2)* for Holloman AFB provides planning, design, and construction criteria that incorporates sustainable development and high-performance green building design objectives for Holloman AFB (Holloman AFB, 2011b). The ID2 is used as a planning design tool to guide both building renovation projects and new construction projects. Finally, the *Southern New Mexico – El Paso, Texas Joint Land Use Study* (Doña Ana County, 2015) provides guidance for enhancing land use compatibility in the Southern New Mexico-El Paso (SNMEP) region. The SNMEP region has experienced population and development growth which potentially exposes more people to noise and safety risks typically associated with military activities. This study was a cooperative planning effort among city and county governments, the public, state and federal agencies, tribal governments, and military installations within the SNMEP region. These three documents provide direction for future development at Holloman AFB, with the objective of aligning current and programmed mission requirements while maintaining compliance with operational, safety, environmental, energy, and security regulations and requirements; maximizing functional capabilities through the utilization and adaption of existing areas; and to foster awareness of the installation by community stakeholders.

To address land use with respect to noise and safety associated with aircraft operations, military installations, including Holloman AFB, have established an Air Installation Compatible Use Zone (AICUZ) program. The goal of the AICUZ program is to protect the health, safety, and welfare of those living or working near military air installations while protecting the military operational capabilities of the base (Holloman AFB, 2004). The AICUZ program includes an analysis of the effects of aircraft noise, accident potential, land use compatibility, and development adjacent to the base. The program assists governmental entities and communities to anticipate, identify, and promote compatible land use and development near military installations. A detailed description of the existing noise environment is provided in **Section 3.2**, and a description of the safety zones associated with Holloman AFB is provided in **Section 3.3**.

The location(s) and extent of the Proposed Action is evaluated for potential effects on the proposed sites and land uses adjacent to project areas on Holloman AFB and beneath airspace that would be used for ADAIR training. The foremost factor affecting a proposed action in terms of land use is its compliance with any applicable land use or zoning regulations. Other relevant factors include existing land use at the project site, the types of land use on adjacent properties and their proximity to a proposed action, the duration of a proposed activity, and its "permanence." The ROI for land use on the installation includes the land surrounding the facilities proposed for use, and the land within the airfield noise contours and safety zones. The ROI also includes the land beneath the MOAs and Restricted Areas.

In addition, sensitive lands beneath the MOAs and Restricted Areas are considered in the evaluation as well. Sensitive lands include those intended to preserve natural or cultural resources, contain recreational opportunities and public access, or provide for the management of public lands. Natural areas include uses such as forestry and agriculture, as well as conservation areas, wildlands, and parks. The ROI of off-base sensitive lands includes the land within the boundaries of the airspace proposed for use).

3.6.2 Existing Conditions – Holloman Air Force Base

Holloman AFB is located in southern New Mexico, 6 mi southwest of Alamogordo in Otero County, New Mexico. The base encompasses approximately 59,639 ac and is bounded to the east by the White Sands National Monument and to the south by Highway 70 and supports about 21,000 active duty Air Force, ANG, Air Force Reserve, retirees, DOD civilians, and their family members.

There are nine on-base land use categories identified at Holloman AFB comprising approximately 7,921 ac (**Table 3-15**). Most of the land uses are categorized as airfield pavement (4,245 ac). Manufacturing and production, outdoor recreation, housing (accompanied and unaccompanied), community (commercial and service) and aircraft operations and maintenance comprise the remaining land uses. Approximately 1,245 ac have been categorized as open space land use. Building 578, proposed for ADAIR operations and maintenance under Option 1, is located within an aircraft operations and maintenance land use area within the existing 80- to 85-dBA DNL. Building 1062, proposed for ADAIR operations under Option 2, is located on the northwest edge of the airfield, within a manufacturing and production land use area and within the existing 75- to 80-dBA DNL noise contour.

Table 3-15
Land Use Summary of Holloman Air Force Base

Category	Acreage
Aircraft Operations and Maintenance	321.0
Airfield Pavement	4,245.0
Community Commercial	86.2
Community Service	3.8
Housing Accompanied	125.6
Housing Unaccompanied	55.0
Manufacturing and Production	1,534.2
Open space	1,244.7
Outdoor Recreation	276.8
Total	**7,921.5**

Off-base land within the Holloman AFB noise contours account for approximately 1,603 ac (**Figure 3-8**). Off-base land use is defined by land ownership because there is no comprehensive land use data or zoning ordinances for Otero County. Most of this land is classified as public lands managed by the Bureau of Land Management (BLM; 74 percent), and WSMR comprises 25 percent (**Table 3-16**). Private land makes up the remaining 1 percent.

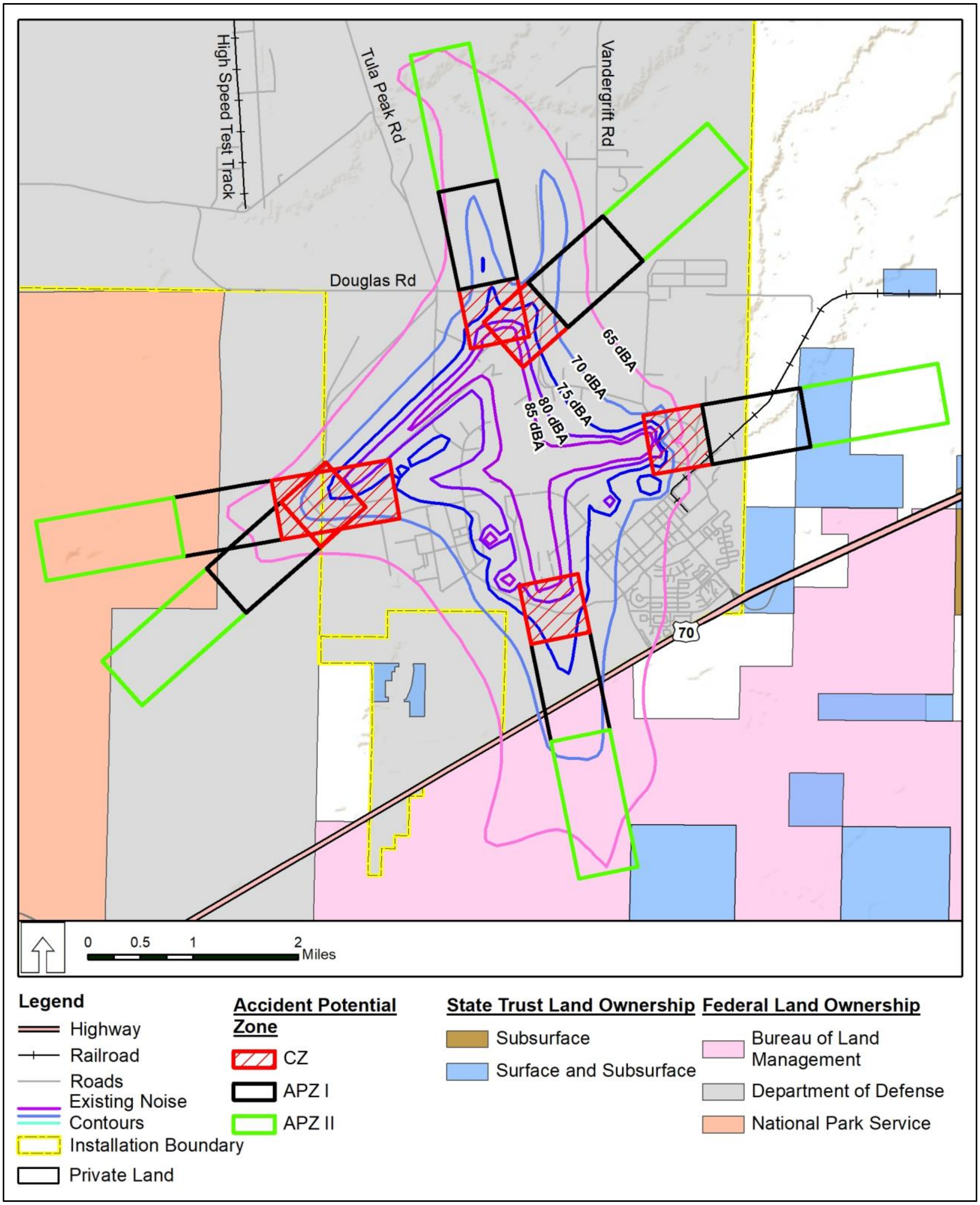


Figure 3-8. Generalized Land Ownership, Noise Contours, and Safety Zones at Holloman Air Force Base.

Table 3-16
Off-base Federal Land Ownership Within the Holloman Air Force Base Noise Contours

Land Ownership	Acres Within Noise Contours					
	65-dBA DNL	70-dBA DNL	75-dBA DNL	80-dBA DNL	85-dBA DNL	Total
Department of Defense	364.3	43.2	0.0	0.0	0.0	407.5
Bureau of Land Management	985.3	210.7	0.0	0.0	0.0	1,196.0
Total	**1,349.6**	**253.9**	**0.0**	**0.0**	**0.0**	**1,603.5**

Source: New Mexico State Land Office, 2019

Note:
dBA = A-weighted decibels; DNL= Day-Night Average Sound Level

Approximately 3,050 ac of off-base land is located within airfield safety zones. Of the 3,050 ac, approximately 196 ac are within the CZ. The CZ includes approximately 166 ac of DOD land (WSMR) and 30 ac of State of New Mexico Trust lands. Approximately 925 ac of off-base land use are within APZ I zone. Most of the land use within the APZ I, approximately 452 ac, are DOD lands (WSMR), with approximately 148 ac being National Park Service (NPS) lands (White Sands National Monument), and 145 ac are BLM lands. Almost 180 ac in the APZ I zone represent private lands. Approximately 1,928 ac of off-base land lays within the APZ II. Off-base lands within the APZ II zone consist of 403 ac of DOD lands (WSMR), 561 ac of NPS lands (White Sands National Monument), and 166 ac of State of New Mexico Trust lands. Approximately 323 ac of private lands are within the APZ II zone. Additional information regarding safety zones can be found in **Section 3.3.**

3.6.3 Existing Conditions – Airspace

Land use beneath the airspace proposed for contract ADAIR is primarily rural, range, agriculture, or federally managed land. Sensitive lands beneath the proposed airspace include portions of Lincoln National Forest, White Mountain Wilderness, White Sands National Monument, Sevilleta National Wildlife Refuge, San Andres National Wildlife Refuge, Salinas Pueblo Missions National Monument, Bosque del Apache National Refuge, Capitan Mountains Wilderness, and Jornada Experimental Range (**Figure 3-9**). No major metropolitan areas are located beneath the airspace. Population centers beneath the airspace are listed in **Table 3-17** by county and identified as either incorporated or unincorporated.

3.7 SOCIOECONOMICS - INCOME AND EMPLOYMENT

3.7.1 Definition of the Resource

There are several factors that can be used as indicators of socioeconomic conditions for a geographic area, such as demographics, median household income, unemployment rates, percentage of families living below the poverty level, employment, and housing data. Data on employment identify gross numbers of employees, employment by industry or trade, and unemployment trends. Data on industrial, commercial, and other sectors of the economy provide baseline information about the socioeconomic health of a region. Economic data are typically presented at county, state, and US levels to characterize baseline socioeconomic conditions in the context of regional, state, and national trends.

Holloman AFB is located within Otero County, New Mexico, 6 mi southwest of Alamogordo, and is the ROI for this resource. The Proposed Action in the special use airspace would not have any impact on socioeconomics – income and employment; therefore, they are not discussed further.

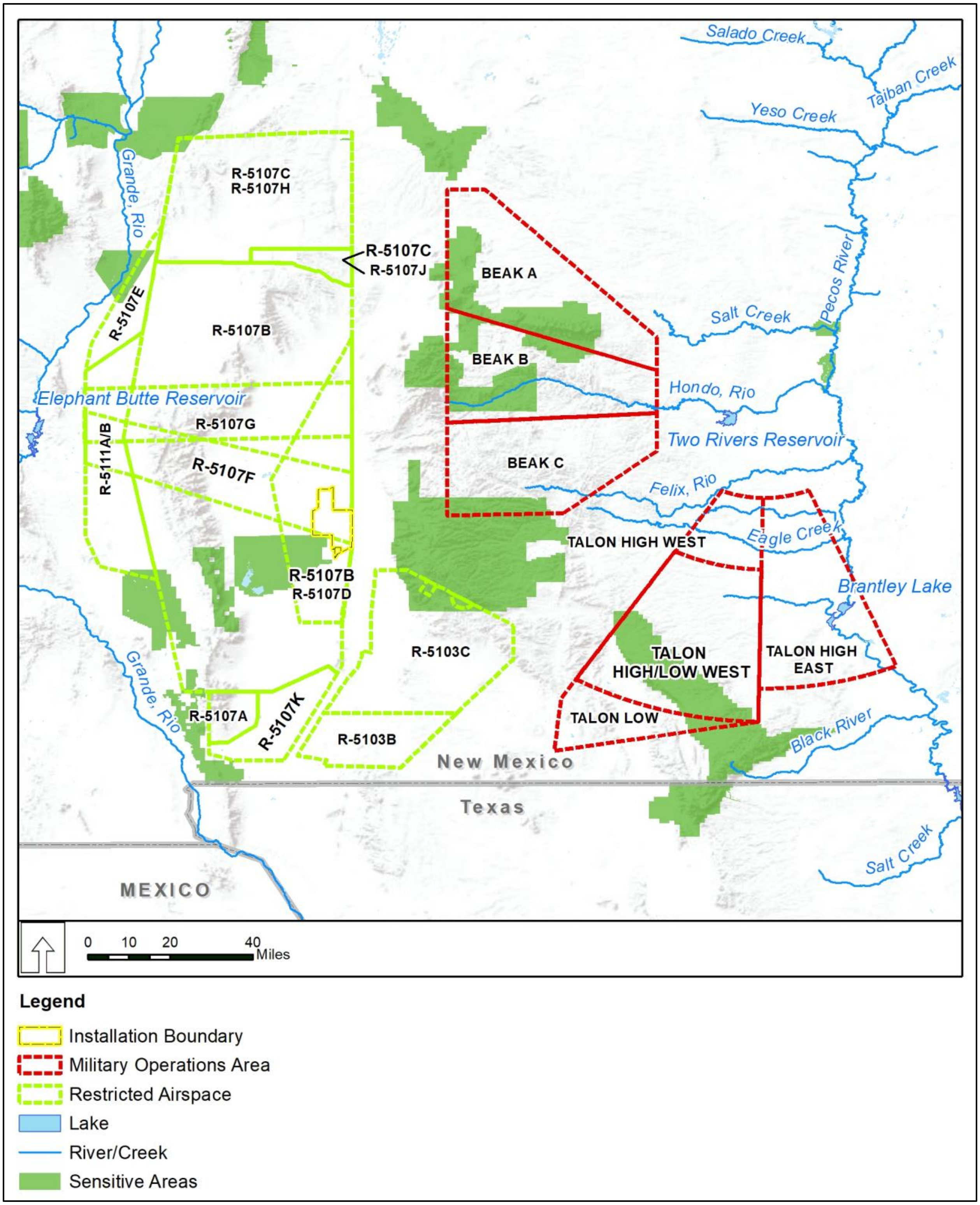


Figure 3-9. Sensitive Areas Beneath Special Use Airspace Proposed for Contract Adversary Air.

Table 3-17
Population Centers Beneath the Airspace Proposed Contract Adversary Air

Incorporated Cities	Unincorporated Communities
Beak A MOA	
Lincoln County	
Not Applicable	Tecolote, Brundage, Catarina
Beak B MOA	
Lincoln County	
Ruidoso, Ruidoso Downs, Capitan	Hollywood, Sunset, Picacho, Hondo, Alto, San Patricio, Glencoe, Lincoln Fort Stanton, Nogal
R-5103C	
Otero County	
Not Applicable	Timberon
R-5107B	
Doña Ana County	
Not Applicable	White Sands, Organ
Otero County	
Not Applicable	Three Rivers
R-5107C	
Socorro County	
Not Applicable	Carthage, Bingham
R-5107D	
Otero County	
Not Applicable	Three Rivers
R-5107F	
Otero County	
Alamogordo, Cloudcroft	Sacramento, Weed, Mayhill, High Rolls, La Luz, Tularosa
Sierra County	
Not Applicable	Engle
R-5107G	
Lincoln County	
Ruidoso Downs, Ruidoso	Hollywood, Alto
Otero County	
Not Applicable	Three Rivers
Sierra County	
Not Applicable	Crocker
R-5107H	
Socorro County	
Not Applicable	Carthage, Bingham
Torrance County	
Not Applicable	Gran Quivira
Talon High East MOA	
Eddy County	
Carlsbad, Artesia	Happy Valley, La Huerta, Dayton, Atoka
Talon High West MOA	
Eddy County	
Hope	Not Applicable

Note:
MOA = Military Operations Area

3.7.2 Existing Conditions – Holloman Air Force Base

The unemployment rate for Otero County was 6.1 percent in 2017 (Bureau of Labor Statistics, 2019). This was slightly higher than the 2017 unemployment rate for New Mexico (5.9 percent) and the United States (4.4 percent) (Bureau of Labor Statistics, 2019). The median household income in 2017 was $43,533 for Otero County, which was slightly lower than that for New Mexico ($46,718) and substantially lower than for the US ($57,652).

In Fiscal Year 2016, 3,720 military personnel and 1,651 civilians were employed by or associated with Holloman AFB (Holloman AFB, 2016a). At Holloman AFB, the annual military pay was $151.5 million and the annual civilian pay was $61.9 million in Fiscal Year 2016. A total of $121 million was spent at Holloman AFB for construction, operations, and maintenance activities in Fiscal Year 2016. It was estimated that the Holloman AFB created $77.2 million in indirect jobs for the local economy in Fiscal Year 2016 (Holloman AFB, 2016a).

3.8 Environmental Justice and Protection of Children

3.8.1 Definition of the Resource

Executive Orders direct federal agencies to address disproportionate environmental and human health effects in minority and low-income communities and to identify and assess environmental health and safety risks to children.

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

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

For the purposes of this analysis, minority populations are defined as Alaska Natives and American Indians, Asians, Blacks or African-Americans, Native Hawaiians, and Pacific Islanders or persons of Hispanic origin (of any race); low-income populations include persons living below the poverty threshold as determined by the US Census Bureau; and youth populations are children under the age of 18 years.

Minority, low-income, and youth populations that could be disproportionately impacted by the project are addressed for Otero County under the Holloman AFB ROI and the counties beneath the special use airspace ROI (see **Section 3.6.3**). Tribal Consultation is described in **Section 1.6.3**.

3.8.2 Existing Conditions – Holloman Air Force Base

An evaluation of minority and low-income populations in Otero County form a baseline for the evaluation of the potential for disproportionate impacts on these populations from the Proposed Action. In 2017, Otero County had a lower percentage of minorities in the population compared to the State of New Mexico, but both New Mexico and Otero County had a substantially higher percentage of the population that identified as minorities than the United States (US Census Bureau, 2019). The same trend occurred for the percent of the population that is Hispanic or Latino (**Table 3-18**).

Otero County had a similar rate of poverty as the State of New Mexico, but both Otero County and New Mexico had a higher rate of poverty than the United States (**Table 3-18**). The percentage of children in Otero County was the same as New Mexico and only slightly higher than the United States as a whole (**Table 3-18**) (US Census Bureau, 2019).

Table 3-18
Total Population and Populations of Concern

	Total Population	Percent Minority	Percent Hispanic or Latino	Percent below Poverty	Percent Youth
Otero County	65,817	51.1	38.4	18.5	23.4
State of New Mexico	2,088,070	62.5	48.8	19.7	23.4
United States	325,719,178	39.3	18.1	12.3	22.6

Source: US Census Bureau, 2019

Note: Hispanic and Latino denote a place of origin and percent youth are all persons under the age of 18

3.8.3 Existing Conditions – Airspace

Beak Military Operations Areas

In 2017, Chaves, Lincoln, and Otero Counties had a lower percentage of the population that identified as minorities than the state of New Mexico; Lincoln County had a slightly lower minority population than the US; however, all three counties had a slightly higher percentage of the population that identified as Hispanic or Latino than the United States (**Table 3-19**). All three counties also had a percentage of the population in poverty in 2017 that was lower than that for the State of New Mexico but higher than the percentage of the population in poverty for the United States. The percentage of youth in the population in Lincoln County was less than that of New Mexico and the United States, while the percentage of youth in Chaves and Otero Counties was similar to that of New Mexico and the United States (**Table 3-19**) (US Census Bureau, 2019).

Talon Military Operations Areas

Minority, low-income, and youth populations were described for Chaves and Otero Counties for the Beak MOAs. The percentage of the population that was a minority in 2017 in Eddy County was less than that of the State of New Mexico but higher than in the United States as a whole (**Table 3-19**). The majority of all the minorities in Eddy County identify as Hispanic or Latino, which is similar to the State of New Mexico. A total of 16.9 percent of the population in Eddy County is below poverty, which is lower than in the State of New Mexico but higher than in the United States. The percentage of youth in the population in Eddy County was slightly higher than in New Mexico and the United States (**Table 3-19**) (US Census Bureau, 2019).

Table 3-19
Total Population and Populations of Concern for the Region of Influence for the Special Use Airspace (2017)

Location	Total Population	Percent Minority	Percent Hispanic or Latino	Percent Below Poverty	Percent Youth	Beak MOAs	Talon MOAs	WSMR Restricted Areas	McGregor Range Restricted Areas
Chaves County	64,866	60.5	56.4	18.9	26.6	X	X		
Doña Ana County	215,579	72.7	68.4	26.3	24.9			X	
Eddy County	56,997	53.0	49.1	16.9	26.3		X		
Lincoln County	19,395	37.9	32.8	15.8	18.6	X		X	
Otero County	65,817	51.1	38.4	18.5	23.4	X	X	X	X
Sierra County	11,116	34.9	30.3	26.6	15.8			X	
Socorro County	16,798	65.7	50.0	28.8	22.7			X	
Torrance County	15,506	48.8	43.0	26.7	21.3			X	
New Mexico	2,088,070	62.5	48.8	19.7	23.4				
United States	325,719,178	39.3	18.1	12.3	22.6				

Source: US Census Bureau, 2019

Notes: Hispanic and Latino denote a place of origin and percent youth are all persons under the age of 18.

MOA = Military Operations Area; WSMR = White Sands Missile Range

White Sands Missile Range Restricted Areas

Lincoln and Otero Counties were previously described for the Beak MOAs. In 2017, in Doña Ana County, 72.7 percent of the population identified as minority, with 68.4 percent of the population identifying as Hispanic or Latino. Socorro County also had a high percentage of the population that identified both as minority and as Hispanic or Latino; however, Sierra and Torrance Counties had minority populations that were substantially lower than the State of New Mexico and similar to the percentage of minorities in the United States (see **Table 3-19**). In Doña Ana, Sierra, Socorro, and Torrance Counties, the percentage of the population below poverty exceeded 26 percent in 2017, which is higher than New Mexico and the United States (see **Table 3-19**). The percentage of the population below 18 was similar to New Mexico and the United States in all of the counties in the Beak MOAs except for Sierra County, which had only 15.8 percent of the population as youths (US Census Bureau, 2019).

McGregor Range Restricted Areas

Minority, low-income, and youth populations were described for Otero County previously for Holloman AFB.

3.9 CULTURAL RESOURCES

3.9.1 Definition of the Resource

Cultural resources include archaeological, architectural, and traditional sites that represent past human use or occupation of an area.

Cultural Resources include the following subcategories:

- Archaeological (i.e., prehistoric or historic sites where human activity has left physical evidence of that activity);
- Architectural (i.e., buildings or other structures or groups of structures, or designed landscapes that are of historic or aesthetic significance); and
- Traditional Cultural Properties (TCPs; resources of traditional, religious, or cultural significance to Native American tribes and other communities).

Significant cultural resources are called historic properties and are listed on the National Register of Historic Places (NRHP) or have been determined to be eligible for listing. These resources are protected under the NRHP as well as other legislation and EOs. Properties that have not yet been evaluated for NRHP eligibility are afforded the same protection under the law as those that have been determined eligible.

To be eligible for listing in the NRHP, properties typically must be 50 years old; possess sufficient integrity of location, design, setting, materials, workmanship, feeling, and association to convey their historical significance; and meet at least one of the following criteria:

- Associated with events that have made a significant contribution to the broad patterns of our history (Criterion A)
- Associated with the lives of persons significant in our past (Criterion B)
- Embody distinctive characteristics of a type, period, or method of construction, or represent the work of a master, or possess high artistic values, or represent a significant and distinguishable entity whose components may lack individual distinction (Criterion C)
- Have yielded or be likely to yield information important to our understanding of national, regional, or local prehistory or history (Criterion D)

Properties that are less than 50 years old can be considered eligible for listing in the NRHP under Criterion Consideration G if they possess exceptional historical importance. Those properties must also retain the seven aspects of integrity and meet at least one of the four NRHP Criteria for Evaluation (Criterion A, B, C, or D).

Federal laws protecting historic properties include the Archaeological and Historic Preservation Act of 1974 as amended, the American Indian Religious Freedom Act of 1978, the Archaeological Resources Protection Act of 1979, the Native American Graves Protection and Repatriation Act of 1990, and the NHPA, as amended through 2016, and associated regulations (36 CFR Part 800). The NHPA requires federal agencies to consider effects of federal undertakings on historic properties. Federal agencies fulfill this requirement by completing the Section 106 consultation process, as set forth in 36 CFR Part 800. Section 106 of the NHPA also requires agencies to consult with federally recognized Indian tribes with a vested interest in the undertaking.

Section 106 of the NHPA requires all federal agencies to seek to avoid, minimize, or mitigate adverse effects on historic properties (36 CFR § 800.1[a]). For cultural resource analysis, the Area of Potential Effects (APE) is used as the ROI. APE is defined as the "geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist," (36 CFR § 800.16[d]) and thereby diminish their historic integrity. There are two APEs including 1) the area of proposed use at Holloman AFB and 2) the MOAs and Restricted Areas depicted on **Figure 1-4**.

3.9.2 Existing Conditions – Holloman Air Force Base

Holloman AFB is located in the Tularosa Basin of south-central New Mexico, approximately 7 mi southwest of Alamogordo. The Main Cantonment covers 51,813 ac. Holloman AFB is bounded by WSMR to the north, south, and west and by White Sands National Monument to the south. Private, state, and BLM lands lie to the east of Holloman AFB. The terrestrial APE for Holloman AFB includes the portions of the Main Cantonment immediately associated with the two buildings proposed for ADAIR use.

3.9.2.1 Archaeological and Traditional Cultural Properties

Sites on Holloman AFB cover more than 10,000 years of human occupation and represent a wide range of site types including unique prehistoric "hearth mounds" as well as ranching and military-era sites. Since 1979, a total of 262 sites have been identified and recorded including 135 prehistoric sites, 24 historical sites, 50 military-era sites, 44 multicomponent sites, and 9 recent or undated sites (Holloman AFB, 2017).

The Mescalero Apache have shown consistent interest in base activities. Though consultation with the Mescalero Apache has involved visits to and tours of the base, as indicated above, no TCPs or other significant resources have been identified as a result on Holloman AFB. The Fort Sill Apache Tribe, Ysleta del Sur Pueblo, and the Pueblo of Zuni have asked to be notified of major actions taken on Holloman AFB by the Air Force, and access procedures and agreements have been established to facilitate this (Holloman AFB, 2017). Tribal consultation associated with the Proposed Action is ongoing. For a complete list of tribes consulted as part of this EA, refer to **Appendix A.**

3.9.2.2 Architectural Properties

Building 578 is located at the southwestern end of the flight line. Constructed in 1993, Building 578 is not historic and is not subject to NRHP consideration until 2043 (Weitze et al., 2009).

Building 1062 is located on Sabre Road, less than 1 mi directly north of the northeastern end of the flight line. Constructed in 1992, Building 1062 is not historic and is not subject to NRHP consideration until 2042 (Weitze et al., 2009).

There are no historic districts within the Holloman AFB Main Cantonment. The only Holloman AFB districts considered eligible for inclusion in the NRHP are the High-Speed Test Track Historic District and the Missile Test Stands Historic District—both of which are located several miles from the main cantonment area (Holloman AFB, 2017b; O’Leary, 1994).

3.9.3 Existing Conditions – Airspace

3.9.3.1 Environmental Setting

The airspace APE includes the special use airspace described in **Section 2.1.6.** Based on the nature of the Proposed Action, archaeological and architectural resources under the airspace are not described in this EA. No known TCPs have been identified in the APE. Significant cultural resources under the airspace are described below. In addition to NRHP-listed resources, hundreds of NRHP-eligible archaeological sites (remains of pueblos, pithouse villages, burned rock middens, rock cairns, ranch headquarters, line camps, early homesteads, railroad stations and work camps, rock art sites, etc.) and sites of traditional cultural or religious importance lie under the airspace.

3.9.3.2 National Register of Historic Places Listed Resources

There are 42 historic resources associated with the airspace APE listed in the NRHP including two National Monuments (this number excludes sensitive and restricted resources, such as archaeological sites). White Sands National Monument and Historic District are located adjacent to Holloman AFB. The district includes the Visitor Center building and seven additional structures constructed during the Great Depression by the Works Progress Administration (and other government agencies). This complex is considered an excellent example of the Spanish pueblo-adobe (Pueblo-Revival) architectural style. It retains integrity of place, is set in a landscape of native plants, and preserves a unique architectural style that is a tribute to the plans of the architects and the fine craftsmanship of the Works Progress Administration workers (NPS, 2017). Salina Pueblo Missions National Monument is located north of Holloman AFB, along the north-northeastern limits of the restricted use airspace. It encompasses the structural and archaeological remains of the missions, Pueblos, Kivas, and homesteads associated with Ancestral Puebloan and Jumano groups, 17th century Spanish Franciscan missionaries, and ranchers of the nineteenth and twentieth centuries (NPS, 2018). In addition to these national monuments and associated resources, a wide range of structures, complexes, and infrastructure-related resources are located beneath the airspace (**Table 3-20**) (NPS, n.d.). Approximately 60 NRHP-listed prehistoric archaeological sites, including Pueblos, rockshelters, middens, and villages, are located within the counties below the special use airspace.

3.9.3.3 Tribal Lands

There are currently seven federally recognized Native American tribes located in New Mexico, Arizona, and Oklahoma, with possible historic ties to the lands comprising Holloman AFB and the lands beneath the airspace: the Comanche Nation, Apache Tribe of Oklahoma, Mescalero Apache Tribe of the Mescalero Reservation, White Mountain Apache Tribe of the Fort Apache Reservation, Fort Sill Apache Tribe of Oklahoma, Navajo Nation, and Pueblo of Acoma (US Department of Housing and Urban Development, 2019).

Government-to-government consultation to date has identified no TCPs, sacred sites, or physical resources of concern or interest on Holloman AFB-managed lands (Holloman AFB, 2017b).

Table 3-20
National Register of Historic Places Listed Resources Under the Airspace*

Special Use Airspace	Resource	Reference No.
Beak A MOA	Jicarilla Schoolhouse	83001623
Beak B MOA	Monjeau Lookout	87002483
Beak B MOA	New Mexico Military Institute Summer Camp, Main Building	83001622
Beak B MOA	Ruidoso Lookout Tower	87002485
R-5107B	Bentley, L. B., General Merchandise	06000155
R-5107B	Launch Complex 33	85003541
R-5107B	White Sands National Monument Historic District	88000751
R-5107C/H	Salinas Pueblo Missions National Monument	66000494
R-5109A	Administration Building	88001564
R-5109A	Alamogordo Woman's Club	03000734
R-5109A	Auditorium and Recreation Building	88001565
R-5109A	Central Receiving Building	88001566
R-5109A	Garcia, Juan, House	80002559
R-5109A	Infirmary Building	88001567
R-5109A	Jackson House	03001511
R-5109A	La Luz Pottery Factory	79001544
R-5109A	Mayhill Administrative Site	89000476
R-5109A	Mexican Canyon Trestle	79001543
R-5109A	Queen Anne House	83002561
R-5109A	Sutherland, D. H., House	80002562
R-5109A	United States Post Office—Alamogordo	00000510
R-5109A	Weed Lookout Tower	87002487
R-5109A	New Mexico Military Institute Summer Camp, Main Building	83001622
R-5109A	Ruidoso Lookout Tower	87002485
Talon High East MOA	Acord, John, House	84002891
Talon High East MOA	Armandine	03000418
Talon High East MOA	Atkeson, Willie D., House	84002894
Talon High East MOA	Baskin Building	90000599
Talon High East MOA	Baskin, William, House	84002898
Talon High East MOA	First National Bank of Eddy	76001196
Talon High East MOA	Gesler, Edward R., House	84002924
Talon High East MOA	Gesler, Edward R., House	84002925
Talon High East MOA	Hodges-Sipple House	84002926
Talon High East MOA	Lukins, F. L., House	84002928
Talon High East MOA	Mauldin-Hall House	84002930
Talon High East MOA	Moore-Ward Cobblestone House	84002932
Talon High East MOA	Robert, Sallie Chisum, House	84002939
Talon High East MOA	Ross, Dr. Robert M., House	84002936
Talon High East MOA	Tansill, Robert Weems and Mary E., House	02001111
Talon High West MOA/Low MOA	Dam--Sitting Bull Falls Recreation Area	93001420
Talon High West MOA/Low MOA	Group Picnic Shelter--Sitting Bull Falls Recreation Area	93001419
Talon High West MOA/Low MOA	Picnic Shelter--Sitting Bull Falls Recreation Area	93001418

Note: MOA = Military Operations Area

3.10 Hazardous Materials and Wastes, Contaminated Sites, and Toxic Substances

3.10.1 Definition of the Resource

The Comprehensive Environmental Response, Compensation, and Liability Act, as amended by the Superfund Amendments and Reauthorization Act and the Toxic Substances Control Act (TSCA), defines hazardous materials (HAZMAT). HAZMAT is defined as any substance with physical properties of ignitability, corrosivity, reactivity, or toxicity that might cause an increase in mortality, serious irreversible illness, and incapacitating reversible illness, or that might pose a substantial threat to human health or the environment. The Occupational Safety and Health Administration (OSHA) is responsible for enforcement and implementation of federal laws and regulations pertaining to worker health and safety under 29 CFR Part 1910. OSHA also includes the regulation of HAZMAT in the workplace and ensures appropriate training in their handling.

The Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act (RCRA), which was further amended by the Hazardous and Solid Waste Amendments, defines hazardous wastes. Hazardous waste is defined as any solid, liquid, contained gaseous, or semi-solid waste, or any combination of wastes, that pose a substantial present or potential hazard to human health or the environment. In general, both HAZMAT and hazardous wastes include substances that, because of their quantity, concentration, physical, chemical, or infectious characteristics, might present substantial danger to public health and welfare or the environment when released or otherwise improperly managed.

AFPD 32-70 establishes the policy that the Air Force is committed to

- cleaning up environmental damage resulting from its past activities;
- meeting all environmental standards applicable to its present operations;
- planning its future activities to minimize environmental impacts;
- responsibly managing the irreplaceable natural and cultural resources it holds in public trust; and
- eliminating pollution from its activities wherever possible.

AFI 32-7044, *Storage Tank Compliance*, implements AFPD 32-70 and identifies compliance requirements for underground storage tanks (USTs), aboveground storage tanks (ASTs), and associated piping that store petroleum products and hazardous substances. Evaluation of HAZMAT and hazardous wastes focuses on USTs and ASTs as well as the storage, transport, and use of pesticides, fuels, oils, and lubricants. Evaluation might also extend to generation, storage, transportation, and disposal of hazardous wastes when such activity occurs at or near the project site of a Proposed Action. In addition to being a threat to humans, the improper release of HAZMAT and hazardous wastes can threaten the health and well-being of wildlife species, botanical habitats, soil systems, and water resources. In the event of release of HAZMAT or hazardous wastes, the extent of contamination varies based on type of soil, topography, weather conditions, and water resources.

AFI 32-7086, *Hazardous Materials Management*, establishes procedures and standards that govern management of HAZMAT throughout the Air Force. It applies to all Air Force personnel who authorize, procure, issue, use, or dispose of HAZMAT and to those who manage, monitor, or track any of those activities.

Through the Environmental Restoration Program (ERP) initiated in 1980, a subcomponent of the Defense ERP that became law under Superfund Amendments and Reauthorization Act (formerly the Installation Restoration Program), each DOD installation is required to identify, investigate, and clean up hazardous waste disposal or release sites. Remedial activities for ERP sites follow the Hazardous and Solid Waste Amendment of 1984 under the RCRA Corrective Action Program. The ERP provides a uniform, thorough methodology to evaluate past disposal sites, control the migration of contaminants, minimize potential hazards to human health and the environment, and clean up contamination through a series of stages until it is decided that no further remedial action is warranted.

Description of ERP activities provides a useful gauge of the condition of soils, water resources, and other resources that might be affected by contaminants. It also aids in identification of properties and their usefulness for given purposes (e.g., activities dependent on groundwater usage might be foreclosed where a groundwater contaminant plume remains to complete remediation).

Toxic substances might pose a risk to human health but are not regulated as contaminants under the hazardous waste statutes. Included in this category are asbestos-containing materials (ACM), lead-based paint (LBP), radon, and polychlorinated biphenyls (PCBs). The presence of special hazards or controls over them might affect, or be affected by, a Proposed Action. Information on special hazards describing their locations, quantities, and condition assists in determining the significance of a Proposed Action.

Asbestos. AFI 32-1052, *Facility Asbestos Management*, provides the direction for asbestos management at Air Force installations. This instruction incorporates by reference applicable requirements of 29 CFR Part 669 et seq., 29 CFR § 1910.1025, 29 CFR § 1926.58, 40 CFR § 61.3.80, Section 112 of the CAA, and other applicable AFIs and DOD Directives. AFI 32-1052 requires bases to develop an Asbestos Management Plan to maintain a permanent record of the status and condition of ACM in installation facilities, as well as documenting asbestos management efforts. In addition, the instruction requires installations to develop an asbestos operating plan detailing how the installation accomplishes asbestos-related projects. Asbestos is regulated by the USEPA with the authority promulgated under OSHA, 29 U.S.C. § 669 et seq. Section 112 of the CAA regulates emissions of asbestos fibers to ambient air. USEPA policy is to leave asbestos in place if disturbance or removal could pose a health threat.

Lead-based Paint. Human exposure to lead has been determined an adverse health risk by agencies such as OSHA and the USEPA. Sources of exposure to lead are dust, soils, and paint. In 1973, the Consumer Product Safety Commission established a maximum lead content in paint of 0.5 percent by weight in a dry film of newly applied paint. In 1978, under the Consumer Product Safety Act (Public Law 101-608, as implemented by 16 CFR Part 1303), the Consumer Product Safety Commission lowered the allowable lead level in paint to 0.06 percent (600 ppm). The Act also restricted the use of LBP in nonindustrial facilities. DOD implemented a ban of LBP use in 1978; therefore, it is possible that facilities constructed prior to or during 1978 may contain LBP.

Radon. The United States Surgeon General (USSG) defines radon as an invisible, odorless, and tasteless gas, with no immediate health symptoms, that comes from the breakdown of naturally occurring uranium inside the earth (USSG, 2005). Radon that is present in soil can enter a building through small spaces and openings, accumulating in enclosed areas such as basements. No federal or state standards are in place to regulate residential radon exposure at the present time, but guidelines were developed. Although 4.0 picocuries per liter (pCi/L) is considered an “action” limit, any reading over 2 pCi/L qualifies as a “consider action” limit. The USEPA and the USSG have evaluated the radon potential around the country to organize and assist building code officials in deciding whether radon-resistant features are applicable in new construction. Radon zones can range from 1 (high) to 3 (low).

Polychlorinated Biphenyls. PCBs are a group of chemical mixtures used as insulators in electrical equipment, such as transformers and fluorescent light ballasts. Chemicals classified as PCBs were widely manufactured and used in the United States until they were banned in 1979. The disposal of PCBs is regulated under the federal TSCA (15 U.S.C. § 2601, et seq., as implemented by 40 CFR Part 761), which banned the manufacture and distribution of PCBs, with the exception of PCBs used in enclosed systems. Per Air Force policy, all installations should have been PCB-free as of 21 December 1998. In accordance with 40 CFR Part 761 and Air Force policy, both of which regulate all PCB articles, which are regulated as follows:

- Less than 50 ppm—non-PCB (or PCB-free)
- 50 ppm to 499 ppm—PCB-contaminated
- 500 ppm and greater—PCB equipment (USEPA, 2008)

The TSCA regulates and the USEPA enforces the removal and disposal of all sources of PCBs containing 50 ppm or more; the regulations are more stringent for PCB equipment than for PCB-contaminated equipment.

The ROI for hazardous materials and wastes, the installation ERP, and toxic materials includes Building 578, Building 1062, and ramp space adjacent to Building 578 at Holloman AFB.

3.10.2 Existing Conditions – Holloman Air Force Base

The information below was summarized from several documents, including management plans, material surveys, the NMED, and other State of New Mexico records, and related documentation.

3.10.2.1 Hazardous Materials and Wastes

Hazardous and toxic material procurements at Holloman AFB are approved and tracked by the 49 CES/CEIE, which has overall management responsibility of the installation environmental program. 49 CES/CEIE supports and monitors environmental permits, hazardous materials, and hazardous waste storage, spill prevention and response, and participation on the Environmental Safety and Occupational Health Council (ESOHC) (Holloman AFB, 2018a).

The ESOHC is a network of safety, environmental, and logistics experts who work with hazardous materials Managers, Unit Environmental Coordinators, and other hazardous materials users to ensure safe and compliant hazardous materials management throughout the Base. A privately contracted hazardous material pharmacy ensures that only the smallest quantities of hazardous materials necessary to accomplish the mission are purchased and used.

The 49 CES/CEIE maintains the *Hazardous Waste Management Plan* (Holloman AFB, 2018a) as directed by AFI 32-7042, Waste Management, and complies with 40 CFR Parts 260 to 272. This plan prescribes the roles and responsibilities of all members of the ESOHC with respect to the waste stream inventory, waste analysis plan, hazardous waste management procedures, training, emergency response, and pollution prevention. The Holloman AFB *Hazardous Waste Management Plan* establishes the procedures to comply with applicable federal, state, and local standards for solid waste and hazardous waste management. The plan outlines procedures for transport, storage, and disposal of hazardous wastes.

Hazardous materials at Holloman AFB are managed by the hazardous material pharmacy. The Enterprise Environmental, Safety, and Occupational Health Management Information System tracks acquisition and inventory control of hazardous materials. Hazardous materials and petroleum products such as fuels, flammable solvents, paints, corrosives, pesticides, deicing fluid, refrigerants, and cleaners are used throughout Holloman AFB for various functions including aircraft maintenance; aircraft ground equipment maintenance; and ground vehicles, communications infrastructure, and facilities maintenance (Holloman AFB, 2011a).

Hazardous wastes generated at Holloman AFB include waste flammable solvents, contaminated fuels and lubricants, paint/coating, stripping chemicals, waste oils, waste paint-related materials, mixed-solid waste, and other miscellaneous wastes. Certain types of hazardous wastes are subject to special management provisions intended to ease the management burden and facilitate the recycling of such materials. These are called “Universal Wastes,” and their associated regulatory requirements are specified in 40 CFR Part 273. Types of waste currently covered under the universal waste regulations include fluorescent light tubes, hazardous waste batteries, hazardous waste thermostats, and hazardous waste lamps. Holloman AFB recycles all lubricating fluids, batteries, and shop rags and hazardous wastes are managed in accordance with the Holloman AFB *Hazardous Waste Management Plan*.

Holloman AFB is classified as a Large-Quantity hazardous waste generator as defined by the USEPA (40CFR § 260.10), generating more than 2,200 pounds of nonacute hazardous waste per month. Holloman AFB operates approximately 39 initial accumulation points (IAPs), where up to 55 gallons of “total regulated hazardous wastes” or up to 1 quart of “acutely hazardous wastes” are accumulated. IAP managers are responsible for properly segregating, storing, characterizing, labeling, marking, packaging, and transferring all hazardous wastes for disposal from the IAP to the established 90-day storage area according to federal, state, local, and Air Force regulations. The Hazardous Waste Program Manager is responsible for characterizing and profiling each waste stream. The installation operates one 90-day accumulation site, located at Building 149, 241 Delaware Street, where hazardous waste accumulates before transfer to the DLA Disposition Services for transportation off-installation for ultimate disposal (Holloman AFB, 2018a). Wastes generated on base are managed under regulations set forth in the Holloman AFB RCRA Part B permit. Holloman AFB also holds a RCRA permit for handling the disposal and treatment of waste munitions.

New maintenance oils in quart size containers are kept at building 578. Holloman AFB contractor M1 Support Services (M1SS) provides T-38 maintenance support to Holloman AFB, 96th Test Group, and the Air Force. M1SS personnel generate used oil from maintenance activities. There are also mobile fuel containers used for M1SS operations based in the facility's secondary containment parking area.

An inventory of ASTs and USTs is maintained by Holloman AFB within the Spill Prevention, Control, and Countermeasure Plan (SPCCP). The SPCCP includes the location, contents, capacity, containment measures, status, and installation dates (Holloman AFB, 2014). Storage tanks at Holloman AFB contain jet fuel, diesel fuel, used cooking oil, used oil, and unleaded gasoline. Building 1062 is reported to have a 500-gallon emergency backup diesel generator AST which was installed in 2007 and a 231-gallon emergency backup diesel generator AST which was installed in 1992 (Holloman AFB, 2014). Building 1062 is reported to also have a 10,000-gallon oil/water separator at the wash rack. Releases of contaminants were not reported in the documents reviewed for this EA.

3.10.2.2 Environmental Restoration Program Sites

Holloman AFB began its Installation Restoration Program in 1983 with the investigation of possible locations of various Areas of Concern (AOCs) and Solid Waste Management Units for hazardous waste contamination. The RCRA Facility Assessment was completed in 1987 (URS Group, Inc., 2015). A total of 71 ERP sites were identified at Holloman AFB: 36 were closed with no further action planned, 9 are categorized as site closed with remedial action operations, 15 are closed with long-term monitoring or require no further action, 3 are in the preliminary assessment/site investigation stage, and 1 is in the remedial design stage. Additionally, two AOCs were identified and are being investigated for further action. None of the facilities within the ROI are proximate to an active ERP site nor have any been identified as AOCs.

3.10.2.3 Asbestos and Lead-Based Paint

The 49 CES/CEIE developed the *Asbestos Management Plan* for Holloman AFB, which includes program administration, organizational roles and responsibilities, standard work practices, and documentation (Holloman AFB, 2017a). Asbestos surveys for Buildings 578 and 1062 were not available for review.

Comprehensive information or records on the presence or absence of LBP in Buildings 578 and 1062 is not available. Holloman AFB has not developed an LBP[2] Management Plan at this time.

3.10.2.4 Radon

The USEPA and the USSG have evaluated the radon potential around the country to organize and assist building code officials in deciding whether radon-resistant features are applicable in new construction. Radon zones can range from 1.0 (high) to 3.0 (low). The USEPA radon zone for Otero County, New Mexico, is Zone 2 (Moderate Potential, predicted indoor average level between 2 and 4 pCi/L); however, radon potential throughout Otero County can vary (USEPA, 1993, 2019). The New Mexico Radiation Control Bureau (2019) indicates that radon levels in Otero County vary from under 2.0 pCi/L (76 percent of reported results in Zone 3), to 15 percent of results between 2.0 and 3.9 pCi/L (Zone 2), and to 9 percent] greater

[2] Isamar Nieves-Cancel, 49 CES/CEIE, Holloman AFB, New Mexico, e-mail to Eric Webb, Ph.D., Technical Services Director, Vernadero Group, Inc., 12 December 2018.

than 4.0 pCi/L (Zone 1). Each zone designation reflects the average short-term radon measurement that can be expected in a building without the implementation of radon control methods.

3.10.2.5 Polychlorinated Biphenyls

Specific PCB materials at the installation have not been identified. Note that ballasts and starters from light fixtures could contain PCB-containing material. The disposal of these materials is regulated. If the ballasts are not plainly marked as “Non-PCB”, the material must be treated as PCB-containing (or be tested and proven to be non-PCB containing). As facility repairs and demolition occur, the suspected ballasts should be removed and disposed. No PCB spills have been identified within the installation. Comprehensive information or records on the presence or absence of PCBs in Buildings 578 and 1062 is not available. Holloman AFB has not developed a PCB Management Plan[2] at this time. There is a pad-mounted transformer at Building 578, but the status of potential PCBs has not been documented.

CHAPTER 4 ENVIRONMENTAL CONSEQUENCES

This chapter presents a detailed analysis of the potential environmental impacts associated with the Proposed Action, alternatives, and No Action Alternative as described in **Chapter 2**. Impacts are described for each ROI previously described in **Chapter 3**. The specific criteria for evaluating impacts and assumptions for the analyses are presented under each resource area. Evaluation criteria for most potential impacts were obtained from standard criteria; federal, state, or local agency guidelines and requirements; and/or legislative criteria. Proposed BMPs to reduce potential impacts are included for each resource area, as appropriate.

Impacts are defined in general terms and are qualified as adverse or beneficial, and as short- or long-term. For the purposes of this EA, short-term impacts are generally considered those impacts that would have temporary effects. Long-term impacts are generally considered those impacts that would result in permanent effects.

Impacts may be direct or indirect and are described in terms of type, context, duration, and intensity, which is consistent with the CEQ regulations. “Direct effects” are caused by an action and occur at the same time and place as the action. “Indirect effects” are caused by the action and occur later in time or are farther removed from the place of impact but are reasonably foreseeable.

Impacts are defined as

- negligible, the impact is localized and not measurable or at the lowest level of detection;
- minor, the impact is localized and slight but detectable;
- moderate, the impact is readily apparent and appreciable; or
- major, the impact is severely adverse or highly noticeable and considered to be significant.

Major impacts are considered significant and receive the greatest attention in the decision-making process. The significance of an impact is assessed based on the relationship between context and intensity. Major impacts require application of a mitigation measure to achieve a less than significant impact. Moderate impacts may not meet the criteria to be classified as significant, but the degree of change is noticeable and has the potential to become significant if not effectively mitigated. Minor impacts have little to no effect on the environment and are not easily detected; impacts defined as negligible are the lowest level of detection and generally not measurable. Beneficial impacts provide desirable situations or outcomes.

CEQ regulations (at 40 CFR § 1508.20) define mitigation in the following five ways, in order of preference:

1. Avoiding the impact altogether by not taking a certain action or parts of an action.
2. Minimizing impacts by limiting the degree or magnitude of the action and its implementation.
3. Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
4. Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
5. Compensating for the impact by replacing or providing substitute resources or environments.

Direct and indirect effects and their significance, as well as the means (e.g., BMPs) for reducing potential adverse environmental impacts are also discussed for each resource.

4.1 AIRSPACE MANAGEMENT AND USE

4.1.1 Evaluation Criteria

Adverse impacts on airspace might include modifications to special use airspace or significantly increasing flight operations within airspace as a result of the Proposed Action and alternatives. For the purposes of this EA, an impact is considered significant if it modifies airspace location, dimensions, or aircraft operational capacity.

4.1.2 Proposed Action

Under the Proposed Action, an estimated 12 contract ADAIR aircraft would provide training sorties at Holloman AFB and the WSMR and McGregor Range Restricted Areas and Beak and Talon MOAs as described in **Chapter 2**. Air Force training on WSMR occurs only when not scheduled for higher priority missions or testing activities. The Air Force and the Army have established a Joint Test and Training Operations Center to maximize usage of WSMR. Should the WSMR Restricted Areas be unavailable for F-16 and contract ADAIR training, the Air Force would schedule sorties in the Beak or Talon MOAs.

An estimated contracted 3,200 sorties would be added to the current number of sorties flown at Holloman AFB. This number includes training sorties and a smaller number of sorties for aircraft leaving and returning from either maintenance or other deployments. The number of sorties within MOAs and Restricted Areas would increase by an estimated 3,144 sorties and would include both subsonic and supersonic flight operation.

4.1.3 Alternatives 1 and 2

Implementation of alternatives differs only in the facilities chosen for operations, maintenance, and aircrew briefings. Because the number and type of aircraft would be using the same flight profiles and airspace under all alternatives, potential impacts on airspace management and use are the same for all action alternatives.

The addition of proposed sorties at Holloman AFB is negligible, increasing the annual number of operations by 8 percent. This change is not expected to impact the operational capacity or necessitate changes to airspace locations or dimensions around Holloman AFB. Potential impacts on the airspace around the airfield are expected to be negligible and long-term.

There would be a 34 percent increase in aircraft operations in the WSMR Restricted Areas, Beak MOAs, Talon MOAs, and McGregor Range Restricted Areas over baseline training sorties. Additionally, contract ADAIR aircraft are expected to perform approximately 220 night operations in the airspaces. Contractor night sorties would be flown during the 49 WG's approved flying window and concurrent to the 49 WG's operations in the airspace.

The MOAs and Restricted Areas proposed for use have the capacity and are in locations with the dimensions necessary to support the contracted sorties proposed; therefore, negligible impacts on airspace are expected from the implementation of Alternatives 1 and 2.

4.1.4 No Action Alternative

Under the No Action Alternative, contract ADAIR would not perform sorties at Holloman AFB and nearby airspace. Under the No Action Alternative, there would be no change to airspace use and management.

4.2 NOISE

4.2.1 Evaluation Criteria

Noise impact analysis typically evaluates potential changes to existing noise environments that would result from implementation of the Proposed Action and alternatives. At the installation, the 65-dBA DNL is the noise level below which generally all land uses are compatible with noise from aircraft operations. Areas beyond the 65-dBA DNL can also experience levels of appreciable noise depending upon training intensity or weather conditions. In addition, DNL noise contours may vary from year to year due to fluctuations in operational tempo due to unit deployments, funding levels, and other factors. In the airspace, supersonic flight operations in the overland MOAs and Restricted Areas have the potential to generate loud sonic booms.

Potential changes in the noise environment can be beneficial (i.e., if they reduce the number of sensitive receptors exposed to unacceptable noise levels), negligible (i.e., if the total area exposed to unacceptable noise levels is essentially unchanged), or adverse (i.e., if they result in increased noise exposure to unacceptable noise levels). Projected noise impacts were evaluated qualitatively for the Proposed Action and alternatives.

4.2.2 Proposed Action

The Proposed Action includes contracting for the support of an estimated 12 contractor aircraft to fly an estimated 3,200 annual sorties in support of the 49 WG at Holloman AFB. This number of sorties includes sorties expected for training activities and aircraft leaving for or returning from either maintenance or other deployments. Of the estimated 3,200 sorties, about 3,144 of those are the training sorties that would occur within the special use airspace.

Because it is not known at this time what type of aircraft would be used by contract ADAIR, three aircraft scenarios were evaluated (High, Medium, and Low) to represent the range of aircraft types that could be selected. These scenarios are discussed further below. Depending on the specific type of contract ADAIR aircraft, potential impacts on the noise environment are expected to range from negligible to minor and would be long term.

No significant impacts are anticipated from the High Noise, Medium Noise, or Low Noise Scenarios. Potential impacts from each alternative are summarized in **Table 4-1,** with details regarding impacts specific to the alternatives described in **Section 4.2.3**.

Table 4-1
Summary of Potential Noise Impacts

Alternative	Change in Noise
Alternatives 1 and 2	High Noise Scenario – Long-term minor increases in noise from addition of contract ADAIR flight operations in the vicinity of the Holloman AFB airfield. Negligible increase in noise from contract ADAIR subsonic and/or supersonic flight operations in the WSMR Restricted Areas, Beak MOAs, Talon MOAs, and McGregor Range Restricted Areas.
	Medium Noise Scenario – Long-term minor increases in noise from addition of contract ADAIR flight operations in the vicinity of the Holloman AFB airfield. Negligible increase in noise from contract ADAIR subsonic and/or supersonic flight operations in the WSMR Restricted Areas, Beak MOAs, Talon MOAs, and McGregor Range Restricted Areas.
	Low Noise Scenario – Long-term minor increases in noise from addition of contract ADAIR flight operations in the vicinity of the Holloman AFB airfield. Negligible increase in noise from contract ADAIR subsonic and/or supersonic flight operations in the WSMR Restricted Areas, Beak MOAs, Talon MOAs, and McGregor Range Restricted Areas.
No Action Alternative	None

Notes:
ADAIR = adversary air; AFB = Air Force Base; MOA = Military Operations Area; WSMR = White Sands Missile Range

4.2.3 Alternatives 1 and 2

Implementation of the Proposed Action would establish contract ADAIR capabilities (an estimated 12 aircraft) providing 3,200 annual training sorties at Holloman AFB in the WSMR Restricted Areas, Beak MOAs, Talon MOAs, and McGregor Range Restricted Areas.

Since the exact fleet of contract ADAIR aircraft operating at Holloman AFB is unknown, three scenarios were designed to provide a bounded analysis of potential impacts on the noise environment. The aircraft proposed for use by contract ADAIR and the surrogate aircraft modeled for the High, Medium, and Low Noise Scenarios are summarized in **Table 4-2**.

Table 4-2
Contract Adversary Air Noise Scenarios

Scenario	Adversary Air Aircraft	Surrogate Aircraft
High Noise Scenario	A-4K	A-4C
Medium Noise Scenario	F-5	F-5
Low Noise Scenario	T-59	T-45

To model changes in noise relative to the baseline conditions, all modeled contract ADAIR flight and engine run-up operations were set to the contract ADAIR aircraft listed in **Table 4-2** for the appropriate scenario. For example, when looking at the High Noise Scenario, all contract ADAIR operations are modeled as A-4K operations; however, the NOISEMAP database does not contain noise data for the A-4K so an appropriate noise modeling surrogate was selected, the A-4C in this case. The noise modeling surrogates for various aircraft presented in **Table 4-2** have been approved for use by the Air Force Civil Engineer Center (AFCEC) NEPA Division (CZN) and Noise and AICUZ Division. Flight profiles for contract ADAIR (i.e., schedules of altitude, power setting, and airspeed along each flight track) were reviewed and approved by operators at Holloman AFB and Air Combat Command (ACC). The representative flight profiles for the various contract ADAIR scenarios are provided in **Appendix B**. All contract ADAIR departure profiles were modeled using afterburner or the maximum possible power on all take-offs.

High Noise Scenario

Under the High Noise Scenario, all contract ADAIR operations are assumed to be performed by A-4K aircraft. Since noise data for the A-4K are not available in NOISEMAP, the A-4C was used as a modeling surrogate. Proposed contract ADAIR flight operations at Holloman AFB and associated airspace would be identical to existing conditions except for the contract ADAIR sorties. Noise analysis of the High Noise Scenario was conducted to analyze changes to the airfield noise contours and the proposed airspace.

Holloman Air Force Base Noise Environment

Implementation of the Proposed Action would result in a 6 percent increase in the number of operations at Holloman AFB. Contract ADAIR would fly up to a projected 5 percent of the estimated total 3,200 contracted sorties during environmental night hours when the effects of aircraft noise are accentuated (10:00 pm to 7:00 am local time). This equates to an increase of approximately 224 sorties per year, a 4 percent increase above existing night sorties. Runway utilization, flight tracks, and flight track utilization for contract ADAIR aircraft would be similar to the existing F-16C operations. Proposed annual departure, arrival, and closed pattern aircraft operations at Holloman AFB with the addition of contract ADAIR are summarized in **Table 4-3**. Contract ADAIR would also perform static run-up operations, such as pre- and postflight run-ups.

As described in **Section 3.2.1.2**, NOISEMAP was used to model military aircraft noise. The resultant 65- to 85-dBA DNL contours in 5-dBA increments for the daily flight events at Holloman AFB under the proposed High Noise Scenario are summarized on **Figure 4-1**. The 65-dBA DNL is the noise level below which generally all land uses are compatible with noise from aircraft operations.

The primary change in noise contour features between the High Noise Scenario and the existing conditions is the slight increase of the DNL contours on all sides of the installation. This overall increase in noise level is a result of contract ADAIR departures, arrivals, and closed pattern flight operations. A comparison of the DNL noise contours of the High Noise Scenario and the existing conditions is shown on **Figure 4-2**, and the increased area within noise contours under the High Noise Scenario is shown in **Table 4-4**.

Table 4-3
Proposed Annual Aircraft Operations Summary at Holloman Air Force Base

Aircraft	Departures		Arrivals		Closed Patterns		Total Operations		
	Day	Night	Day	Night	Day	Night	Day	Night	Total
Military	20,419	2,876	21,977	1,318	36,452	693	78,848	4,887	83,735
Contract Adversary Air	3,040	160	2,976	224	864	0	6,880	384	7,264
Civilian	576	0	576	0	0	0	1,152	0	1,152
Transient	1,370	0	1,370	0	0	0	2,740	0	2,740
Grand Total	**25,405**	**3,036**	**26,899**	**1,542**	**37,316**	**693**	**89,620**	**5,271**	**94,891**

As a result of the implementation of the High Noise Scenario, noise levels at representative POIs identified in **Section 3.2.2** would increase (**Table 4-5**).

At the representative noise-sensitive locations modeled, the DNL would increase by an amount ranging from 0 to 1 dBA under the High Noise Scenario. The increased DNL at these POIs and the surrounding areas would be barely noticeable and considered minor and not significant but long-term under Alternatives 1 and 2.

Airspace Noise Environment

Under the High Noise Scenario, contract ADAIR would perform an estimated 3,144 annual operations in the special use airspaces. Contract ADAIR would only operate in the same MOAs and Restricted Areas already used by Holloman AFB aircraft. The utilization of the airspaces by the contractor aircraft is 56 percent in WSMR, 33 percent in the Beak MOAs, 10 percent in the Talon MOAs, and approximately 1 percent in the Centennial Flying area located in the McGregor Ranges. A summary of estimated annual airspace operations is presented in **Table 4-6**.

Using the methods described in **Section 3.2.1.2** for MR_NMAP, the L_{dnmr} noise levels from the proposed High Noise Scenario were calculated from the subsonic aircraft operations underneath the WSMR Restricted Areas, Beak MOAs, Talon MOAs, and McGregor Range Restricted Areas. Subsonic noise levels modeled for Holloman AFB-based aircraft and contract ADAIR aircraft under the High Noise Scenario using MR_NMAP differ negligibly from the levels reported in **Table 3-5**. Due to the negligible change and the overall low L_{dnmr} noise levels from the proposed High Noise Scenario, there are no significant impacts expected to the noise environments of any of the listed airspaces.

Supersonic operations are allowed in the WSMR Restricted Areas (R-5107 and R-5111) above 10,000 ft MSL, in the Beak MOAs above 23,000 ft MSL, and in the McGregor Range Restricted Areas (R-5103B and C) above 10,000 ft MSL. Airspace sorties require aircraft to exceed Mach 1.0 (supersonic) for brief periods of time for approximately 10 percent of total flight time. This is equivalent to less than 5 minutes of supersonic flight activity per sortie.

For cumulative sonic boom exposure under supersonic air combat training arenas, the BooMap program as described in **Section 3.2.1.2** was used to model the cumulative CDNL exposure in the Restricted Areas and MOAs proposed for use under the Proposed Action. The sonic boom noise levels (modeled only for the Medium Noise Scenario as described below) are unlikely to exceed the 45-dB CDNL under any primary use airspace unit.

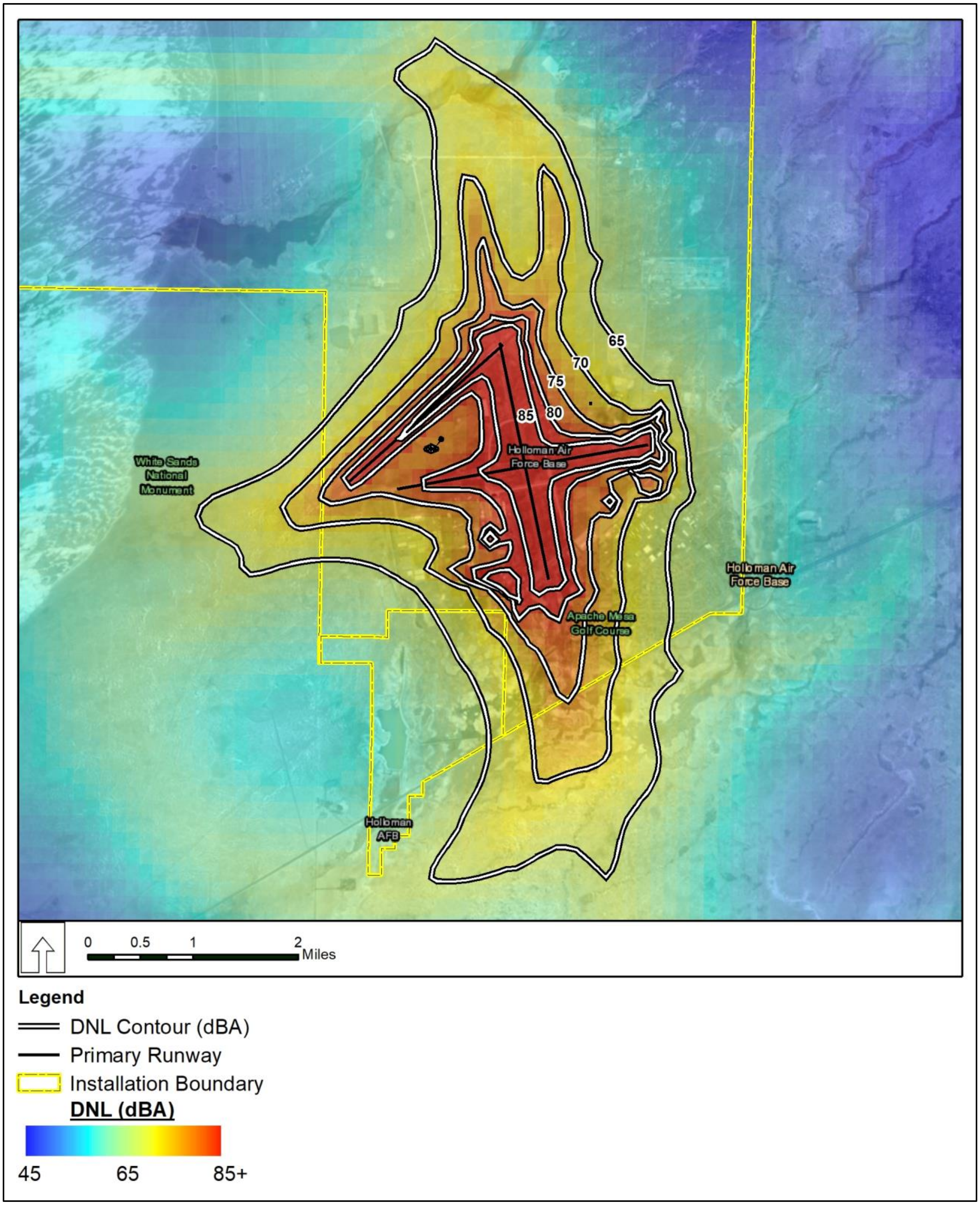


Figure 4-1. High Noise Scenario Day-Night Average Sound Level Contours at Holloman Air Force Base.

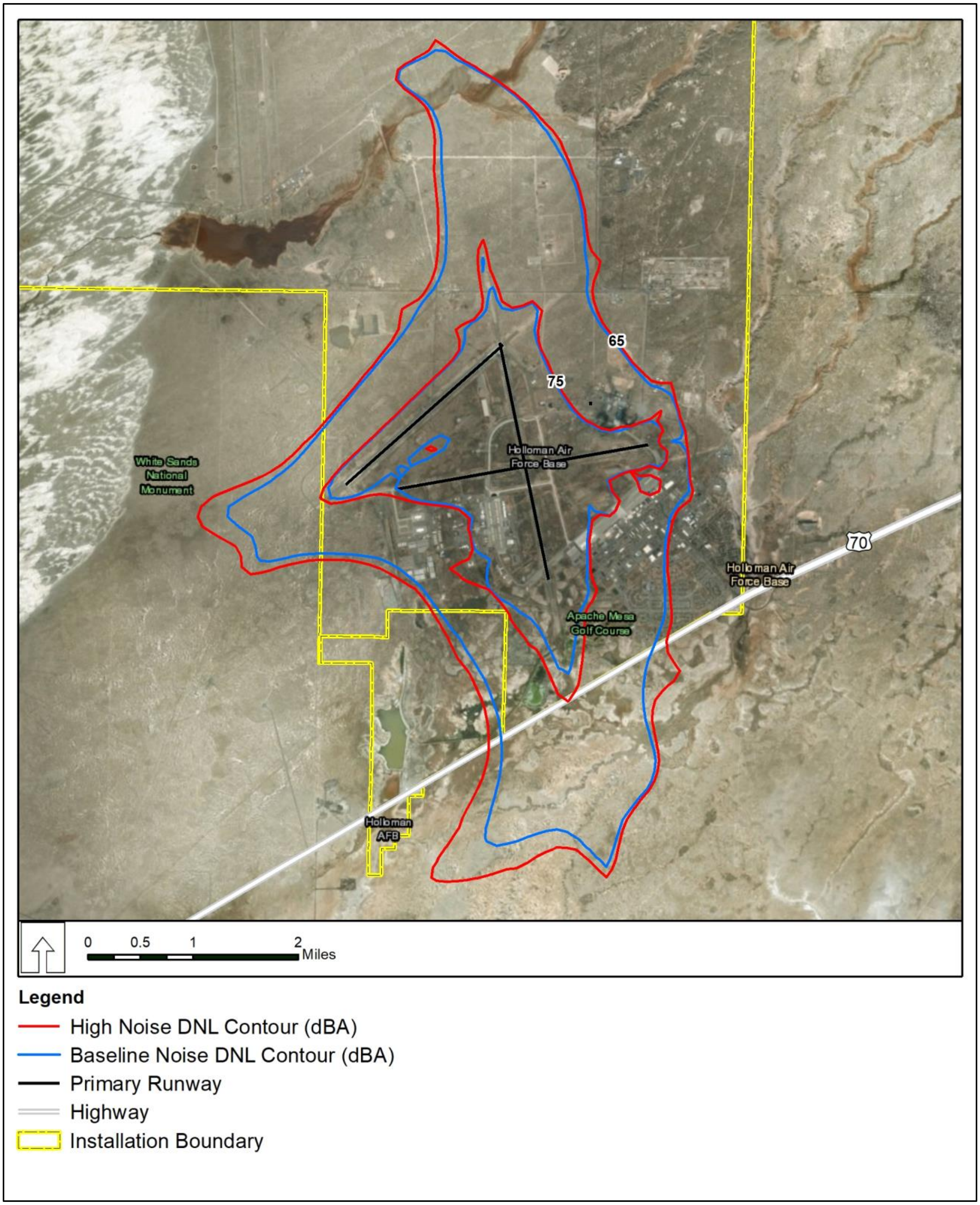


Figure 4-2. Comparison of High Noise Scenario and Existing Day-Night Average Sound Level Contours at Holloman Air Force Base.

Table 4-4
Proposed High Noise Scenario Day-Night Average Sound Level Area Affected on and Surrounding Holloman Air Force Base

Noise Level (dBA DNL)	Area Within Noise Contour (acres)		
	Existing	High Noise Scenario	Increase
>65	9,590	10,707	1,117
>70	4,866	5,432	566
>75	2,764	3,163	399
>80	1,503	1,695	192
>85	762	858	96

Notes:
dBA = A-weighted decibel(s); DNL = day-night average sound level

Table 4-5
Proposed High Noise Scenario Day-Night Average Sound Level at Representative Points of Interest on and near Holloman Air Force Base

POI		DNL (dBA)		
ID	Description	Existing	High Noise Scenario	Increase in DNL
H01	White Sands National Monument Historic Visitor Center	49	50	1
S01	Child Development Center 1	66	66	0
S02	Child Development Center 2	64	65	1
S03	Embry-Riddle Aeronautical University	66	67	1
S04	Holloman Elementary School	65	65	0
S05	Holloman Middle School	64	64	0
W01	Holloman Chapel	65	65	0

Notes:
Affected POIs based off NOISEMAP modeled noise contours and used to calculate the POIs within each noise contour.
dBA = A-weighted decibel(s); DNL = Day-Night Average Sound Level; POI = point of interest

Table 4-6
Proposed Annual Airspace Operations Summary by Holloman Air Force Base in the Restricted Areas and Military Operations Areas

Aircraft	White Sands Missile Range Restricted Areas		Beak MOAs		Talon MOAs		McGregor Range Restricted Areas		Total Operations		
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Total
F-16C	4,615	347	2,389	180	748	83	603	45	8,355	655	9,010
Contract Adversary Air	1,673	88	986	52	298	16	29	2	2,986	158	3,144
Grand Total	6,288	435	3,375	232	1,046	99	632	47	11,341	813	12,154

Notes:
ADAIR =adversary air; MOA = Military Operations Area

Single event sonic boom levels were estimated, using the PCBoom program also described in **Section 3.2.1.2**, directly undertrack for the F-16C and F-5 aircraft at various altitudes and Mach numbers. The single event levels reported include Overpressure (psf) and CSEL in decibels. Sonic boom levels are only shown for the Medium Noise Scenario which uses the supersonic F-5 aircraft; High and Low Noise Scenario aircraft proposed for Holloman AFB, A-4K and T-59, respectively, do not have supersonic flight capability with the exception that the T-59 can marginally exceed Mach 1 while in a clean configuration dive.

Medium Noise Scenario

Under the Medium Noise Scenario, all contract ADAIR operations are assumed to be performed by F-5 aircraft. Proposed flight operations at Holloman AFB and associated MOAs and Restricted Areas would be identical to existing conditions except for the contract ADAIR sorties. Noise analysis of the Medium Noise Scenario was conducted to analyze changes to the airfield noise contours and assess noise changes in the proposed airspace.

Holloman Air Force Base Noise Environment

Under the Medium Noise Scenario, contract ADAIR would perform the same operations as outlined under the High Noise Scenario (see **Table 4-4**). As such, the increase in the total number of operations and increase in night sorties, runway utilization, flight tracks, and flight track utilization would also be the same as described in the High Noise Scenario.

NOISEMAP was used to model military aircraft noise. The resultant 65- to 85-dBA DNL contours in 5-dBA increments for the existing daily flight events at Holloman AFB are shown on **Figure 4-3**. The primary changes in noise contour features between the High Noise Scenario and the existing conditions is the slight increase of the DNL contours on all sides of the installation. This overall increase in noise level is a result of contract ADAIR departures, arrivals, and closed pattern flight operations. A comparison of the DNL noise contours of the Medium Noise Scenario and the existing conditions is shown on **Figure 4-4**.

Under the Medium Noise Scenario, the amount of area within noise contours would increase (**Table 4-7**). These increases would not lead to significant impacts in these areas.

As a result of the implementation of the Medium Noise Scenario, noise levels at representative POIs identified in **Section 3.2.3** would increase (**Table 4-8**). At the representative noise-sensitive locations modeled, the DNL would increase by an amount ranging from 0 to 1 dBA under the Medium Noise Scenario. The potential minor impacts on these POIs and the surrounding areas would be long-term and not significant under Alternatives 1 and 2.

Airspace Noise Environment

Sonic boom levels estimated for contract ADAIR supersonic flights in WSMR Restricted Areas (R-5107 and R-5111), the Beak MOAs, and the McGregor Range Restricted Areas are shown on **Tables 4-9** through **4-11**, respectively. The sonic boom levels are the loudest levels computed at the center of the footprint for the constant Mach, level flight conditions indicated. Supersonic flights in the WSMR Restricted Areas, Beak MOAs, and McGregor Range Restricted Areas would occur at high altitudes but would still generate booms that are certain to be noticed. The location of these booms would vary with changing flight paths and weather conditions, so it is unlikely that any given location would experience these undertrack levels more than once over multiple events. Overpressure levels, directly under the flight path, estimated for the WSMR Restricted Areas would range from 6.7 to 0.8 psf depending on the aircraft and flight conditions. Likewise, overpressure levels directly under the flight path for the Beak MOAs would range from 2.5 to 0.8 psf and for McGregor Range Restricted Areas would range from 6.7 to 0.8 psf. Neither the F-16C or F-5 can attain Mach 1.5 at 10,000 ft MSL; therefore, levels are not reported. Public reaction may occur with overpressures above 1 psf, and in rare instances, damage to structures have occurred at overpressures between 2 and 5 psf (NASA, 2017). People located farther away from the supersonic flight paths, who are still within the primary boom carpet, might also be exposed to levels that may be startling or annoying, but the probability of this decreases the farther away they are from the flight path. People located beyond the edge of the boom carpet are not expected to be exposed to sonic boom although postboom rumbling sounds may be heard.

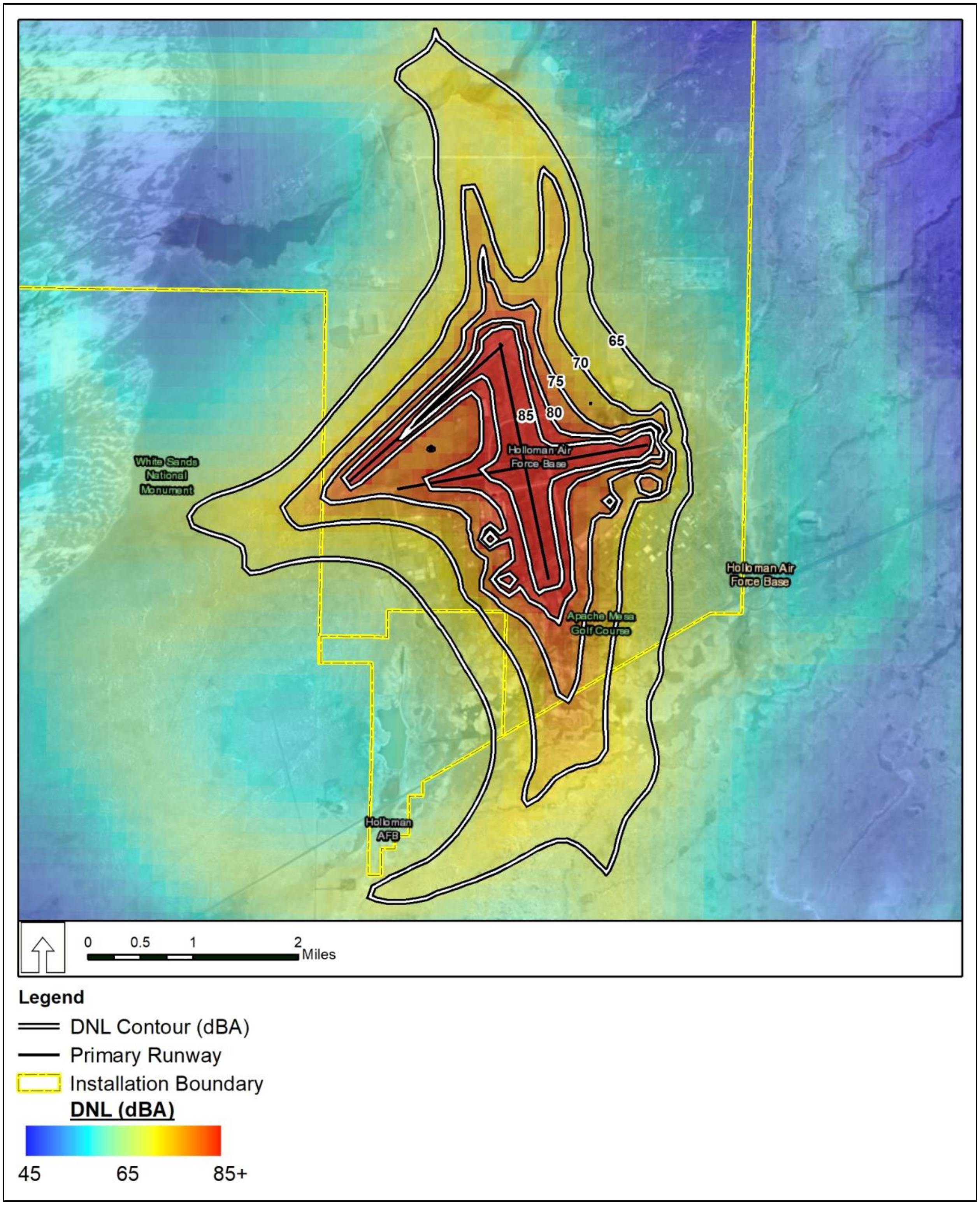


Figure 4-3. Medium Noise Scenario Day-Night Average Sound Level Contours at Holloman Air Force Base.

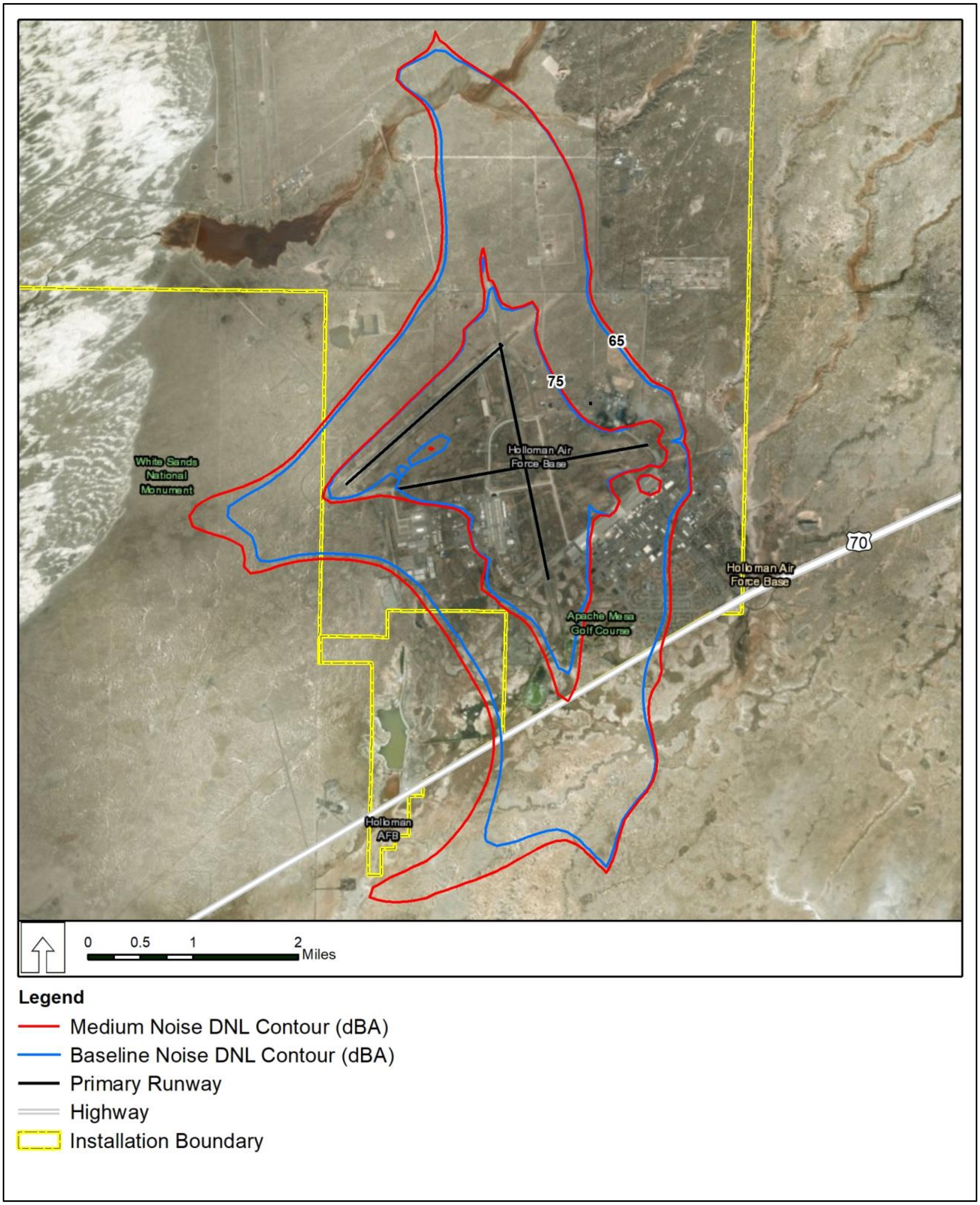


Figure 4-4. Comparison of Medium Noise Scenario and Existing Day-Night Average Sound Level Contours at Holloman Air Force Base.

Table 4-7
Proposed Medium Noise Scenario Day-Night Average Sound Level Area Affected on and Surrounding Holloman Air Force Base

Noise Level (dBA DNL)	Area Within Noise Contour (acres)		
	Existing	Medium Noise Scenario	Increase
>65	9,590	10,608	1,018
>70	4,866	5,298	432
>75	2,764	3,042	278
>80	1,503	1,607	104
>85	762	807	45

Notes:
dBA = A-weighted decibel(s); DNL = Day-Night Average Sound Level

Table 4-8
Proposed Medium Noise Scenario Day-Night Average Sound Level at Representative Points of Interest on and Near Holloman Air Force Base

POI		DNL (dBA)		
ID	Description	Existing	Medium Noise Scenario	Increase in DNL
H01	White Sands National Monument Historic Visitor Center	49	50	1
S01	Child Development Center 1	66	66	0
S02	Child Development Center 2	64	65	1
S03	Embry-Riddle Aeronautical University	66	66	0
S04	Holloman Elementary School	65	65	0
S05	Holloman Middle School	64	64	0
W01	Holloman Chapel	65	65	0

Notes:
Affected POIs based off NOISEMAP modeled noise contours and used to calculate the POIs within each noise contour.
dBA = A-weighted decibel(s); DNL = Day-Night Average Sound Level; POI = point of interest

Under the Medium Noise Scenario, the subsonic airspace noise environment would be practically identical to the subsonic airspace noise environment under the High Noise Scenario. The aircraft proposed in the Medium Noise Scenario are slightly quieter than those used in the High Noise Scenario, which was determined to have no significant impacts; as such, there would be no significant impacts under the quieter Medium Noise Scenario under Alternatives 1 and 2. For the supersonic airspace noise environment, the addition of contractor ADAIR aircraft operating at supersonic speeds means that the number of sonic booms heard would likely increase; however, potential impacts associated with sonic booms are still expected to be negligible under Alternatives 1 and 2.

Table 4-9
White Sands Missile Range Restricted Areas (R-5107 and R-5111): Sonic Boom Levels Undertrack for Adversary Air Aircraft in Level Flight at Mach 1.2 and 1.5

Aircraft	Altitude (feet above mean sea level)		
	10,000[1]	35,000	50,000
Mach 1.2			
Overpressure (pound[s] per square foot)			
F-16C	6.7	1.3	1.0
F-5	3.0	1.1	0.8
CSEL (decibels)[2]			
F-16C	118	104	101
F-5	111	102	100
Mach 1.5			
Overpressure (pound[s] per square foot)			
F-16C	--	1.5	0.9
F-5	--	1.2	0.8
CSEL (decibels)[2]			
F-16C	--	105	101
F-5	--	103	99

Note:
1 Neither the F-16C nor the F-5 can attain Mach 1.5 at an altitude of 10,000 feet above mean sea level.
2 C-weighted Sound Exposure Level (CSEL) – Sound Exposure Level with frequency weighting that places more emphasis on low frequencies below 1,000 hertz

Table 4-10
Beak Military Operations Areas: Sonic Boom Levels Undertrack for Adversary Air Aircraft in Level Flight at Mach 1.2 and 1.5

Aircraft	Altitude (feet above mean sea level)		
	25,000	40,000	50,000
Mach 1.2			
Overpressure (pound[s] per square foot)			
F-16C	2.2	1.2	1.0
F-5	1.8	1.0	0.9
CSEL (decibels)*			
F-16C	109	103	102
F-5	107	101	100
Mach 1.5			
Overpressure (pound[s] per square foot)			
F-16C	2.5	1.3	1.0
F-5	2.0	1.0	0.8
CSEL (decibels)*			
F-16C	110	104	102
F-5	108	102	100

Note:
* C-weighted Sound Exposure Level (CSEL) – Sound Exposure Level with frequency weighting that places more emphasis on low frequencies below 1,000 hertz

Table 4-11
McGregor Range Restricted Areas R-5103B and C: Sonic Boom Levels Undertrack for Adversary Air Aircraft in Level Flight at Mach 1.2 and 1.5

Aircraft	Altitude (feet above mean sea level)		
	10,000[1]	35,000	50,000
Mach 1.2			
Overpressure (psf)			
F-16C	6.7	1.3	1.0
F-5	3.0	1.1	0.8
CSEL (decibels)[1]			
F-16C	118	104	101
F-5	111	102	100
Mach 1.5			
Overpressure (psf)			
F-16C	--	1.5	0.9
F-5	--	1.2	0.8
CSEL (decibels)[1]			
F-16C	--	105	101
F-5	--	103	99

Note:
[1] Neither the F-16C nor the F-5 can attain Mach 1.5 at an altitude of 15,000 feet above mean sea level.
[2] C-weighted Sound Exposure Level (CSEL) – Sound Exposure Level with frequency weighting that places more emphasis on low frequencies below 1,000 hertz

Low Noise Scenario

Under the Low Noise Scenario, all contract ADAIR operations would be performed by T-59 aircraft. Since noise data for the T-59 are not available in NOISEMAP, the T-45 was used as a modeling surrogate. Proposed contract ADAIR flight operations at Holloman AFB and associated airspace would be identical to existing conditions except for the contract ADAIR sorties. Noise analysis of the Low Noise Scenario was conducted to analyze changes to the airfield noise contours and the proposed airspace.

Holloman Air Force Base Noise Environment

Under the Low Noise Scenario, contract ADAIR would perform the same operations as outlined under the High Noise Scenario (see **Table 4-4**). As such, the increase in the total number of operations and increase in night sorties, runway utilization, flight tracks, and flight track utilization would also be the same as described in the High Noise Scenario.

NOISEMAP was used to model military aircraft noise. The resultant 65- to 85-dBA DNL contours in 5-dBA increments for the existing daily flight events at Holloman AFB are shown on **Figure 4-5**. The primary changes in noise contour features between the High Noise Scenario and the existing conditions is the slight increase of the DNL contours on all sides of the installation. This overall increase in noise level is a result of contract ADAIR departures, arrivals, and closed pattern flight operations. A comparison of the DNL noise contours of the Low Noise Scenario and the existing conditions is shown on **Figure 4-6**.

The area within each DNL noise contour band for both the existing conditions and the Low Noise Scenario is shown in **Table 4-12**. These increases are not significant in these areas.

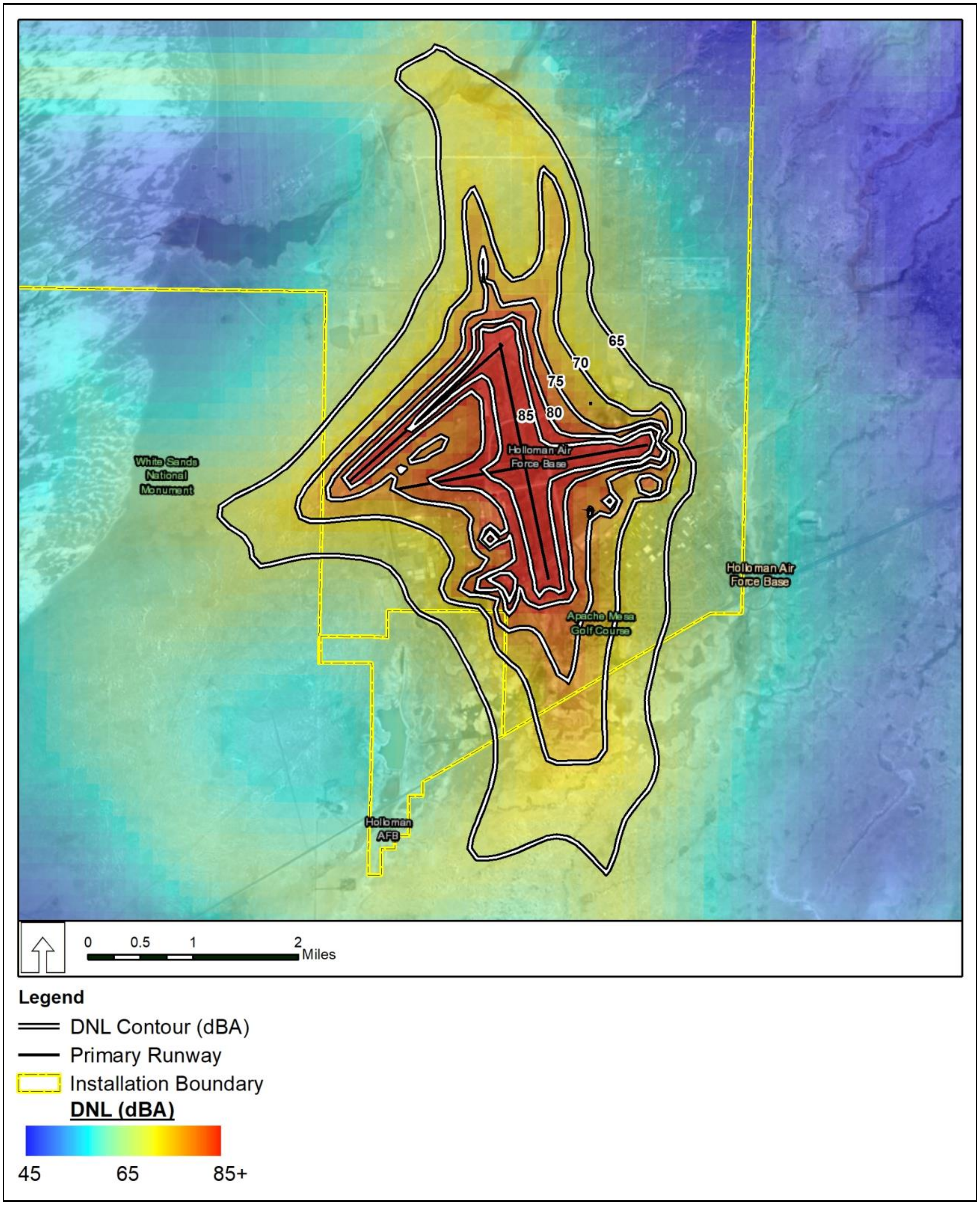


Figure 4-5. Low Noise Scenario Day-Night Average Sound Level Contours at Holloman Air Force Base.

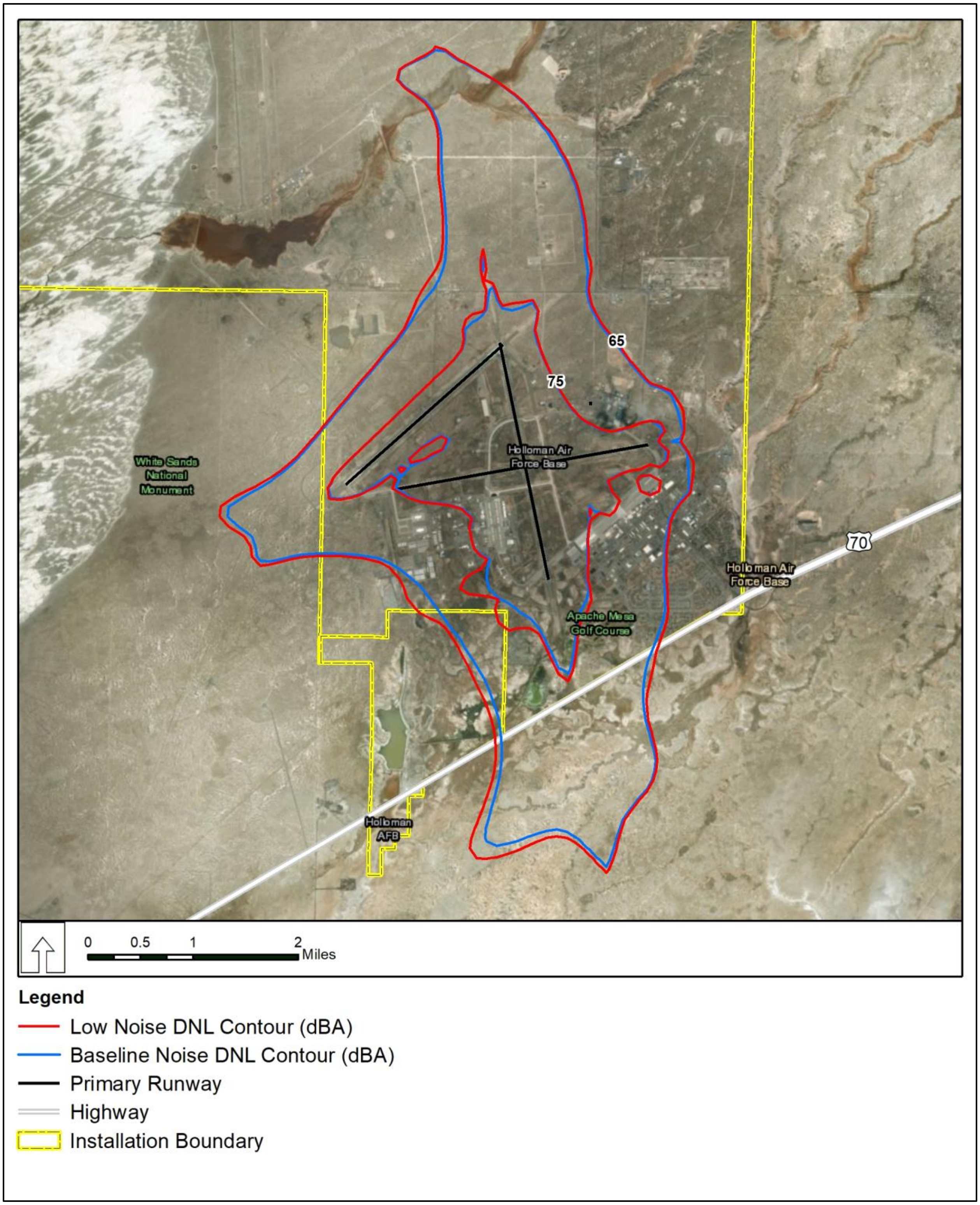


Figure 4-6. Comparison of Low Noise Scenario and Existing Day-Night Average Sound Level Contours at Holloman Air Force Base.

Table 4-12
Proposed Low Noise Scenario Day-Night Average Sound Level Area Affected on and Surrounding Holloman Air Force Base

Noise Level (dBA DNL)	Area Within Noise Contour (acres)		
	Existing	Low Noise Scenario	Increase
>65	9,590	10,075	485
>70	4,866	5,137	271
>75	2,764	2,949	185
>80	1,503	1,590	87
>85	762	801	39

Notes:
dBA = A-weighted decibel(s); DNL = Day-Night Average Sound Level

As a result of the implementation of the Low Noise Scenario, noise levels at representative POIs identified in **Section 3.2.2** would increase (**Table 4-13**). At the representative noise-sensitive locations studied, the DNL would increase by an amount ranging from 0 to 1 dBA under the Low Noise Scenario. The potential minor impacts on these POIs and the surrounding areas would be long-term and not significant under Alternatives 1 and 2.

Airspace Noise Environment

Under the Low Noise Scenario, the airspace noise environment is practically identical to the airspace noise environment under the High Noise Scenario. The aircraft used in the Low Noise Scenario are slightly quieter than those used in the High Noise Scenario. Since there was a determination of no significant impacts under the High Noise Scenario, there would be no significant impacts under the quieter Low Noise Scenario (**Tables 4-7** through **4-9**) under Alternatives 1 and 2.

4.2.4 No Action Alternative

Under the No Action Alternative, contract ADAIR would not perform sorties at Holloman AFB and nearby airspace. Under the No Action Alternative, there would be no change to the noise environment.

Table 4-13
Proposed Low Noise Scenario Day-Night Average Sound Level at Points of Interest at Holloman Air Force Base

POI		DNL (dBA)		
ID	Description	Existing	Low Noise Scenario	Increase in DNL
H01	White Sands National Monument Historic Visitor Center	49	50	1
S01	Child Development Center 1	66	66	0
S02	Child Development Center 2	64	65	1
S03	Embry-Riddle Aeronautical University	66	66	0
S04	Holloman Elementary School	65	65	0
S05	Holloman Middle School	64	64	0
W01	Holloman Chapel	65	65	0

Notes:
Affected POIs based off NOISEMAP modeled noise contours and used to calculate the POIs within each noise contour.
dBA = A-weighted decibel(s); DNL = Day-Night Average Sound Level; POI = point of interest

4.3 SAFETY

4.3.1 Evaluation Criteria

Impacts from implementation of the Proposed Action are assessed according to the potential to increase or decrease safety risks to personnel, the public, property, or the environment. Adverse impacts on safety might include implementing contractor flight procedures that result in greater safety risk or constructing new buildings within established Q-D safety arcs. For the purposes of this EA, an impact is considered significant if the proposed safety measures are not consistent with AFOSH and OSHA standards resulting in unacceptable safety risks.

Safety concerns associated with ground, explosive, and flight activities are considered in this section. Ground safety considers issues associated with ground operations and maintenance activities that support operations including arresting gear capability, jet blast/maintenance testing, and safety danger zones. Ground safety also considers the safety of personnel and facilities on the ground that may be placed at risk from flight operations in the vicinity of the airfield and in the airspace.

CZs and APZs around the airfield restrict the public's exposure to areas where there is a higher accident potential. Although ground and flight safety are addressed separately, in the immediate vicinity of the runway, risks associated with safety-of-flight issues are interrelated with ground safety concerns. Explosives safety relates to the management and safe use of ordnance and munitions. Flight safety considers aircraft flight risks such as midair collision, BASH, and in-flight emergency requirements. Contractor planes will follow Air Force safety procedures and aircraft specific emergency procedures based on the aircraft design. Basic airmanship procedures also exist for handling any deviations to ATC procedures due to an in-flight emergency; these procedures are defined in AFI 11-202 (Volume 3) and established aircraft flight manuals. The Flight Crew Information File is a safety resource for aircrew day-to-day operations which is composed of air and ground operation rules and procedures.

4.3.2 Proposed Action

Ground, explosive, and flight safety associated with implementation of the Proposed Action are described in the following sections. Contract ADAIR safety procedures described in this section are mandated by the *Performance Work Statement for the Combat Air Forces (CAF) Contracted Air Support (CAF CAS)* (PWS) (Air Force, 2018).

4.3.3 Alternatives 1 and 2

Ground Safety

Under the Proposed Action, limited contractor aircraft maintenance and testing would occur on the aircraft parking ramp or in the hangar and would be consistent with current aircraft maintenance activities on Holloman AFB. No unique maintenance activities would be associated with the contract ADAIR aircraft. All scheduled depot-level or other heavy maintenance requirements would occur at off base contractor facilities.

Emergency Response

For initial emergency response involving a contract ADAIR aircraft, the Air Force would provide emergency responders (Airport Firefighter) trained on the applicable mission design series they are providing. For crash response, the DOD would provide on-field aircraft CDDAR. For events occurring off-base, civilian authorities (city, county, or state) would be first on scene. After the initial response, the Contractor would be required to facilitate crash site security and clean-up. The Contractor is responsible to cooperate with the Air Force or the National Transportation Safety Board investigation, depending upon circumstances of the incident.

The contractor emergency response would include the following:

- Establish a CDDAR program that is fully integrated into the host operating location's CDDAR program. The Contractor would provide technical expertise and facilitate the host operating location's response and recovery capability of Contractor-owned aircraft, consistent with the following considerations: (1) urgency to open the runway for operational use; (2) prevention of secondary damage to the aircraft; and (3) preservation of evidence for mishap or accident investigations in accordance with AFIs 91-202 and 91-204; National Transportation Safety Board guidelines; and any local operating location guidance, as applicable. The Contractor would ensure the host operating location's CDDAR personnel receive familiarization training on Contractor aircraft and procedures prior to commencing local flying operations, at permanent and temporary duty operating locations.
- The Contractor would develop an egress/cockpit familiarization training program to ensure all host operating location's nonegress personnel (e.g., emergency response personnel, fire department, CDDAR) who may access Contractor aircraft cockpits, equipped with egress systems, receive initial and annual refresher training.

Safety Zones

Under the Proposed Action, safety zones around the airfield would not change.

Arresting Gear Capability

Contract ADAIR aircraft would be compatible with the arresting systems on the airfield or able to operate on the airfield without interference to the existing arresting system. There would be no need to change or modify the existing arresting gear. There would be no impacts on arresting gear capability for the implementation of the Proposed Action under Alternative 1 or 2.

No significant impacts on ground safety are anticipated to occur under Alternative 1 or 2 provided the contractor establishes a CDDAR program and all applicable AFOSH and OSHA requirements are implemented.

Explosives Safety

Under the Proposed Action, the 49 MXG Munitions Flight would support contract ADAIR daily training operations with the maintenance and delivery of countermeasure chaff and flares. This support would be provided by trained and certified personnel following Air Force safety guidance and technical orders. Trained and certified contract ADAIR personnel would be responsible for the loading and unloading of defensive countermeasures on contract ADAIR aircraft and would follow approved safety measures outlined in the PWS. Contract ADAIR personnel would also be responsible for the maintenance of captive air training missiles and any ejector cartridges as contractor-provided equipment.

There may be rare occasions in which egress CADs and PADs may need to be removed from the aircraft for maintenance. In accordance with AFMAN 91-201, 11.15, when necessary, units may license a limited quantity of in-use egress explosive components of any Hazard Division explosive in the egress shop after removal from aircraft undergoing maintenance. This limit would not exceed the total number of complete sets for the number of aircraft in maintenance and the net explosive weight is limited. Contract ADAIR would work with the Wing Safety Office to obtain a license, if needed, to store egress CADs and PADs. Short-term storage may be within the 49 MXG Munitions Storage Area provided a courtesy storage agreement is created and space is available. Short-term storage would be limited and only in the event of an emergency or unforeseen occurrence such as the issuance of a suspension or restriction of egress equipment or munitions. All scheduled maintenance would occur at the Contractor's off-base Central Repair Facility. CAD/PAD items are typically replaced just prior to expiration of the service life, which is typically part of aircraft scheduled maintenance. If temporary storage of contract ADAIR CAD/PAD items within the Wing munitions storage area is needed, they would be stored in facilities sited in the Explosive Safety plan for the type and amount of explosives to be stored.

The loading and unloading of countermeasure chaff and flares would occur on the aircraft parking ramp. The proposed ramp area for contract ADAIR aircraft is authorized for chaff and flare operations (Hazard Class 1.3) in accordance with AFMAN 91-201, para 12.47.2 and 12.47.3.

No significant impacts on explosive safety are anticipated to occur under Alternative 1 or 2 provided contract ADAIR personnel are trained and all applicable safety guidelines are implemented. Q-D arcs would not change.

Flight Safety

The potential for aircraft accidents is a primary public concern with regard to flight safety. Such accidents may occur as a result of mid-air collisions, collisions with manmade structures or terrain, mechanical failure, weather-related accidents, pilot error, BASH, or strikes from defensive countermeasures used during training. Under the Proposed Action, contract ADAIR would be required to strictly conform to the flight safety rules directed by the Operations Group Commander. In addition, the PWS stipulates the following requirements for contract ADAIR:

- Contractor Flight Operations would respond to and follow ATC vectors from approved facilities per FAA and AFI guidelines.
- Contract ADAIR would be conducted under positive tactical control. Pilots would be responsible to respond to tactical vectors and instructions by the applicable controlling authority (Ground Controller Intercept, Baron Controllers, Range Control Officer, Joint Terminal Attack Controller, etc.). If positive control is unavailable, mission flights would remain autonomous and adhere to the briefed presentations and Special Instructions.
- Contract ADAIR aircraft would
    - be equipped with applicable communication and navigation capability to operate in the National Airspace Structure under FAA IFR and aircraft operating limitations (if applicable) and International Civil Aviation Organization equipment prerequisites;
    - have at least one type of FAA-approved Navigation System such as a Tactical Air Navigation, Automatic Direction Finder Receiver System, with Automatic Direction Finder indicator; Very High Frequency Omni Directional Range; Global Positioning System/Long Range Navigation;
    - have sufficient precision approach instrumentation (compatible with standard Air Force instrument landing systems) to permit operations down to 300-ft ceilings and 1-statute-mile visibility; and
    - have at least two functional voice radios operating in either the very high frequency/ultra-high frequency bands, and one must be ultra-high frequency.

Bird/Wildlife-Aircraft Strike Hazards

Contractor operations would not follow government BASH procedures; they follow the PWS-directed Flight Operations Procedures and Quality Management System per the references above. In this case, the contractor's BASH plan would be part of the Quality Management System and be integrated with the host Wing's plan. It is expected the contract ADAIR BASH plan would very closely mirror and, in fact, may be an exact copy of the Wing's BASH plan. While, it is not required to be so, the contract ADAIR BASH plan would comply with the FAA Wildlife Hazard Mitigation Program.

No significant impacts on airspace/flight safety are anticipated to occur under Alternative 1 or 2 provided that contractor flight safety rules are followed and all applicable AFOSH and OSHA requirements are implemented.

4.3.4 No Action Alternative

Under the No Action Alternative, contract ADAIR would not perform sorties at Holloman AFB and nearby airspace. Under the No Action Alternative, there would be no change to safety.

4.4 AIR QUALITY

4.4.1 Evaluation Criteria

The CAA Section 176(c), *General Conformity*, requires federal agencies to demonstrate that their proposed activities would conform to the applicable SIPs for attainment of the NAAQS. General conformity applies to nonattainment and maintenance areas. If the emissions from a federal action proposed in a nonattainment area exceed annual *de minimis* thresholds identified in the rule, a formal conformity determination is required of that action. The thresholds are more restrictive as the severity of the nonattainment status of the region increases.

This section discusses the potential effects of the Proposed Action and alternatives on air quality within the ROI. The ROI comprising Holloman AFB (Otero County) is located within attainment or unclassifiable areas for all regulated pollutants. Although in such areas the conformity does not apply, the 100 tpy *de minimis* threshold was relied upon as a significance indicator to evaluate expected emissions from contract ADAIR activities in the immediate vicinity of the Holloman AFB airfield. If project emissions exceed the *de minimis* threshold, further analysis of projected emissions is conducted to determine their significance. In such cases, the PSD threshold for new major sources (i.e., 250 tpy of a criteria pollutant and 100,000 tpy CO_2e) is used as the primary indicator of potential significant impact as a result of implementing the Proposed Action.

All MOAs or Restricted Areas to be associated with contract ADAIR training are within attainment or unclassifiable areas for all regulated pollutants. Although in such areas the conformity does not apply, the 100 tpy *de minimis* threshold was relied upon as a significance indicator. If project emissions exceed the *de minimis* threshold further analysis of projected emissions is conducted to determine their significance. In such cases the PSD threshold for new major sources (i.e., 250 tpy of a criteria pollutant and 100,000 tpy CO_2e) is used as the primary indicator of potential significant impact as a result of implementing the Proposed Action.

A small part of Doña Ana County (Sunland Park area) has recently been designated as a marginal nonattainment area with respect to the 2015 8-hour ozone standard. Also, Anthony, New Mexico, which lies on the border of Texas and New Mexico, is a PM_{10} nonattainment area. These areas are restricted to a small area in the southern part of the Doña Ana County. The ROI comprising Holloman AFB airfield is not located within these nonattainment areas. Also, the contract ADAIR special use airspace does not overlay any areas of nonattainment in Doña Ana County. Thus, the special use airspace is not considered to be affected by these nonattainment classifications. As in the case of the ROI for Holloman AFB, expected emissions from contract ADAIR activities in the MOAs or Restricted Areas are also evaluated against conformity *de minimis* thresholds of 100 tpy.

As described in **Section 3.4.1**, for the airspace only, emissions from the WSMR Restricted Areas, Talon Low MOA, and McGregor Range Restricted Areas were estimated as these were entirely within the mixing layer (surface to 3,000 ft AGL). These emissions were compared against the *de minimis* thresholds. In addition, an earlier version of the General Conformity Rule used a 10 percent indicator for regional significance. Under the rule, “regionally significant action means a Federal action for which the direct and indirect emissions of any pollutant represent 10 percent or more of a nonattainment or maintenance area’s emission inventory for that pollutant.” The regional significance indicator was removed in the March 2010 revision to the rule (40 CFR Parts 51 and 93); however, it still provides one metric against which projected ADAIR emissions can be evaluated.

The Air Conformity Applicability Model (ACAM) (version 5.0.13a) was used to provide emissions estimates for contract ADAIR airfield operations, maintenance activities, worker commutes, and flight operations in the airspace. ACAM was developed by the Air Force (Air Force, 2017a) and provides estimated air emissions from proposed federal actions for each specific criterion and precursor pollutant as defined in the NAAQS. Assumptions of the model are discussed in **Appendix C**. ACAM uses the procedures established by the Air Force as provided in *Air Emissions Guide for Air Force Mobile Sources* (Air Force, 2017a) and the *Air Emissions Guide for Air Force Stationary Sources* (Air Force, 2017b). Emission calculations in the stationary guide often reflect the use of emission factors published in USEPA's AP-42. For aircraft, operational modes (including taxi/idle [in and out], take off, climb out, approach, and pattern flight that includes touch and go operations) are used as the basis of the emission estimates. Furthermore, only emissions in the lower atmosphere's mixing level have the potential to cause a substantial impact on ground-level pollutant concentrations. The mixing layer extends from ground level up to the point at which the vertical mixing of pollutants decreases significantly. The USEPA recommends that a default mixing layer of 3,000 ft be used in aircraft emission calculations (40 CFR § 93.153[c][2]); therefore, aircraft emissions released above 3,000 ft AGL were not included in analysis for the ROI. The basis for the air emissions performed is summarized in **Table 4-14**. Emissions were calculated separately for airfield operations (Holloman AFB) and the special use airspace described above (WSMR Restricted Areas, Talon Low MOA, and McGregor Range Restricted Areas). The emissions in the Beak MOAs constitute a small fraction of the overall emissions in all the MOAs. Estimates show that, even when a completely flat terrain is assumed in the Beak MOAs at their respective maximum heights, the CO emissions will increase only by 2.4 percent for all MOA operations. Realistically, there will be almost no overlap between the mixing zone and the zone of flight operations, resulting in almost no emissions in the mixing zone.

In nonattainment and maintenance areas, emissions at or above 100 tpy are considered significant, particularly as this threshold triggers full conformity analysis. Emissions below 100 tpy are considered moderate or, if very low, minor. The air quality analysis focused on emissions associated with the airfield operations and with sorties in the MOAs and Restricted Areas. As such, emissions from ACAM were determined separately for the airfield ROI and the special use airspace ROI.

Details regarding impacts specific to each alternative are described in **Sections 4.4.2** and **4.4.3**.

Table 4-14
Basis of Air Emission Calculations

Location	Type of Operation	Number of Sorties per Year	Ground Operation Emission Sources
Holloman Air Force Base Airfield	LTO Cycles	3,200	Auxiliary power unit equipment, AGE, personal vehicle use, aircraft maintenance (solvent use), fuel handling and storage, emergency generator, aircraft trim tests (24 per aircraft)
	TGO Cycles	456[1]	Not Applicable
White Sands Missile Range Restricted Areas (R-5107 and R-5111)	Sorties @ ≤3,000 feet AGL	1,761[2]	Not Applicable
Beak MOAs	Sorties @ ≤3,000 feet AGL	None[3]	Not Applicable
Talon High East/West MOA	Sorties @ ≤3,000 feet AGL	None[4]	Not Applicable
Talon Low MOA	Sorties @ ≤3,000 feet AGL	118[5]	Not Applicable
McGregor Range Restricted Areas (R-5103B and R-5103C)	Sorties @ ≤3,000 feet AGL	31[6]	Not Applicable

Notes:
1 5 percent of on-airfield daytime sorties (3,040) are expected to include multiple patterns for contractor proficiency. Each of those 5 percent sorties is assumed to include three TGO/low approaches.
2 56 percent of all sorties (3,144).
3 1,038 total sorties (33 percent of all sorties) occur above the mixing height. No emissions calculated.
4 196 total sorties (6 percent of all sorties) occur above the mixing height. No emissions calculated.
5 4 percent of all sorties (3,144).
6 1 percent of all sorties (3,144).

AGE = Aerospace Ground Equipment; AGL = above ground level; LTO = Landing and Takeoff; MOA = Military Operations Area; TGO = Touch and Go

4.4.2 Proposed Action

Under the Proposed Action, both alternatives are nearly identical in terms of potential air emissions. As described in **Chapter 2** the only substantive difference between the three alternatives is the location of the contract ADAIR facilities on Holloman AFB airfield and whether the operations are consolidated in one building versus two. Further, no construction emissions are associated with any of the alternatives. There may be some minor, small scale interior renovations which would have negligible effects on outdoor air quality. For these reasons, the emissions are the same for all alternatives. Only those emissions associated with the addition of contract ADAIR operations were evaluated as no substantive changes to current operations of the 49 WG and other tenants using Holloman AFB airfield are expected to occur as a result of the action. Baseline emissions were not estimated for this proposed action. Rather, instead of performing a numeric analysis for the baseline emissions, a qualitative analysis was conducted.

Similar to the analysis for potential noise impacts, analyses were performed for three different emission scenarios to evaluate the different adversarial aircraft that may be utilized by the ADAIR contractor. The three different emission scenarios (identified as High, Medium, and Low) are listed below with the engine type used for the basis for the emission calculations:

- High: A-4K, Engine: J52-P-8B*
- Medium: T-59 Hawk, Engine: TF34-GE-100*
- Low: F-5A/5B, Engine: J-85-GE-13

*Surrogate engine type, reliable criteria emission factors not available for foreign engine types.

4.4.3 Alternatives 1 and 2

Holloman Air Force Base Operations

Contract ADAIR targeted performance is estimated to start in July 2020 with a 10-year contract. Emissions were estimated for each year of the Proposed Action beginning in July 2020 and ending in June 2030. For air quality modeling purposes, these are representative years; the modeling generates air emissions estimates for the life of a representative 10-year contract. Total increases in annual operational emissions in the vicinity of the airfield are presented in **Table 4-15**. The methodologies, emission factors, and assumptions used for the emission estimates for each of the scenarios and related activities are outlined in **Appendix C**.

The primary pollutants of concern for ozone are NO_x and VOC. VOCs in all three emission scenarios are below the 100 tpy *de minimis* threshold (**Table 4-15**). For NO_x, the Medium Scenario had the highest emission rate of approximately 95 tpy. This is just below the *de minimis* threshold for conformity. Looking at all criteria pollutants, CO had the highest annual emission rate (219 tpy) under the Low Scenario. This is above the *de minimis* threshold for conformity and is even approaching the PSD threshold for pollutants in attainment. The CO emissions for the Medium Scenario was also higher than the conformity *de minimis* level. For all pollutants, the project emissions are only a very small fraction of the emissions for Otero County shown in **Chapter 3** (**Table 3-9**).

The analysis results discussed above demonstrate the following for the airfield operations in Otero County:

1. The annual emissions of CO for the Medium and Low Scenarios are over the 100 tpy *de minimis* threshold for conformity.
2. The project should not interfere with region's ability to maintain compliance with the NAAQS for attainment area pollutants (CO, NO_x, PM, SO_x) as these emissions are a small percentage of the overall Otero County emissions for criteria pollutants.
3. The project should not hamper efforts to achieve NAAQS compliance for the pollutants that contribute to ozone nonattainment (VOC and NO_x). No conformity analysis is required.

Thus, the predicted contract ADAIR annual emission increases are considered to be moderate, but within threshold levels, in the vicinity of the airfield.

Table 4-15
Contract Adversary Air Emissions – Airfield Operations

Scenario	Contract Year(s)[1]	Emissions (tpy)[2,3]								
		VOC	NOx	CO	SO_x	PM_{10}	$PM_{2.5}$	CO_2e	Pb	NH_3
High	2020 (July – December)	17.4	12.7	26.5	1.3	1.0	0.9	2,810	0	0.006
	2021 through 2029	34.8	25.4	52.9	2.6	1.9	1.8	5,619	0	0.013
	2030 (January - June)	17.4	12.7	26.5	1.3	1.0	0.9	2,810	0	0.006
Medium	2020 (July – December)	35.1	47.9	71.9	3.0	9.8	7.3	4,314	0	0.006
	2021 through 2029	70.2	95.8	143.7	6.0	19.5	14.6	8,629	0	0.013
	2030 (January - June)	35.1	47.9	71.9	3.0	9.8	7.3	4,314	0	0.006
Low	2020 (July – December)	20.7	9.9	109.7	1.6	0.8	0.8	3,534	0	0.006
	2021 through 2029	41.4	19.9	219.3	3.2	1.7	1.6	7,070	0	0.013
	2030 (January - June)	20.7	9.9	109.7	1.6	0.8	0.8	3,534	0	0.006

Source: Air Conformity Applicability Model output
Notes:
1 ADAIR targeted performance is estimated to start in July 2020 with a 10-year contract; the emissions were estimated for each year of the Proposed Action beginning in July 2020 and ending in June 2030. For air quality modeling purposes, these are representative years; the modeling generates air emissions estimates for the life of a representative 10-year contract.
2 Represents total per year emissions for: 1) flight operations (includes trim tests and auxiliary power unit use), 2) Aerospace Ground Equipment, 3) aircraft maintenance (parts cleaning), and 4) Jet-A storage (fuel for contract ADAIR operations only - includes Contractor ADAIR fuel for LTOs, TGOs, trim tests, airspace use, and travel to the airspace).
3 Based on 3,200 LTOs and 456 TGOs per year.

ADAIR = adversary air; NO_x = nitrogen oxides; CO = carbon monoxide; CO_2e = carbon dioxide equivalent; LTO = Landing and Takeoff; NH_3 = ammonia; Pb = lead; $PM_{2.5}$ = particulate matter less than 2.5 microns; PM_{10} = particulate matter less than 10 microns; SO_x = sulfur oxides; TGO = Touch and Go; tpy = tons per year; VOC = volatile organic compound

Airspace Operations

For the special use airspace, only WSMR Restricted Areas, Talon Low MOA, and McGregor Range Restricted Areas would include contract ADAIR sorties at or below 3,000 ft, AGL and, thus, these are included in the air quality analysis. Consistent with the USEPA recommendation regarding mixing height, only those emissions that would occur with the mixing layer (lowest 3,000 ft) were analyzed. Out of the of the proposed sorties, 1,761 in the WSMR Restricted Areas, 118 in the Talon Low MOA, and 31 in the McGregor Range Restricted Areas are expected to occur between 500 to 3,000 ft AGL. For the MOAs and Restricted Areas, chaff (if allowed) was not considered to have an air quality impact as it has been determined that chaff material maintains its integrity after ejection and that the use of explosive charge in impulse cartridges results in minimal PM_{10} emissions (Air Force, 1997). Flare emissions were not determined for any MOAs or Restricted Areas. This is because at no time are flares anticipated to be deployed within the mixing layer (surface to 3,000 ft AGL), or if they did deploy, they would result in very low levels of emissions relative to those from aircraft operations.

The emissions associated with contract ADAIR sorties proposed for the WSMR Restricted Areas, Talon Low MOA, and McGregor Range Restricted Areas were evaluated using ACAM for the High, Medium and Low Scenarios described previously. The flight time in the mixing layer was estimated to be approximately 18.7 minutes per sortie. In addition, the time it would take to fly from Holloman AFB airfield to and from the MOAs or Restricted Areas was assumed to occur at an altitude above 3,000 ft AGL and thus this portion of the sortie is not included in the analysis. The methodologies, emission factors, and assumptions used for the emission estimates for each of the scenarios are outlined in **Appendix C**.

The emissions estimated for the WSMR Restricted Areas, Talon MOA Low, and McGregor Range Restricted Areas that would result from contract ADAIR sorties are shown in **Tables 4-16**, **4-17**, and **4-18**.

Emissions cover the proposed 10-year period beginning in July 2020 and ending in June 2030. Since the airspace operations would be identical for all alternatives, the results are applicable to Alternatives 1 and 2. All special use airspace proposed for contract ADAIR are located in an area that is an attainment or unclassifiable for all criteria pollutants. As such, the general conformity rule does not apply; however, the rule's 100-tpy *de minimis* threshold was applied as a significance indicator. Low emission scenarios are not necessarily lower for all pollutants. Because of its role in ozone formation NO_x is the primary pollutant of concern in many areas and thus the Low Scenario reflects lower emission rates for NO_x; however, the lower NO_x emissions are often at the expense of other pollutants such as higher CO. Other factors such as the number of engines, fuel flow rates, and power mode can cause variations that may result in the Low Scenario having higher emissions for some pollutants when compared to an engine with higher emission factors (pounds pollutant/1,000 pounds fuel burned).

As shown in **Tables 4-16**, **4-17**, and **4-18**, the annual CO emission rate for WSMR Restricted Areas is the highest (52 tpy) among the three locations for the Low Scenario. None of the remaining annual criteria pollutants emission rates at any of the MOAs or Restricted Areas exceed 20 tpy, which is well below the 100-tpy *de minimis* threshold. Also, annual emissions for all three scenarios at the McGregor Range Restricted Areas are less than a ton for all pollutants. The same is true for Talon Low MOA except for annual CO emissions for the Low Scenario which is close to 4 tpy. This demonstrates that the proposed contract ADAIR sorties would have no impact on air quality (NAAQS compliance) in the special use airspace ROI under Alternatives 1 or 2. Also, areas under the airspace are in attainment of the NAAQS. Contract ADAIR training would not affect air quality under any of the airspace proposed for use. Emissions would be easily dispersed and would not measurably affect air quality or visibility in regional Class 1 areas as described in **Section 3.4.2.2**.

Table 4-16
Contract Adversary Air Emissions – White Sands Missile Range Restricted Areas

Scenario	Contract Year(s)[1]	Emissions (tpy)[2,3]								
		VOC	NOx	CO	SO_x	PM_{10}	$PM_{2.5}$	CO_2e	Pb	NH_3
High	2020 (July – December)	0.4	6.0	1.8	0.6	0.1	0.1	1,917.0	0	0
	2021 through 2029	0.8	12.0	3.6	1.3	0.2	0.1	3,833.9	0	0
	2030 (January - June)	0.4	6.0	1.8	0.6	0.1	0.1	1,917.0	0	0
Medium	2020 (July – December)	2.9	0.3	9.8	0.1	1.1	0.9	408.2	0	0
	2021 through 2029	5.9	0.7	19.7	0.3	2.3	1.8	816.5	0	0
	2030 (January - June)	2.9	0.3	9.8	0.1	1.1	0.9	408.2	0	0
Low	2020 (July – December)	2.5	1.4	26.2	0.6	0.0	0.0	1,972.0	0	0
	2021 through 2029	4.9	2.8	52.4	1.3	0.0	0.0	3,944.0	0	0
	2030 (January - June)	2.5	1.4	26.2	0.6	0.0	0.0	1,972.0	0	0

Source: Air Conformity Applicability Model output

Notes:

1 Contract adversary air targeted performance is estimated to start in July 2020 with a 10-year contract; the emissions were estimated for each year of the Proposed Action beginning in July 2020 and ending in June 2030. For air quality modeling purposes, these are representative years; the modeling generates air emissions estimates for the life of a representative 10-year contract.

2 Represents total per year emissions.

3 Based on 1,761 sorties (56 percent of 3,144 on airspace sorties).

NO_x = nitrogen oxides; CO = carbon monoxide; CO_2e = carbon dioxide equivalent; NH_3 = ammonia; Pb = lead; $PM_{2.5}$ = particulate matter less than 2.5 microns; PM_{10} = particulate matter less than 10 microns; SO_x = sulfur oxides; tpy = tons per year; VOC = volatile organic compounds.

Table 4-17
Contract Adversary Air Emissions – Talon Low Military Operations Area

Scenario	Contract Year(s)[1]	Emissions (tpy)[2,3]								
		VOC	NOx	CO	SO_x	PM_{10}	$PM_{2.5}$	CO_2e	Pb	NH_3
High	2020 (July – December)	0.03	0.4	0.1	0.04	0.01	0.01	128.5	0	0
	2021 through 2029	0.05	0.8	0.2	0.08	0.01	0.01	256.9	0	0
	2030 (January - June)	0.03	0.4	0.1	0.04	0.01	0.01	128.5	0	0
Medium	2020 (July – December)	0.2	0.02	0.7	0.01	0.1	0.1	27.4	0	0
	2021 through 2029	0.4	0.04	1.3	0.02	0.2	0.1	54.7	0	0
	2030 (January - June)	0.2	0.02	0.7	0.01	0.1	0.1	27.4	0	0
Low	2020 (July – December)	0.2	0.1	1.8	0.04	0.000	0.000	132.1	0	0
	2021 through 2029	0.3	0.2	3.5	0.09	0.001	0.001	264.3	0	0
	2030 (January - June)	0.2	0.1	1.8	0.04	0.000	0.000	132.1	0	0

Source: Air Conformity Applicability Model output
Notes:
[1] Contract adversary air targeted performance is estimated to start in July 2020 with a 10-year contract; the emissions were estimated for each year of the Proposed Action beginning in July 2020 and ending in June 2030. For air quality modeling purposes, these are representative years; the modeling generates air emissions estimates for the life of a representative 10-year contract.
[2] Represents total per year emissions.
[3] Based on 118 sorties (4 percent of 3,144 on airspace sorties).

NO_x = nitrogen oxides; CO = carbon monoxide; CO_2e = carbon dioxide equivalent; NH_3 = ammonia; Pb = lead; $PM_{2.5}$ = particulate matter less than 2.5 microns; PM_{10} = particulate matter less than 10 microns; SO_x = sulfur oxides; tpy = tons per year; VOC = volatile organic compounds.

Table 4-18
Contract Adversary Air Emissions – McGregor Range Restricted Areas

Scenario	Contract Year(s)[1]	Emissions (tpy)[2,3]								
		VOC	NOx	CO	SO_x	PM_{10}	$PM_{2.5}$	CO_2e	Pb	NH_3
High	2020 (July – December)	0.01	0.11	0.03	0.01	0.001	0.001	34	0	0
	2021 through 2029	0.01	0.21	0.06	0.02	0.003	0.003	68	0	0
	2030 (January - June)	0.01	0.11	0.03	0.01	0.001	0.001	34	0	0
Medium	2020 (July – December)	0.1	0.01	0.2	0.002	0.02	0.02	7	0	0
	2021 through 2029	0.1	0.01	0.3	0.01	0.04	0.03	14	0	0
	2030 (January - June)	0.1	0.01	0.2	0.002	0.02	0.02	7	0	0
Low	2020 (July – December)	0.04	0.03	0.5	0.01	0.0	0.0	35	0	0
	2021 through 2029	0.09	0.05	0.9	0.02	0.0	0.0	69	0	0
	2030 (January - June)	0.04	0.03	0.5	0.01	0.0	0.0	35	0	0

Source: Air Conformity Applicability Model output
Notes:
[1] Contract adversary air targeted performance is estimated to start in July 2020 with a 10-year contract; the emissions were estimated for each year of the Proposed Action beginning in July 2020 and ending in June 2030. For air quality modeling purposes, these are representative years; the modeling generates air emissions estimates for the life of a representative 10-year contract.
[2] Represents total per year emissions.
[3] Based on 31 sorties (1 percent of 3,144 on airspace sorties).

NO_x = nitrogen oxides; CO = carbon monoxide; CO_2e = carbon dioxide equivalent; NH_3 = ammonia; Pb = lead; $PM_{2.5}$ = particulate matter less than 2.5 microns; PM_{10} = particulate matter less than 10 microns; SO_x = sulfur oxides; tpy = tons per year; VOC = volatile organic compounds.

4.4.4 No Action Alternative

The No Action Alternative would not generate any new emissions and would not change emissions from current baseline levels presented in **Section 3.4**. As a result, there would be no change to regional air quality.

4.4.5 Climate Change Considerations

Like many locations, climate trends in New Mexico appear to be reflecting the influence of climate change. Across the Southwest, over the last century, the average annual temperature has increased by about 1.5°F, with the decade 2001 to 2010 being the warmest in over a century. Although this is slightly below the national average, there has been pronounced location to location and season to season variability. Looking forward, based on observed trends and the future projections provided by the Third National Climate Assessment, the climate in the state is will see less precipitation overall and more consecutive dry days (Union of Concerned Scientists, 2016).

To serve as a reference point, project GHG emissions were compared against New Mexico statewide GHG emissions and to the Title V and PSD major source thresholds for CO_2e applicable to stationary sources (**Table 4-19**). Based on the relative magnitude of the project's GHG emissions, a general inference can be drawn regarding whether the Proposed Action is any way meaningful with respect to the discussion regarding climate change.

As shown in the table, GHG emissions (expressed as CO_2e) for all three emission scenarios are not substantial when compared against the metrics. The projected GHG emissions would account for about 5 percent of the state's total GHG emissions, are less than six times lower than permitting thresholds, and are two times lower than the GHG mandatory reporting rule threshold. This demonstrates that, in isolation, additional CO_2e emissions expected as a result of contract ADAIR would have a less than significant impact under Alternatives 1 and 2.

Table 4-19
Metrics for Greenhouse Gas Emission Impacts

Emissions Scenario	ADAIR Projected CO_2e Emissions (tpy)[1,2]	CO_2e Regulatory Thresholds (tpy)			NMED 2018 GHG Inventory (tons CO_2e/yr)[3]
		Title V Permit	PSD New/ Modified Source	GHG Mandatory Reporting Rule[4]	
High	9,777	100,000	100,000/75,000	25,000	228,486
Medium	9,514				
Low	11,348				

Notes:
[1] CO_2e = carbon dioxide equivalent from Air Conformity Applicability Model
[2] Sum of emissions from airfield operations and Military Operations Area or restricted area sorties
[3] Source: NMED Emissions Analysis Tool, 2018 (https://eatool.air.net.env.nm.gov/aqbeatool/)
[4] 40 Code of Federal Regulations Part 98

ADAIR = adversary air; GHG = greenhouse gas; PSD = Prevention of Significant Deterioration; tpy = ton(s) per year

4.5 BIOLOGICAL RESOURCES

4.5.1 Evaluation Criteria

The level of impact on biological resources is based on the

- importance (i.e., legal, commercial, recreational, ecological, or scientific) of the resource;
- proportion of the resource that would be affected relative to its occurrence in the region;
- sensitivity of the resource to the proposed activities; and
- duration of potential ecological ramifications.

The impacts on biological resources are adverse if species or habitats of high concern are negatively affected over relatively large areas. Impacts are also considered adverse if disturbances cause reductions in population size or distribution of a species of high concern.

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

4.5.2 Proposed Action

Under the Proposed Action, there would be no ground disturbing activities and all potential impacts on biological resources would be associated with aircraft operations at Holloman AFB and in the MOAs and Restricted Areas. The aircraft operations associated with the Proposed Action could have impacts on biological resources from aircraft movement, the use of defensive countermeasures, noise, or BASH. Because the number and type of aircraft, using the same flight profiles and airspace are the same under all alternatives, potential impacts on biological resources are the same for all action alternatives.

In approved areas, chaff and flares (types similar to RR-188 chaff and M206 flares) are proposed for annual use during the training sortie operations. Potential direct impacts on resources from training activities include the deposition of residual materials, such as plastic, from chaff and flare use, its accumulation in sensitive and protected areas, and the ultimate breakdown of these materials into substrate mediums. Indirect impacts include fire risk, transportation of these materials to other areas by environmental elements, and the potential for ingestion by sensitive species within the ROI and beyond. Depending on the altitude of release and wind speed and direction, the chaff from a single bundle can be spread over distances ranging from less than a 0.25 mi to over 100 mi (Air Force, 1997). The most confined distribution would be from a low-altitude release in calm conditions (Air Force, 1997).

Chaff chemical composition, composition, rate of decomposition, and tendency to leach toxic chemicals under various situations paired with baseline substrate chemistry and conditions are factors that could potentially alter substrate chemistry. A change in chemistry could potentially affect fauna, flora, vegetative cover, substrate stability, the type and quality of habitat, and leaching and runoff potential. Silica (silicon dioxide), aluminum, and stearic acid are major components of chaff with minor quantities of copper, manganese, titanium, vanadium, and zinc in the aluminum chaff coating. All are generally prevalent in the environment, and all but titanium are either found in plants and animals and/or necessary essentials for their growth. Silica does not present a concern to chemistry as it is found in silicate minerals, the most common mineral group on Earth. Silica is more stable in acidic environments than alkaline. Aluminum is also very abundant in the earth's crust, forming common minerals like feldspars, micas, and clays. While acidic and extremely alkaline substrates increase the solubility of aluminum, what is left eventually oxidizes to aluminum oxide which is insoluble. Stearic acid is used in conjunction with palmitic acid to produce an anticlumping compound for chaff fibers and both degrade when exposed to light and air (Air Force, 1997).

The primary material in flares is magnesium, which is not highly toxic, and it is highly unlikely organisms would ingest flare materials; however, plastic caps are released with the deployment of both chaff and flares and, although highly unlikely, could be ingested. Some flares utilize impulse cartridges and initiates which contain chromium and sometimes lead. Even though these are hazardous air pollutants under the CAA and have been known to cause health risk in certain avian species, significant effects on biological resources are not expected because previous studies have indicated that there are no health risks from most flare components (Air Force, 1997), the amount of lead is expected to be very small and dispersed over great distances, and the use of BMPs would avoid the selection of flares containing lead. More significantly, flares have a potential to start fires that can spread, adversely and indirectly affecting many resources. Flare-induced fires depend on the probabilities of flare materials reaching the ground, igniting vegetation, and causing significant damage if fire spreads (Air Force, 1997); however, all use of flares in the MOAs and

Restricted Areas is subject to altitude and seasonal restrictions based on specific location and the fire danger level. These restrictions greatly reduce the risk of wildland fires as a result of flare use.

The following BMPs would be implemented as appropriate:

- Comply with Air Force and local procedures.
- Establish a capability to analyze fire risks on a site-specific basis. The methodologies presented in this report provide a mechanism for accomplishing this.
- Replace impulse cartridges and initiators in future procurements of flares with models that do not contain toxic air pollutants such as chromium and lead.
- Consider a public information program in areas where flares are used over non-DOD land to educate the public about the hazards of dud flares and proper procedures to follow if a dud flare is found.

4.5.3 Alternatives 1 and 2

Vegetation

Under the Proposed Action, there would be no ground disturbing activities and as such no potential to disturb vegetation or habitats on Holloman AFB; therefore, there would be no impacts on vegetation under Alternative 1 or 2.

The Proposed Action within the special use airspace would not have impacts on vegetation communities or habitat under Alternative 1 or 2. Potential impacts on vegetation from countermeasure chaff and flare constituents may include toxicity or accumulation of chemical compounds. Studies have determined that chaff deposition onto soils does not lead to significant increase of concentrations of chaff or flare chemical constituents in soil and have not been found to be toxic to plants or soil fauna (Air Force, 1997). Damage to vegetation from wildland fire from the use of flares would be greatly reduced as seasonal restrictions and altitudes would be followed for their use.

Wildlife

There is suitable habitat for wildlife on developed areas of Holloman AFB; however, the habitats on Holloman AFB near the airfield only support relatively common wildlife species. Wildlife, and especially avian species, utilizing these undeveloped areas for foraging and breeding would normally be sensitive to increased noise impacts from military aircraft. Although there is variability in responses across species, many birds and wildlife have the ability to habituate to noise and movement from military aircraft (Grubb et al., 2010), and military aircraft operations have been ongoing at Holloman AFB for decades. As such, the noise and movement from increased aircraft operations is anticipated to have negligible, short- and long-term impacts on wildlife, including birds breeding and foraging in nearby relatively undisturbed habitats, under Alternative 1 or 2.

Aircraft operations always have the potential for bird and other wildlife strikes. This can occur during takeoff and landing on and near active runways, as well as during flight at altitude; however, a minimal BASH exists at Holloman AFB and its vicinity due to low populations of resident and migratory bird species and the distribution patterns of those species. The trend of BASH strikes shows a slow decline despite increased flying hours. BASH incidents are so rare on Holloman AFB that little bird control has been needed near the runways (Holloman AFB, 2018b). With an increase in air operations associated with contract ADAIR aircraft at Holloman AFB, there is an increased risk of BASH; however, Holloman AFB maintains a BASH prevention program specifically to manage BASH risk and implement measures to greatly reduce the likelihood for BASH incidents. The outcome of the BASH program is both increased safety for pilots and military aircraft as well as less incidents of injury or death to birds and other wildlife. As such, with the continued airfield management and risk reduction implementation measures associated with the BASH program and the ADAIR contractor's compliance with the FAA Wildlife Hazard Mitigation Program, the impacts on birds and other wildlife from contract ADAIR aircraft strikes during air operations at Holloman AFB is minor as discussed in **Section 4.3.2.1**.

Contract ADAIR aircraft training operations would occur at low altitudes in the Restricted Areas and Talon Low MOA and could adversely impact avian and mammal species. Low-flying aircraft could startle breeding and foraging birds and mammals; however, aircraft training has occurred in these airspaces for decades, and most wildlife has likely become habituated to aircraft movement and noise. Aircraft movement and noise may have a moderate adverse impact on foraging and breeding birds and mammals and would have a minor risk of BASH under Alternative 1 or 2.

Noise modeling for the contract ADAIR aircraft training operations (see **Section 4.2.3**) indicates that there would be no substantial increase in noise impacts within the MOAs or Restricted Areas and that subsonic and/or supersonic noise levels in the airspace would not change substantially from the baseline conditions; therefore, the minor change in noise levels as a result of contract ADAIR training may have a minor, adverse impact on breeding, foraging, or nesting birds or mammals in MOAs and Restricted Areas under Alternative 1 or 2.

Sonic booms from supersonic flights within MOAs and Restricted Areas (which would only occur under the Medium Noise Scenario if those aircraft are selected) could cause startle effects on avian and mammal species on or near the ground level; however, the sonic boom and postboom rumbling sounds that would be experienced by wildlife do not differ substantially from thunder, which is commonly experienced by wildlife during relatively frequent thunderstorms in the region. Further, the sonic boom events would be highly isolated and rare occurrences in the MOAs and Restricted Areas and occur in areas where supersonic flights currently occur with military training activities. As such, sonic booms from supersonic flights would have no impact on wildlife, including birds breeding and foraging in MOAs and Restricted Areas under Alternative 1 or 2.

Under the Proposed Action, the use of chaff and flares would increase by 5 percent within approved special use airspace. Potential impacts on wildlife from the use of chaff and flares would be limited to a startle effect from chaff and flare deployment, inhalation of chaff fibers or flare combustion products, and ingestion of plastic caps from chaff and flare deployment. The potential of being struck by debris, given the small amount, or a dud flare is remote. Startle effects from the release of chaff and flares would be minimal relative to the noise of the aircraft. The potential for wildlife to be startled from flare deployment at night when flares would be most visible would be minimal due to the short burn time of the flare. It is highly unlikely that during active military training with contract ADAIR aircraft that birds would remain in the area where training is occurring to be adversely impacted by chaff and flares deployment. Further, chaff and flares are so small in size, that it is highly unlikely that small amount of lightweight material ejected during their deployment would have an adverse impact on birds or that the material would reach the ground level and have an impact on mammals. Lastly, an evaluation of the potential for chaff to be inhaled by humans and large wildlife found that the fibers are too large to be inhaled into the lungs and that chaff material is made of silicon and aluminum that has been shown to have low toxicity (Air Force, 1997); therefore, the use of chaff and flares during contract ADAIR training would have a minor impact on wildlife under Alternative 1 or 2.

Invasive Species

There are no activities associated with the Proposed Action that have the potential to affect invasive species. There would be no ground-disturbing activities that have the potential to spread or remove invasive plants. Similarly, aircraft operations on the airfield or in the airspace would have no impact on invasive plants or wildlife under Alternative 1 or 2.

Threatened and Endangered Species

Contract ADAIR training at Holloman AFB and in the MOAs and Restricted Areas would have no effect on listed reptiles, amphibians, fish, mollusks, insects, or plants. Aircraft movement, aircraft noise, and the use of defensive countermeasures would not interact with these listed species, especially considering there is no substantial change in the noise emissions from contract ADAIR training in the MOAs and Restricted Areas.

The Baird's sparrow, bald eagle, least tern, neotropic cormorant, and peregrine falcon only are known to occur as transient species on Holloman AFB and would not be present on habitats adjacent to the airfield; therefore, there are no federally or state listed species on Holloman AFB that would be adversely affected by the additional contract ADAIR flights. As such, there would be no effect on listed species at Holloman AFB from implementation of the Proposed Action.

Federally and state listed species are known to occur beneath and within the airspace of the MOAs and Restricted Areas proposed for use. The potential exists for species discussed in **Section 3.5.2** to be affected by aircraft operation, noise, and the use of defensive countermeasures.

As previously described for impacts on birds and mammals, contract ADAIR aircraft movement may affect but is not likely to adversely affect federally and state listed bird and mammal species during training under Alternative 1 or 2. The northern aplomado falcon, Mexican spotted owl, southwestern willow flycatcher, yellow-billed cuckoo, and Mexican gray wolf within the Talon Low MOA and Restricted Areas could be startled or, in the case of listed avian species, at risk from aircraft strikes from aircraft flying at very low altitudes. The Mexican gray wolf could occur in the action area, primarily in the higher-elevation areas of the Lincoln National Forest in the Beak MOAs as well as higher-elevation areas of the Restricted Areas. The Mexican gray wolf would not be startled by high-altitude training activities where most contract ADAIR training would occur; however, in the Talon Low MOA and the Restricted Areas, low-altitude training flights would occur and could startle the Mexican gray wolf or their prey species during foraging activities if they are present in the area at the time of the training flights. Aircraft noise in the special use airspace would have no effect on bird species as the noise levels would not exceed 45 dB from contract ADAIR training. Potential biological impacts from the use of countermeasure chaff and flares are not likely to be significant. Reasons include that the components of chaff and flares have been found to have low toxicity and do not accumulate or magnify in food webs; chaff fibers are too large to be inhaled; and human health assessments have found the products from flare combustion have been found to not have significant adverse effects, which is likely applicable to other species (Air Force, 1997). While birds and bats may experience disorientation if they fly through a cloud of chaff, the effect would be short and the potential for injury is low due to the low mass and diffuse nature of the chaff, the low resistance times chaff is in the air, and the localized nature of the chaff release (Air Force, 1997); therefore, the use of chaff and flares during contract ADAIR training would have no effect on federally and state listed birds and mammals.

Sonic booms from supersonic aircraft movement could cause a startle response by the listed species; however, sonic booms would be relatively rare events during contract ADAIR training in the airspace, and the sonic boom and postboom rumbling would be similar to what wildlife experience during a thunderstorm. Sonic booms from supersonic aircraft movement would therefore have no effect on listed species.

The Air Force has made a no effect determination on federally listed reptiles, amphibians, fish, mollusks, insect, and plant species in the ROI listed in **Appendix D**. Further, the Air Force has made a may affect but not likely to adversely affect the listed northern aplomado falcon, Mexican spotted owl, southwestern willow flycatcher, yellow-billed cuckoo, and Mexican gray wolf in the ROI (see **Table 3-14**) due to the potential for species to be startled by the additional low-flying aircraft during training. The piping plover and least tern do not occur in the action area where low-altitude flights would occur, and there would be no effect from the Proposed Action on these listed bird species. The New Mexico meadow jumping mouse and Penasco least chipmunk would not be startled by occasional low altitude contract ADAIR flights as aircraft movement would be obscured by vegetation, woody debris, and rocks for these two species, and there would be no effect from the Proposed Action on these listed mammal species. A letter requesting concurrence with these determinations has been sent to the USFWS (**Appendix A**).

Wetlands

The locations proposed for use on the installation are not located near wetlands. There would be no need to fill or alter wetlands on Holloman AFB; therefore, there are no impacts associated with wetlands on the installation under Alternative 1 or 2.

Contract ADAIR operations would not impact wetlands located beneath the proposed MOAs and Restricted Areas under Alternative 1 or 2. As discussed in vegetation, impacts from increased chaff and flare use would not have significant impacts on wetlands as the deposition of countermeasure chaff and flare compounds onto soils does not lead to significant increase of soil concentrations of their chemical constituents and have not been found to be toxic to plants or soil fauna (Air Force, 1997).

4.5.4 No Action Alternative

Under the No Action Alternative, the contract ADAIR operations would not occur at Holloman AFB, and there would be no training operations in the MOAs and Restricted Areas. As such, there would be no change to biological resources.

4.6 LAND USE

4.6.1 Evaluation Criteria

Potential impacts on land use are based on the level of land use sensitivity in areas potentially affected by the Proposed Action and alternatives as well as compatibility of those actions with existing conditions. In general, a land use impact would be adverse if it met one of the following criteria:

- inconsistency or noncompliance with existing land use plans or policies
- precluded the viability of existing land use
- precluded continued use or occupation of an area
- incompatibility with adjacent land use to the extent that public health or safety is threatened
- conflict with planning criteria established to ensure the safety and protection of human life and property

4.6.2 Proposed Action

Under the Proposed Action, contract ADAIR would provide support to the 49 WG in F-16 fighter pilot training. Contract ADAIR personnel would use existing facilities at Holloman AFB for operations, maintenance, and administrative activities, as well as for equipment and tool storage. In addition, existing ramp and hangar space would be used for parking and maintenance of aircraft. Contract ADAIR proposes to use existing airspace (WSMR Restricted Areas; Beak MOAs; Talon High West, Talon High East; Talon High/Low West, and Talon Low MOAs; McGregor Range Restricted Areas R-5103A, B, and C) for training. The Proposed Action is compatible with the IDP for Holloman AFB (Holloman AFB, 2016b), the ID2 for Holloman AFB (Holloman AFB, 2011b), and the *Southern New Mexico-El Paso, Texas Joint Land Use Study* (Doña Ana County, 2015). The Proposed Action also would use existing facilities that are available for use at Holloman AFB. Two options for operations and maintenance facilities are proposed. Under both options, aircraft would be parked at the ramp area adjacent to Building 578. Land use under the airspace would not be impacted by the Proposed Action.

Implementation of alternatives differs only in the facilities chosen for operations, maintenance, and aircrew briefings. Because the number and type of aircraft, using the same flight profiles and airspace are the same under all alternatives, potential impacts associated with land use are the same for all alternatives.

4.6.3 Alternatives 1 and 2

Changes in the noise setting can affect land use compatibility as a result of increased noise exposure to existing POIs. As indicated in **Section 4.2**, during a High Noise Scenario, the DNL would increase slightly, but while considered long-term, this increase would negligible to minor resulting in an increase of the DNL contours on all sides of the installation. The primary change to the noise contours would be a slight elongation at the runway centerline, increasing the affected area greater than the 65-dBA DNL by approximately 1,117 additional acres. Of the additional affected acres, 92 percent of the acres are DOD, BLM, and NPS lands which are primarily open space and would not represent an incompatibility in land use. The remaining 8 percent is private lands, and noise could potentially affect residential areas; however, since the land surrounding Holloman AFB is primarily open space and rural, it is unlikely that residential areas would be affected. DNL increases at representative noise sensitive locations ranged from 0 to 1 dBA and, while long-term, would be barely noticeable. As such, this minor change in the noise setting would be compatible with surrounding land uses. Changes to the current noise contours would be minor, and safety zone designations (i.e., APZ, CZ, and Q-D arcs) are not expected to change; therefore, land use would not change under both action alternatives. No impacts on land use beneath the airspace proposed for contract ADAIR are expected.

4.6.4 No Action Alternative

Under the No Action Alternative, there would be no addition of contract ADAIR personnel or aircraft stationed at Holloman AFB. ADAIR operations and maintenance facilities would not change from their current use; therefore, no changes would occur to the existing land use.

4.7 SOCIOECONOMICS – INCOME AND EMPLOYMENT

4.7.1 Evaluation Criteria

Consequences to socioeconomics – income and employment were assessed in terms of the potential impacts on the local economy from proposed contract ADAIR. The level of impacts associated with the contract ADAIR expenditure is assessed in terms of direct effects on the local economy and related effects on other socioeconomic resources (e.g., property values and employment). The magnitude of potential impacts can vary greatly, depending on the location of an action. For example, implementation of an action that creates 10 employment positions might be unnoticed in an urban area but might have significant impacts in a rural region. In addition, if potential socioeconomic changes resulting from other factors were to result in substantial shifts in population trends or in adverse effects on regional spending and earning patterns, they may be considered adverse.

4.7.2 Proposed Action

Under the Proposed Action, the Air Force would contract an estimated 3,200 sorties annually at Holloman AFB which requires an estimated 12 contracted aircraft and 93 contract personnel for this requirement. As such, there is no substantive difference in where the aircraft and personnel are located at Holloman AFB as it pertains to impacts on socioeconomics – income and employment. There are no socioeconomic impacts in the special use airspace as contract ADAIR training would not alter income or employment in these areas.

Implementation of Alternatives differs only in the facilities chosen for operations, maintenance, and aircrew briefings. Because the number and type of aircraft, using the same flight profiles and airspace are the same under both alternatives, potential impacts on socioeconomics – income and employment are the same for both alternatives.

4.7.3 Alternatives 1 and 2

Minor interior renovations to buildings and associated communication infrastructure needed for aircrew flight equipment or secured storage space would be a minor requirement for materials and labor and would have no impacts on the socioeconomic condition on the region under Alternative 1 or 2. The 93 contracted ADAIR maintenance personnel and pilots would represent a small increase in the total persons permanently assigned to and working at Holloman AFB, where currently over 5,300 military and civilian personnel are employed.

It is estimated that the maximum contracted value for ADAIR training would be $30,000 per flight hour (Headquarters ACC Acquisition Management and Integration Center, 2018) though most likely between $8,500 and $15,000 based on technical solution sought; therefore, there would be increased annual expenditures in the region of up to approximately $48 million to support the 12 contracted fighter aircraft flying 3,200 annual sorties from Holloman AFB. These expenditures would be in the form of purchasing fuel, equipment, and materials to support the contract ADAIR sorties as well as the employment of 93 highly skilled contracted personnel (maintainers and pilots). These increased expenditures would provide a potential long-term, major, beneficial impact on the ROI through increased payroll tax revenue and the purchase of additional equipment, materials, and fuel needed for aircraft operations and maintenance under Alternative 1 or 2.

4.7.4 No Action Alternative

Under the No Action Alternative, the contract ADAIR operations would not occur at Holloman AFB and no expenditures would occur locally or regionally to support contracted aircraft or sorties. As a result, there would be no change in socioeconomics – income or employment.

4.8 ENVIRONMENTAL JUSTICE AND PROTECTION OF CHILDREN

4.8.1 Evaluation Criteria

Environmental justice analysis applies to potential disproportionate effects on minority, low-income, and youth populations. Environmental justice issues could occur if an adverse environmental or socioeconomic consequence to the human population fell disproportionately upon minority, low-income, or youth populations. Ethnicity and poverty status were examined and compared to state and national data to determine if these populations could be disproportionately affected by the Proposed Action.

4.8.2 Proposed Action

Under the Proposed Action, the Air Force would contract an estimated 3,200 ADAIR sorties annually at Holloman AFB. The addition of an estimated 12 aircraft and 93 contract personnel and their families to Holloman AFB and Otero County, and the associated noise from those aircraft have the potential to cause disproportionate impacts on minorities and children in the community, regardless of the alternative location at Holloman AFB for contract ADAIR operations and maintenance.

Implementation of Alternatives 1 and 2 differs only in the facilities chosen for operations, maintenance, and aircrew briefings; therefore, potential impacts on environmental justice populations and children are the same for both alternatives.

4.8.3 Alternatives 1 and 2

Under the Proposed Action, the increase in the number of personnel at Holloman AFB supporting the contract ADAIR sorties would not result in a disproportionate impact on minorities, low-income populations, and protection of children, because there is adequate housing, community resources, and community services in the region to support the increase in personnel. The 93 additional personnel and their families supporting the contract ADAIR requirement would not disproportionately affect the availability of these resources to minorities, low-income populations, or children under Alternative 1 or 2.

The noise increase associated with contract ADAIR training would not impact sensitive POIs or residential communities; therefore, there would be no disproportionate impacts from minor increase in noise on minority populations, low-income communities, or children under Alternative 1 or 2.

As noise levels in the special use airspace proposed for contract ADAIR training would not exceed 45 dB, there would be no impacts on minority or low-income communities or children as a result of Alternative 1 or 2.

4.8.4 No Action Alternative

Contract ADAIR operations would not occur at Holloman AFB under the No Action Alternative; therefore, there would be no disproportionate impacts on minority or low-income communities or children from regional expenditures to support contract ADAIR aircraft or from the increased training sorties.

4.9 CULTURAL RESOURCES

4.9.1 Evaluation Criteria

Adverse effects on cultural resources might include physically altering, damaging, or destroying all or part of a resource or altering characteristics of the resource that make it eligible for listing in the NRHP. Those effects can include introducing visual or audible elements that are out of character with the property or its setting; neglecting the resource to the extent that it deteriorates or is destroyed; or the sale, transfer, or lease of the property out of agency ownership (or control) without adequate enforceable restrictions or conditions to ensure preservation of the property's historic significance. For the purposes of this EA, an effect is considered adverse if it alters the integrity of a NRHP-listed or eligible resource or if it has the potential to adversely affect TCPs and the practices associated with the property.

4.9.2 Proposed Action

The Proposed Action includes elements affecting the base and military training airspace. As described in **Chapter 2**, the elements affecting the base would include contract ADAIR aircraft, facilities, maintenance, personnel, and sorties. The elements affecting the airspace would include airspace use and defensive countermeasures. Impact results from each alternative related to cultural resources are described below.

4.9.3 Alternative 1

Under Alternative 1, Operations and the AMU would be located in Building 578, and aircraft parking would be located on the adjacent ramp. Building 578 was constructed in 1993 and is neither historic nor is it located within any historic districts on Holloman AFB (Weitze et al., 2009). The only Holloman AFB districts considered eligible for inclusion in the NRHP are the High-Speed Test Track Historic District and the Missile Test Stands Historic District—both of which are located several miles from the main cantonment area (Holloman AFB, 2017b; O'Leary, 1994).

No ground disturbance would take place as part of the Proposed Action; therefore, no archaeological resources (surface or subsurface) would be disturbed or otherwise affected. Current data indicate no known TCPs are located under the airspace.

Forty-two historic properties listed in the NRHP are located beneath the airspace APE including the White Sands Historic District, located within White Sands National Monument and Gran Quivira Mission Complex, part of Salina Pueblo Missions National Monument. In addition to these resources, dozens of significant archaeological sites (both subsurface and those with surface remains), whose specific locations are protected, lie under the airspace.

Because it is not known what type of aircraft would be used by contract ADAIR, three aircraft scenarios were evaluated (High, Medium, and Low) to represent the range of aircraft types that could be selected. Sound levels modeled under each noise scenario resulted in an increased DNL of a single dBA over baseline conditions, with long-term impacts classified as negligible to minor. Noise modeling further indicated subsonic and/or supersonic noise levels in the airspace would not change substantially from the baseline conditions; therefore, Alternative 1 would therefore have no effect, and consequently no impact, on historic properties.

Both the White Sands Historic District and the Gran Quivira Mission Complex are located under WSMR no fly zones.[3,4] For additional detail on how the High, Medium, and Low Noise Scenarios compare to the existing noise contours at Holloman AFB, with specific reference to White Sands National Monument, see **Section 4.2**.

4.9.4 Alternative 2

Under Alternative 2, Operations would be located in Building 1062, and the AMU would be located in Building 578. Buildings 578 and 1062 are not historic, as they were constructed in 1993 and 1992, respectively (Weitze et al., 2009). Neither is located within any historic district on Holloman AFB. The only Holloman AFB districts considered eligible for inclusion in the NRHP are the High-Speed Test Track Historic District and the Missile Test Stands Historic District—both of which are located several miles from the main cantonment area (Holloman AFB, 2017b; O'Leary, 1994).

No traditional cultural resources or sacred sites have been identified at Holloman AFB. No ground disturbance would take place as part of the Proposed Action; therefore, potential archaeological deposits would not be impacted. Potential effects on historic properties under the airspace is the same as described in Alternative 2.

4.9.5 No Action Alternative

The No Action Alternative provides a benchmark for assessment, preserving the status quo. Under this alternative, no contract ADAIR would be established at Holloman AFB, and there would be no impacts on historic properties.

4.10 HAZARDOUS MATERIALS AND WASTES, CONTAMINATED SITES, AND TOXIC SUBSTANCES

4.10.1 Evaluation Criteria

Impacts on HAZMAT management would be considered adverse if the federal action resulted in noncompliance with applicable federal and state regulations or increased the amounts of hazardous waste generated or procured beyond Holloman AFB's current waste management procedures and capacities. Impacts on the ERP would be considered adverse if the federal action disturbed or created contaminated sites resulting in negative effects on human health or the environment.

4.10.2 Proposed Action

Under the Proposed Action, maintenance and operations of 12 contracted ADAIR aircraft could contribute to the volume of HAZMAT stored and used at Holloman AFB and the amount of hazardous wastes generated. Impacts associated with hazardous materials and wastes, contaminated sites, and toxic substances are limited to Holloman AFB. As discussed previously, an emergency fuel dump could occur in the MOAs and Restricted Areas; however, due to the infrequent nature of fuel dumps as well as in-place safety precautions, these emergency procedures are not likely to have adverse effects.

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[3] Melissa Hartleb, 49 CES/CEIE, email to Marie Sauter, Superintendent, White Sands National Monument, 22 August 2019.

[4] Debbie Nethers, Ecologist, Directorate of Public Works-Environmental Customer Support, White Sands Army Garrison, email to Melissa Hartleb, 49 CES/CEIE, 29 August 2019.

4.10.3 Alternatives 1 and 2

Hazardous Materials and Wastes

The quantity of HAZMAT such as oil, Jet-A fuel, hydrazine, hydraulic fluid, solvents, sealants, and antifreeze would increase with the operations and maintenance of contract ADAIR aircraft at Holloman AFB. It is anticipated that USTs/ASTs that would be used to support contract ADAIR operations would be stored in Facility 702 – Petroleum, Oils, and Lubricants Yard. The Petroleum, Oils, and Lubricants Yard is a controlled area surrounded by a security fence. A video surveillance camera covers the entrance gate and the parking area. The access gate is locked when the site is unattended. The entire yard has adequate lighting to prevent vandalism and allow discovery of a possible spill. There are no storage tanks at or near Building 578. There is fuel storage at Building 1062. There are two emergency backup generators at Building 1062; one AST has a capacity of 500 gallons and the second AST has a capacity of 231 gallons. All facilities are included in the Holloman AFB SPCCP (Holloman AFB, 2014). No release of contaminants has been reported at these facilities.

HAZMAT required for the contract ADAIR aircraft and used by contract personnel would be contractor-provided and managed in accordance with approved ground operations procedures outlined in the PWS but tracked through the Holloman AFB Environmental Section (49 CES/CEIE) following established Holloman AFB procedures. This would ensure that only HAZMAT needed for operations and maintenance at the smallest quantities would be used and that all HAZMAT used for contract ADAIR at Holloman AFB would be properly tracked and remain compliant at the Base; therefore, there would potentially be a minor impact from the requirement to track and handle the increased HAZMAT use to support the contract ADAIR sorties at Holloman AFB under Alternative 1 or 2.

The quantity of hazardous wastes generated (e.g., used petroleum products) would increase as a result of the contract ADAIR operations at Holloman AFB; however, all hazardous waste generated as a result of contract ADAIR aircraft operations and maintenance would be properly handled, stored, and disposed of following the Holloman AFB *Hazardous Waste Management Plan* (Holloman AFB, 2018a). These procedures ensure that hazardous waste is managed according to all federal, state, and local laws and regulations. As such, there would be no impact from procurement and use of HAZMAT or the storage and disposal of hazardous waste.

Environmental Restoration Program

There are no ERP sites located proximate to Building 578 or 1062. Three sites are located approximately 0.5 mi from Building 578: SS-59, TU-515, and SS-074. Five sites are located approximately 0.25 mi from Building 1062: DP-30, LF-29, SS-61, TU-505, and TS-851. No environmental contamination is known to occur within the project area, and no impact on contaminated sites would occur from the use of Building 578 or 1062 for contract ADAIR operations and maintenance.

Asbestos-Containing Materials and Lead-Based Paint

No asbestos survey information is available for Buildings 578 and 1062, and ACM could be present in building materials within these two facilities. Before any interior renovations or modifications occur to these buildings to support contract ADAIR, materials to be disturbed during renovations must be sampled for ACM including any construction materials, including pipe insulation and HDUCT insulation, that would be disturbed regardless of construction date. If ACM is discovered in building materials that would be modified as a result of Alternative 1 or 2, the ACM would be remediated in accordance with the Holloman AFB *Asbestos Management and Operations Plan* (Holloman AFB, 2017a).

LBP could be present in Buildings 578 and 1062. Interior renovations would require that materials to be altered would be tested for LBP, and any LBP found would be properly handled by a certified contractor and disposed of in accordance with federal, state, and local laws. LBP sampling must be analyzed by a certified NMED laboratory. Any LBP areas that are disturbed require a lead inspection. All lead sample analysis must be conducted by a NMED-approved laboratory.

No ACM or LBP impacts would be expected during renovations at Buildings 578 and 1062 with adherence to the Holloman AFB *Asbestos Management and Operations Plan* (Holloman AFB, 2017a), which complies with applicable AFIs for waste management and occupational health/safety.

Radon

There is a low potential for radon to pose a health hazard at Holloman AFB. Buildings 578 and 1062 have adequate ventilation systems. Further, no new construction is proposed. As such, no impact from radon is anticipated.

Polychlorinated Biphenyls

Removal of any light fixtures has the potential to disturb PCBs. If renovations of the interior of Buildings 578 and 1062 require the removal of fluorescent lighting fixtures where the ballasts and starters could contain PCBs, fixtures will be disposed in accordance with AFI 32-7086. The removal and proper disposal of light fixtures containing PCBs is a long-term, minor, beneficial impact.

4.10.4 No Action Alternative

Under the No Action Alternative, the contract ADAIR operations would not occur at Holloman AFB. As such, no increased quantity of HAZMAT would be used, and no increased quantity of hazardous wastes would be generated. No interior renovations of buildings to support contract ADAIR personnel would be required; therefore, there would be no potential disturbance of ACM, LBP, or PCBs in Holloman AFB buildings. As a result, there would be no change on any HAZMAT or hazardous or special wastes.

CHAPTER 5 CUMULATIVE IMPACTS AND OTHER ENVIRONMENTAL CONSIDERATIONS

This section includes an analysis of the potential cumulative impacts by considering past, present, and reasonably foreseeable future actions; potential unavoidable adverse impacts; the relationship between short-term uses of resources and long-term productivity; and irreversible and irretrievable commitment of resources.

5.1 CUMULATIVE EFFECTS

The CEQ regulations stipulate that the cumulative effects analysis considers the potential environmental consequences resulting from "the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions" (40 CFR § 1508.7). In addition, CEQ published guidance for addressing and analyzing cumulative impacts under NEPA. CEQ's publication, *Considering Cumulative Effects Under the National Environmental Policy Act* (January 1997) provides additional guidance for conducting an effective and informative cumulative impacts analysis.

The baseline conditions at Holloman AFB were discussed in **Chapter 3**. The potential for environmental consequences related to the Proposed Action or alternatives were addressed in **Chapter 4**. This section identifies and evaluates past, present, and reasonably foreseeable other projects, which could cumulatively affect environmental resources in conjunction with the Proposed Action.

Assessing cumulative effects begins with defining the scope of other actions and their potential interrelationship with the Proposed Action or alternatives. Other activities or projects that coincide with the location and timetable of the Proposed Action and other actions are evaluated. Actions not identified in **Chapter 2** as part of the Proposed Action or alternatives, but that could be considered as actions connected in time or space (40 CFR § 1508.25) may include projects that affect areas on or near the Holloman AFB or the special use airspace proposed for use by contract ADAIR.

An effort has been made to identify actions that are being considered or are in the planning phase at this time. To the extent that details regarding such actions exist and the actions have a potential to interact with the CAF ADAIR Proposed Action or alternatives at Holloman AFB, these actions are included in this cumulative analysis. This approach enables decision makers to have the most current information available in order that they can evaluate the potential environmental consequences of the Proposed Action.

5.2 PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS

Past, present, and reasonably foreseeable actions by the Air Force on Holloman AFB as well as in the region were considered. A review of the available information from the BLM, US Forest Service, and NPS indicated that there were no major projects with the potential to create cumulative impacts when combined with the proposed project and other reasonably foreseeable future projects.

5.2.1 Air Force Actions

Recent past and ongoing military actions at Holloman AFB were considered as part of the baseline or existing condition in the appropriate ROI. Each project summarized in this section was reviewed to consider the implication of each action with the Proposed Action or alternatives. Potential overlap in the affected area and project timing were considered.

Holloman AFB is an active military installation that experiences continuous evolution of mission and operational requirements. All construction projects must comply with land use controls, which include safety and environmental constraints, which are outlined in the IDP (Holloman AFB, 2016b). Holloman AFB, like other major military installations, requires new construction, infrastructure improvements, and general maintenance. These routine projects are environmentally cleared using NEPA's Categorical Exclusion process and would continue to occur during operation of the Proposed Action. In addition to these routine projects, the past, present, and reasonably foreseeable future major Air Force projects anticipated to occur on the base are listed in **Table 5-1**. Anticipated future off-base projects that may overlap in the potentially affected area or project timing with the Proposed Action were also considered and are discussed in **Section 5.2.2**.

Table 5-1
Past, Present, and Reasonably Foreseeable Future Projects at Holloman Air Force Base

Scheduled Project	Project Summary	Implementation Date	Relevance to Proposed Action	Interaction with Resources
Past Actions				
MQ-1 Predator and MQ-9 Reaper Unmanned Aircraft System Second Formal Training Unit (FTU-2) Beddown EA	Project included stand-up a second Unmanned Aircraft System FTU and relocated the existing FTU operating at Creech AFB, Nevada to another location. Beddown included 38 MQ-1 Predator and MQ-9 Reaper aircraft and up to 800 personnel. Proposed Action included new facility construction and renovation to support the beddown.	April 2009	Use of airspace proposed for use by ADAIR	Airspace Management and Use, Noise, Air Quality, Socioeconomics
Recapitalization of the 49th Wing Combat Capabilities and Capacities for Holloman AFB EA	Project included relocation of two F-16 training squadrons with 50 Primary Aircraft Inventory and six Backup Aircraft Inventory aircraft to Holloman AFB in two phases. Construction of new facilities and renovation of underutilized facilities was required.	July 2011	Use of airspace proposed for use by ADAIR; squadrons located at Holloman AFB	Airspace Management and Use, Noise, Air Quality, Socioeconomics
Holloman Air Force Base F-16 Use in White Sands Missile Range R-5111C/D Airspace EA	Project included expansion of F-16 pilot training flight into available restricted areas not being used for F-16 training missions.	July 2017	Use of airspace proposed for use by ADAIR	Airspace Management, Noise, Air Quality

Table 5-1
Past, Present, and Reasonably Foreseeable Future Projects at Holloman Air Force Base

Scheduled Project	Project Summary	Implementation Date	Relevance to Proposed Action	Interaction with Resources
Interim Relocation of Two F-16 Squadrons EA	Project included temporary relocation of two squadrons of F-16s from Hill AFB, Utah, to a location currently hosting an F-16 FTU. Holloman AFB and JBSA-Lackland were analyzed as alternative locations.	May 2017	Squadrons located at Holloman AFB	Airspace Management and Use, Noise, Air Quality, Socioeconomics
Present Actions				
Special Use Airspace Optimization at Holloman AFB Draft EIS	Project includes optimization of special use airspace available for pilot training use through reconfiguration of existing airspace and establishing new airspace to accommodate current and future training requirements.	Draft EIS Public Comment Period October 2019 – January 2020	Potential change to airspace proposed for use by Holloman AFB squadrons, but note that ADAIR could not use that potential western New Mexico airspace due to operational distance and time limitations of ADAIR aircraft (see **Section 2.4**)	Airspace Management and Use
Future Actions				
Permanent Beddown of One F-16 Squadron – EIAP	Project includes permanently locating one squadron of F-16 aircraft at Holloman AFB that are currently located at Holloman AFB on an interim basis.	Anticipated 2021	Overlap with proposed ADAIR implementation on base and in the airspace proposed for use	Airspace Management and Use, Noise, Air Quality, Socioeconomics
MQ-9 Formal Training Unit Operations Facility	MILCON project includes a 212,000-square-foot data center/academic facility.	Construction anticipated 2019	Construction overlap with proposed ADAIR implementation on base	Noise, Air Quality, Land Use
NC3 Shipping/Storage Facility	MILCON project includes a 67,000-square-foot warehouse in Basic Expeditionary Airfield Resources Base.	Construction anticipated 2021	Construction overlap during the proposed ADAIR operations on base	Noise, Air Quality, Land Use

Notes:
ADAIR = adversary air; AFB = Air Force Base; DOPAA = Description of the Proposed Action and Alternatives; EA = Environmental Assessment; EIS = Environmental Impact Statement; FTU = formal training unit; JBSA = Joint Base San Antonio; MILCON = military construction;

5.2.2 Nonfederal Actions

Nonfederal actions such as new development or construction projects occurring in the area surrounding Holloman AFB were considered for potential cumulative impacts. The area surrounding Holloman AFB is primarily rural, agricultural, and ranching with a mix of private, state, federal, and tribal lands; the nearest populated area is Alamogordo, approximately 6 mi from the installation. The region is expected to experience economic growth over the next few decades from tourism-based activities; renewable energy development; science, technology, engineering and math–based research; motion picture filming; and, subsequently, induced population growth and associated infrastructure development (Doña Ana County, 2015); however, no reasonably foreseeable future actions beyond the conceptual phase were identified in the Holloman AFB area. As such, no nonfederal actions were included for consideration in the cumulative impact analysis.

5.3 CUMULATIVE EFFECTS ANALYSIS

The following analysis considers how projects identified in **Table 5-1** could cumulatively result in potential environmental consequences with the Proposed Action.

5.3.1 Airspace Management and Use

Cumulative impacts on airspace from contract ADAIR operations, in addition to past, present, and reasonably foreseeable future actions is expected to be negligible. There is the potential for new and modified airspace from the special use airspace optimization effort that would increase airspace operational capacity, and thereby, result in a beneficial impact on airspace management and use.

5.3.2 Noise

The Proposed Action and alternatives, in addition to past, present, and reasonably foreseeable future actions on and off Holloman AFB would potentially result in negligible to minor cumulative impacts on noise for the High, Medium, and Low Noise Scenarios. MILCON projects (MQ-9 Training Unit Operations Facility and NC3 Shipping/Storage Facility) on the installation are proposed during the same period as the Proposed Action at Holloman AFB. Since construction noise is localized to the construction sites and would be short-term, no cumulative noise impacts are anticipated. The addition of contract ADAIR aircraft operating at supersonic speeds means that the number of sonic booms in the MOAs and Restricted Areas would increase; but this increase is expected to be negligible in the proposed ADAIR airspace compared to what currently exists; therefore, no cumulative effect on noise is expected in the airspace.

5.3.3 Safety

The Proposed Action and alternatives in addition to past, present, and reasonably foreseeable future actions on and off Holloman AFB would follow existing safety procedures and policies for ground and flight operations. Safety zones would not change under contract ADAIR. Contract personnel will be trained and required to follow safety procedures in accordance with the Flight Crew Information File and established aircraft flight manuals. As such, no cumulative impact on ground and flight safety is expected with implementation of the Proposed Action.

5.3.4 Air Quality

The Proposed Action and alternatives would result in to moderate cumulative impacts on air quality; however, within threshold levels in the vicinity of the airfield. For all pollutants, the Proposed Action emissions at the installation represent a small fraction of emissions for Otero County and the annual emission increase was considered less than significant. With the addition of proposed construction projects (MQ-9 Training Unit Operations Facility and NC3 Shipping/Storage Facility) at Holloman AFB, PM_{10} emissions could increase, but those increases would be short in duration, and the incremental impact on air quality would be less than significant.

There would be no project impacts on air quality within the special use airspace proposed to support ADAIR operations. With the potential modifications to the airspace under the airspace optimization proposal, there is the potential for increased emissions; however, these emissions would be widely dispersed, and therefore impacts on air quality would be less than significant. Overall, no incremental change to air quality is expected when adding the Proposed Action to past, present, and reasonably foreseeable future actions; therefore, potential cumulative impacts on air quality is expected to be minor to moderate.

5.3.5 Biological Resources

The Proposed Action and alternatives, in addition to past, present, and reasonably foreseeable future actions on and off the Holloman AFB would result in less than significant cumulative impacts on biological resources. There are no project impacts on threatened and endangered species on base or beneath and within the MOAs or Restricted Areas proposed for use. The increased use of chaff and flares within the proposed MOAs and Restricted Areas would have a minor impact on birds and mammals. When added to past, present, and foreseeable future actions, the Proposed Action would result in an increased risk of aircraft bird and other wildlife strikes. Compliance with the Holloman AFB BASH prevention program would reduce the potential cumulative risk of contracted sortie operations associated with aircraft bird and other wildlife conflicts. No significant cumulative effects on biological resources would be expected.

5.3.6 Land Use

The Proposed Action and alternatives, in addition to past, present, and reasonably foreseeable future actions on and off Holloman AFB are consistent with existing land uses; therefore, no cumulative impacts on land use are anticipated. There are two major building construction projects (MQ-9 Training Unit Operations Facility and NC3 Shipping/Storage Facility) proposed on the base; however, these new building construction projects would be consistent with existing land uses.

5.3.7 Socioeconomics – Income and Employment

The Proposed Action and alternatives, as well as past, present, and reasonably foreseeable future actions on and off the Holloman AFB would not result in an adverse cumulative impact on the region’s employment; however, the Proposed Action would increase annual expenditures in the local economy to approximately $48 million at the installation. This economic boost to the region represents a long-term, beneficial impact on the local economy. The construction of the MQ-9 Training Unit Operations Facility and NC3 Shipping/Storage Facility would further benefit the local economy through the purchase of equipment, construction materials, and employment opportunities.

5.3.8 Environmental Justice and Protection of Children

The Proposed Action and alternatives, as well as past, present, and reasonably foreseeable future actions on and off the Holloman AFB are not expected to have a disproportionate cumulative impact on minority and low-income populations or children from increased noise emissions.

5.3.9 Hazardous Materials and Wastes, Contaminated Sites, and Toxic Substances

The Proposed Action and alternatives, as well as past, present, and reasonably foreseeable future actions on and off Holloman AFB are not anticipated to result in significant cumulative impacts on the management of hazardous materials and wastes, and toxic substances. Storage and quantity of jet fuels, solvents, oil, and other hazardous materials supporting contract ADAIR operations would increase in addition to past, present, and foreseeable future projects; however, this increase would result in a minor cumulative effect. The proposed contract ADAIR project in addition to other proposed projects would require compliance with the Holloman AFB *Hazardous Waste Management Plan*. The plan ensures that procedures for managing hazardous waste are in accordance with federal, state, and local regulations; therefore, no cumulative impacts on the storage and disposal of hazardous waste is expected. Likewise, the addition of the proposed contract ADAIR project and foreseeable future projects would be required to adhere to the Holloman AFB

Asbestos Management and Operations Plan for any modifications to existing structures. No significant adverse cumulative impacts on hazardous materials and wastes, contaminated sites, and toxic substances are expected.

5.4 RELATIONSHIP BETWEEN SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

CEQ regulations (Section 1502.16) specify that analysis must address "…the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity." Attention should be given to impacts that narrow the range of beneficial uses of the environment in the long term or pose a long-term risk to human health or safety. This section evaluates the short-term benefits of the proposed project compared to the long-term productivity derived from not pursuing the Proposed Action and alternatives.

Short-term effects on the environment are generally defined as a direct consequence of a project in its immediate vicinity. For example, short-term effects could include localized disruptions from construction. Environmental commitments, mitigation measures, and BMPs in place for each project should reduce potential impacts or disruptions.

The Proposed Action involves providing dedicated contract ADAIR sorties to employ adversary tactics within existing airspace. There would be no short-term effects on the airspace proposed for use by contract ADAIR sorties and, therefore, would not adversely affect the long-term productivity and future use of the special use airspace. The Proposed Action also includes elements affecting the Base such as contract ADAIR aircraft, facilities, maintenance, and personnel. Under the Proposed Action, there would be no new construction. Existing installation facilities would be used with some internal modifications. While other maintenance activities and proposed new construction would be occurring in the vicinity of the Proposed Action facilities, construction associated with these modifications represent a negligible effect on the short-term use of construction labor, goods, and services. No negative effects are expected from the Proposed Action short-term use or long-term productivity.

5.5 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that the uses of these resources have on future generations. Irreversible effects result primarily 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.

The Proposed Action would use existing airspace to conduct contract ADAIR activities and would not result in an irreversible and irretrievable commitment of airspace resources; however, the Proposed Action calls for 3,200 contracted sorties which represent an increase of 34 percent in the number of operations over the baseline training sorties. As such, flight operations and training would result in the consumption of additional fuel, increasing the irreversible and irretrievable commitment of fuels. The addition of 93 contract personnel to support the Proposed Action also would create additional fuel consumption from daily commute travel to and from Holloman AFB. Consumption of fuel associated with the Proposed Action, in addition to the total use of available fuels, is expected to result in a negligible decrease to the overall supply of regional petroleum resources. No significant irreversible or irretrievable commitment of resources is anticipated from implementing the Proposed Action.

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APPENDICES

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APPENDIX A

INTERAGENCY AND INTERGOVERNMENTAL COORDINATION AND CONSULTATIONS

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Table of Contents

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Appendix A-1

Interagency and Intergovernmental Coordination for Environmental Planning – Description of Proposed Action and Alternatives

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Coordination Letters

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (AETC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

03 AUG 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Ste 1700
Holloman AFB NM 88330-8277

Jeff Pappas
State Historic Preservation Officer
NM Historic Preservation Division
407 Galisteo Street, Suite 236
Santa Fe NM 87501

Dear Dr. Pappas

The US Air Force (Air Force), and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), New Mexico, to address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advance combat training missions. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Air Force NEPA regulations, the Air Force is in the process of preparing an Environmental Assessment to assess the potential environmental impacts of contract ADAIR support at Holloman AFB.

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Pursuant to 36 CFR Sections 800.4(a) and (b), we request your assistance defining the Area of Potential Effects and information on any historic properties located therein that may be affected by our undertaking. A summary of the Description of Proposed Action and Alternatives (DOPAA) containing location maps is attached for your review. Your comments will help us develop the scope of our environmental review.

COMBAT AIRPOWER STARTS HERE

To ensure the Air Force has sufficient time to consider your input in the preparation of the Draft Environmental Assessment, and for compliance with Section 106 of the National Historic Preservation Act, please forward your written comments or requests for additional information to Ms. Jennifer Frederick at 49 CES/CEIE, 550 Tabosa Ave, Holloman AFB, New Mexico 88330. You may also email your comments to jennifer.frederick.2@us.af.mil. We request your comments within 30 days of receipt of this letter to ensure we can address them during the environmental impact analysis process. Thank you for your assistance.

Sincerely

JOSEPH L. CAMPO, Colonel, USAF
Commander

Attachment:
DOPAA Summary

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (AETC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

03 AUG 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Ste 1700
Holloman AFB NM 88330-8277

Amy Lueders
Regional Director
U.S. Fish and Wildlife Service, Southwest Region
500 Gold Avenue SW
Albuquerque NM 87102

Dear Ms. Lueders

The US Air Force (Air Force), and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), New Mexico, to address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advance combat training missions. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Air Force NEPA regulations, the Air Force is in the process of preparing an Environmental Assessment to assess the potential environmental impacts of contract ADAIR support at Holloman AFB.

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Pursuant to Section 7 of the Endangered Species Act, we request additional information on what listed, proposed, and candidate species or designated or proposed critical habitats may be in the action area. This information and your comments on the Proposed Action will help us develop the scope of our environmental review. A summary of the Description of Proposed Action and Alternatives (DOPAA) is attached for your review.

COMBAT AIRPOWER STARTS HERE

Please forward additional information and your written comments to Mr. Ramon Acevedo-Cruz at 49 CES/CEIE, 550 Tabosa Ave, Holloman AFB, New Mexico 88330. You may also email your comments to ramon.acevedocruz.3@us.af.mil. We request your comments within 30 days of receipt of this letter to ensure we can address them during the environmental impact analysis process. Thank you for your assistance.

Sincerely

JOSEPH L. CAMPO, Colonel, USAF
Commander

Attachment:
DOPAA Summary

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Jennifer Montoya
Planning and Environmental Coordinator
Bureau of Land Management, Las Cruces District Office
1800 Marquess Street
Las Cruces, NM 88005

Dear Ms. Montoya

The US Air Force (Air Force), and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), New Mexico, to address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advance combat training missions. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Air Force NEPA regulations, the Air Force is in the process of preparing an Environmental Assessment to assess the potential environmental impacts of contract ADAIR support at Holloman AFB.

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Robert Houston
Chief, Special Projects (NEPA)
U.S. Environmental Protection Agency, Region 6
1445 Ross Avenue, Ste. 1200
Dallas, TX 75202

Dear Mr. Houston

The US Air Force (Air Force), and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), New Mexico, to address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advance combat training missions. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Air Force NEPA regulations, the Air Force is in the process of preparing an Environmental Assessment to assess the potential environmental impacts of contract ADAIR support at Holloman AFB.

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JOSEPH L. CAMPO, Colonel, USAF
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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Deborah Hartell
NEPA Support Division
White Sands Missile Range
Building 163, Springfield Street
White Sands Missile Range, NM 88002

Dear Ms. Hartell

The US Air Force (Air Force), and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), New Mexico, to address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advance combat training missions. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Air Force NEPA regulations, the Air Force is in the process of preparing an Environmental Assessment to assess the potential environmental impacts of contract ADAIR support at Holloman AFB.

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JOSEPH L. CAMPO, Colonel, USAF
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1. DOPAA Summary

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Ken Lance
Airspace Manager
White Sands Missile Range
2506 East Ridge
Alamogordo, NM 88310

Dear Mr. Lance

The US Air Force (Air Force), and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), New Mexico, to address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advance combat training missions. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Air Force NEPA regulations, the Air Force is in the process of preparing an Environmental Assessment to assess the potential environmental impacts of contract ADAIR support at Holloman AFB.

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JOSEPH L. CAMPO, Colonel, USAF
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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Mike Sloane
Director
NM Dept of Game and Fish
One Wildlife Way
Santa Fe, NM 87507

Dear Mr. Sloane

The US Air Force (Air Force), and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), New Mexico, to address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advance combat training missions. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Air Force NEPA regulations, the Air Force is in the process of preparing an Environmental Assessment to assess the potential environmental impacts of contract ADAIR support at Holloman AFB.

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JOSEPH L. CAMPO, Colonel, USAF
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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Barbara Mick
Chair
Alamogordo Chamber of Commerce
1301 North White Sands Blvd.
Alamogordo, NM 88310

Dear Ms. Mick

The US Air Force (Air Force), and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), New Mexico, to address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advance combat training missions. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Air Force NEPA regulations, the Air Force is in the process of preparing an Environmental Assessment to assess the potential environmental impacts of contract ADAIR support at Holloman AFB.

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JOSEPH L. CAMPO, Colonel, USAF
Commander

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Michael Espiritu
OCEDC President/CEO
Alamogordo Chamber of Commerce
1301 North White Sands Blvd.
Alamogordo, NM 88310

Dear Mr. Espiritu

The US Air Force (Air Force), and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), New Mexico, to address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advance combat training missions. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Air Force NEPA regulations, the Air Force is in the process of preparing an Environmental Assessment to assess the potential environmental impacts of contract ADAIR support at Holloman AFB.

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JOSEPH L. CAMPO, Colonel, USAF
Commander

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DEPARTMENT OF THE AIR FORCE
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HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Director
Alamogordo City Commission
1376 East 9th Street
Alamogordo, NM 88310

Dear Sir or Madam

The US Air Force (Air Force), and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), New Mexico, to address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advance combat training missions. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Air Force NEPA regulations, the Air Force is in the process of preparing an Environmental Assessment to assess the potential environmental impacts of contract ADAIR support at Holloman AFB.

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JOSEPH L. CAMPO, Colonel, USAF
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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Richard Boss
Mayor
City of Alamogordo
1376 East 9th Street
Alamogordo, NM 88310

Dear Honorable Boss

The US Air Force (Air Force), and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), New Mexico, to address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advance combat training missions. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Air Force NEPA regulations, the Air Force is in the process of preparing an Environmental Assessment to assess the potential environmental impacts of contract ADAIR support at Holloman AFB.

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JOSEPH L. CAMPO, Colonel, USAF
Commander

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Sandy Whitehead
Mayor
City of Truth or Consequences
505 Sims Street
Truth or Consequences, NM 87901

Dear Honorable Whitehead

The US Air Force (Air Force), and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), New Mexico, to address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advance combat training missions. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Air Force NEPA regulations, the Air Force is in the process of preparing an Environmental Assessment to assess the potential environmental impacts of contract ADAIR support at Holloman AFB.

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JOSEPH L. CAMPO, Colonel, USAF
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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Fernando R. Macias
County Manager
Dona Ana County
845 North Motel Boulevard
Las Cruces, NM 88007

Dear Mr. Macias

The US Air Force (Air Force), and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), New Mexico, to address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advance combat training missions. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Air Force NEPA regulations, the Air Force is in the process of preparing an Environmental Assessment to assess the potential environmental impacts of contract ADAIR support at Holloman AFB.

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JOSEPH L. CAMPO, Colonel, USAF
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HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Chairman
Dona Ana County Commissioners
845 North Motel Boulevard
Las Cruces, NM 88007

Dear Sir or Madam

The US Air Force (Air Force), and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), New Mexico, to address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advance combat training missions. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Air Force NEPA regulations, the Air Force is in the process of preparing an Environmental Assessment to assess the potential environmental impacts of contract ADAIR support at Holloman AFB.

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HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Director
Otero County Commissioners
1101 New York Ave.
Alamogordo, NM 88310

Dear Sir or Madam

The US Air Force (Air Force), and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), New Mexico, to address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advance combat training missions. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Air Force NEPA regulations, the Air Force is in the process of preparing an Environmental Assessment to assess the potential environmental impacts of contract ADAIR support at Holloman AFB.

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Sincerely

JOSEPH L. CAMPO, Colonel, USAF
Commander

Attachment
1. DOPAA Summary

COMBAT AIRPOWER STARTS HERE

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Bruce Swingle
County Manager
Sierra County
855 Van Platten Street
Truth or Consequences, NM 87901

Dear Mr. Swingle

The US Air Force (Air Force), and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), New Mexico, to address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advance combat training missions. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Air Force NEPA regulations, the Air Force is in the process of preparing an Environmental Assessment to assess the potential environmental impacts of contract ADAIR support at Holloman AFB.

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Chairman
Sierra County Commissioners
855 Van Patten Street
Truth or Consequences, NM 87901

Dear Sir or Madam

The US Air Force (Air Force), and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), New Mexico, to address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advance combat training missions. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Air Force NEPA regulations, the Air Force is in the process of preparing an Environmental Assessment to assess the potential environmental impacts of contract ADAIR support at Holloman AFB.

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Delilah Walsh
County Manager
Socorro County
PO Box I
Socorro, NM 87801

Dear Ms. Walsh

The US Air Force (Air Force), and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), New Mexico, to address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advance combat training missions. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Air Force NEPA regulations, the Air Force is in the process of preparing an Environmental Assessment to assess the potential environmental impacts of contract ADAIR support at Holloman AFB.

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Director
Socorro County Commission
PO Box I
Socorro, NM 87801

Dear Sir or Madam

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Chris Ventura
Mayor
Town of Carrizozo
P.O. Box 247
Carrizozo, NM 88301

Dear Honorable Ventura

The US Air Force (Air Force), and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), New Mexico, to address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advance combat training missions. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Air Force NEPA regulations, the Air Force is in the process of preparing an Environmental Assessment to assess the potential environmental impacts of contract ADAIR support at Holloman AFB.

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HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Ken Miyagishima
Mayor
City of Las Cruces
PO Box 20000
Las Cruces, NM 88004

Dear Honorable Miyagishima

The US Air Force (Air Force), and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), New Mexico, to address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advance combat training missions. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Air Force NEPA regulations, the Air Force is in the process of preparing an Environmental Assessment to assess the potential environmental impacts of contract ADAIR support at Holloman AFB.

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Lynn D. Crawford
Mayor
Village of Ruidoso
313 Cree Meadows Dr.
Ruidoso, NM 88345

Dear Honorable Crawford

The US Air Force (Air Force), and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), New Mexico, to address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advance combat training missions. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Air Force NEPA regulations, the Air Force is in the process of preparing an Environmental Assessment to assess the potential environmental impacts of contract ADAIR support at Holloman AFB.

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August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Dennis Kintigh
Mayor
City of Roswell
425 N. Richardson Ave.
Roswell, NM 88201

Dear Honorable Kintigh

The US Air Force (Air Force), and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), New Mexico, to address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advance combat training missions. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Air Force NEPA regulations, the Air Force is in the process of preparing an Environmental Assessment to assess the potential environmental impacts of contract ADAIR support at Holloman AFB.

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HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Gary Williams
Mayor
City of Ruidoso Downs
103 Acequia
Ruidoso Downs, NM 88346

Dear Honorable Williams

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August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Director
Lincoln County Commissioners
Commission Chambers, 300 Central Ave.
P.O. Box 711
Carrizozo, NM 88301

Dear Sir or Madam

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HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Director
Cloudcroft Chamber of Commerce
P.O. Box 1291
Cloudcroft, NM 88317

Dear Sir or Madam

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August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Director
Las Cruces Chamber of Commerce
150 E Lohman Ave
Las Cruces, NM 88001

Dear Sir or Madam

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DEPARTMENT OF THE AIR FORCE
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HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Director
Ruidoso Valley Chamber of Commerce
720 Sudderth Dr.
Ruidoso, NM 88345

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Travis Moseley
Superintendent
Lincoln National Forest
3463 Las Palomas
Alamogoro, NM 88310

Dear Mr. Moseley

The US Air Force (Air Force), and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), New Mexico, to address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advance combat training missions. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Air Force NEPA regulations, the Air Force is in the process of preparing an Environmental Assessment to assess the potential environmental impacts of contract ADAIR support at Holloman AFB.

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HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Dara Dana
Chaves County
1 Saint Mary's Place
Roswell, NM 88203

Dear Commissioner Dana

The US Air Force (Air Force), and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), New Mexico, to address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advance combat training missions. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Air Force NEPA regulations, the Air Force is in the process of preparing an Environmental Assessment to assess the potential environmental impacts of contract ADAIR support at Holloman AFB.

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Please forward your written comments or requests for additional information to Ms. Marissa Hartleb at 49 CES/CEIE, 550 Tabosa Ave, Holloman AFB, New Mexico 88330. You may also email your comments to marissa.hartleb@us.af.mil. We request your comments within 30 days of receipt of this letter to ensure we can address them during the environmental impact analysis process. Thank you for your assistance.

Sincerely

JOSEPH L. CAMPO, Colonel, USAF
Commander

Attachment
1. DOPAA Summary

COMBAT AIRPOWER STARTS HERE

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Stanton L. Riggs
County Manager
Chaves County
1 Saint Mary's Place
Roswell, NM 88203

Dear Mr. Riggs

The US Air Force (Air Force), and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), New Mexico, to address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advance combat training missions. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Air Force NEPA regulations, the Air Force is in the process of preparing an Environmental Assessment to assess the potential environmental impacts of contract ADAIR support at Holloman AFB.

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Gerald Matherly
Otero County
1101 New York Avenue
Alamogordo, NM 88310

Dear Commissioner Matherly

The US Air Force (Air Force), and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), New Mexico, to address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advance combat training missions. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Air Force NEPA regulations, the Air Force is in the process of preparing an Environmental Assessment to assess the potential environmental impacts of contract ADAIR support at Holloman AFB.

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JOSEPH L. CAMPO, Colonel, USAF
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COMBAT AIRPOWER STARTS HERE

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Pamela Heltner
County Manager
Otero County
1101 New York Avenue, Room 106
Alamogordo, NM 88310

Dear Ms. Heltner

The US Air Force (Air Force), and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), New Mexico, to address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advance combat training missions. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Air Force NEPA regulations, the Air Force is in the process of preparing an Environmental Assessment to assess the potential environmental impacts of contract ADAIR support at Holloman AFB.

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JOSEPH L. CAMPO, Colonel, USAF
Commander

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COMBAT AIRPOWER STARTS HERE

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Xochitl Torres Small
New Mexico Representative, District 2
U.S. House of Representatives
430 Cannon HOB
Washington, DC 20515

Dear Honorable Small

The US Air Force (Air Force), and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), New Mexico, to address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advance combat training missions. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Air Force NEPA regulations, the Air Force is in the process of preparing an Environmental Assessment to assess the potential environmental impacts of contract ADAIR support at Holloman AFB.

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Sincerely

JOSEPH L. CAMPO, Colonel, USAF
Commander

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2. DOPAA Summary

COMBAT AIRPOWER STARTS HERE

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Martin Heinrich
New Mexico Senator
U.S. Senate
505 South Main Street, Suite 148
Las Cruces, NM 88001

Dear Honorable Heinrich

The US Air Force (Air Force), and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), New Mexico, to address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advance combat training missions. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Air Force NEPA regulations, the Air Force is in the process of preparing an Environmental Assessment to assess the potential environmental impacts of contract ADAIR support at Holloman AFB.

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JOSEPH L. CAMPO, Colonel, USAF
Commander

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Tom Udall
New Mexico Senator
U.S. Senate
201 N. Church Street, Suite 201B
Las Cruces, NM 88001

Dear Honorable Udall

The US Air Force (Air Force), and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), New Mexico, to address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advance combat training missions. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Air Force NEPA regulations, the Air Force is in the process of preparing an Environmental Assessment to assess the potential environmental impacts of contract ADAIR support at Holloman AFB.

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JOSEPH L. CAMPO, Colonel, USAF
Commander

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Commander
White Sands Missile Range
Building 1510
White Sands Missile Range, NM 88002

Dear Commander

The US Air Force (Air Force), and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), New Mexico, to address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advance combat training missions. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Air Force NEPA regulations, the Air Force is in the process of preparing an Environmental Assessment to assess the potential environmental impacts of contract ADAIR support at Holloman AFB.

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JOSEPH L. CAMPO, Colonel, USAF
Commander

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Ned Farquhar
NM SPOC Energy and Environmental Policy Advisor
State Capitol Building, Suite 400
Santa Fe, NM 87501

Dear Mr. Farquhar

The US Air Force (Air Force), and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), New Mexico, to address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advance combat training missions. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Air Force NEPA regulations, the Air Force is in the process of preparing an Environmental Assessment to assess the potential environmental impacts of contract ADAIR support at Holloman AFB.

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Field Manager
Bureau of Land Management
Roswell Field Office
2909 West Second St.
Roswell, NM 88201

Dear Sir or Madam

The US Air Force (Air Force), and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), New Mexico, to address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advance combat training missions. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Air Force NEPA regulations, the Air Force is in the process of preparing an Environmental Assessment to assess the potential environmental impacts of contract ADAIR support at Holloman AFB.

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Mark Matthews
Field Manager
Bureau of Land Management, Socorro Field Office
901 S. Highway 85
Socorro, NM 97801-4168

Dear Mr. Matthews

The US Air Force (Air Force), and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), New Mexico, to address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advance combat training missions. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Air Force NEPA regulations, the Air Force is in the process of preparing an Environmental Assessment to assess the potential environmental impacts of contract ADAIR support at Holloman AFB.

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Marie Sauter
Superintendent
White Sands National Monument
P.O. Box 1086
Holloman AFB, NM 88330

Dear Ms. Sauter

The US Air Force (Air Force), and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), New Mexico, to address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advance combat training missions. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Air Force NEPA regulations, the Air Force is in the process of preparing an Environmental Assessment to assess the potential environmental impacts of contract ADAIR support at Holloman AFB.

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Governor Fred Vallo
Pueblo of Acoma
PO Box 309
Acoma Pueblo, NM 87034-0309

Dear Governor Vallo

The purpose of this letter is twofold: to give you an opportunity to review and comment on a proposed action in which the Pueblo of Acoma may have an interest; and to invite the Pueblo of Acoma to participate in government-to-government consultation with the US Air Force (Air Force) pursuant to Section 106 of the National Historic Preservation Act (NHPA).

The Air Force and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), New Mexico, to address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advance combat training missions. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Air Force NEPA regulations, the Air Force is in the process of preparing an Environmental Assessment to assess the potential environmental impacts of contract ADAIR support at Holloman AFB.

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A summary of the Description of Proposed Action and Alternatives (DOPAA) is attached for your review. Pursuant to Section 106 of the NHPA, implementing regulations at 36 Code of Federal Regulations (CFR) Part 800, and Department of Defense Instruction 4710.02 Section 6, *DoD Interactions with Federally-Recognized Tribes*, we request government-to-government consultation on this Proposed Action. In particular, we invite you, pursuant to 36 CFR Section 800.4(a)(4), to provide information on any properties of historic, religious, or cultural significance that may be affected by our proposed undertaking. Regardless of whether the Tribe chooses to consult on this project, the Air Force will comply with the Native American Graves Protection and Repatriation Act by informing you of any inadvertent discovery of archaeological or human remains and consulting on their disposition. Being defined as a federal undertaking, we will be seeking input and inviting other potential consulting parties, such as the New Mexico State Historic Preservation Office.

COMBAT AIRPOWER STARTS HERE

At your earliest convenience, please provide information, comments, or requests for additional information to Ms. Jennifer Frederick at 49 CES/CEIE, 550 Tabosa Ave, Holloman AFB, New Mexico 88330. You may also email your comments to jennifer.frederick.2@us.af.mil. This will ensure we can address them during the environmental impact analysis process. Thank you for your assistance.

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JOSEPH L. CAMPO, Colonel, USAF
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Attachment:
DOPAA Summary

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Governor Leroy Arquero
Pueblo of Cochiti
PO Box 70
Cochiti Pueblo, NM 87072-0070

Dear Governor Arquero

The purpose of this letter is twofold: to give you an opportunity to review and comment on a proposed action in which the Pueblo of Cochiti may have an interest; and to invite the Pueblo of Cochiti to participate in government-to-government consultation with the US Air Force (Air Force) pursuant to Section 106 of the National Historic Preservation Act (NHPA).

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DOPAA Summary

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Chairman Herman Honanie
Hopi Tribe
PO Box 123
Kykotsmovi, AZ 86039-0123

Dear Chairman Honanie

The purpose of this letter is twofold: to give you an opportunity to review and comment on a proposed action in which the Hopi Tribe may have an interest; and to invite the Hopi Tribe to participate in government-to-government consultation with the US Air Force (Air Force) pursuant to Section 106 of the National Historic Preservation Act (NHPA).

The Air Force and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), New Mexico, to address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advance combat training missions. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Air Force NEPA regulations, the Air Force is in the process of preparing an Environmental Assessment to assess the potential environmental impacts of contract ADAIR support at Holloman AFB.

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COMBAT AIRPOWER STARTS HERE

At your earliest convenience, please provide information, comments, or requests for additional information to Ms. Jennifer Frederick at 49 CES/CEIE, 550 Tabosa Ave, Holloman AFB, New Mexico 88330. You may also email your comments to jennifer.frederick.2@us.af.mil. This will ensure we can address them during the environmental impact analysis process. Thank you for your assistance.

Sincerely

JOSEPH L. CAMPO, Colonel, USAF
Commander

Attachment:
DOPAA Summary

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Governor E. Paul Torres
Pueblo of Isleta
PO Box 1270
Isleta, NM 87022-1270

Dear Governor Torres

The purpose of this letter is twofold: to give you an opportunity to review and comment on a proposed action in which the Pueblo of Isleta may have an interest; and to invite the Pueblo of Isleta to participate in government-to-government consultation with the US Air Force (Air Force) pursuant to Section 106 of the National Historic Preservation Act (NHPA).

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HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Governor Raymond Loretto
Pueblo of Jemez
PO Box 100
Jemez Pueblo, NM 87024-0100

Dear Governor Loretto

The purpose of this letter is twofold: to give you an opportunity to review and comment on a proposed action in which the Pueblo of Jemez may have an interest; and to invite the Pueblo of Jemez to participate in government-to-government consultation with the US Air Force (Air Force) pursuant to Section 106 of the National Historic Preservation Act (NHPA).

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HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

President Ty Vicenti
Jicarilla Apache Nation
PO Box 507
Dulce, NM 87528-0507

Dear President Vicenti

The purpose of this letter is twofold: to give you an opportunity to review and comment on a proposed action in which the Jicarilla Apache Nation may have an interest; and to invite the Jicarilla Apache Nation to participate in government-to-government consultation with the US Air Force (Air Force) pursuant to Section 106 of the National Historic Preservation Act (NHPA).

The Air Force and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), New Mexico, to address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advance combat training missions. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Air Force NEPA regulations, the Air Force is in the process of preparing an Environmental Assessment to assess the potential environmental impacts of contract ADAIR support at Holloman AFB.

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DOPAA Summary

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Governor Virgil A. Siow
Pueblo of Laguna
PO Box 194
Laguna Pueblo, NM 87026-0194

Dear Governor Siow

The purpose of this letter is twofold: to give you an opportunity to review and comment on a proposed action in which the Pueblo of Laguna may have an interest; and to invite the Pueblo of Laguna to participate in government-to-government consultation with the US Air Force (Air Force) pursuant to Section 106 of the National Historic Preservation Act (NHPA).

The Air Force and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), New Mexico, to address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advance combat training missions. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Air Force NEPA regulations, the Air Force is in the process of preparing an Environmental Assessment to assess the potential environmental impacts of contract ADAIR support at Holloman AFB.

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JOSEPH L. CAMPO, Colonel, USAF
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DOPAA Summary

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

President Danny Breuninger
Mescalero Apache Tribe
PO Box 227
Mescalero, NM 88340-0227

Dear President Breuninger

The purpose of this letter is twofold: to give you an opportunity to review and comment on a proposed action in which the Mescalero Apache Tribe may have an interest; and to invite the Mescalero Apache Tribe to participate in government-to-government consultation with the US Air Force (Air Force) pursuant to Section 106 of the National Historic Preservation Act (NHPA).

The Air Force and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), New Mexico, to address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advance combat training missions. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Air Force NEPA regulations, the Air Force is in the process of preparing an Environmental Assessment to assess the potential environmental impacts of contract ADAIR support at Holloman AFB.

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August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Governor Phillip A. Perez
Pueblo of Nambe
Route 1 Box 117-BB
Santa Fe, NM 87506-9702

Dear Governor Perez

The purpose of this letter is twofold: to give you an opportunity to review and comment on a proposed action in which the Pueblo of Nambe may have an interest; and to invite the Pueblo of Nambe to participate in government-to-government consultation with the US Air Force (Air Force) pursuant to Section 106 of the National Historic Preservation Act (NHPA).

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DEPARTMENT OF THE AIR FORCE
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HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

President Russell Begaye
Navajo Nation
PO Box 7440
Window Rock, AZ 86515-7440

Dear President Begaye

The purpose of this letter is twofold: to give you an opportunity to review and comment on a proposed action in which the Navajo Nation may have an interest; and to invite the Navajo Nation to participate in government-to-government consultation with the US Air Force (Air Force) pursuant to Section 106 of the National Historic Preservation Act (NHPA).

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HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Governor Earl Salazar
Ohkay Owingeh
PO Box 1099
Ohkay Owingeh Pueblo, NM 87566-1099

Dear Governor Salazar

The purpose of this letter is twofold: to give you an opportunity to review and comment on a proposed action in which the Ohkay Owingeh may have an interest; and to invite the Ohkay Owingeh to participate in government-to-government consultation with the US Air Force (Air Force) pursuant to Section 106 of the National Historic Preservation Act (NHPA).

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Governor Gary Pyne
Pueblo of Picuris
PO Box 127
Peñasco, NM 87553-0127

Dear Governor Pyne

The purpose of this letter is twofold: to give you an opportunity to review and comment on a proposed action in which the Pueblo of Picuris may have an interest; and to invite the Pueblo of Picuris to participate in government-to-government consultation with the US Air Force (Air Force) pursuant to Section 106 of the National Historic Preservation Act (NHPA).

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HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Governor Joseph M. Talachy
Pueblo of Pojoaque
78 Cities of Gold Road
Santa Fe, NM 87506-0918

Dear Governor Talachy

The purpose of this letter is twofold: to give you an opportunity to review and comment on a proposed action in which the Pueblo of Pojoaque may have an interest; and to invite the Pueblo of Pojoaque to participate in government-to-government consultation with the US Air Force (Air Force) pursuant to Section 106 of the National Historic Preservation Act (NHPA).

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COMBAT AIRPOWER STARTS HERE

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Sincerely

JOSEPH L. CAMPO, Colonel, USAF
Commander

Attachment:
DOPAA Summary

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Governor Isaac Lujan
Pueblo of Sandia
481 Sandia Loop
Bernalillo, NM 87004

Dear Governor Lujan

The purpose of this letter is twofold: to give you an opportunity to review and comment on a proposed action in which the Pueblo of Sandia may have an interest; and to invite the Pueblo of Sandia to participate in government-to-government consultation with the US Air Force (Air Force) pursuant to Section 106 of the National Historic Preservation Act (NHPA).

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HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Governor Ronald Tenorio
Pueblo of San Felipe
PO Box 4339
San Felipe Pueblo, NM 87001-4339

Dear Governor Tenorio

The purpose of this letter is twofold: to give you an opportunity to review and comment on a proposed action in which the Pueblo of San Felipe may have an interest; and to invite the Pueblo of San Felipe to participate in government-to-government consultation with the US Air Force (Air Force) pursuant to Section 106 of the National Historic Preservation Act (NHPA).

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DOPAA Summary

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Governor James Mountain
Pueblo of San Ildefonso
02 Tunyo Po
Santa Fe, NM 87506

Dear Governor Mountain

The purpose of this letter is twofold: to give you an opportunity to review and comment on a proposed action in which the Pueblo of San Ildefonso may have an interest; and to invite the Pueblo of San Ildefonso to participate in government-to-government consultation with the US Air Force (Air Force) pursuant to Section 106 of the National Historic Preservation Act (NHPA).

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DOPAA Summary

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Governor Lawrence Montoya
Pueblo of Santa Ana
2 Dove Road
Santa Ana Pueblo, NM 87004

Dear Governor Montoya

The purpose of this letter is twofold: to give you an opportunity to review and comment on a proposed action in which the Pueblo of Santa Ana may have an interest; and to invite the Pueblo of Santa Ana to participate in government-to-government consultation with the US Air Force (Air Force) pursuant to Section 106 of the National Historic Preservation Act (NHPA).

The Air Force and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), New Mexico, to address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advance combat training missions. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Air Force NEPA regulations, the Air Force is in the process of preparing an Environmental Assessment to assess the potential environmental impacts of contract ADAIR support at Holloman AFB.

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JOSEPH L. CAMPO, Colonel, USAF
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DOPAA Summary

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Governor J. Michael Chavarria
Pueblo of Santa Clara
PO Box 580
Española, NM 87532

Dear Governor Chavarria

The purpose of this letter is twofold: to give you an opportunity to review and comment on a proposed action in which the Pueblo of Santa Clara may have an interest; and to invite the Pueblo of Santa Clara to participate in government-to-government consultation with the US Air Force (Air Force) pursuant to Section 106 of the National Historic Preservation Act (NHPA).

The Air Force and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), New Mexico, to address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advance combat training missions. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Air Force NEPA regulations, the Air Force is in the process of preparing an Environmental Assessment to assess the potential environmental impacts of contract ADAIR support at Holloman AFB.

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Governor Thomas Moquino, Jr.
Kewa Pueblo
PO Box 99
Kewa Pueblo, NM 87052

Dear Governor Moquino, Jr.

The purpose of this letter is twofold: to give you an opportunity to review and comment on a proposed action in which the Kewa Pueblo may have an interest; and to invite the Kewa Pueblo to participate in government-to-government consultation with the US Air Force (Air Force) pursuant to Section 106 of the National Historic Preservation Act (NHPA).

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Governor Luis Romero
Pueblo of Taos
PO Box 1846
Taos, NM 87571

Dear Governor Romero

The purpose of this letter is twofold: to give you an opportunity to review and comment on a proposed action in which the Pueblo of Taos may have an interest; and to invite the Pueblo of Taos to participate in government-to-government consultation with the US Air Force (Air Force) pursuant to Section 106 of the National Historic Preservation Act (NHPA).

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Governor Milton Herrera
Pueblo of Tesuque
Route 42 Box 360-T
Santa Fe, NM 87506

Dear Governor Herrera

The purpose of this letter is twofold: to give you an opportunity to review and comment on a proposed action in which the Pueblo of Tesuque may have an interest; and to invite the Pueblo of Tesuque to participate in government-to-government consultation with the US Air Force (Air Force) pursuant to Section 106 of the National Historic Preservation Act (NHPA).

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DOPAA Summary

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Governor Carlos Hisa
Ysleta del Sur Pueblo
119 S. Old Pueblo Drive
El Paso, TX 79917

Dear Governor Hisa

The purpose of this letter is twofold: to give you an opportunity to review and comment on a proposed action in which the Ysleta del Sur Pueblo may have an interest; and to invite the Ysleta del Sur Pueblo to participate in government-to-government consultation with the US Air Force (Air Force) pursuant to Section 106 of the National Historic Preservation Act (NHPA).

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HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Governor David Pino
Pueblo of Zia
135 Capitol Square Drive
Zia Pueblo, NM 87053-6013

Dear Governor Pino

The purpose of this letter is twofold: to give you an opportunity to review and comment on a proposed action in which the Pueblo of Zia may have an interest; and to invite the Pueblo of Zia to participate in government-to-government consultation with the US Air Force (Air Force) pursuant to Section 106 of the National Historic Preservation Act (NHPA).

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The Proposed Action is to contract the support of an estimated 3,200 ADAIR flights by individual aircraft. Contract ADAIR may use different types of fighter aircraft available with acceptable capabilities to support training requirements. An estimated 12 contractor aircraft would be located at Holloman AFB. Training activities would use special use airspace near Holloman AFB; no airspace modifications would be required. Holloman AFB has existing facilities available for use and may require minimal interior modifications to be made ready for the contract ADAIR mission.

A summary of the Description of Proposed Action and Alternatives (DOPAA) is attached for your review. Pursuant to Section 106 of the NHPA, implementing regulations at 36 Code of Federal Regulations (CFR) Part 800, and Department of Defense Instruction 4710.02 Section 6, *DoD Interactions with Federally-Recognized Tribes*, we request government-to-government consultation on this Proposed Action. In particular, we invite you, pursuant to 36 CFR Section 800.4(a)(4), to provide information on any properties of historic, religious, or cultural significance that may be affected by our proposed undertaking. Regardless of whether the Tribe chooses to consult on this project, the Air Force will comply with the Native American Graves Protection and Repatriation Act by informing you of any inadvertent discovery of archaeological or human remains and consulting on their disposition. Being defined as a federal undertaking, we will be seeking input and inviting other potential consulting parties, such as the New Mexico State Historic Preservation Office.

COMBAT AIRPOWER STARTS HERE

At your earliest convenience, please provide information, comments, or requests for additional information to Ms. Jennifer Frederick at 49 CES/CEIE, 550 Tabosa Ave, Holloman AFB, New Mexico 88330. You may also email your comments to jennifer.frederick.2@us.af.mil. This will ensure we can address them during the environmental impact analysis process. Thank you for your assistance.

Sincerely

JOSEPH L. CAMPO, Colonel, USAF
Commander

Attachment:
DOPAA Summary

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Governor Val R. Panteah, Sr.
Pueblo of Zuni
PO Box 339
Zuni, NM 87327

Dear Governor Panteah, Sr.

The purpose of this letter is twofold: to give you an opportunity to review and comment on a proposed action in which the Pueblo of Zuni may have an interest; and to invite the Pueblo of Zuni to participate in government-to-government consultation with the US Air Force (Air Force) pursuant to Section 106 of the National Historic Preservation Act (NHPA).

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DOPAA Summary

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Chairperson Manuel Heart
Ute Mountain Ute Tribe
PO Box JJ
Towaoc, CO 81334-0248

Dear Chairperson Heart

The purpose of this letter is twofold: to give you an opportunity to review and comment on a proposed action in which the Ute Mountain Ute Tribe may have an interest; and to invite the Ute Mountain Ute Tribe to participate in government-to-government consultation with the US Air Force (Air Force) pursuant to Section 106 of the National Historic Preservation Act (NHPA).

The Air Force and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), New Mexico, to address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advance combat training missions. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Air Force NEPA regulations, the Air Force is in the process of preparing an Environmental Assessment to assess the potential environmental impacts of contract ADAIR support at Holloman AFB.

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JOSEPH L. CAMPO, Colonel, USAF
Commander

Attachment:
DOPAA Summary

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Chairman Jeff Haozous
Fort Sill Apache Tribe of Oklahoma
43187 US Highway 281
Apache, OK 73006-8038

Dear Chairman Haozous

The purpose of this letter is twofold: to give you an opportunity to review and comment on a proposed action in which the Fort Sill Apache Tribe of Oklahoma may have an interest; and to invite the Fort Sill Apache Tribe of Oklahoma to participate in government-to-government consultation with the US Air Force (Air Force) pursuant to Section 106 of the National Historic Preservation Act (NHPA).

The Air Force and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), New Mexico, to address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advance combat training missions. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Air Force NEPA regulations, the Air Force is in the process of preparing an Environmental Assessment to assess the potential environmental impacts of contract ADAIR support at Holloman AFB.

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Sincerely

JOSEPH L. CAMPO, Colonel, USAF
Commander

Attachment:
DOPAA Summary

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Chairman Lyman Guy
Apache Tribe of Oklahoma
PO Box 1330
Anadarko, OK 73005

Dear Chairman Guy

The purpose of this letter is twofold: to give you an opportunity to review and comment on a proposed action in which the Apache Tribe of Oklahoma may have an interest; and to invite the Apache Tribe of Oklahoma to participate in government-to-government consultation with the US Air Force (Air Force) pursuant to Section 106 of the National Historic Preservation Act (NHPA).

The Air Force and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), New Mexico, to address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advance combat training missions. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Air Force NEPA regulations, the Air Force is in the process of preparing an Environmental Assessment to assess the potential environmental impacts of contract ADAIR support at Holloman AFB.

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Sincerely

JOSEPH L. CAMPO, Colonel, USAF
Commander

Attachment:
DOPAA Summary

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Chairman Amber Toppah
Kiowa Indian Tribe of Oklahoma
PO Box 369
Carnegie, OK 73015

Dear Chairman Toppah

The purpose of this letter is twofold: to give you an opportunity to review and comment on a proposed action in which the Kiowa Indian Tribe of Oklahoma may have an interest; and to invite the Kiowa Indian Tribe of Oklahoma to participate in government-to-government consultation with the US Air Force (Air Force) pursuant to Section 106 of the National Historic Preservation Act (NHPA).

The Air Force and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), New Mexico, to address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advance combat training missions. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Air Force NEPA regulations, the Air Force is in the process of preparing an Environmental Assessment to assess the potential environmental impacts of contract ADAIR support at Holloman AFB.

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DOPAA Summary

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Chairman William Nelson
Comanche Nation of Oklahoma
PO Box 908
Lawton, OK 73502

Dear Chairman Nelson

The purpose of this letter is twofold: to give you an opportunity to review and comment on a proposed action in which the Comanche Nation of Oklahoma may have an interest; and to invite the Comanche Nation of Oklahoma to participate in government-to-government consultation with the US Air Force (Air Force) pursuant to Section 106 of the National Historic Preservation Act (NHPA).

The Air Force and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), New Mexico, to address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advance combat training missions. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Air Force NEPA regulations, the Air Force is in the process of preparing an Environmental Assessment to assess the potential environmental impacts of contract ADAIR support at Holloman AFB.

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Attachment:
DOPAA Summary

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

President Misty Nuttle
Pawnee Nation of Oklahoma
PO Box 470
Pawnee, OK 74058

Dear President Nuttle

The purpose of this letter is twofold: to give you an opportunity to review and comment on a proposed action in which the Pawnee Nation of Oklahoma may have an interest; and to invite the Pawnee Nation of Oklahoma to participate in government-to-government consultation with the US Air Force (Air Force) pursuant to Section 106 of the National Historic Preservation Act (NHPA).

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DOPAA Summary

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Chairperson Terry Rambler
San Carlos Apache Tribe
PO Box 0
San Carlos, AZ 85550

Dear Chairperson Rambler

The purpose of this letter is twofold: to give you an opportunity to review and comment on a proposed action in which the San Carlos Apache Tribe may have an interest; and to invite the San Carlos Apache Tribe to participate in government-to-government consultation with the US Air Force (Air Force) pursuant to Section 106 of the National Historic Preservation Act (NHPA).

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DOPAA Summary

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Chairman Clement Frost
Southern Ute Indian Tribe
PO Box 737
Ignacio, CO 81137-0737

Dear Chairman Frost

The purpose of this letter is twofold: to give you an opportunity to review and comment on a proposed action in which the Southern Ute Indian Tribe may have an interest; and to invite the Southern Ute Indian Tribe to participate in government-to-government consultation with the US Air Force (Air Force) pursuant to Section 106 of the National Historic Preservation Act (NHPA).

The Air Force and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), New Mexico, to address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advance combat training missions. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Air Force NEPA regulations, the Air Force is in the process of preparing an Environmental Assessment to assess the potential environmental impacts of contract ADAIR support at Holloman AFB.

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DOPAA Summary

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

President Terri Parton
Wichita & Affiliated Tribes
PO Box 729
Anadarko, OK 73005

Dear President Parton

The purpose of this letter is twofold: to give you an opportunity to review and comment on a proposed action in which the Wichita & Affiliated Tribes may have an interest; and to invite the Wichita & Affiliated Tribes to participate in government-to-government consultation with the US Air Force (Air Force) pursuant to Section 106 of the National Historic Preservation Act (NHPA).

The Air Force and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), New Mexico, to address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advance combat training missions. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Air Force NEPA regulations, the Air Force is in the process of preparing an Environmental Assessment to assess the potential environmental impacts of contract ADAIR support at Holloman AFB.

The Proposed Action is to contract the support of an estimated 3,200 ADAIR flights by individual aircraft. Contract ADAIR may use different types of fighter aircraft available with acceptable capabilities to support training requirements. An estimated 12 contractor aircraft would be located at Holloman AFB. Training activities would use special use airspace near Holloman AFB; no airspace modifications would be required. Holloman AFB has existing facilities available for use and may require minimal interior modifications to be made ready for the contract ADAIR mission.

A summary of the Description of Proposed Action and Alternatives (DOPAA) is attached for your review. Pursuant to Section 106 of the NHPA, implementing regulations at 36 Code of Federal Regulations (CFR) Part 800, and Department of Defense Instruction 4710.02 Section 6, *DoD Interactions with Federally-Recognized Tribes*, we request government-to-government consultation on this Proposed Action. In particular, we invite you, pursuant to 36 CFR Section 800.4(a)(4), to provide information on any properties of historic, religious, or cultural significance that may be affected by our proposed undertaking. Regardless of whether the Tribe chooses to consult on this project, the Air Force will comply with the Native American Graves Protection and Repatriation Act by informing you of any inadvertent discovery of archaeological or human remains and consulting on their disposition. Being defined as a federal undertaking, we will be seeking input and inviting other potential consulting parties, such as the New Mexico State Historic Preservation Office.

COMBAT AIRPOWER STARTS HERE

At your earliest convenience, please provide information, comments, or requests for additional information to Ms. Jennifer Frederick at 49 CES/CEIE, 550 Tabosa Ave, Holloman AFB, New Mexico 88330. You may also email your comments to jennifer.frederick.2@us.af.mil. This will ensure we can address them during the environmental impact analysis process. Thank you for your assistance.

Sincerely

JOSEPH L. CAMPO, Colonel, USAF
Commander

Attachment:
DOPAA Summary

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Chairman E. Paul Torres
All Pueblo Council of Governors
2401 12th Street NW
Albuquerque, NM 87103

Dear Chairman Torres

The purpose of this letter is twofold: to give you an opportunity to review and comment on a proposed action in which the All Pueblo Council of Governors may have an interest; and to invite the All Pueblo Council of Governors to participate in government-to-government consultation with the US Air Force (Air Force) pursuant to Section 106 of the National Historic Preservation Act (NHPA).

The Air Force and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), New Mexico, to address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advance combat training missions. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Air Force NEPA regulations, the Air Force is in the process of preparing an Environmental Assessment to assess the potential environmental impacts of contract ADAIR support at Holloman AFB.

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COMBAT AIRPOWER STARTS HERE

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Sincerely

JOSEPH L. CAMPO, Colonel, USAF
Commander

Attachment:
DOPAA Summary

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Executive Director Joshua Madalena
Five Sandoval Indian Pueblos, Inc.
4321 Fulcrum Way NE, Suite B
Rio Rancho, NM 87144

Dear Executive Director Madalena

The purpose of this letter is twofold: to give you an opportunity to review and comment on a proposed action in which the Five Sandoval Indian Pueblos, Inc. may have an interest; and to invite the Five Sandoval Indian Pueblos, Inc. to participate in government-to-government consultation with the US Air Force (Air Force) pursuant to Section 106 of the National Historic Preservation Act (NHPA).

The Air Force and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), New Mexico, to address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advance combat training missions. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Air Force NEPA regulations, the Air Force is in the process of preparing an Environmental Assessment to assess the potential environmental impacts of contract ADAIR support at Holloman AFB.

The Proposed Action is to contract the support of an estimated 3,200 ADAIR flights by individual aircraft. Contract ADAIR may use different types of fighter aircraft available with acceptable capabilities to support training requirements. An estimated 12 contractor aircraft would be located at Holloman AFB. Training activities would use special use airspace near Holloman AFB; no airspace modifications would be required. Holloman AFB has existing facilities available for use and may require minimal interior modifications to be made ready for the contract ADAIR mission.

A summary of the Description of Proposed Action and Alternatives (DOPAA) is attached for your review. Pursuant to Section 106 of the NHPA, implementing regulations at 36 Code of Federal Regulations (CFR) Part 800, and Department of Defense Instruction 4710.02 Section 6, *DoD Interactions with Federally-Recognized Tribes*, we request government-to-government consultation on this Proposed Action. In particular, we invite you, pursuant to 36 CFR Section 800.4(a)(4), to provide information on any properties of historic, religious, or cultural significance that may be affected by our proposed undertaking. Regardless of whether the Tribe chooses to consult on this project, the Air Force will comply with the Native American Graves Protection and Repatriation Act by informing you of any inadvertent discovery of archaeological or human remains and consulting on their disposition. Being defined as a federal undertaking, we will be seeking input and inviting other potential consulting parties, such as the New Mexico State Historic Preservation Office.

COMBAT AIRPOWER STARTS HERE

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Sincerely

JOSEPH L. CAMPO, Colonel, USAF
Commander

Attachment:
DOPAA Summary

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Executive Director Gilbert Vigil
Eight Northern Indian Pueblos Council, Inc.
327 Eagle Drive, PO Box 969
Ohkay Owingeh, NM 87566

Dear Executive Director Vigil

The purpose of this letter is twofold: to give you an opportunity to review and comment on a proposed action in which the Eight Northern Indian Pueblos Council, Inc. may have an interest; and to invite the Eight Northern Indian Pueblos Council, Inc. to participate in government-to-government consultation with the US Air Force (Air Force) pursuant to Section 106 of the National Historic Preservation Act (NHPA).

The Air Force and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), New Mexico, to address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advance combat training missions. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Air Force NEPA regulations, the Air Force is in the process of preparing an Environmental Assessment to assess the potential environmental impacts of contract ADAIR support at Holloman AFB.

The Proposed Action is to contract the support of an estimated 3,200 ADAIR flights by individual aircraft. Contract ADAIR may use different types of fighter aircraft available with acceptable capabilities to support training requirements. An estimated 12 contractor aircraft would be located at Holloman AFB. Training activities would use special use airspace near Holloman AFB; no airspace modifications would be required. Holloman AFB has existing facilities available for use and may require minimal interior modifications to be made ready for the contract ADAIR mission.

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At your earliest convenience, please provide information, comments, or requests for additional information to Ms. Jennifer Frederick at 49 CES/CEIE, 550 Tabosa Ave, Holloman AFB, New Mexico 88330. You may also email your comments to jennifer.frederick.2@us.af.mil. This will ensure we can address them during the environmental impact analysis process. Thank you for your assistance.

Sincerely

JOSEPH L. CAMPO, Colonel, USAF
Commander

Attachment:
DOPAA Summary

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

August 1, 2019

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Suite 1700
Holloman AFB NM 88330-8277

Speaker Pro Tem LoRenzo Bates
23rd Navajo Nation Council, Office of the Speaker
PO Box 3390
Window Rock, AZ 86515

Dear Speaker Pro Tem Bates

The purpose of this letter is twofold: to give you an opportunity to review and comment on a proposed action in which the 23rd Navajo Nation Council, Office of the Speaker may have an interest; and to invite the 23rd Navajo Nation Council, Office of the Speaker to participate in government-to-government consultation with the US Air Force (Air Force) pursuant to Section 106 of the National Historic Preservation Act (NHPA).

The Air Force and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), New Mexico, to address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advance combat training missions. In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality regulations, and the Air Force NEPA regulations, the Air Force is in the process of preparing an Environmental Assessment to assess the potential environmental impacts of contract ADAIR support at Holloman AFB.

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A summary of the Description of Proposed Action and Alternatives (DOPAA) is attached for your review. Pursuant to Section 106 of the NHPA, implementing regulations at 36 Code of Federal Regulations (CFR) Part 800, and Department of Defense Instruction 4710.02 Section 6, *DoD Interactions with Federally-Recognized Tribes*, we request government-to-government consultation on this Proposed Action. In particular, we invite you, pursuant to 36 CFR Section 800.4(a)(4), to provide information on any properties of historic, religious, or cultural significance that may be affected by our proposed undertaking. Regardless of whether the Tribe chooses to consult on this project, the Air Force will comply with the Native American Graves Protection and Repatriation Act by informing you of any inadvertent discovery of archaeological or human remains and consulting on their disposition. Being defined as a

COMBAT AIRPOWER STARTS HERE

At your earliest convenience, please provide information, comments, or requests for additional information to Ms. Jennifer Frederick at 49 CES/CEIE, 550 Tabosa Ave, Holloman AFB, New Mexico 88330. You may also email your comments to jennifer.frederick.2@us.af.mil. This will ensure we can address them during the environmental impact analysis process. Thank you for your assistance.

Sincerely

JOSEPH L. CAMPO, Colonel, USAF
Commander

Attachment:
DOPAA Summary

Description of Proposed Action and Alternatives Summary

Attachment 1: DOPAA Summary

To accomplish the mission of the United States Air Force (Air Force), it is critical that combat pilots, and the Airmen supporting them, adequately train to attain proficiency on tasks they must execute during times of war and to sustain this proficiency as they serve in the Air Force. Increasingly, fighter pilots of the Combat Air Forces (CAF) have been operating at degraded levels of proficiency and training readiness due to diminishing fiscal resources. Along with insufficient budgets to support the flying hours/training requirements needed by CAF pilots, they also have to support adversary air (ADAIR) flying missions that have minimal training value to the CAF pilots themselves. ADAIR missions simulate an opposing force that provides a necessary and realistic combat environment during CAF training missions. Flying these ADAIR sorties requires the use of potential adversaries' tactics and procedures that may differ significantly from CAF tactics and procedures and therefore provide minimal CAF training while taking up valuable flying hours that could otherwise be spent on core training tasks. This could potentially be resolved through contract ADAIR, which would reduce the need for in-house CAF ADAIR. At present, the current approach meets less than 50 percent of the total ADAIR requirement across the Air Force.

The Air Force proposes to provide dedicated contract ADAIR sorties to improve the quality of training and readiness of pilots of the 49th Wing at Holloman Air Force Base (AFB) in New Mexico (**Figure 1**). Contract ADAIR support would employ adversary tactics across the training spectrum from basic fighter maneuvers to higher-end, advanced, simulated, combat training missions. The Proposed Action would include establishing an estimated 78 contracted maintainers and 15 contracted pilots who would operate an estimated 12 contracted aircraft. Contract ADAIR would fly approximately 3,200 ADAIR sorties annually in support of the 49th Wing at Holloman AFB. Contract ADAIR would follow the local squadron's nighttime flying window with 5 percent of departures and 7 percent of arrivals occurring during environmental night (10:00 pm to 7:00 am local time). Holloman AFB has sufficient facilities to support the Proposed Action with minimal modification. No airspace modifications would be required due to the Proposed Action.

The Air Force has identified two alternatives for proposed contract ADAIR operations and maintenance facilities at Holloman AFB under the Proposed Action. Under Alternative 1, both Operations and the Aircraft Maintenance Unit would be located in Building 578, which is the current T-38 depot hangar, and the ADAIR aircraft would be parked on the ramp adjacent to the Building 578 (**Figure 2**). The building and ramp would be vacated by the T-38 depot maintenance function as it transitions to the German Air Force Flying Training Center facilities. Under Alternative 2, contractor Operations would share Building 1062 with two F-16 formal training unit squadrons and the ADAIR Aircraft Maintenance Unit would be located in Building 578; contract ADAIR aircraft would be parked on the ramp adjacent to Building 578 (**Figure 3**).

Under both alternatives, contract ADAIR Aircraft Maintenance Unit activities would be performed at Building 578. This facility would provide office space and covered aircraft maintenance space, if required. The parking ramp adjacent to Building 578 would provide at least 8,400 square yards of aircraft parking space. Following training sorties, contract ADAIR pilots would land and park their aircraft at Holloman AFB on the ramp area adjacent to Building 578. Contract pilots would participate in debriefs with pilots of the 49th Wing and other units, as required, at facilities on Holloman AFB.

CAF training activities utilize special use airspace within and around Holloman AFB. Special use airspace includes restricted airspace and Military Operations Areas, which provide airspace for military aircraft training and serve to warn nonparticipating aircraft of potential danger. The primary operational airspace that would be used by contract ADAIR aircraft includes the restricted airspace over White Sands Missile Range (**Figure 4**). Holloman AFB is underneath this restricted airspace. Other airspace available for use by ADAIR missions includes the Beak Military Operations Areas 25 miles to the east, the Talon Military Operations Areas approximately 72 miles east, and the McGregor Range Restricted Airspace approximately 6 miles southeast of Holloman AFB.

Contract ADAIR aircraft would employ chaff and flares (e.g., RR-188 chaff and M206 flares or similar) during 100 percent of their training sortie operations in the White Sands Missile Range and McGregor Range Restricted Airspaces and the Beak and Talon Military Operations Areas. Chaff and flares are the principal defensive countermeasure dispensed by military aircraft to avoid detection or attack by enemy air defense systems.

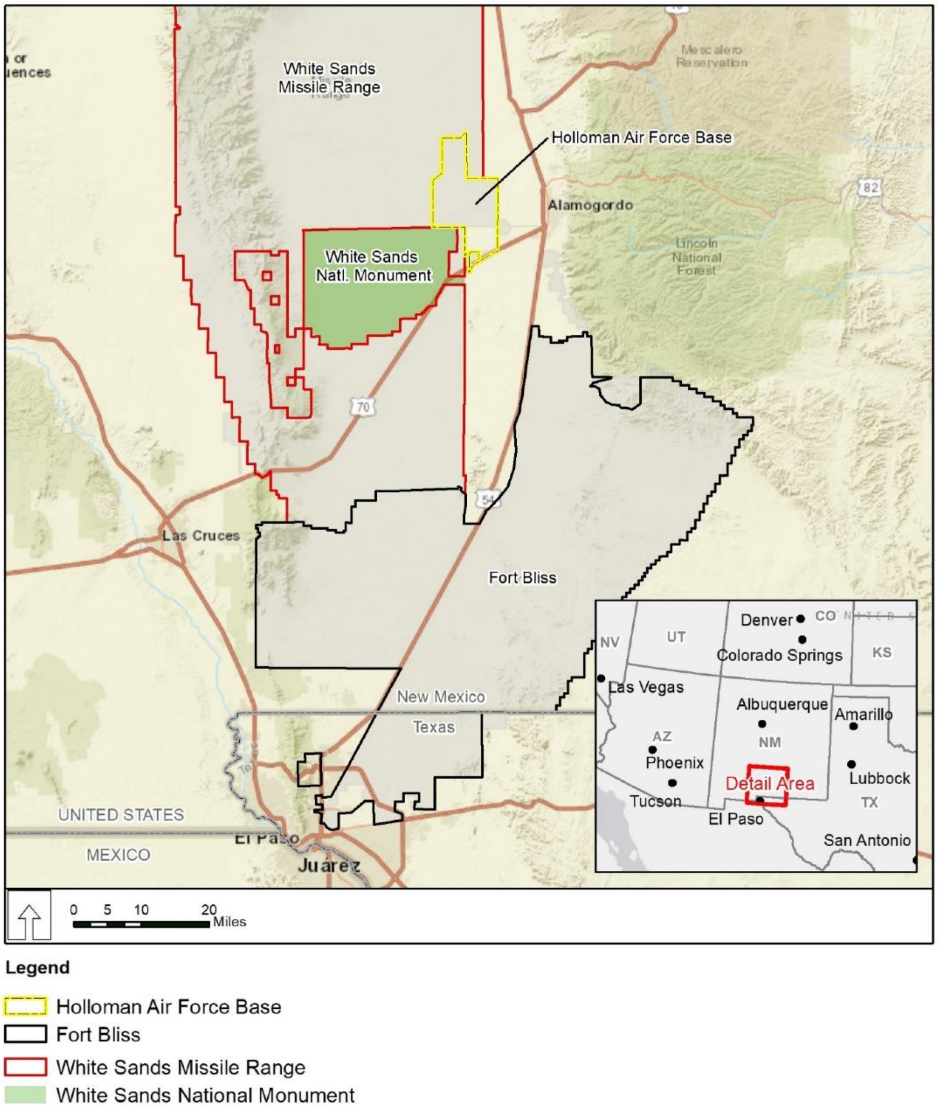

Figure 1. Location of Holloman Air Force Base

Figure 2. Proposed Location for Combined Operations, Aircraft Maintenance Unit, and Maintenance Space in Building 578 and Aircraft Parking on the adjacent Aircraft Ramp

Figure 3. Proposed Location for Operations in Building 1062, Aircraft Maintenance Unit and Maintenance Space in Building 578, and Aircraft Parking on the Aircraft Ramp adjacent to Building 578

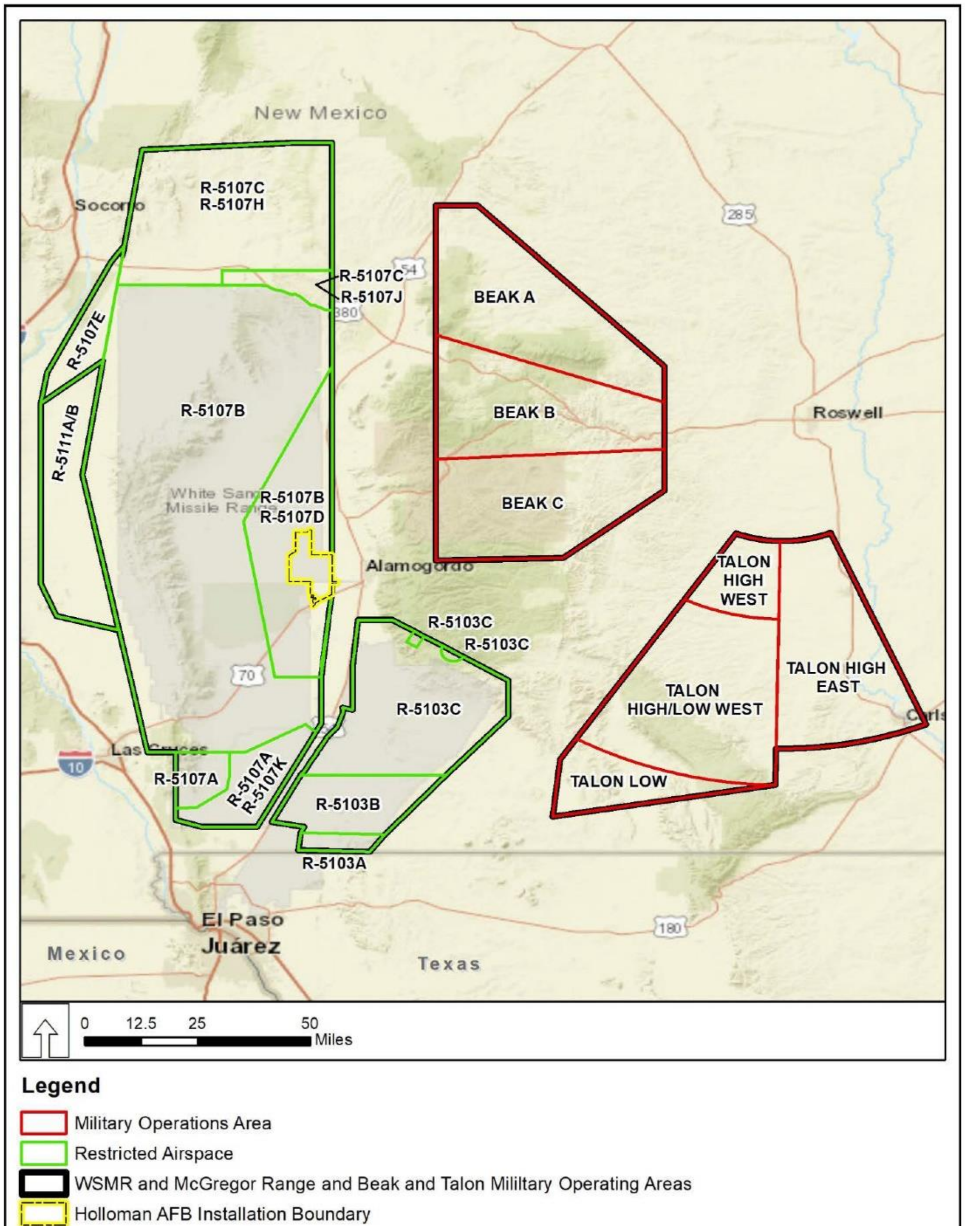

Figure 4. Special Use Airspace Proposed for Contract Adversary Air Sorties

Mailing List

Jennifer Montoya
Planning and Environmental Coordinator
Bureau of Land Management, Las Cruces District Office
1800 Marquess Street
Las Cruces, NM 88005

Robert Houston, Chief
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US Fish and Wildlife Service, Southwest Region
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Michael Espiritum OCEDC President/CEO
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Governor Fred Vallo
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Chairman Herman Honanie
Hopi Tribe
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Governor E. Paul Torres
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Governor Raymond Loretto
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Pueblo of Laguna
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President Danny Breuninger
Mescalero Apache Tribe
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Governor Phillip A. Perez
Pueblo of Nambe
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President Russell Begaye
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Governor Earl Salazar
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Governor Luis Romero
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Governor Milton Herrera
Pueblo of Tesuque
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Governor Carlos Hisa
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Governor David Pino
Pueblo of Zia
135 Capitol Square Drive
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Governor Val R. Panteah, Sr.
Pueblo of Zuni
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Chairperson Manuel Heart
Ute Mountain Ute Tribe
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Towaoc, CO 81334-0248

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Anadarko, OK 73005

Chairman Amber Toppah
Kiowa Indian Tribe of Oklahoma
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Chairman William Nelson
Comanche Nation of Oklahoma
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Lawton, OK 73502

President Misty Nuttle
Pawnee Nation of Oklahoma
PO Box 470
Pawnee, OK 74058

Chairperson Terry Rambler
San Carlos Apache Tribe
PO Box 0
San Carlos, AZ 85550

Chairman Clement Frost
Southern Ute Indian Tribe
PO Box 737
Ignacio, CO 81137-0737

President Terri Parton
Wichita & Affiliated Tribes
PO Box 729
Anadarko, OK 73005

Chairman E. Paul Torres
All Pueblo Council of Governors
2401 12th Street NW
Albuquerque, NM 87103

Executive Director Joshua Madalena
Five Sandoval Indian Pueblos, Inc.
4321 Fulcrum Way NE, Suite B
Rio Rancho, NM 87144

Executive Director Gilbert Vigil
Eight Northern Indian Pueblos Council, Inc.
327 Eagle Drive
PO Box 969
Ohkay Owingeh, NM 87566

Speaker Pro Tem LoRenzo Bates
23rd Navajo Nation Council, Office of the Speaker
PO Box 3390
Window Rock, AZ 86515

Appendix A-2

United States Fish and Wildlife Service Consultation

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (AETC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Joseph L. Campo
Commander, 49th Wing
490 First Street, Ste 1700
Holloman AFB NM 88330-8277

Ms. Susan Millsap
US Fish and Wildlife Service
New Mexico Ecological Services Field Office
2105 Osuna Road NE
Albuquerque NM 87113-1001

Dear Ms. Millsap

The United States Air Force (Air Force) and Headquarters Air Combat Command are proposing to provide Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base (AFB), located in Alamogordo, New Mexico. This action will address shortfalls in combat readiness and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to high-end, advanced combat training missions. Holloman AFB has, based on the information in the attached Biological Evaluation, determined that the proposed action *may affect but is not likely to adversely affect* the northern aplomado falcon (*Falco femoralis*), Mexican spotted owl (*Strix occidentalis lucida*), southwestern willow flycatcher (*Empidonax traillii extimus*), yellow-billed cuckoo (*Bartramia longicauda*), and Mexican gray wolf (*Canis lupus baileyi*) and have *no effect* on the least tern (*Sternula antillarum*), piping plover (*Charadrius melodus*), New Mexico meadow jumping mouse (*Zapus luteus luteus*), and Penasco least chipmunk (*Neotamias minimus atristriatus*). Pursuant to Section 7 of the Endangered Species Act and 50 Code of Federal Regulations Part 402.13, *Informal Consultation,* Holloman AFB requests your concurrence with these determinations.

The Proposed Action is to contract the support of an estimated 3,200 ADAIR flights by individual aircraft. Contract ADAIR may use different types of fighter aircraft available with acceptable capabilities to support training requirements. An estimated 12 contractor aircraft would be located at Holloman AFB. Training activities would use special use airspace near Holloman AFB; no airspace modifications would be required. Holloman AFB has existing facilities available for use that may require minimal interior modifications to be made ready for the contract ADAIR mission.

Threatened, Endangered, and Candidate Species and Critical Habitat

A review of the US Fish and Wildlife Service's Information for Planning and Consultation Database, the New Mexico Department of Game and Fish's Biota Information System of New Mexico, and the Holloman AFB Integrated Natural Resources Management Plan identified the federally listed species with the potential to occur at Holloman AFB and in the Beak and Talon Military Operations Areas (MOAs) and White Sands Missile Range and McGregor Range Restricted Areas. These are described in the attached Biological Evaluation.

There would be no ground-disturbing activities on Holloman AFB or in the MOAs and Restricted Areas; moreover, there would be no introduction of new, potentially toxic substances from implementation of the Proposed Action. The activities most likely to affect listed species are aircraft

COMBAT AIRPOWER STARTS HERE

overflights in the airspace and the use of defensive countermeasures where noise and visual cues could cause behavioral changes in birds and mammals; therefore, there would be no effect on listed plants, aquatic species (e.g., fish), reptiles and amphibians, mollusks, or crustaceans. The potential for animals to come into contact with or ingest chaff and flare materials such as plastic caps is low and insignificant. There are nine federally listed birds and mammals potentially occurring at Holloman AFB and the MOAs and Restricted Areas that could be affected by military aircraft training operations (Table 1). The species with the potential to be affected by aircraft operations on Holloman AFB or in the MOAs and Restricted Areas are further described in the attached Biological Evaluation.

Table 1. Federally Listed Birds and Mammals Potentially Affect by Military Training Operations, Holloman Air Force Base

Species	Federal Status[1]	Preferred Habitat
Northern aplomado falcon (*Falco femoralis*)	NEP	Breeds and forages in desert grasslands. In New Mexico, the northern aplomado falcon nests in yuccas within intact grassland habitats.
Least tern (*Sternula antillarum*)	E	Nests on bare or sparsely vegetated sand, shell, and gravel beaches, sandbars, islands, and salt flats associated with rivers and reservoirs.
Mexican spotted owl (*Strix occidentalis lucida*)	T	Associated with old-growth, mixed-conifer forests that are usually more than 200 years old. Habitat characteristics include forests with high canopy closure, high stand density, a multilayered canopy, unevenly aged stands, numerous snags, and downed woody material.
Piping plover (*Charadrius melodus*)	T	Occurs on sandflats or along bare shorelines of rivers, lakes, or coasts, and occasionally reservoir shorelines.
Southwestern willow flycatcher (*Empidonax traillii extimus*)	E	Nests in riparian habitats primarily with mature native trees and is found in areas dominated by saltcedar.
Yellow-billed cuckoo (*Bartramia longicauda*)	T	Occurs in deciduous woodlands, low scrubby vegetation, abandoned farmland, and dense riparian thickets.
New Mexico meadow jumping mouse (*Zapus luteus luteus*)	E	Primarily associated with riparian habitats in New Mexico and is found in areas with high soil moisture.
Mexican gray wolf (*Canis lupus baileyi*)	E	Primarily found in higher-elevation woodlands and savannahs.
Penasco least chipmunk (*Neotamias minimus atristriatus*)	C	Occurs between 6,800 and 8,000 feet in elevation in ponderosa pine forests.

Source:
[1] US Fish and Wildlife Service, 2019
C = candidate; E = endangered; NEP = Nonessential Experimental Population; T = Threatened

There is designated critical habitat for the Mexican spotted owl in the Beak MOAs and R-5103C Restricted Area. There is designated critical habitat for the New Mexico meadow jumping mouse in the Beak C MOA.

Determination of the Effects of the Proposed Action

Of the federally listed species known or with suitable habitat in Otero County, New Mexico, only the least tern could potentially occur on Holloman AFB. However, there would be no ground-disturbing activities, and increased takeoffs and landings at the airfield associated with contract ADAIR training would not impact the least tern, which does not occur proximate to the airfield; therefore, there would be no effect on the least tern at Holloman AFB from the proposed contract ADAIR training.

Listed bird species that would occur in the MOAs would primarily be foraging or nesting; therefore, these species would likely not be startled or at risk from aircraft strikes from aircraft flying at higher altitudes. However, low-altitude contract ADAIR flights would occur in the Talon Low MOA and in the Restricted Areas; these low-altitude flights could startle listed bird species if they were to be present at the time that aircraft involved in training passed overhead. The least tern is primarily associated with the Pecos River in southern New Mexico. The piping plover is a rare migrant in New Mexico, where it has been occasionally observed on the shorelines of reservoirs. Because these habitats are not present in the Talon Low MOA and the Restricted Areas, there would be no effect from aircraft movement on these species; however, the northern aplomado falcon, Mexican spotted owl, southwestern willow flycatcher, and yellow-billed cuckoo are known to occur in the Talon Low MOA and Restricted Areas. While additional sorties of contract ADAIR aircraft involved in low-altitude training could startle these species during breeding or foraging, military training has occurred at low altitudes in these areas for decades and the species are likely habituated to aircraft movement; thus, the potential response to this increase is discountable. Therefore, contract ADAIR may affect but is not likely to adversely affect these species.

Aircraft noise in the MOAs would have no effect on bird species as the noise levels would not exceed the 45-A-weighted decibel (dBA) day-night level (DNL) from ADAIR training. There would be minimal effect from the use of countermeasure chaff and flares, as the components of chaff and flares have been found to have low toxicity and do not accumulate or magnify in food webs. Chaff fibers are too large to be inhaled, and human health assessments have found the products from flare combustion to not have significant adverse effects, which is likely applicable to other species (Air Force, 1997). There is a probability, although very low, that birds and other wildlife may ingest the plastic caps from discharged chaff and flares, which may cause digestive problems leading to potential take in the form of injury and possibly death. While birds may experience disorientation if they fly through a cloud of chaff, the effect would be short and the potential for injury is low due to the low mass and diffuse nature of the chaff, the short period of time that chaff is in the air due to its low air resistance, and the localized nature of the chaff release (Air Force, 1997).

Noise from contract ADAIR aircraft would not exceed the 45 dBA DNL and would therefore have no effect on the listed mammal species. The listed mammals would potentially only be affected by aircraft overflights if the training activities elicited negative behavioral responses. It is highly unlikely that either aircraft movement or noise emissions, especially at higher altitudes, would elicit a response from mammals. The visibility of aircraft movement by the Penasco least chipmunk and New Mexico meadow jumping mouse would be obscured by vegetation, woody debris, and rocks, and aircraft movement even at lower altitudes would not cause a startle affect in these rodents. Aircraft movement would not be visible to those mammals unless an individual were to be at the exact location at the moment in which an aircraft traveling at high speed at a relatively low altitude passed directly overhead; however, in the Talon Low MOA and Restricted Areas, low-level aircraft training would occur and could cause a startle response in the Mexican gray wolf or its prey and therefore may affect but not adversely affect this species. These occurrences with contract ADAIR aircraft, however, would be so rare as to be negligible and insignificant and, due to the species potentially being habituated from decades of military training in these airspaces, might not even generate a startle response if an interaction occurred. Lastly, studies have shown that the use of chaff and flares has no adverse impact on wildlife, their components have been shown to have no or low toxicity, and they are not known to accumulate or magnify in food webs (Air Force, 1997). With the exception of the Mexican gray wolf, the contract ADAIR training in would have no effect on federally listed mammals. As discussed above, low-level flights may startle the wolf or its prey, and we have therefore made a determination of may affect but is not likely to adversely affect.

Sonic booms from supersonic aircraft movement could cause a startle response by the listed species; however, sonic booms would be relatively rare during contract ADAIR training in the MOAs and Restricted Areas. Further, the sonic boom and post-boom rumbling would be similar to what wildlife experience during a thunderstorm, and thunderstorms occur during monsoon season in the region. Therefore, sonic booms from supersonic aircraft movement would have no effect on listed species.

Contract ADAIR training in the Beak MOAs and the R-5103C Restricted Area would not change the habitat suitability for listed species. No ground-disturbing activities in designated critical habitat in these areas is proposed, and military aircraft training has been ongoing for decades in these special use airspaces; therefore, there would be no effect on designated critical habitat as a result of the proposed project.

I am requesting your written concurrence with our "may affect but not likely to adversely affect" determination for the northern aplomado falcon, Mexican spotted owl, southwestern willow flycatcher, yellow-billed cuckoo, and Mexican gray wolf. Address all comments and correspondence to Mr. Spencer Robison at 49 CES/CEIE, 550 Tabosa Ave, Holloman AFB, New Mexico 88330. You may also email your correspondence to spencer.robison@us.af.mil. Thank you for your assistance.

Sincerely

JOSEPH L. CAMPO, Colonel, USAF
Commander

Attachment:
Biological Evaluation

References

Air Force. 1997. *Environmental Effects of Self-Protection Chaff and Flares: Final Report.* Prepared for Headquarters Air Combat Command, Langley Air Force Base, Virginia.

US Fish and Wildlife Service. 2019. Environmental Conservation Online System. <https://ecos.fws.gov/ecp>. Accessed March 2019.

United States Department of the Interior

FISH AND WILDLIFE SERVICE

New Mexico Ecological Services Field Office
2105 Osuna Road NE
Albuquerque, New Mexico 87113
Telephone 505-346-2525 Fax 505-346-2542
www.fws.gov/southwest/es/newmexico/

November 18, 2019

Cons. # 02ENNM00-2020-I-0114

Colonel Joseph L. Campo
Commander, 49th Wing
Department of the Air Force
490 First Street, Ste 1700
Holloman Air Force Base, NM 88330-8277

Dear Colonel Joseph L. Campo:

Thank you for your August 28, 2019 letter, attached Biological Assessment, and subsequent clarifying emails requesting informal consultation with the U.S. Fish and Wildlife Service (Service) pursuant to section 7 of the Endangered Species Act (ESA) of 1973 (16 U.S.C. § 1531 *et seq*.) as amended. Your request is associated with your proposed action of contracting adversary air support at Holloman Air Force Base in Alamogordo, New Mexico (Proposed Action). The proposed action would include an estimated 3,200 adversary air support flights completed by a variety of fighter aircraft. There would be no ground-disturbing activities, but low flying aircraft in areas specified within your Biological Assessment could cause behavioral changes in birds and mammals due to increased noise disturbance and animals could also potentially ingest chaff and flare materials.

In your Biological Assessment, you determined the proposed action "may affect, is not likely to adversely affect" the endangered status Southwestern Willow Flycatcher (*Empidonax traillii extimus;* flycatcher), the threatened status Yellow-billed Cuckoo (*Coccyzus americanus*; cuckoo), and the threatened status Mexican Spotted Owl (*Strix occidentalis lucida*; owl). You also requested concurrence for the Northern Aplomado Falcon (*Falco femoralis septentrionalis*) and the Mexican Gray Wolf (*Canis lupus baileyi*), both of which are experimental, non-essential populations. For section 7 consultation purposes, any nonessential experimental population located outside a National Park or National Wildlife Refuge System is treated as a proposed species and subsequently conference may be conducted, but not required by the ESA. At this time, the Service does not have any further recommendations for these species other than the conservation measures you have proposed.

Col. Joseph L. Campo, Commander, 49th Wing, Air Force

The Service concurs with your determination of "may affect, not likely to adversely affect" for the flycatcher, cuckoo, and the owl. Our concurrence is based on the rationale provided within your Biological Assessment, which is summarized below:

- Owls have been observed as permanent residents within the action area, however their movement for nesting, migration, and foraging would be below the altitudes where the Proposed Action would occur. Noise disturbance is anticipated to be at 45 decibels which is below the threshold of startling the species or causing nest abandonment or flushing events (the Recovery Plan for the owl recommends noise disturbance to be below 69 decibels); and,
- Though protocol surveys have not been completed throughout the entire action area, there have been periodic protocol surveys in various locations as well as general avian species point counts in select locations. From the historic data available, flycatchers and cuckoos are not known to occupy the action area during the breeding season. The amount of disturbance associated with noise cannot be measured with any sort of certainty and is considered insignificant and discountable.

There were a number of species and/or critical habitat considered for impacts for which "no effect" determinations were made. Although the ESA does not require Federal agencies to consult with the Service if the action agency determines their action will have "no effect" on threatened or endangered species or designated critical habitat (50 CFR 402.12), we appreciate notification of your determination.

This concludes informal section 7 consultation on your Proposed Action. Please contact the Service if: 1) future surveys detect listed, proposed, or candidate species in habitats where they have not been previously observed; 2) the project is changed or new information reveals effects of the action to the listed or proposed species or their habitats to an extent not considered in these evaluations; or, 3) a new species is listed that may be affected by this project. We appreciate your conscientious efforts to comply with ESA requirements and your concern for New Mexico's fish and wildlife resources. In future communications regarding this letter or the Project, please contact David Campbell of my staff at [redacted] or [redacted]

Sincerely,

Susan S. Millsap
Field Supervisor

2

Col. Joseph L. Campo, Commander, 49th Wing, Air Force

Cc:
Director, New Mexico Department of Game and Fish, Santa Fe, New Mexico
NEPA Program Manager, Environmental Management System Coordinator, Holloman Air Force Base, New Mexico
Administrative Record Consultation No. 02ENNM00-2019- I-1346

3

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Appendix A-3

Agency Comment Letters

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From: DOSS, JOHN M GS-13 USAF AFMC AFCEC/CZN [redacted]
Sent: Friday, August 23, 2019 8:15 AM
To: Stumpf, Christa [USA - EMP]
Subject: FW: Question about EA DOPAA on Contract ADAIR

Email comment for AR below.

John M. Doss
NEPA Division, AFCEC/CZN
[redacted]

ADDRESSES:
U.S. POST OFFICE DELIVERIES:
2261 HUGHES AVE STE 155
JBSA LACKLAND TX 78236-9853

FedEx and UPS DELIVERIES:
3515 S GENERAL McMULLEN STE 155
SAN ANTONIO TX 78226-2018

"It all comes down to livin' fast or dyin' slow....which way you gonna go!" - Robert Earl Keen

---

From: HARTLEB, MARISSA E GS-12 USAF AETC 49 CES/[redacted]
Sent: Thursday, August 22, 2019 6:13 PM
To: DOSS, JOHN M GS-13 USAF AFMC AFCEC/CZN [redacted]
Subject: FW: Question about EA DOPAA on Contract ADAIR

For the Administrative Record/YSA

From: Tom Stewart [redacted]
Sent: Thursday, August 22, 2019 5:10 PM
To: HARTLEB, MARISSA E GS-12 USAF AETC 49 CES/CEIE [redacted] CASS, DANIEL J GS-13 USAF AETC 49 CES/CENP [redacted]
Cc: KUSMAK, ADAM M GS-13 USAF AETC 49 CES/CEI [redacted]
Subject: [Non-DoD Source] RE: Question about EA DOPAA on Contract ADAIR

Marissa, Thanks for the information. We discussed the DOPAA at our County Commission meeting yesterday. You will be getting a letter from our County Manager expressing the Commission's concerns and can use the information you have sent me to respond. Thanks, Tom Stewart

---

From: HARTLEB, MARISSA E GS-12 USAF AETC 49 CES/CEIE [redacted]
Sent: Thursday, August 22, 2019 1:23 PM
To: CASS, DANIEL J GS-13 USAF AETC 49 CES/CENP; Tom Stewart
Cc: KUSMAK, ADAM M GS-13 USAF AETC 49 CES/CEI
Subject: RE: Question about EA DOPAA on Contract ADAIR

1

Dan – Thank you for passing this along.

Mr. Stewart,

Chaff and flares will be used only in areas and at altitudes authorized by the Federal Aviation Administration (FAA) permit, and in line with fire danger level restrictions for flares. Holloman AFB does not allow the use of flares during "Very High" or "Extreme" National Fire Danger Ratings. During periods of "High" fire danger, aircraft would not use flares below 18,000 feet mean sea level (MSL). In general, flares are not released below 2,000 feet above ground level (AGL) and are designed to completely burn within the first 400 feet of descent. Chaff and flares would not be used in any previously unused areas under the ADAIR proposal.

Thank you very much,

Ms. Marissa Hartleb
NEPA Program Manager, Environmental Management System Coordinator
Holloman AFB Environmental (49 CES/CEIE)
Holloman AFB eDASH Home Page

From: CASS, DANIEL J GS-13 USAF AETC 49 CES/CENP [redacted]
Sent: Monday, August 19, 2019 7:48 AM
To: HARTLEB, MARISSA E GS-11 USAF AETC 49 CES/CEIE [redacted]
Cc: KUSMAK, ADAM M GS-13 USAF AETC 49 CES/CEI [redacted]
Subject: FW: Question about EA DOPAA on Contract ADAIR

Marissa,
Please see below from Lincoln County. Tom Stewart is a JLUS friend Lincoln County Commissioner and wants to make sure their comments are based in fact. Can you shed some light on the chaff/flare question? Is it different than we currently operate?

≡✪≡ DC ≡✪≡

DANIEL J. CASS, GS-13
Chief, Portfolio Optimization Element
49 CES/CENP
Holloman AFB, NM 88310
[redacted]

From: Tom Stewart [redacted]
Sent: Saturday, August 17, 2019 7:24 PM
To: CASS, DANIEL J GS-13 USAF AETC 49 CES/CENP [redacted]
Subject: [Non-DoD Source] Question about EA DOPAA on Contract ADAIR

Dan, My county is in receipt of a letter from COL Campo about an EA on proposed ADAIR (adversary air) support dated August 1, 2019. He is requesting comments back to a Marissa Hartleb within 30 days. My concern is that the last paragraph in the DOPAA summary letter says that chaff and flares will be employed in the Beak and Talon MOAs. Since these areas are over national forest (Beaks in Lincoln County) and we have a concern over forest fires, is there a concern for a flare starting a forest fire? Because of my JLUS involvement, my fellow commissioners will turn to me for answers. Thanks, Tom Stewart, County Commissioner, [redacted]

2

From: DOSS, JOHN M GS-13 USAF AFMC AFCEC/CZN [redacted]
Sent: Friday, August 23, 2019 11:11 AM
To: Stumpf, Christa [USA - EMP]
Subject: FW: [EXTERNAL] RE: [Non-DoD Source] Re: Combat Air Forces contract adversary air (ADAIR) support at Holloman AFB - DOPAA

Additional dialoged below between WSNM and Holloman. I have asked that you are included on future emails to prevent anything from slipping through the cracks.

John M. Doss
NEPA Division, AFCEC/CZN
[redacted]

ADDRESSES:

U.S. POST OFFICE DELIVERIES:	FedEx and UPS DELIVERIES:
2261 HUGHES AVE STE 155	3515 S GENERAL McMULLEN STE 155
JBSA LACKLAND TX 78236-9853	SAN ANTONIO TX 78226-2018

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"It all comes down to livin' fast or dyin' slow....which way you gonna go!" - Robert Earl Keen

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From: HARTLEB, MARISSA E GS-12 USAF AETC 49 CES/CEIE [redacted]
Sent: Thursday, August 22, 2019 4:44 PM
To: DOSS, JOHN M GS-13 USAF AFMC AFCEC/CZN [redacted]
Cc: ROBISON, SPENCER R GS-07 USAF AETC 49 CES/CEIE [redacted]
Subject: FW: [EXTERNAL] RE: [Non-DoD Source] Re: Combat Air Forces contract adversary air (ADAIR) support at Holloman AFB - DOPAA

For the Administrative Record/YSA

From: HARTLEB, MARISSA E GS-12 USAF AETC 49 CES/CEIE
Sent: Thursday, August 22, 2019 3:43 PM
To: 'Sauter, Marie' [redacted]
Cc: KUSMAK, ADAM M GS-13 USAF AETC 49 CES/CEI [redacted]; Daniel Niosi [redacted] David Bustos [redacted]; Doug Neighbor [redacted]
Subject: RE: [EXTERNAL] RE: [Non-DoD Source] Re: Combat Air Forces contract adversary air (ADAIR) support at Holloman AFB - DOPAA

Ms. Sauter,

I appreciate your assistance in ensuring all interested entities are aware of the project. Regarding your questions:

How does this action relate to the DEIS for the Air Space Use (air optimization) that is in progress now?

1

The ADAIR project is entirely separate from the Airspace EIS. Regardless of what happens with the Airspace EIS, the ADAIR EA could still occur and would be pursued. Regardless of what happens with the ADAIR EA, the EIS project could still occur and would be pursued. Both projects are based at Holloman and involve some of the same airspace, but the purposes for each are entirely separate and distinct. The Airspace EIS seeks to optimize the airspace around Holloman AFB for modern aircraft, the F-16 in particular as it is currently in substantial use at Holloman. The airspace was originally designed for aircraft with far more limited capability. The ADAIR EA seeks to improve the efficiency of pilot training by removing the burden on F-16 pilots of simulating opposing forces to practice against in air-to-air exercises by contracting out the "red air" or opposing side. The contracted aircraft would also improve the realism of the training by allowing F-16 pilots to train against different aircraft.

How are comments being use in the NEPA process during this stage?
Comments are being used to shape the analysis whenever applicable. Essentially, we are using comments at this stage to improve the quality of the scope of our analysis. Also, if additional stakeholders are identified, we will then include them in consultations/notifications. After the draft EA is released, we will also take comments on the document. Those comments have the potential to affect the scope as well, or to simply highlight a need for additional clarification or information. Comments received after any response deadlines will be incorporated to the extent possible. All comments and inquiries received will also be documented in the Administrative Record for the EA.

Thank you very much,

Ms. Marissa Hartleb
NEPA Program Manager, Environmental Management System Coordinator
Holloman AFB Environmental (49 CES/CEIE)
Holloman AFB eDASH Home Page

From: Sauter, Marie [redacted]
Sent: Thursday, August 22, 2019 3:10 PM
To: HARTLEB, MARISSA E GS-12 USAF AETC 49 CES/CEIE [redacted]
Cc: KUSMAK, ADAM M GS-13 USAF AETC 49 CES/CE [redacted]; Daniel Niosi [redacted]; David Bustos [redacted]; Doug Neighbor [redacted]>
Subject: Re: [EXTERNAL] RE: [Non-DoD Source] Re: Combat Air Forces contract adversary air (ADAIR) support at Holloman AFB - DOPAA

Thank you Marissa for responding and providing these answers. I have included Doug Neighbor, Superintendent of Carlsbad National Park, which lies under the Talon MOAs.

Other questions:

How does this action relate to the DEIS for the Air Space Use (air optimization) that is in progress now?

How are comments being use in the NEPA process during this stage?

2

Looking forward to hearing back from you.

Thank you,
Marie Sauter

Marie Frias Sauter
Superintendent
White Sands National Monument
P.O. Box 1068
Holloman AFB NM 88330

[redacted]
575-479-4333 Fax
www.nps.gov/whsa

" Walking is the best possible exercise. Habituate yourself to walk very far. "
Thomas Jefferson

On Thu, Aug 22, 2019 at 10:18 AM HARTLEB, MARISSA E GS-12 USAF AETC 49 CES/CEIE [redacted] wrote:

Ms. Sauter,

Thank you for reaching out with your questions. I was away at a work conference last week, so I was unable to respond as quickly as I would have liked to. I am still waiting on a response from the contractor team and associated project manager regarding when the draft EA is expected to be released. I will send you another email once I have that tentative date. Regarding your questions:

1. How far along is the USAF in drafting the environmental assessment for the contract adversary air support (ADAIR) at Holloman AFB?

The ADAIR EA is currently at the Interim Draft EA phase.

2. If available would you please provide me with a copy of the draft EA (DEA)?

The Draft EA has not yet been released, but we will make a note of your interest and send you a CD once it is.

3. If not yet available, when should we expect the DEA and how would I obtain a copy?

I am awaiting an updated tentative release date for the DEA. We would be happy to mail you a CD copy once it is. The DEA will also be available on the Holloman Public Website.

4. Does the USAF intend to publish a FONSI with the DEA?

3

A draft FONSI will be published for public comment with the draft EA. Until the EA is finalized, the decision as to whether or not a FONSI would be appropriate will not be made. The final FONSI, if a FONSI is reached, would be released with the final EA.

Please let me know if you have any other questions and I will do my best to find you the answers.

Thank you very much,

Ms. Marissa Hartleb

NEPA Program Manager, Environmental Management System Coordinator

Holloman AFB Environmental (49 CES/CEIE)

Holloman AFB eDASH Home Page

From: Sauter, Marie [redacted]
Sent: Wednesday, August 21, 2019 3:01 PM
To: HARTLEB, MARISSA E GS-11 USAF AETC 49 CES/CEIE [redacted]; KUSMAK, ADAM M GS-13 USAF AETC 49 CES/CEI [redacted]
Cc: Daniel Niosi [redacted]; David Bustos [redacted]
Subject: [Non-DoD Source] Re: Combat Air Forces contract adversary air (ADAIR) support at Holloman AFB - DOPAA

Hi Adam,

I have reached out to Ms. Marissa Hartleb multiple times for additional information on the HAFB contract adversary air (ADAIR) project since 8/12/2019. I have not received a reply to any of my inquires and would appreciate a response to my questions below.

Are you able to provide me with the information I have requested? I am available for a phone call as well.

4

Thank you,
Marie

Marie Frias Sauter

Superintendent

White Sands National Monument

P.O. Box 1068

Holloman AFB NM 88330

[redacted]

575-479-4333 Fax

www.nps.gov/whsa

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Thomas Jefferson

On Thu, Aug 15, 2019 at 4:59 PM Sauter, Marie [redacted]> wrote:

Ms. Hartleb,

Per the 8/1/2019 letter from Col. Campo, (Commander, 49th Wing HAFB) regarding a draft environmental assessment for contract adversary air support (ADAIR) at Holloman AFB, I am reaching out to you for more information.

5

Would you please answer following questions? This email references the phone message I left for you on 8/14.

1. How far along is the USAF in drafting the environmental assessment for the contract adversary air support (ADAIR) at Holloman AFB?

2. If available would you please provide me with a copy of the draft EA (DEA)?

3. If not yet available, when should we expect the DEA and how would I obtain a copy?

4. Does the USAF intend to publish a FONSI with the DEA?

Please feel free to call me at my office (see below). I am happy to speak with you as well.

Thank you very much,

Marie Sauter

Marie Frias Sauter

Superintendent

White Sands National Monument

P.O. Box 1068

Holloman AFB NM 88330

[redacted]

575-479-4333 Fax

www.nps.gov/whsa

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Thomas Jefferson

On Mon, Aug 12, 2019 at 6:16 PM Sauter, Marie [redacted]> wrote:

Dear Ms. Hartleb

I recently received correspondence from Commander Campo, HAFB USAF regarding a new project and EA for the Combat Air Forces contract adversary air (ADAIR) support at Holloman AFB. You are listed at the primary Point of Contact for the NEPA compliance process. I would like to ask you a few questions regarding this proposal and wish to speak with you directly. Please provide me a contact number that I can reach you during regular business hours.

I look forward to a quick conversation with you at your earliest convenience.

Sincerely,

Marie Sauter

7

Marie Frias Sauter

Superintendent

White Sands National Monument

P.O. Box 1068

Holloman AFB NM 88330

[redacted]

575-479-4333 Fax

www.nps.gov/whsa

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Thomas Jefferson

8

From: HARTLEB, MARISSA E GS-12 USAF AETC 49 CES/CEIE [redacted]
Sent: Tuesday, September 3, 2019 10:27 AM
To: DOSS, JOHN M GS-13 USAF AFMC AFCEC/CZN; Stumpf, Christa [USA - EMP]
Cc: KUSMAK, ADAM M GS-13 USAF AETC 49 CES/CEI; ROBISON, SPENCER R GS-07 USAF AETC 49 CES/CEIE
Subject: FW: WSMR Comments on ADAIR (UNCLASSIFIED)
Attachments: No Fly Areas.pptx; CH01N-19 - Holloman AFB Training Chaff Permit (AETC 18-0002).pdf

Follow Up Flag: Follow up
Flag Status: Flagged

ALCON,

Please see the comment below from the WSMR airspace manager. Please add to the Administrative Record.

Thank you very much,

Ms. Marissa Hartleb
NEPA Program Manager, Environmental Management System Coordinator
Holloman AFB Environmental (49 CES/CEIE)
Holloman AFB eDASH Home Page

-----Original Message-----
From: Nethers, Deborah L (Debbie) CIV USARMY USAG (USA)
[redacted]
Sent: Thursday, August 29, 2019 2:28 PM
To: HARTLEB, MARISSA E GS-12 USAF AETC 49 CES/CEIE
[redacted]
Cc: Lance, Kenneth D CIV USARMY ATEC (US) [redacted]
Subject: WSMR Comments on ADAIR (UNCLASSIFIED)

CLASSIFICATION: UNCLASSIFIED

Ms. Hartleb

White Sands Missile Range received the request to review the Description of Proposed Action and Alternatives (DOPAA) associated with the environmental assessment for the Combat Air Forces contract adversary air (ADAIR) support at Holloman Air Force Base.

WSMR airspace manager, Ken Lance, has provided the following comment:

'Ensure the contract ADAIR are aware of Chaff permits, and WSMR's no fly areas. ADIR has a 5% departure and 7% arrivals occurring from 10pm-7am this normally the F16 squadrons go no later than midnight for their training

1

missions does that mean ADIR and F16 Squadron are planning to be working longer hours? If so, will they be working weekends?'

WSMR environmental has no comment.

Thanks, Debbie

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CLASSIFICATION: UNCLASSIFIED

2

APPENDIX B

NOISE

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Appendix B-1

Sound, Noise, and Potential Effects

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B.1 Sound, Noise, and Potential Effects

B.1.1 Introduction

This appendix discusses sound and noise and their potential effects on the human and natural environment. **Section B.1.2** provides an overview of the basics of sound and noise. **Section B.1.3** defines and describes the different metrics used to describe noise. The largest section, **Section B.1.4**, reviews the potential effects of noise, focusing on effects on humans but also addressing effects on property values, terrain, structures, and animals. **Section B.1.5** contains the list of references cited. **Appendix B-2** contains data used in the noise modeling process. A number of noise metrics are defined and described in this appendix. Some metrics are included for the sake of completeness when discussing each metric and to provide a comparison of cumulative noise metrics.

B.1.2 Basics of Sound

B.1.2.1 Sound Waves and Decibels

Sound consists of minute vibrations in the air that travel through the air and are sensed by the human ear. **Figure B-1** is a sketch of sound waves from a tuning fork. The waves move outward as a series of crests where the air is compressed and troughs where the air is expanded. The height of the crests and the depth of the troughs are the amplitude or sound pressure of the wave. The pressure determines its energy or intensity. The number of crests or troughs that pass a given point each second is called the frequency of the sound wave.

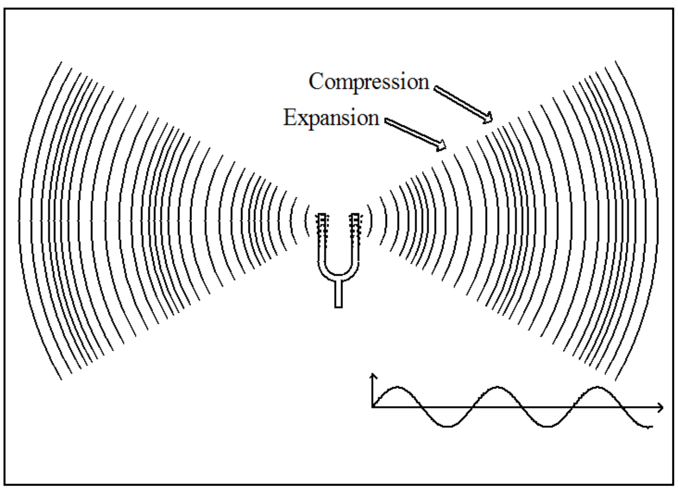


Figure B-1. Sound Waves from a Vibrating Tuning Fork.

The measurement and human perception of sound involves three basic physical characteristics: intensity, frequency, and duration.

- Intensity is a measure of the acoustic energy of the sound and related to sound pressure. The greater the sound pressure, the more energy carried by the sound and the louder the perception of that sound.
- Frequency determines how the pitch of the sound is perceived. Low-frequency sounds are characterized as rumbles or roars, while high-frequency sounds are typified by sirens or screeches.
- Duration or the length of time the sound can be detected.

The loudest sounds that can be comfortably heard by the human ear have intensities a trillion times higher than those of sounds barely heard. Because of this vast range, it is unwieldy to use a linear scale to represent the intensity of sound. As a result, a logarithmic unit known as the decibel (abbreviated dB) is used to represent the intensity of a sound. Such a representation is called a sound level. A sound level of 0 dB is approximately the threshold of human hearing and barely audible under extremely quiet listening conditions. Normal speech has a sound level of approximately 60 dB. Sound levels above 120 dB begin to be felt inside the human ear as discomfort. Sound levels between 130 and 140 dB are felt as pain (Berglund and Lindvall, 1995).

As shown on **Figure B-1**, the sound from a tuning fork spreads out uniformly as it travels from the source. The spreading causes the sound's intensity to decrease with increasing distance from the source. For a source such as an aircraft in flight, the sound level will decrease by about 6 dB for every doubling of the distance. For a busy highway, the sound level will decrease by 3 to 4.5 dB for every doubling of distance.

As sound travels from the source, it also is absorbed by the air. The amount of absorption depends on the frequency composition of the sound, temperature, and humidity conditions. Sound with high frequency content gets absorbed by the air more than sound with low frequency content. More sound is absorbed in colder and drier conditions than in hot and wet conditions. Sound is also affected by wind and temperature gradients, terrain (elevation and ground cover), and structures.

Because of the logarithmic nature of the decibel unit, sound levels cannot simply be added or subtracted and are somewhat cumbersome to handle mathematically; however, some simple rules 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.

Second, 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.

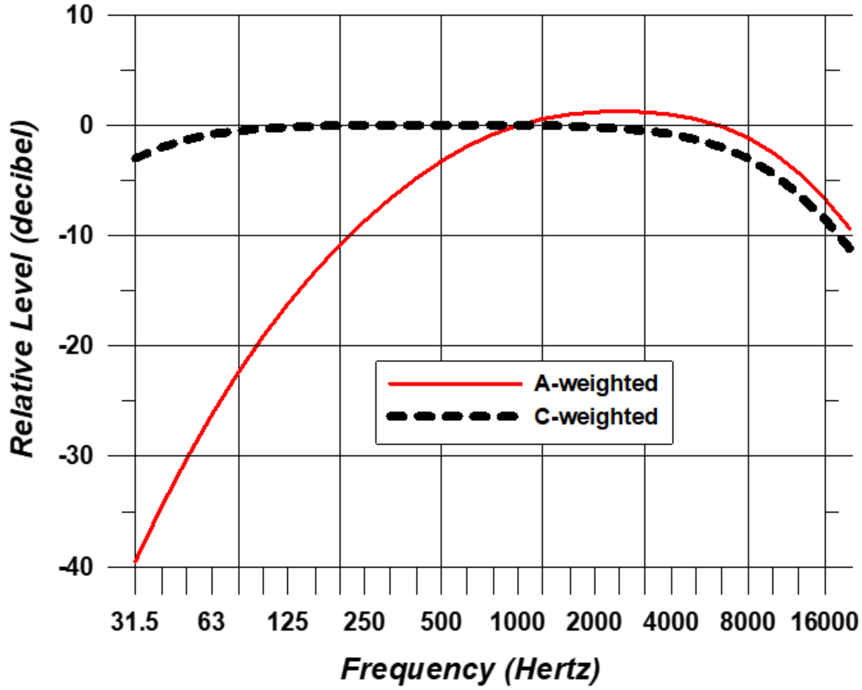
Because the addition of sound levels is different than that of ordinary numbers, this process is often referred to as "decibel addition."

The minimum change in the sound level of individual events that an average human ear can detect is about 3 dB. On average, a person perceives a change in sound level of about 10 dB as a doubling (or halving) of the sound's loudness. This relation holds true for loud and quiet 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 the human ear does not respond linearly.

Sound frequency is measured in terms of cycles per second or hertz (Hz). The normal ear of a young person can detect sounds that range in frequency from about 20 to 20,000 Hz. As we get older, we lose the ability to hear high frequency sounds. Not all sounds in this wide range of frequencies are heard equally. Human hearing is most sensitive to frequencies in the 1,000 to 4,000 Hz range. The notes on a piano range from just over 27 to 4,186 Hz, with middle C equal to 261.6 Hz. Most sounds (including a single note on a piano) are not simple pure tones like the tuning fork on **Figure B-1** but contain a mix, or spectrum, of many frequencies.

Sounds with different spectra are perceived differently even if the sound levels are the same. Weighting curves have been developed to correspond to the sensitivity and perception of different types of sound. A-weighting and C-weighting are the two most common weightings. These two curves, shown on **Figure B-2**, are adequate to quantify most environmental noises. A-weighting puts emphasis on the 1,000- to 4,000-Hz range where human hearing is most sensitive.

Very loud or impulsive sounds, such as explosions or sonic booms, can sometimes be felt and cause secondary effects, such as shaking of a structure or rattling of windows. These types of sounds can add to annoyance and are best measured by C-weighted sound levels, denoted dBC. C-weighting is nearly flat throughout the audible frequency range and includes low frequencies that may not be heard but cause shaking or rattling. C-weighting approximates the human ear's sensitivity to higher intensity sounds.



Source: ANSI S1.4A -1985 "Specification of Sound Level Meters"

Figure B-2. Frequency Characteristics of A- and C-Weighting.

B.1.2.2 Sound Levels and Types of Sounds

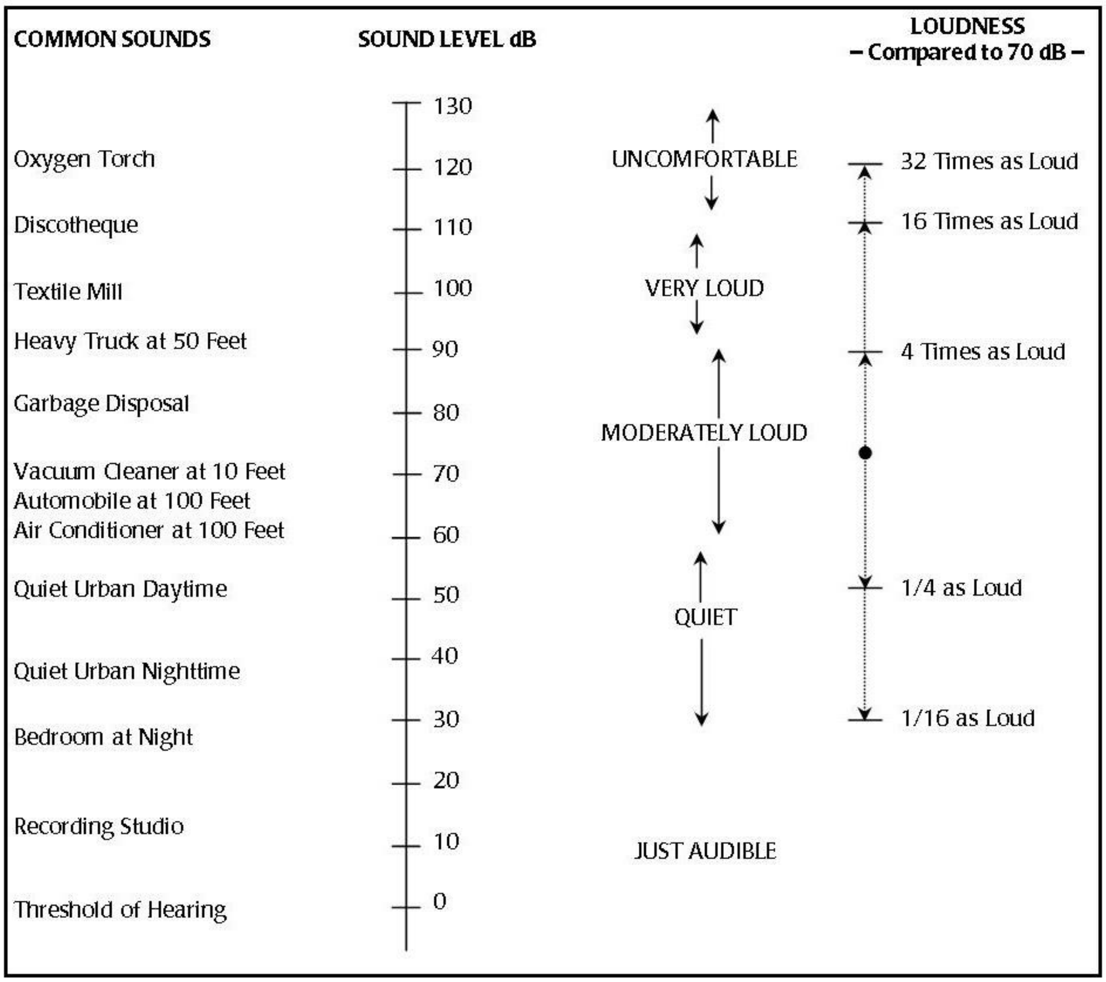
Most environmental sounds are measured using A-weighting. They are called A-weighted sound levels and sometimes use the unit dBA or dB(A) rather than dB. When the use of A-weighting is understood, the term "A-weighted" is often omitted and the unit dB is used. Unless otherwise stated, dB units refer to A-weighted sound levels.

Sound becomes noise when it is unwelcome and interferes with normal activities, such as sleep or conversation. Noise is unwanted sound. Noise can become an issue when its level exceeds the ambient or background sound level. Ambient noise in urban areas typically varies from 60 to 70 dB but can be as high as 80 dB in the center of a large city. Quiet suburban neighborhoods experience ambient noise levels around 45 to 50 dB (United States Environmental Protection Agency [USEPA], 1978).

Figure B-3 shows A-weighted sound levels from common sources. Some sources, like the air conditioner and vacuum cleaner, are continuous sounds whose levels are constant for some time. Some sources, like the automobile and heavy truck, are the maximum sound during an intermittent event like a vehicle pass-by. Some sources like "urban daytime" and "urban nighttime" are averages over extended periods. A variety of noise metrics have been developed to describe noise over different time periods. These are discussed in detail in **Section B.1.3**.

Aircraft noise consists of two major types of sound events: flight (including takeoffs, landings, and flyovers) and stationary, such as engine maintenance run-ups. The former is intermittent and the latter primarily continuous. Noise from aircraft overflights typically occurs beneath main approach and departure paths, in local air traffic patterns around the airfield, and in areas near aircraft parking ramps and staging areas. As aircraft climb, the noise received on the ground drops to lower levels, eventually fading into the background or ambient levels.

Impulsive noises are generally short, loud events. Their single-event duration is usually less than 1 second. Examples of impulsive noises are small-arms gunfire, hammering, pile driving, metal impacts during rail-yard shunting operations, and riveting. Examples of high-energy impulsive sounds are quarry/mining explosions, sonic booms, demolition, and industrial processes that use high explosives, military ordnance (e.g., armor, artillery and mortar fire, and bombs), explosive ignition of rockets and missiles, and any other explosive source where the equivalent mass of dynamite exceeds 25 grams (American National Standards Institute [ANSI], 1996).



Source: Harris, 1979

Figure B-3. Typical A-weighted Sound Levels of Common Sounds.

B.1.3 Noise Metrics

Noise metrics quantify sounds so they can be compared with each other and. with their effects, in a standard way. There are a number of metrics that can be used to describe a range of situations, from a particular individual event to the cumulative effect of all noise events over a long time. This section describes the metrics relevant to environmental noise analysis.

B.1.3.1 Single Events

Maximum Sound Level

The highest A-weighted sound level measured during a single event in which the sound changes with time is called the maximum A-weighted sound level or Maximum Sound Level and is abbreviated L_{max}. The L_{max} is depicted for a sample event in **Figure B-4**.

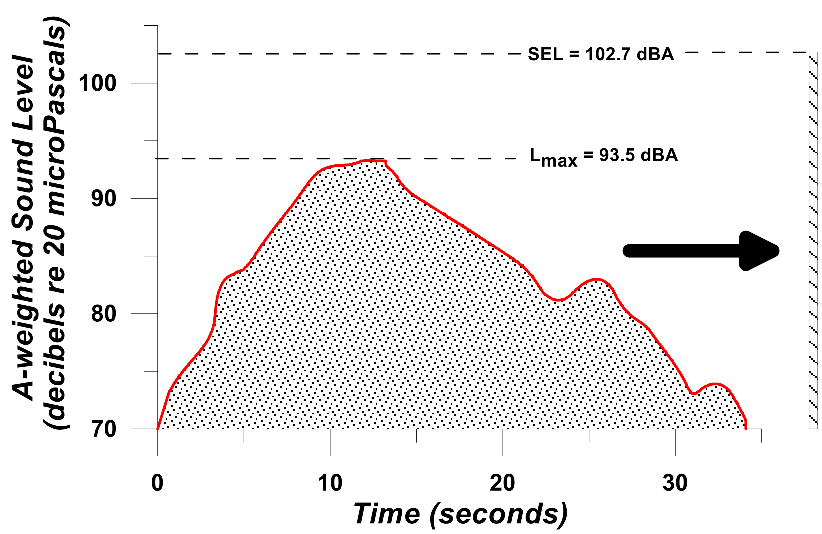
L_{max} is the maximum level that occurs over a fraction of a second. For aircraft noise, the “fraction of a second” is one-eighth of a second, denoted as “fast” response on a sound level measuring meter (ANSI, 1988). Slowly varying or steady sounds are generally measured over 1 second, denoted as “slow” response. L_{max} is important in judging if a noise event will interfere with conversation, television or radio listening, or other common activities. Although it provides some measure of the event, it does not fully describe the noise because it does not account for how long the sound is heard.

Peak Sound Pressure Level

The Peak Sound Pressure Level (L_{pk}) is the highest instantaneous level measured by a sound level measurement meter. L_{pk} is typically measured every 20 microseconds and usually based on unweighted or linear response of the meter. It is used to describe individual impulsive events such as blast noise. Because blast noise varies from shot to shot and varies with meteorological (weather) conditions, the US Department of Defense (DOD) usually characterizes L_{pk} by the metric PK 15(met), which is the L_{pk} exceeded 15 percent of the time. The “met” notation refers to the metric accounting for varied meteorological or weather conditions.

Sound Exposure Level

Sound Exposure Level (SEL) combines both the intensity of a sound and its duration. For an aircraft flyover, SEL includes the maximum and all lower noise levels produced as part of the overflight, together with how long each part lasts. It represents the total sound energy in the event. **Figure B-4** indicates the SEL for an example event, representing it as if all the sound energy were contained within 1 second.



Source: Wyle Laboratories

Figure B-4. Example Time History of Aircraft Noise Flyover.

Aircraft noise varies with time. During an aircraft overflight, noise starts at the background level, rises to a maximum level as the aircraft flies close to the observer, then returns to the background as the aircraft recedes into the distance. This is sketched on **Figure B-4**, which also indicates two metrics (L_{max} and SEL) that are described above. Over time there can be a number of events, not all the same. Because aircraft noise events last more than a few seconds, the SEL value is larger than L_{max}. It does not directly represent the sound level heard at any given time but rather the entire event. SEL provides a much better measure of aircraft flyover noise exposure than L_{max} alone.

Overpressure

The single event metrics commonly used to assess supersonic noise are overpressure in pounds per square foot and C-Weighted Sound Exposure Level (CSEL). Overpressure is the peak pressure at any location within the sonic boom footprint.

C-Weighted Sound Exposure Level

CSEL is SEL computed with C frequency weighting, which is similar to A-Weighting (discussed in **Section B.1.2.2**) except that C weighting places more emphasis on low frequencies below 1,000 hertz.

B.1.3.2 Cumulative Events

Equivalent Sound Level

Equivalent Sound Level (L_{eq}) is a “cumulative” metric that combines a series of noise events over a period of time. L_{eq} is the sound level that represents the decibel average SEL of all sounds in the time period. Just as SEL has proven to be a good measure of a single event, L_{eq} has proven to be a good measure of series of events during a given time period.

The time period of an L_{eq} measurement is usually related to some activity and is given along with the value. The time period is often shown in parenthesis (e.g., L_{eq}[24] for 24 hours). The L_{eq} from 7:00 a.m. to 3:00 p.m. may give exposure of noise for a school day.

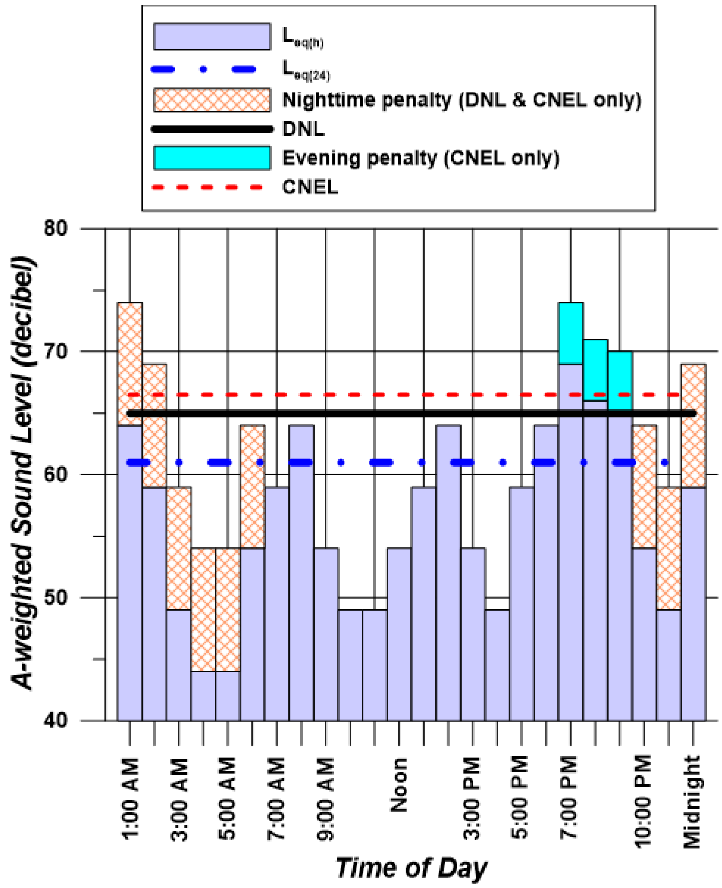
Figure B-5 gives an example of L_{eq}(24) using notional hourly average noise levels (L_{eq}[h]) for each hour of the day as an example. The L_{eq}(24) for this example is 61 dB.

Day-Night Average Sound Level and Community Noise Equivalent Level

Day-Night Average Sound Level (DNL or L_{dn}) is a cumulative metric that accounts for all noise events in a 24-hour period; however, unlike L_{eq}(24), DNL contains a nighttime noise penalty. To account for our increased sensitivity to noise at night, DNL applies a 10-dB penalty to events during the nighttime period, defined as 10:00 p.m. to 7:00 a.m. The notations DNL and L_{dn} are both used for Day-Night Average Sound Level and are equivalent.

Community Noise Equivalent Level (CNEL) is a variation of DNL specified by law in California (California Code of Regulations Title 21, Public Works) (Wyle Laboratories, 1970). CNEL has the 10-dB nighttime penalty for events between 10:00 p.m. and 7:00 a.m. but also includes a 4.8-dB penalty for events during the evening period of 7:00 p.m. to 10:00 p.m. The evening penalty in CNEL accounts for the added intrusiveness of sounds during that period. For airports and military airfields, DNL and CNEL represent the average sound level for annual average daily aircraft events.

Figure B-5 gives an example of DNL and CNEL using notional hourly average noise levels (L_{eq}[h]) for each hour of the day as an example. Note the L_{eq}(h) for the hours between 10:00 p.m. and 7:00 a.m. have a 10-dB penalty assigned. For CNEL, the hours between 7:00 p.m. and 10:00 p.m. have a 4.8-dB penalty assigned. The DNL for this example is 65 dB. The CNEL for this example is 66 dB.



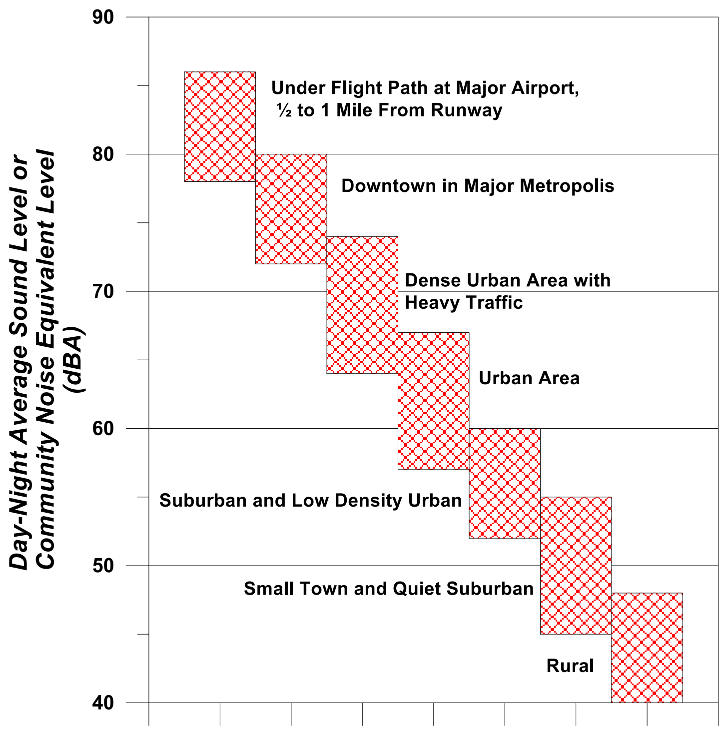
Source: Wyle Laboratories

Figure B-5. Example of L_{eq}(24), DNL and CNEL Computed from Hourly Equivalent Sound Levels.

Figure B-6 shows the ranges of DNL or CNEL that occur in various types of communities. Under a flight path at a major airport the DNL may exceed 80 dB while rural areas may experience DNL less than 45 dB. The decibel summation nature of these metrics causes the noise levels of the loudest events to control the 24-hour average. As a simple example, consider a case in which only one aircraft overflight occurs during the daytime over a 24-hour period, creating a sound level of 100 dB for 30 seconds. During the remaining 23 hours, 59 minutes, and 30 seconds of the day, the ambient sound level is 50 dB. The DNL for this 24-hour period is 65.9 dB. Assume, as a second example that 10 such 30-second overflights occur during daytime hours during the next 24-hour period, with the same ambient sound level of 50 dB during the remaining 23 hours and 55 minutes of the day. The DNL for this 24-hour period is 75.5 dB. Clearly, the averaging of noise over a 24-hour period does not ignore the louder single events and tends to emphasize both the sound levels and number of those events.

A feature of the DNL metric is that a given DNL value could result from a very few noisy events or a large number of quieter events. For example, one overflight at 90 dB creates the same DNL as 10 overflights at 80 dB.

DNL or CNEL does not represent a level heard at any given time but represent long-term exposure. Scientific studies have found good correlation between the percentages of groups of people highly annoyed and the level of average noise exposure measured in DNL (Schultz, 1978; USEPA, 1978).



Source: DOD 1978.

Figure B-6. Typical DNL or CNEL Ranges in Various Types of Communities.

Onset-Rate Adjusted Monthly Day-Night Average Sound Level and Onset-Rate Adjusted Monthly Community Noise Equivalent Level

Military aircraft utilizing special use airspace such as Military Training Routes, Military Operations Areas, and restricted areas generate a noise environment that is somewhat different from that around airfields. Rather than regularly occurring operations like at airfields, activity in special use airspace is highly sporadic. It is often seasonal, ranging from 10 per hour to less than 1 per week. 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, with rates of up to 150 dB per second.

The cumulative daily noise metric devised to account for the “surprise” effect of the sudden onset of aircraft noise events on humans and the sporadic nature of special use airspace activity is the Onset-Rate Adjusted Monthly Day-Night Average Sound Level (L_{dnmr}). Onset rates between 15 and 150 dB per second require an adjustment of 0 to 11 dB to the event’s SEL while onset rates below 15 dB per second require no adjustment to the event’s SEL (Stusnick et al., 1992). The term ‘monthly’ in L_{dnmr} refers to the noise assessment being conducted for the month with the most operations or sorties -- the so-called busiest month.

In California, a variant of the L_{dnmr} includes a penalty for evening operations (7:00 p.m. to 10:00 p.m.) and is denoted Onset-Rate Adjusted Monthly Community Noise Equivalent Level ($CNEL_{mr}$).

B.1.3.3 Supplemental Metrics

Number-of-Events Above a Threshold Level

The Number-of-Events Above (NA) metric gives the total number of events that exceed a noise level threshold (L) during a specified period of time. Combined with the selected threshold, the metric is denoted NAL. The threshold can be either SEL or L_{max}, and it is important that this selection is shown in the nomenclature. When labeling a contour line or point of interest, NAL is followed by the number of events in parentheses. For example, where 10 events exceed an SEL of 90 dB over a given period of time, the nomenclature would be NA90SEL(10). Similarly, for L_{max} it would be NA90L_{max}(10). The period of time can be an average 24-hour day, daytime, nighttime, school day, or any other time period appropriate to the nature and application of the analysis.

NA is a supplemental metric. It is not supported by the amount of science behind DNL/CNEL, but it is valuable in helping to describe noise to the community. A threshold level and metric are selected that best meet the need for each situation. An L_{max} threshold is normally selected to analyze speech interference, while an SEL threshold is normally selected for analysis of sleep disturbance.

The NA metric is the only supplemental metric that combines single-event noise levels with the number of aircraft operations. In essence, it answers the question of how many aircraft (or range of aircraft) fly over a given location or area at or above a selected threshold noise level.

Time Above a Specified Level

The Time Above (TA) metric is the total time, in minutes, that the A-weighted noise level is at or above a threshold. Combined with the threshold level (L), it is denoted TAL. TA can be calculated over a full 24-hour annual average day, the 15-hour daytime and 9-hour nighttime periods, a school day, or any other time period of interest, provided there is operational data for that time.

TA is a supplemental metric, used to help understand noise exposure. It is useful for describing the noise environment in schools, particularly when assessing classroom or other noise sensitive areas for various scenarios. TA can be shown as contours on a map similar to the way DNL contours are drawn.

TA helps describe the noise exposure of an individual event or many events occurring over a given time period. When computed for a full day, the TA can be compared alongside the DNL in order to determine the sound levels and total duration of events that contribute to the DNL. TA analysis is usually conducted along with NA analysis, so the results show not only how many events occur, but also the total duration of those events above the threshold.

B.1.4 Noise Effects

Noise is of concern because of potential adverse effects. The following subsections describe how noise can affect communities and the environment and how those effects are quantified. The specific topics discussed are

- annoyance;
- speech interference;
- sleep disturbance;
- noise effects on children; and
- noise effects on domestic animals and wildlife.

B.1.4.1 Annoyance

With the introduction of jet aircraft in the 1950s, it became clear that aircraft noise annoyed people and was a significant problem around airports. Early studies, such as those of Rosenblith et al. (1953) and Stevens et al. (1953) showed that effects depended on the quality of the sound, its level, and the number of flights.

Over the next 20 years considerable research was performed refining this understanding and setting guidelines for noise exposure. In the early 1970s, the USEPA published its “Levels Document” (USEPA, 1974) that reviewed the factors that affected communities. DNL (still known as L_{dn} at the time) was identified as an appropriate noise metric, and threshold criteria were recommended.

Threshold criteria for annoyance were identified from social surveys, where people exposed to noise were asked how noise affects them. Surveys provide direct real-world data on how noise affects actual residents.

Surveys in the early years had a range of designs and formats and needed some interpretation to find common ground. In 1978, Schultz showed that the common ground was the number of people “highly annoyed,” defined as the upper 28 percent range of whatever response scale a survey used (Schultz, 1978). With that definition, he was able to show a remarkable consistency among the majority of the surveys for which data were available. **Figure B-7** shows the result of his study relating DNL to individual annoyance measured by percent highly annoyed (%HA).

Schultz’s original synthesis included 161 data points. **Figure B-8** shows a comparison of the predicted response of the Schultz data set with an expanded set of 400 data points collected through 1989 (Finegold et al., 1994). The new form is the preferred form in the United States, endorsed by the Federal Interagency Committee on Aviation Noise (FICAN, 1997). Other forms have been proposed, such as that of Fidell and Silvati (2004) but have not gained widespread acceptance.

When the goodness of fit of the Schultz curve is examined, the correlation between groups of people is high, in the range of 85 to 90 percent; however, the correlation between individuals is much lower, at 50 percent or less. This is not surprising, given the personal differences between individuals. The surveys underlying the Schultz curve include results that show that annoyance to noise is also affected by nonacoustical factors. Newman and Beattie (1985) divided the nonacoustic factors into the emotional and physical variables shown in **Table B-1**.

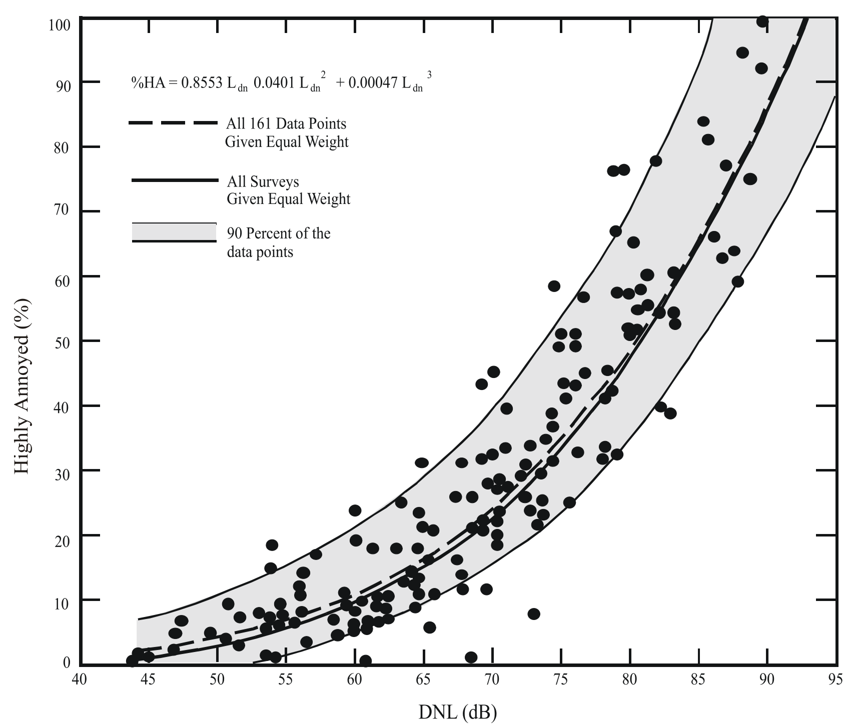


Figure B-7. Schultz Curve Relating Noise Annoyance to DNL (Schultz, 1978).

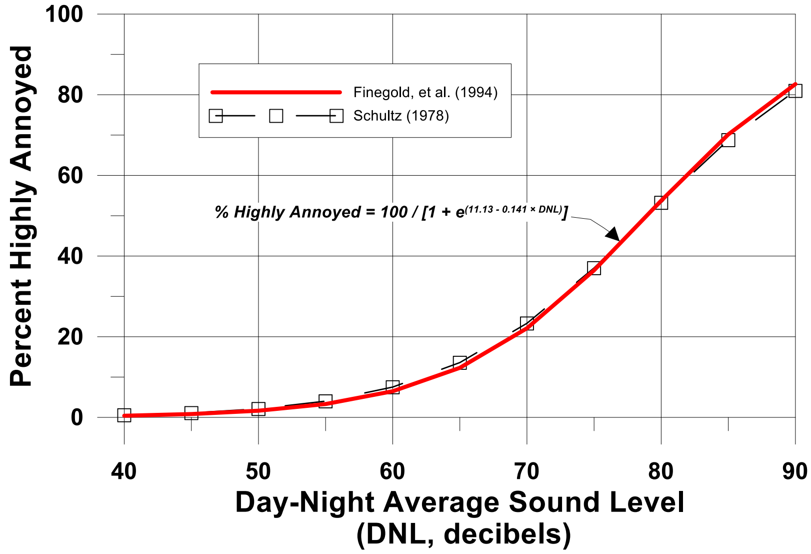


Figure B-8. Response of Communities to Noise; Comparison of Original Schultz (1978) with Finegold et al. (1994).

Table B-1
Nonacoustic Variables Influencing Aircraft Noise Annoyance

Emotional Variables
Feeling about the necessity or preventability of the noise
Judgement of the importance and value of the activity that is producing the noise
Activity at the time an individual hears the noise
Attitude about the environment
General sensitivity to noise
Belief about the effect of noise on health
Feeling of fear associated with the noise

Physical Variables
Type of neighborhood
Time of day
Season
Predictability of the noise
Control over the noise source
Length of time individual is exposed to a noise.

Schreckenberg and Schuemer (2010) examined the importance of some of these factors on short term annoyance. Attitudinal factors were identified as having an effect on annoyance. In formal regression analysis, however, sound level (L_{eq}) was found to be more important than attitude. A series of studies at three European airports showed that less than 20 percent of the variance in annoyance can be explained by noise alone (Márki, 2013).

A study by Plotkin et al. (2011) examined updating DNL to account for these factors. It was concluded that the data requirements for a general analysis were much greater than are available from most existing studies. It was noted that the most significant issue with DNL is that it is not readily understood by the public and that supplemental metrics such as TA and NA were valuable in addressing attitude when communicating noise analysis to communities (DOD, 2009a).

A factor that is partially nonacoustical is the source of the noise. Miedema and Vos (1998) presented synthesis curves for the relationship between DNL and percentage “Annoyed” and percentage “Highly Annoyed” for three transportation noise sources. Different curves were found for aircraft, road traffic, and railway noise. **Table B-2** summarizes their results. Comparing the updated Schultz curve suggests that the percentage of people highly annoyed by aircraft noise may be higher than previously thought. Miedema and Oudshoorn (2001) authors supplemented that investigation with further derivation of percent of population highly annoyed as a function of either DNL or DENL along with the corresponding 95 percent confidence intervals with similar results.

Table B-2
Percent Highly Annoyed for Different Transportation Noise Sources

Day-Night Average Sound Level (decibels)	Percent Highly Annoyed (%HA)			
	Miedema and Vos			Schultz Combined
	Air	Road	Rail	
55	12	7	4	3
60	19	12	7	6
65	28	18	11	12
70	37	29	16	22
75	48	40	22	36

Source: Miedema and Vos, 1998

As noted by the World Health Organization (WHO), however, even though aircraft noise seems to produce a stronger annoyance response than road traffic, caution should be exercised when interpreting synthesized data from different studies (WHO, 1999).

Consistent with WHO's recommendations, the Federal Interagency Committee on Noise (FICON, 1992) considered the Schultz curve to be the best source of dose information to predict community response to noise but recommended further research to investigate the differences in perception of noise from different sources.

The International Standard (ISO 1996:1-2016) update introduced the concept of Community Tolerance Level (L_{ct}) as the day-night sound level at which 50 percent of the people in a particular community are predicted to be highly annoyed by noise exposure. L_{ct} accounts for differences between sources and/or communities when predicting the percentage highly annoyed by noise exposure. ISO also recommended a change to the adjustment range used when comparing aircraft noise to road noise. The previous edition suggested +3 to +6 dB for aircraft noise relative to road noise while the latest editions recommends an adjustment range of +5 to +8 dB. This adjustment range allows DNL to be correlated to consistent annoyance rates when originating from different noise sources (i.e., road traffic, aircraft, or railroad). This change to the adjustment range would increase the calculated percent highly annoyed at the 65-dBA DNL by approximately 2 to 5 percent greater than the previous ISO definition. **Figure B-9** depicts the estimated percentage of people highly annoyed for a given DNL using both the ISO 1996-1 estimation and the older FICON 1992 method. The results suggest that the percentage of people highly annoyed may be greater than previous thought and reliance solely on DNL for impact analysis may be insufficient if utilizing the FICON 1992 method.

The US Federal Aviation Administration (FAA) is currently conducting a major airport community noise survey at approximately 20 US airports in order to update the relationship between aircraft noise and annoyance. Results from this study are expected to be released in 2018.

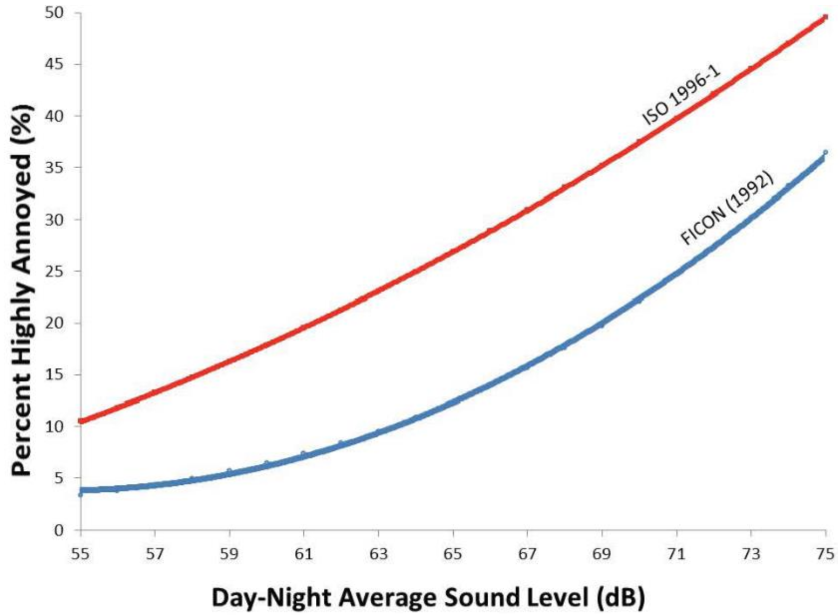


Figure B-9. Percent Highly Annoyed Comparison of ISO 1996-1 to FICON (1992).

B.1.4.2 Speech Interference

Speech interference from noise is a primary cause of annoyance for communities. Disruption of routine activities such as radio or television listening, telephone use, or conversation leads to frustration and annoyance. The quality of speech communication is important in classrooms and offices. In the workplace, speech interference from noise can cause fatigue and vocal strain in those who attempt to talk over the noise. In schools it can impair learning.

There are two measures of speech comprehension:

1. Word Intelligibility - the percent of words spoken and understood. This might be important for students in the lower grades who are learning the English language and particularly for students who have English as a Second Language.
2. Sentence Intelligibility – the percent of sentences spoken and understood. This might be important for high-school students and adults who are familiar with the language and who do not necessarily have to understand each word in order to understand sentences.

United States Federal Criteria for Interior Noise

In 1974, the USEPA identified a goal of an indoor L_{eq}(24) of 45 dB to minimize speech interference based on sentence intelligibility and the presence of steady noise (USEPA, 1974). **Figure B-10** shows the effect of steady indoor background sound levels on sentence intelligibility. For an average adult with normal hearing and fluency in the language, steady background indoor sound levels of less than the 45-dB L_{eq} are expected to allow 100 percent sentence intelligibility.

The curve on **Figure B-10** shows 99 percent intelligibility at L_{eq} below 54 dB and less than 10 percent above 73 dB. Recalling that L_{eq} is dominated by louder noise events, the USEPA L_{eq}(24) goal of 45 dB generally ensures that sentence intelligibility will be high most of the time.

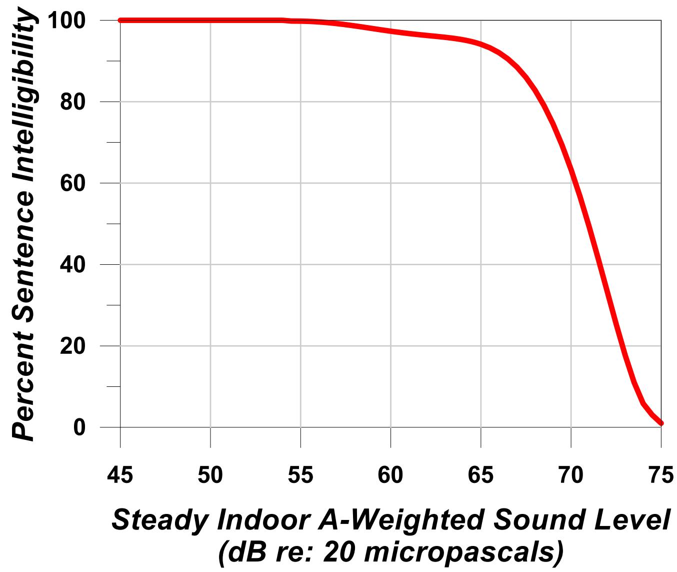


Figure B-10. Speech Intelligibility Curve (digitized from USEPA, 1974).

Classroom Criteria

For teachers to be understood, their regular voice must be clear and uninterrupted. Background noise has to be below the teacher's voice level. Intermittent noise events that momentarily drown out the teacher's voice need to be kept to a minimum. It is therefore important to evaluate the steady background level, level of voice communication, and single-event level due to aircraft overflights that might interfere with speech.

Lazarus (1990) found that for listeners with normal hearing and fluency in the language, complete sentence intelligibility can be achieved when the signal-to-noise ratio (i.e., a comparison of the level of the sound to the level of background noise) is in the range of 15 to 18 dB. The initial ANSI (2002) classroom noise standard and American Speech-Language-Hearing Association (2005) guidelines concur, recommending at least a 15-dB signal-to-noise ratio in classrooms. If the teacher's voice level is at least 50 dB, the background noise level must not exceed an average of 35 dB. The National Research Council of Canada (Bradley, 1993) and WHO (1999) agree with this criterion for background noise.

For eligibility for noise insulation funding, the FAA guidelines state that the design objective for a classroom environment is the 45-dB L_{eq} during normal school hours (FAA, 1985).

Most aircraft noise is not continuous. It consists of individual events like the one sketched on **Figure B-4**. Since speech interference in the presence of aircraft noise is caused by individual aircraft flyover events, a time-averaged metric alone, such as L_{eq}, is not necessarily appropriate. In addition to the background level criteria described above, single-event criteria that account for those noisy events are also needed.

A 1984 study by Wyle for the Port Authority of New York and New Jersey recommended using Speech Interference Level (SIL) for classroom noise criteria (Sharp and Plotkin, 1984). SIL is based on the maximum sound levels in the frequency range that most affects speech communication (500 to 2,000 Hz). The study identified an SIL of 45 dB as the goal. This would provide 90 percent word intelligibility for the short time periods during aircraft overflights. While SIL is technically the best metric for speech interference, it can be approximated by an L_{max} value. An SIL of 45 dB is equivalent to an A-weighted L_{max} of 50 dB for aircraft noise (Wesler, 1986).

Lind et al. (1998) also concluded that an L_{max} criterion of 50 dB would result in 90 percent word intelligibility. Bradley (1985) recommends SEL as a better indicator. His work indicates that 95 percent word intelligibility would be achieved when indoor SEL did not exceed 60 dB. For typical flyover noise, this corresponds to an L_{max} of 50 dB. While WHO (1999) only specifies a background L_{max} criterion, they also note the SIL frequencies and that interference can begin at around 50 dB.

The United Kingdom Department for Education and Skills (UKDfES) established in its classroom acoustics guide a 30-minute time-averaged metric of L_{eq}(30min) for background levels and the metric of LA1,30min for intermittent noises, at thresholds of 30 to 35 dB and 55 dB, respectively. LA1,30min represents the A-weighted sound level that is exceeded 1 percent of the time (in this case, during a 30-minute teaching session) and is generally equivalent to the L_{max} metric (UKDfES, 2003).

Table B-3 summarizes the criteria discussed. Other than the FAA (1985) 45 dB L_{max} criterion, they are consistent with a limit on indoor background noise of 35 to 40 dB L_{eq} and a single event limit of 50 dB L_{max}. It should be noted that these limits were set based on students with normal hearing and no special needs. At-risk students may be adversely affected at lower sound levels.

Table B-3
Indoor Noise Level Criteria Based on Speech Intelligibility

Source	Metric/Level (dB)	Effects and Notes
Federal Aviation Administration (1985)	$L_{eq(during\ school\ hours)}$ = 45 dB	Federal assistance criteria for school sound insulation; supplemental single-event criteria may be used.
Lind et al. (1998), Sharp and Plotkin (1984), Wesler (1986)	L_{max} = 50 dB / Speech Interference Level 45	Single event level permissible in the classroom.
World Health Organization (1999)	L_{eq} = 35 dB L_{max} = 50 dB	Assumes average speech level of 50 dB and recommends signal to noise ratio of 15 dB.
American National Standards Institute (2010)	L_{eq} = 35 dB, based on Room Volume (e.g., cubic feet)	Acceptable background level for continuous and intermittent noise.
United Kingdom Department for Education and Skills (2003)	$L_{eq(30min)}$ = 30-35 dB L_{max} = 55 dB	Minimum acceptable in classroom and most other learning environs.

Notes:
dB = decibel(s); L_{eq} = Equivalent Sound Level; L_{max} = Maximum Sound Level

B.1.4.3 Sleep Disturbance

Sleep disturbance is a major concern for communities exposed to aircraft noise at night. A number of studies have attempted to quantify the effects of noise on sleep. This section provides an overview of the major noise-induced sleep disturbance studies. Emphasis is on studies that have influenced US federal noise policy. The studies have been separated into two groups:

1. Initial studies performed in the 1960s and 1970s, where the research was focused on sleep observations performed under laboratory conditions.
2. Later studies performed in the 1990s up to the present, where the research was focused on field observations.

Initial Studies

The relation between noise and sleep disturbance is complex and not fully understood. The disturbance depends not only on the depth of sleep and the noise level but also on the nonacoustic factors cited for annoyance. The easiest effect on measure is the number of arousals or awakenings from noise events.

Much of the literature has therefore focused on predicting the percentage of the population that will be awakened at various noise levels.

FICON's 1992 review of airport noise issues (FICON, 1992) included an overview of relevant research conducted through the 1970s. Literature reviews and analyses were conducted from 1978 through 1989 using existing data (Griefahn, 1978; Lukas, 1978; Pearsons et. al., 1989). Because of large variability in the data, FICON did not endorse the reliability of those results.

FICON did, however, recommend an interim dose-response curve, awaiting future research. That curve predicted the percent of the population expected to be awakened as a function of the exposure to SEL. This curve was based on research conducted for the US Air Force (Finegold, 1994). The data included most of the research performed up to that point and predicted a 10 percent probability of awakening when exposed to an interior SEL of 58 dB. The data used to derive this curve were primarily from controlled laboratory studies.

Recent Sleep Disturbance Research – Field and Laboratory Studies

It was noted that early sleep laboratory studies did not account for some important factors. These included habituation to the laboratory, previous exposure to noise, and awakenings from noise other than aircraft. In the early 1990s, field studies in people's homes were conducted to validate the earlier laboratory work conducted in the 1960s and 1970s. The field studies of the 1990s (e.g., Horne, 1994) found that 80 to 90 percent of sleep disturbances were not related to outdoor noise events but rather to indoor noises and nonnoise factors. The results showed that, in real life conditions, there was less of an effect of noise on sleep than had been previously reported from laboratory studies. Laboratory sleep studies tend to show more sleep disturbance than field studies because people who sleep in their own homes are used to their environment and, therefore, do not wake up as easily (FICAN, 1997).

FICAN

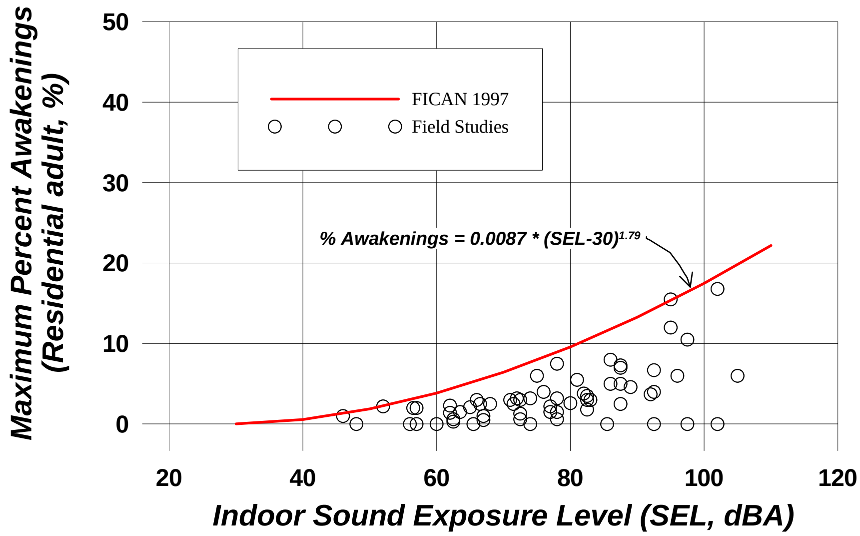
Based on this new information, in 1997 FICAN recommended a dose-response curve to use instead of the earlier 1992 FICON curve (FICAN, 1997). **Figure B-11** shows FICAN's curve, the red line, which is based on the results of three field studies shown in the figure (Ollerhead et al., 1992; Fidell et al., 1994, 1995a, 1995b), along with the data from six previous field studies.

The 1997 FICAN curve represents the upper envelope of the latest field data. It predicts the maximum percent awakened for a given residential population. According to this curve, a maximum of 3 percent of people would be awakened at an indoor SEL of 58 dB. An indoor SEL of 58 dB is equivalent to an outdoor SEL of about 83 dB, with the windows closed (73 dB with windows open).

Number of Events and Awakenings

It is reasonable to expect that sleep disturbance is affected by the number of events. The German Aerospace Center (DLR Laboratory) conducted an extensive study focused on the effects of nighttime aircraft noise on sleep and related factors (Basner, 2004). The DLR Laboratory study was one of the largest studies to examine the link between aircraft noise and sleep disturbance. It involved both laboratory and in-home field research phases. The DLR Laboratory investigators developed a dose-response curve that predicts the number of aircraft events at various values of L_{max} expected to produce one additional awakening over the course of a night. The dose-effect curve was based on the relationships found in the field studies.

Later studies by DLR Laboratory conducted in the laboratory comparing the probability of awakenings from different modes of transportation showed that aircraft noise lead to significantly lower awakening probabilities than either road or rail noise (Basner et al., 2011). Furthermore, it was noted that the probability of awakening, per noise event, decreased as the number of noise events increased. The authors concluded that by far the majority of awakenings from noise events merely replaced awakenings that would have occurred spontaneously anyway.



Source: FICAN 1997

Figure B-11. FICAN (1997) Recommended Sleep Disturbance Dose-Response Relationship.

A different approach was taken by an ANSI standards committee (ANSI, 2008). The committee used the average of the data shown on **Figure B-10** rather than the upper envelope, to predict average awakening from one event. Probability theory is then used to project the awakening from multiple noise events.

Currently, there are no established criteria for evaluating sleep disturbance from aircraft noise although recent studies have suggested a benchmark of an outdoor SEL of 90 dB as an appropriate tentative criterion when comparing the effects of different operational alternatives. The corresponding indoor SEL would be approximately 25 dB lower (at 65 dB) with doors and windows closed, and approximately 15 dB lower (at 75 dB) with doors or windows open. According to the ANSI (2008) standard, the probability of awakening from a single aircraft event at this level is between 1 and 2 percent for people habituated to the noise sleeping in bedrooms with windows closed, and between 2 to 3 percent with windows open. The probability of the exposed population awakening at least once from multiple aircraft events at the 90-dB SEL is shown in **Table B-4**.

Table B-4
Probability of Awakening from NA90SEL

Number of Aircraft Events at the 90-Decibel Sound Exposure Level for Average 9-Hour Night	Minimum Probability of Awakening at Least Once	
	Windows Closed	Windows Open
1	1%	2%
3	4%	6%
5	7%	10%
9 (1 per hour)	12%	18%
18 (2 per hour)	22%	33%
27 (3 per hour)	32%	45%

Source: DOD, 2009b

In December 2008, FICAN recommended the use of this new standard. FICAN also recognized that more research is underway by various organizations, and that work may result in changes to FICAN's position. Until that time, FICAN recommends the use of the ANSI (2008) standard (FICAN, 2008).

Summary

Sleep disturbance research still lacks the details to accurately estimate the population awakened for a given noise exposure. The procedure described in the ANSI (2008) Standard and endorsed by FICAN is based on probability calculations that have not yet been scientifically validated. While this procedure certainly provides a much better method for evaluating sleep awakenings from multiple aircraft noise events, the estimated probability of awakenings can only be considered approximate.

B.1.4.4 Noise Effects on Children

Recent studies on school children indicate a potential link between aircraft noise and both reading comprehension and learning motivation. The effects may be small but may be of particular concern for children who are already scholastically challenged.

Effects on Learning and Cognitive Abilities

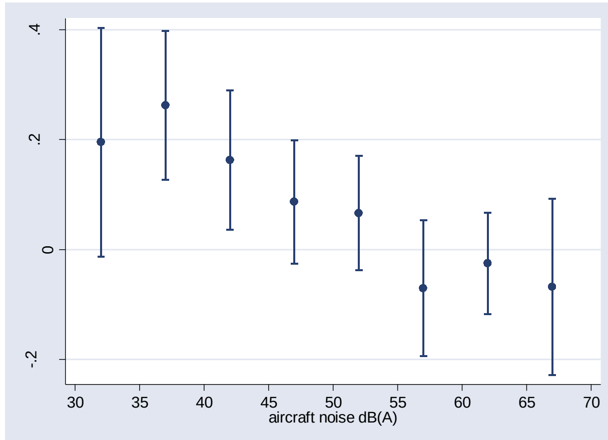
Early studies in several countries (Cohen et al., 1973, 1980, 1981; Bronzaft and McCarthy, 1975; Green et al., 1982; Evans et al., 1998; Haines et al., 2002; Lercher et al., 2003) showed lower reading scores for children living or attending school in noisy areas than for children away from those areas. In some studies noise exposed children were less likely to solve difficult puzzles or more likely to give up.

A longitudinal study reported by Evans et al. (1998), conducted prior to relocation of the old Munich airport in 1992, reported that high noise exposure was associated with deficits in long-term memory and reading comprehension in children with a mean age of 10.8 years. Two years after the closure of the airport, these deficits disappeared, indicating that noise effects on cognition may be reversible if exposure to the noise ceases. Most convincing was the finding that deficits in memory and reading comprehension developed over the 2-year follow-up for children who became newly noise exposed near the new airport; deficits were also observed in speech perception for the newly noise-exposed children.

More recently, the Road Traffic and Aircraft Noise Exposure and Children's Cognition and Health (RANCH) study (Stansfeld et al., 2005; Clark et al., 2005) compared the effect of aircraft and road traffic noise on over 2,000 children in three countries. This was the first study to derive exposure-effect associations for a range of cognitive and health effects and was the first to compare effects across countries.

The study found a linear relation between chronic aircraft noise exposure and impaired reading comprehension and recognition memory. No associations were found between chronic road traffic noise exposure and cognition. Conceptual recall and information recall surprisingly showed better performance in high road traffic noise areas. Neither aircraft noise nor road traffic noise affected attention or working memory (Stansfeld et al., 2005; Clark et al., 2006).

Figure B-12 shows RANCH's result relating noise to reading comprehension. It shows that reading falls below average (a z-score of 0) at Leq greater than 55 dB. Because the relationship is linear, reducing exposure at any level should lead to improvements in reading comprehension.



Sources: Stansfeld et al. 2005; Clark et al. 2006

Figure B-12. RANCH Study Reading Scores Varying with L_{eq}.

An observation of the RANCH study was that children may be exposed to aircraft noise for many of their childhood years and the consequences of long-term noise exposure were unknown. A follow-up study of the children in the RANCH project is being analyzed to examine the long-term effects on children's reading comprehension (Clark et al., 2009). Preliminary analysis indicated a trend for reading comprehension to be poorer at 15 to 16 years of age for children who attended noise-exposed primary schools. An additional study utilizing the same data set (Clark et al., 2012) investigated the effects of traffic-related air pollution and found little evidence that air pollution moderated the association of noise exposure on children's cognition.

There was also a trend for reading comprehension to be poorer in aircraft noise exposed secondary schools. Significant differences in reading scores were found between primary school children in the two different classrooms at the same school (Bronzaft and McCarthy, 1975). One classroom was exposed to high levels of railway noise while the other classroom was quiet. The mean reading age of the noise-exposed children was 3 to 4 months behind that of the control children. Studies suggest that the evidence of the effects of noise on children's cognition has grown stronger over recent years (Stansfeld and Clark, 2015), but further analysis adjusting for confounding factors is ongoing and needed to confirm these initial conclusions.

Studies identified a range of linguistic and cognitive factors to be responsible for children´s unique difficulties with speech perception in noise. Children have lower stored phonological knowledge to reconstruct degraded speech reducing the probability of successfully matching incomplete speech input when compared with adults. Additionally, young children are less able than older children and adults to make use of contextual cues to reconstruct noise-masked words presented in sentential context (Klatte et al., 2013).

FICAN funded a pilot study to assess the relationship between aircraft noise reduction and standardized test scores (Eagan et al., 2004; FICAN, 2007). The study evaluated whether abrupt aircraft noise reduction within classrooms, from either airport closure or sound insulation, was associated with improvements in test scores. Data were collected in 35 public schools near three airports in Illinois and Texas. The study used several noise metrics. These were, however, all computed indoor levels, which makes it hard to compare with the outdoor levels used in most other studies.

The FICAN study found a significant association between noise reduction and a decrease in failure rates for high school students but not middle or elementary school students. There were some weaker associations between noise reduction and an increase in failure rates for middle and elementary schools. Overall, the study found that the associations observed were similar for children with or without learning difficulties, and between verbal and math/science tests. As a pilot study, it was not expected to obtain final answers but provided useful indications (FICAN, 2007).

A recent study of the effect of aircraft noise on student learning (Sharp et al., 2013) examined student test scores at a total of 6,198 US elementary schools, 917 of which were exposed to aircraft noise at 46 airports with noise exposures exceeding the 55-dBA DNL. The study found small but statistically significant associations between airport noise and student mathematics and reading test scores, after taking demographic and school factors into account. Associations were also observed for ambient noise and total noise on student mathematics and reading test scores, suggesting that noise levels per se, as well as from aircraft, might play a role in student achievement.

As part of the Noise-Related Annoyance, Cognition and Health study conducted at Frankfurt airport, reading tests were conducted on 1,209 school children at 29 primary schools. It was found that there was a small decrease in reading performance that corresponded to a 1-month reading delay; however, a recent study observing children at 11 schools surrounding Los Angeles International Airport found that the majority of distractions to elementary age students were other students followed by themselves, which includes playing with various items and daydreaming. Less than 1 percent of distractions were caused by traffic noise.

While there are many factors that can contribute to learning deficits in school-aged children, there is increasing awareness that chronic exposure to high aircraft noise levels may impair learning. This awareness has led WHO and a North Atlantic Treaty Organization (NATO) working group to conclude that daycare centers and schools should not be located near major sources of noise, such as highways, airports, and industrial sites (NATO, 2000; WHO, 1999). The awareness has also led to the classroom noise standard discussed earlier (ANSI, 2002).

B.1.4.5 Noise Effects on Animals and Wildlife

Hearing is critical to an animal's ability to react, compete, reproduce, hunt, forage, and survive in its environment. While the existing literature does include studies on possible effects of jet aircraft noise and sonic booms on wildlife, there appears to have been little concerted effort in developing quantitative comparisons of aircraft noise effects on normal auditory characteristics. Behavioral effects have been relatively well described, but the larger ecological context issues, and the potential for drawing conclusions regarding effects on populations, have not been well developed.

The relationships between potential auditory/physiological effects and species interactions with their environments are not well understood. Manci et al. (1988) assert that the consequences that physiological effects may have on behavioral patterns are vital to understanding the long-term effects of noise on wildlife. Questions regarding the effects (if any) on predator-prey interactions, reproductive success, and intraspecific behavior patterns remain.

The following discussion provides an overview of the existing literature on noise effects (particularly jet aircraft noise) on animal species. The literature reviewed here involves those studies that have focused on the observations of the behavioral effects that jet aircraft and sonic booms have on animals.

A great deal of research was conducted in the 1960s and 1970s on the effects of aircraft noise on the public and the potential for adverse ecological impacts. These studies were largely completed in response to the increase in air travel and as a result of the introduction of supersonic jet aircraft. According to Manci et al. (1988), the foundation of information created from that focus does not necessarily correlate or provide information specific to the impacts on wildlife in areas overflown by aircraft at supersonic speed or at low altitudes.

The abilities to hear sounds and noise and to communicate assist wildlife in maintaining group cohesiveness and survivorship. Social species communicate by transmitting calls of warning, introduction, and other types that are subsequently related to an individual's or group's responsiveness.

Animal species differ greatly in their responses to noise. Noise effects on domestic animals and wildlife are classified as primary, secondary, and tertiary. Primary effects are direct, physiological changes to the auditory system and most likely include the masking of auditory signals. Masking is defined as the inability of an individual to hear important environmental signals that may arise from mates, predators, or prey. There is some potential that noise could disrupt a species' ability to communicate or could interfere with behavioral patterns (Manci et al., 1988). Although the effects are likely temporal, aircraft noise may cause masking of auditory signals within exposed faunal communities. Animals rely on 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. Other primary effects, such as ear drum rupture or temporary and permanent hearing threshold shifts, are not as likely given the subsonic noise levels produced by aircraft overflights.

Secondary effects may include nonauditory effects such as stress and hypertension; behavioral modifications; interference with mating or reproduction; and impaired ability to obtain adequate food, cover, or water. Tertiary effects are the direct result of primary and secondary effects and include population decline and habitat loss. Most of the effects of noise are mild enough that they may never be detectable as variables of change in population size or population growth against the background of normal variation (Bowles, 1995). Other environmental variables (e.g., predators, weather, changing prey base, ground-based disturbance) also influence secondary and tertiary effects and confound the ability to identify the ultimate factor in limiting productivity of a certain nest, area, or region (Smith et al., 1988). Overall, the literature suggests that species differ in their response to various types, durations, and sources of noise (Manci et al., 1988).

Many scientific studies have investigated the effects of aircraft noise on wildlife, and some have focused on wildlife "flight" due to noise. Animal responses to aircraft are influenced by many variables, including size, speed, proximity (both height above the ground and lateral distance), engine noise, color, flight profile, and radiated noise. The type of aircraft (e.g., fixed wing versus rotor-wing [helicopter]) and type of flight mission may also produce different levels of disturbance, with varying animal responses (Smith et al., 1988). Consequently, it is difficult to generalize animal responses to noise disturbances across species.

One result of the Manci et al. (1988) literature review was the conclusion that, while behavioral observation studies were relatively limited, a general behavioral reaction in animals from exposure to aircraft noise is the startle response. The intensity and duration of the startle response appears to be dependent on which species is exposed, whether there is a group or an individual, and whether there have been some previous exposures. Responses range from flight, trampling, stampeding, jumping, or running, to movement of the head in the apparent direction of the noise source. Manci et al. (1988) reported that the literature indicated that avian species may be more sensitive to aircraft noise than mammals.

Domestic Animals

Although some studies report that the effects of aircraft noise on domestic animals is inconclusive, a majority of the literature reviewed indicates that domestic animals exhibit some behavioral responses to military overflights but generally seem to habituate to the disturbances over a period of time. Mammals in particular appear to react to noise at sound levels higher than 90 dB, with responses including the startle response, freezing (i.e., becoming temporarily stationary), and fleeing from the sound source. Many studies on domestic animals suggest that some species appear to acclimate to some forms of sound disturbance (Manci et al., 1988). Some studies have reported such primary and secondary effects as reduced milk production and rate of milk release, increased glucose concentrations, decreased levels of hemoglobin, increased heart rate, and a reduction in thyroid activity. These latter effects appear to represent a small percentage of the findings occurring in the existing literature.

Some reviewers have indicated that earlier studies, and claims by farmers linking adverse effects of aircraft noise on livestock, did not necessarily provide clear-cut evidence of cause and effect (Cottereau, 1978). In contrast, many studies conclude that there is no evidence that aircraft overflights affect feed intake, growth, or production rates in domestic animals.

Wildlife

Studies on the effects of overflights and sonic booms on wildlife have been focused mostly on avian species and ungulates such as caribou and bighorn sheep. Few studies have been conducted on marine mammals, small terrestrial mammals, reptiles, amphibians, and carnivorous mammals. Generally, species that live entirely below the surface of the water have also been ignored due to the fact they do not experience the same level of sound as terrestrial species (National Park Service, 1994). Wild ungulates appear to be much more sensitive to noise disturbance than domestic livestock. This may be due to previous exposure to disturbances. One common factor appears to be that low-altitude flyovers seem to be more disruptive in terrain where there is little cover (Manci et al., 1988).

Some physiological/behavioral responses such as increased hormonal production, increased heart rate, and reduction in milk production have been described in a small percentage of studies. A majority of the studies focusing on these types of effects have reported short-term or no effects.

The relationships between physiological effects and how species interact with their environments have not been thoroughly studied; therefore, the larger ecological context issues regarding physiological effects of jet aircraft noise (if any) and resulting behavioral pattern changes are not well understood.

Animal species exhibit a wide variety of responses to noise. It is therefore difficult to generalize animal responses to noise disturbances or to draw inferences across species, as reactions to jet aircraft noise appear to be species-specific. Consequently, some animal species may be more sensitive than other species and/or may exhibit different forms or intensities of behavioral responses. For instance, wood ducks appear to be more sensitive and more resistant to acclimation to jet aircraft noise than Canada geese in one study. Similarly, wild ungulates seem to be more easily disturbed than domestic animals.

The literature does suggest that common responses include the “startle” or “fright” response and, ultimately, habituation. It has been reported that the intensities and durations of the startle response decrease with the numbers and frequencies of exposures, suggesting no long-term adverse effects. The majority of the literature suggests that domestic animal species (e.g., cows, horses, chickens) and wildlife species exhibit adaptation, acclimation, and habituation after repeated exposure to jet aircraft noise and sonic booms.

Animal responses to aircraft noise appear to be somewhat dependent on, or influenced by, the size, shape, speed, proximity (vertical and horizontal), engine noise, color, and flight profile of planes. Helicopters also appear to induce greater intensities and durations of disturbance behavior as compared to fixed-wing aircraft. Some studies showed that animals that had been previously exposed to jet aircraft noise exhibited greater degrees of alarm and disturbance to other objects creating noise, such as boats, people, and objects blowing across the landscape. Other factors influencing response to jet aircraft noise may include wind direction, speed, and local air turbulence; landscape structures (i.e., amount and type of vegetative cover); and, in the case of bird species, whether the animals are in the incubation/nesting phase.

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Appendix B-2

Noise Modeling

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B.2 NOISE MODELING

The following sections describe input data used in the noise modeling process. This data were developed in coordination with the Air Force Air Combat Command (ACC), Air Force Civil Engineer Center, and Holloman Air Force Base (AFB) personnel.

B.2.1 Airfield Operations

The first step in estimating the effects of the contract adversary air (ADAIR) action was to determine the baseline operations at Holloman AFB. The baseline operations were identified through a recent evaluation of the interim relocation of two F-16 Formal Training Units (FTUs). The FTUs were relocated to Holloman AFB and are in the process of standing up. The aircraft operations identified from that project were determined appropriate by the Air Force for use as the baseline for the contract ADAIR. The baseline has a total of 87,627 operations at the airfield. **Table B-5** contains the break out of those operations by aircraft type and organization. **Table B-6** contains the operations to be modeled for the baseline as well as the contract ADAIR aircraft operations.

A SORTIE IS A SINGLE FLIGHT, BY ONE AIRCRAFT, FROM TAKEOFF TO LANDING WHILE A SORTIE-OPERATION IS THE USE OF ONE AIRSPACE UNIT (E.G., MILITARY OPERATIONS AREA) BY ONE AIRCRAFT. THE NUMBER OF SORTIE-OPERATIONS IS USED TO QUANTIFY THE NUMBER OF USES BY AIRCRAFT AND TO ACCURATELY MEASURE POTENTIAL IMPACTS (E.G., NOISE, AIR QUALITY, AND SAFETY IMPACTS). A SORTIE-OPERATION IS NOT A MEASURE OF HOW LONG AN AIRCRAFT USES AN AIRSPACE UNIT, NOR DOES IT INDICATE THE NUMBER OF AIRCRAFT IN AN AIRSPACE UNIT DURING A GIVEN PERIOD; IT IS A MEASUREMENT FOR THE NUMBER OF TIMES A SINGLE AIRCRAFT USES A PARTICULAR AIRSPACE UNIT.

Table B-5
Baseline Operations at Holloman Air Force Base

Category	Squadron / Unit / Group	Aircraft	Modeled Type (if different) or engine designation	AB Departure			Standard/MIL Departure			Overhead Arrivals			Straight In Arrivals			Closed Pattern[2]			Total		
				Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total
Based	54 FG	F-16C		10397	547	10944	6785	511	7296	14419	1085	15504	2544	192	2736	30106	614	30720	64251	2949	67200
	49 OG	MQ-9	Cessna 441	-	-	-	1320	1680	3000	-	-	-	3000	-	3000	380	20	400	4700	1700	6400
	82 ATRS/Det 1	QF-16C	F-16C	400	-	400	-	-	-	260	-	260	140	-	140	2280	-	2280	3080	-	3080
	ACC/AFGSC	T-38A		91	4	95	-	-	-	5	-	5	90	-	90	513	-	513	699	4	703
	586 FLTS	T-38C		365	15	380	-	-	-	317	-	317	63	-	63	2052	-	2052	2797	15	2812
		C-12		-	-	-	361	19	380	-	-	-	361	19	380	1083	57	1140	1805	95	1900
	Army	C-12		-	-	-	190	10	200	-	-	-	190	10	200	38	2	40	418	22	440
		UH-60 Lima	UH-60A	-	-	-	510	90	600	-	-	-	588	12	600	-	-	-	1098	102	1200
	Aeroclub	DA-40	T-3 (Firefly)	-	-	-	288	-	288	-	-	-	288	-	288	-	-	-	576	-	576
		Cessna 172	T-41	-	-	-	288	-	288	-	-	-	288	-	288	-	-	-	576	-	576
Transient		F-18A/C	F-18A/C	-	-	-	669	-	669	-	-	-	669	-	669	-	-	-	1338	-	1338
		Fighter Jets	F-35	-	-	-	8	-	8	-	-	-	8	-	8	-	-	-	16	-	16
		Small Props	T-6	-	-	-	350	-	350	-	-	-	350	-	350	-	-	-	700	-	700
		Small Jets	C-20	-	-	-	210	-	210	-	-	-	210	-	210	-	-	-	420	-	420
		Big Jets	C-17	-	-	-	117	-	117	-	-	-	117	-	117	-	-	-	234	-	234
		Big Props	C-130E	-	-	-	15	-	15	-	-	-	15	-	15	-	-	-	30	-	30
		Helos	UH-1N	-	-	-	1	-	1	-	-	-	1	-	1	-	-	-	2	-	2
Based Totals				11253	566	11819	9742	2310	12052	15001	1085	16086	7552	233	7785	36452	693	37145	80000	4887	84887
Transient Totals				-	-	-	1370	-	1370	-	-	-	1370	-	1370	-	-	-	2740	-	2740
Grand Totals				**11253**	**566**	**11819**	**11112**	**2310**	**13422**	**15001**	**1085**	**16086**	**8922**	**233**	**9155**	**36452**	**693**	**37145**	**82740**	**4887**	**87627**

Notes:
(1) All operations shown to nearest integer
(2) Each circuit counted as two operations

Table B-6
Baseline Operations at Holloman Air Force Base Plus Contract Adversary Air Operations

Category	Squadron / Unit / Group	Aircraft	Modeled Type (if different) or engine designation	AB Departure			Standard/MIL Departure			Overhead Arrivals			Straight In Arrivals			Closed Pattern[2]			Total		
				Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total
Based	54 FG	F-16C		10397	547	10944	6785	511	7296	14419	1085	15504	2544	192	2736	30106	614	30720	64251	2949	67200
	49 OG	MQ-9	Cessna 441	-	-	-	1320	1680	3000	-	-	-	3000	-	3000	380	20	400	4700	1700	6400
	82 ATRS/Det 1	QF-16C	F-16C	400	-	400	-	-	-	340	-	340	60	-	60	2280	-	2280	3080	-	3080
	ACC/AFGSC	T-38A		91	4	95	-	-	-	5	-	5	90	-	90	513	-	513	699	4	703
	586 FLTS	T-38C		365	15	380	-	-	-	317	-	317	63	-	63	2052	-	2052	2797	15	2812
		C-12		-	-	-	361	19	380	-	-	-	361	19	380	1083	57	1140	1805	95	1900
	Army	C-12		-	-	-	190	10	200	-	-	-	190	10	200	38	2	40	418	22	440
		UH-60 Lima	UH-60A	-	-	-	510	90	600	-	-	-	588	12	600	-	-	-	1098	102	1200
	Aeroclub	DA-40	T-3 (Firefly)	-	-	-	288	-	288	-	-	-	288	-	288	-	-	-	576	-	576
		Cessna 172	T-41	-	-	-	288	-	288	-	-	-	288	-	288	-	-	-	576	-	576
	ADAIR	Category B	See Notes (3,4)	3040	160	3200	-	-	-	2720	-	2720	256	224	480	864	-	864	6880	384	7264
Transient		F-18A/C	F-18A/C	-	-	-	669	-	669	-	-	-	669	-	669	-	-	-	1338	-	1338
		Fighter Jets	F-35	-	-	-	8	-	8	-	-	-	8	-	8	-	-	-	16	-	16
		Small Props	T-6	-	-	-	350	-	350	-	-	-	350	-	350	-	-	-	700	-	700
		Small Jets	C-20	-	-	-	210	-	210	-	-	-	210	-	210	-	-	-	420	-	420
		Big Jets	C-17	-	-	-	117	-	117	-	-	-	117	-	117	-	-	-	234	-	234
		Big Props	C-130E	-	-	-	15	-	15	-	-	-	15	-	15	-	-	-	30	-	30
		Helos	UH-1N	-	-	-	1	-	1	-	-	-	1	-	1	-	-	-	2	-	2
Based Totals				14293	726	15019	9742	2310	12052	17801	1085	18886	7728	457	8185	37316	693	38009	86880	5271	92151
Transient Totals				-	-	-	1370	-	1370	-	-	-	1370	-	1370	-	-	-	2740	-	2740
Grand Totals				**14293**	**726**	**15019**	**11112**	**2310**	**13422**	**17801**	**1085**	**18886**	**9098**	**457**	**9555**	**37316**	**693**	**38009**	**89620**	**5271**	**94891**

Notes:
(1) All operations shown to nearest integer
(2) Each circuit counted as two operations
(3) ADAIR operations apply only to the Proposed Action scenario to be modeled as A-4C, F-5E, or T-45 for High, Medium, and Low Noise Category B Proposed Action Scenarios, respectively.
(4) ADAIR night operations follow 54 FG schedule.

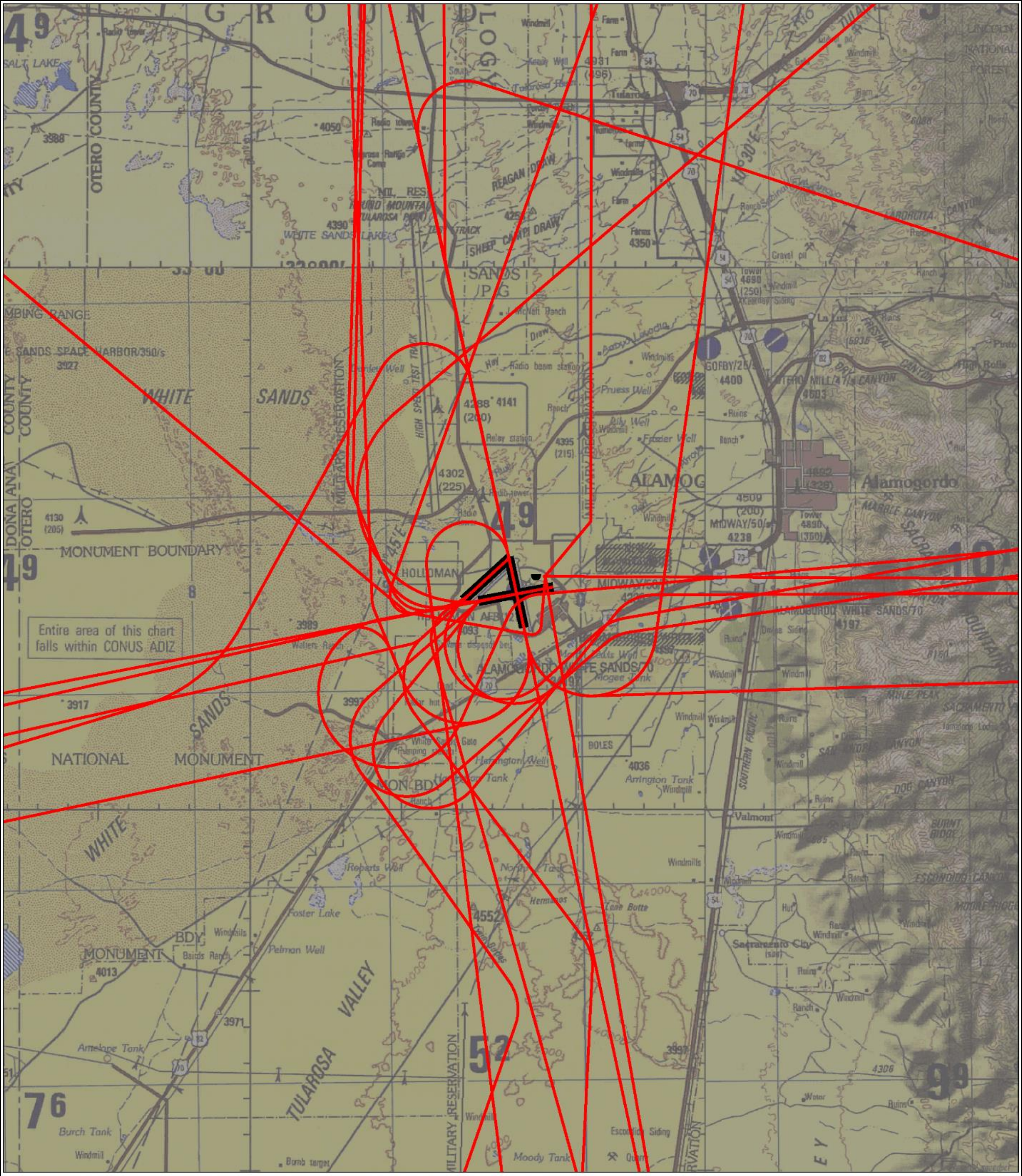
B.2.2 Runway and Flight Track Use

This section describes the flight tracks used by the aircraft operating out of Holloman AFB as well as the runway utilization. Utilization percentages are provided for each runway in **Table B-7**. Flight track maps for all aircraft are presented on **Figure B-13** (departures), **Figure B-14** (arrivals), and **Figure B-15** (closed patterns). Closed pattern flight track represent aircraft patterns that depart and arrive on the same runway. Example flight profiles that use closed pattern flight tracks are simulated flame out and visual flight rules pattern profiles.

Table B-7
Runway Usage for Aircraft at Holloman Air Force Base

Op Type	Runway ID	Based						Transient
		54 FG - F-16Cs	49 OG - MQ-9s	82 ATRS/Det 1 QF-16Cs	ACC/AGCS T-38As 586 FLTS-T-38Cs	586 FLTS & Army C-12s	Aeroclub	
Departure	Day/Night:	95%/5%	44%/56%	100%/0%	96%/4%	95%/5%	100%/0%	100%/0%
	04	0%	0%	0%	0%	0%	0%	0%
	22	5%	0%	33%	0%	0%	50%	0%
	07	0%	0%	0%	0%	0%	0%	0%
	25	15%	45%	57%	95%	95%	50%	100%
	16	70%	8%	7%	4%	4%	0%	0%
	34	10%	47%	3%	1%	1%	0%	0%
Arrivals	Day/Night:	93%/7%	100%/0%	100%/0%	100%/0%	95%/5%	100%/0%	100%/0%
	04	0%	0%	33%	0%	0%	0%	0%
	22	5%	6%	3%	0%	0%	50%	0%
	07	0%	0%	0%	0%	0%	0%	0%
	25	1%	40%	7%	2%	2%	50%	0%
	16	84%	40%	52%	95%	95%	0%	100%
	34	10%	14%	5%	3%	3%	0%	0%
Closed Patterns	Day/Night:	98%/2%	95%/5%	100%/0%	100%/0%	95%/5%	100%/0%	100%/0%
	04	0%	0%	33%	0%	0%	0%	0%
	22	5%	6%	3%	0%	0%	0%	0%
	07	0%	0%	0%	0%	0%	0%	0%
	25	5%	40%	7%	8%	8%	0%	0%
	16	80%	40%	52%	90%	90%	0%	0%
	34	10%	14%	5%	2%	2%	0%	0%

Note:
(1) Army UH-60 helicopters utilize the landing pad NHP with 15% Departure and 2% Arrival night operations.



Holloman Air Force Base
Departure Flight Tracks

Scale in Feet 1:243,000 (1 inch = 20,300 feet)

Figure B-13. Departure Flight Tracks at Holloman Air Force Base.

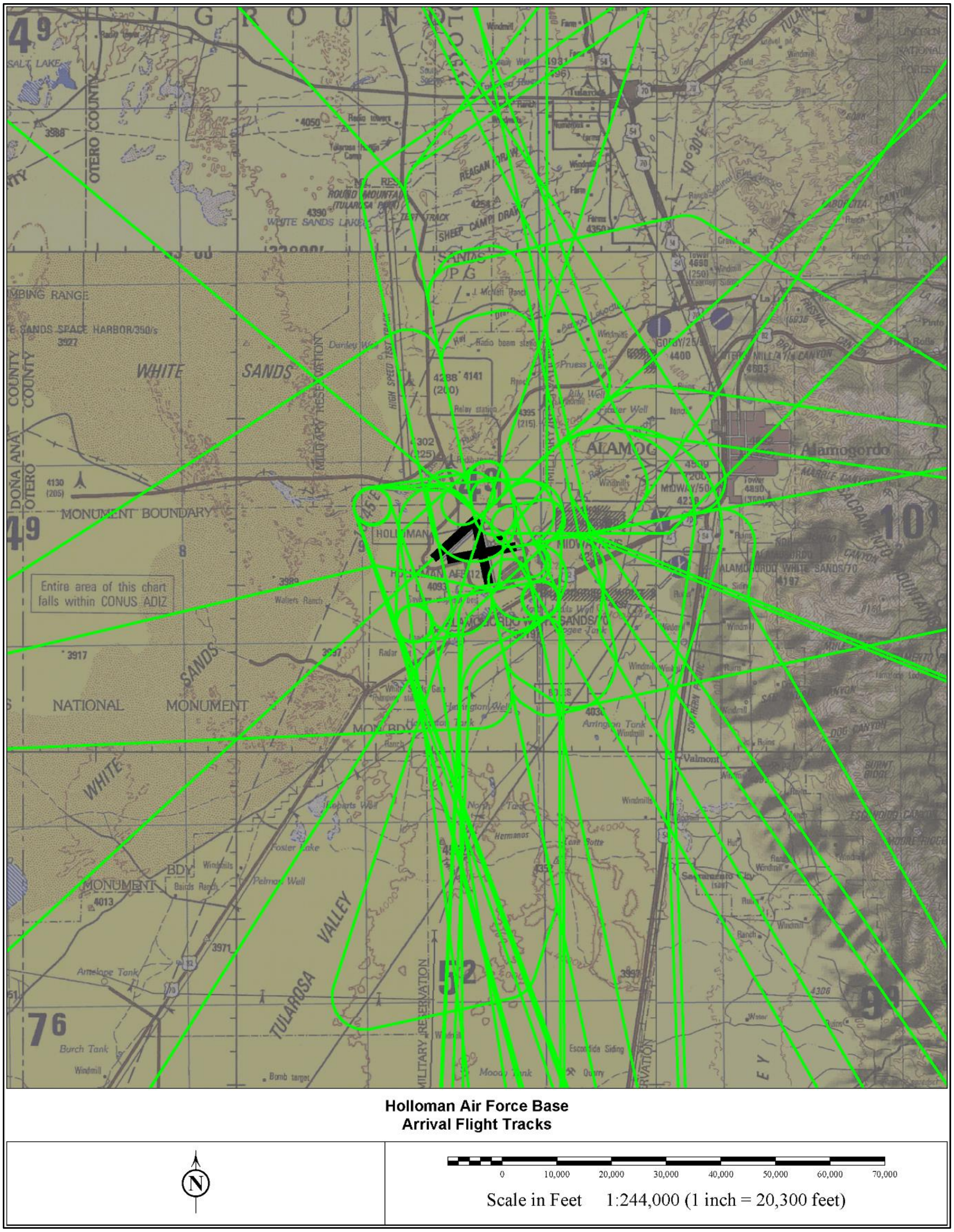


Figure B-14. Arrival Flight Tracks at Holloman Air Force Base.

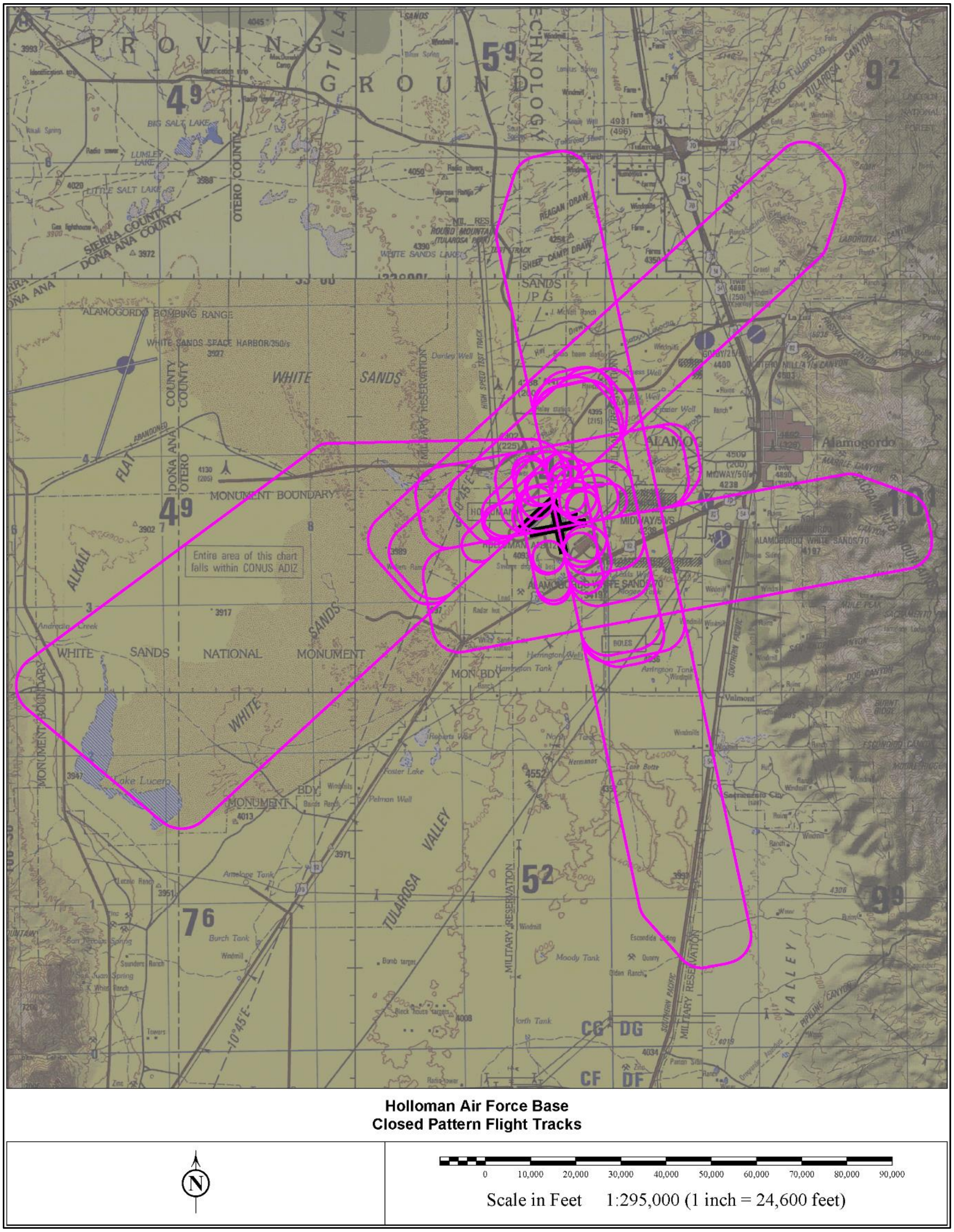


Figure B-15. Closed Pattern Flight Tracks at Holloman Air Force Base.

B.2.3 Flight Profiles and Aircraft

The ADAIR program would locate contractor aircraft at Holloman AFB with the appropriate capabilities to respond to the needs of the fighters at the bases. The Air Force identified three categories of aircraft with differing capabilities (A, B, and C) on the contract. Holloman AFB is designated a category B location. To fulfill the requirements of a category a contractor could provide a variety of aircraft with the appropriate specifications. Because the type of aircraft for contract ADAIR are not known at this time, representative noise surrogates were selected for the lowest through highest potential noise emission scenarios for the aircraft that contractors may select to provide for each of the categories. To model a given noise scenario for a certain category, all contract ADAIR flight operations were assigned to the surrogate. All three scenarios for Category B will be modeled separately in the final analysis for Holloman AFB. The surrogates for Category B are presented in **Table B-8.**

Table B-8
Aircraft Scenarios

Category	High Noise Scenario	Medium Noise Scenario	Low Noise Scenario
B	A-4K (A-4C surrogate)	F-5 (F-5E surrogate)	T-59 Hawk (T-45 surrogate)

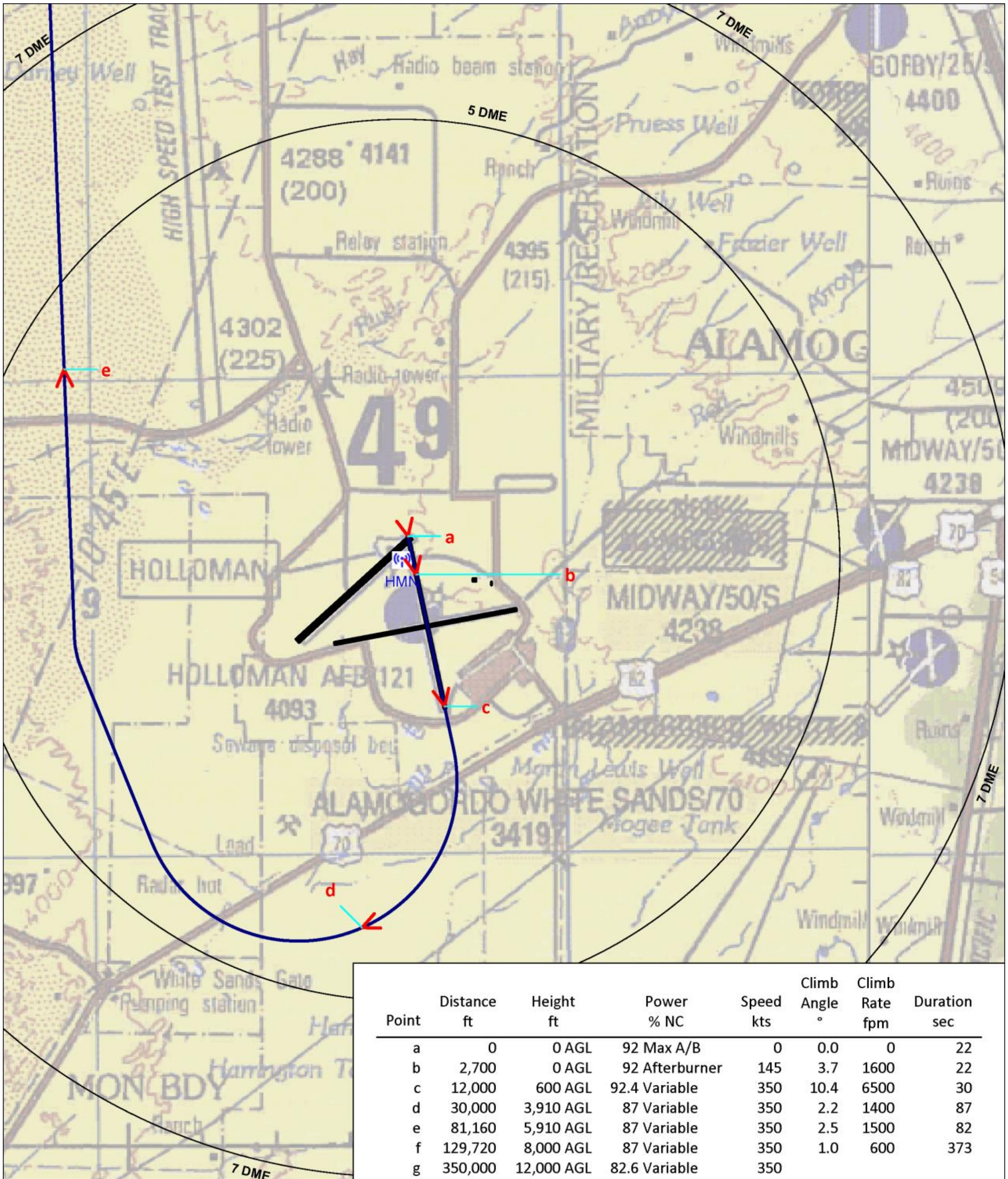
This section details the representative profiles for each aircraft that is based at Holloman AFB. This includes the F-16C aircraft of the 54 FG, the MQ-9s of the 49 OG, the QF-16Cs of the 82 ATRS/Det 1, the T-38As that are sent to Holloman AFB for maintenance, the T-38Cs of the 586 FLTS, the C-12s used by the Army and 586 FLTS, UH-60L helicopters, the DA-40 and Cessna 172 planes flown by the Aeroclub, and the proposed contract ADAIR aircraft for Category B. The Category B aircraft are modeled as the T-45 for the Low Noise Scenario, the F-5E for the Medium Noise Scenario, and the A-4C for the High Noise Scenario. Because it is unknown which aircraft type or combination thereof that the contractor will bring to Holloman AFB, each scenario is modeled separately as if it were the only aircraft in the contract ADAIR inventory.

Representative profiles provide the speed and power setting of each type of aircraft as a function of distance along the flight track for the representative maneuvers. For modeling purposes, the appropriate profile is used for all flight tracks that conform to that maneuver type. For example, all overhead break arrival tracks utilize the representative profile for modeling that maneuver.

The operations tables (**Tables B-5** and **B-6**) can be used with the runway usage table (**Table B-7**) to understand the distribution of the following representative profiles that will be modeled on tracks associated with each runway. One important point to note in looking at flight profiles: the description of the power setting indicates the aircraft's configuration. For modeling noise emissions, there are two different configurations. Any description with the words Approach or Parallel indicate that the aircraft is fully configured for arrival (landing gear down, flaps set, etc.). All other descriptions in the profile indicate the aircraft is not fully configured for arrival.

B.2.3.1 Based Aircraft Representative Flight Profiles

Flight Profiles for 54th Fighter Group F-16Cs



Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0	0 AGL	92 Max A/B	0	0.0	0	22
b	2,700	0 AGL	92 Afterburner	145	3.7	1600	22
c	12,000	600 AGL	92.4 Variable	350	10.4	6500	30
d	30,000	3,910 AGL	87 Variable	350	2.2	1400	87
e	81,160	5,910 AGL	87 Variable	350	2.5	1500	82
f	129,720	8,000 AGL	87 Variable	350	1.0	600	373
g	350,000	12,000 AGL	82.6 Variable	350			

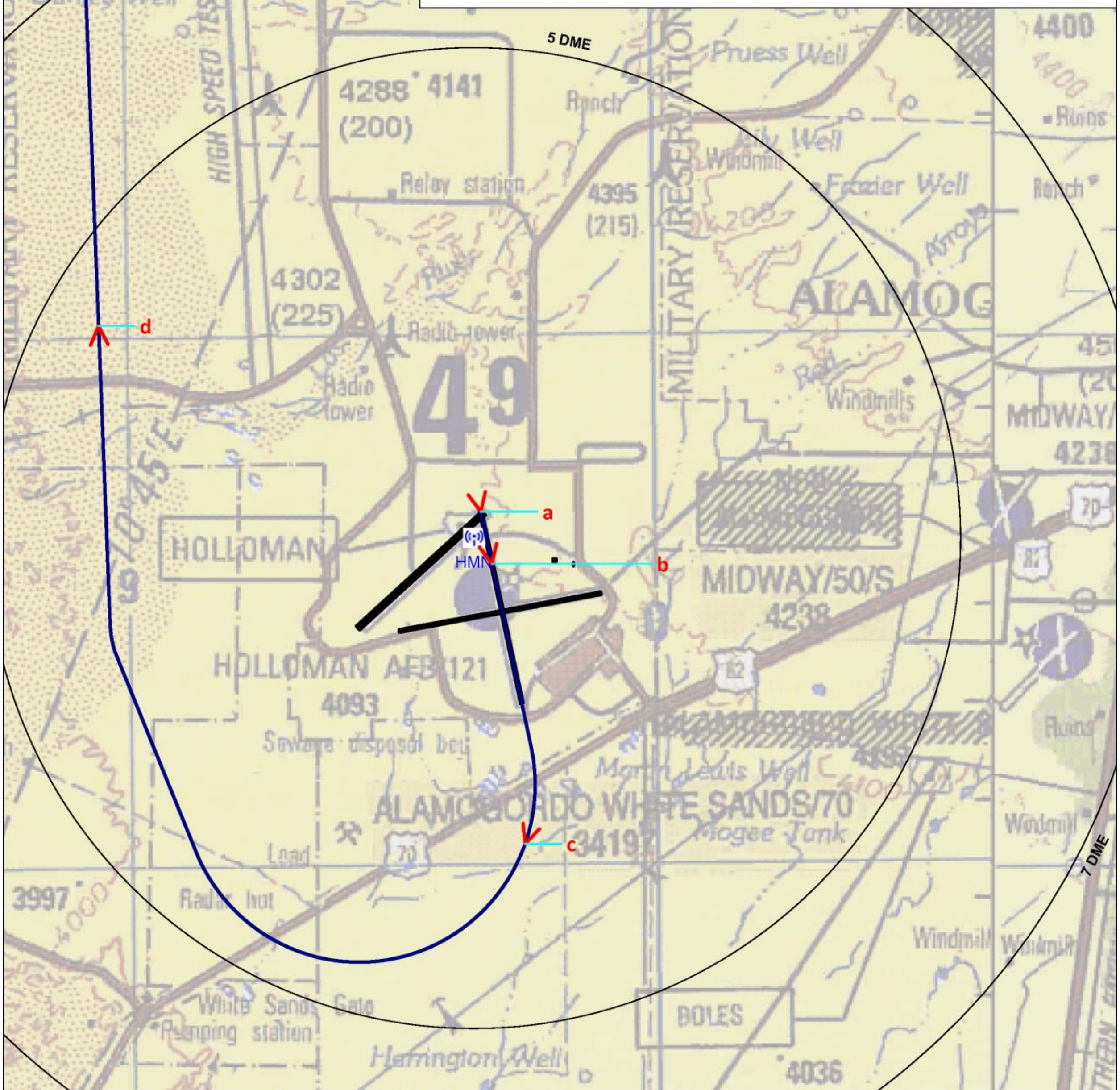
Flight Profile 16DD
AB TAKEOFF TO 'ROMEO' LINE-REPRESENTATIVE

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000

Scale in Feet 1:98,000 (1 inch = 8,170 feet)

N

Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0	0 AGL	92 Mil	0	0.0	0	27
b	3,300	0 AGL	92.4 Variable	145	3.9	1500	47
c	21,000	1,200 AGL	92.4 Variable	300	4.5	2600	110
d	81,160	5,910 AGL	87 Variable	350	2.5	1500	82
e	129,720	8,000 AGL	87 Variable	350	1.3	800	288
f	299,999	12,000 AGL	82.6 Variable	350			

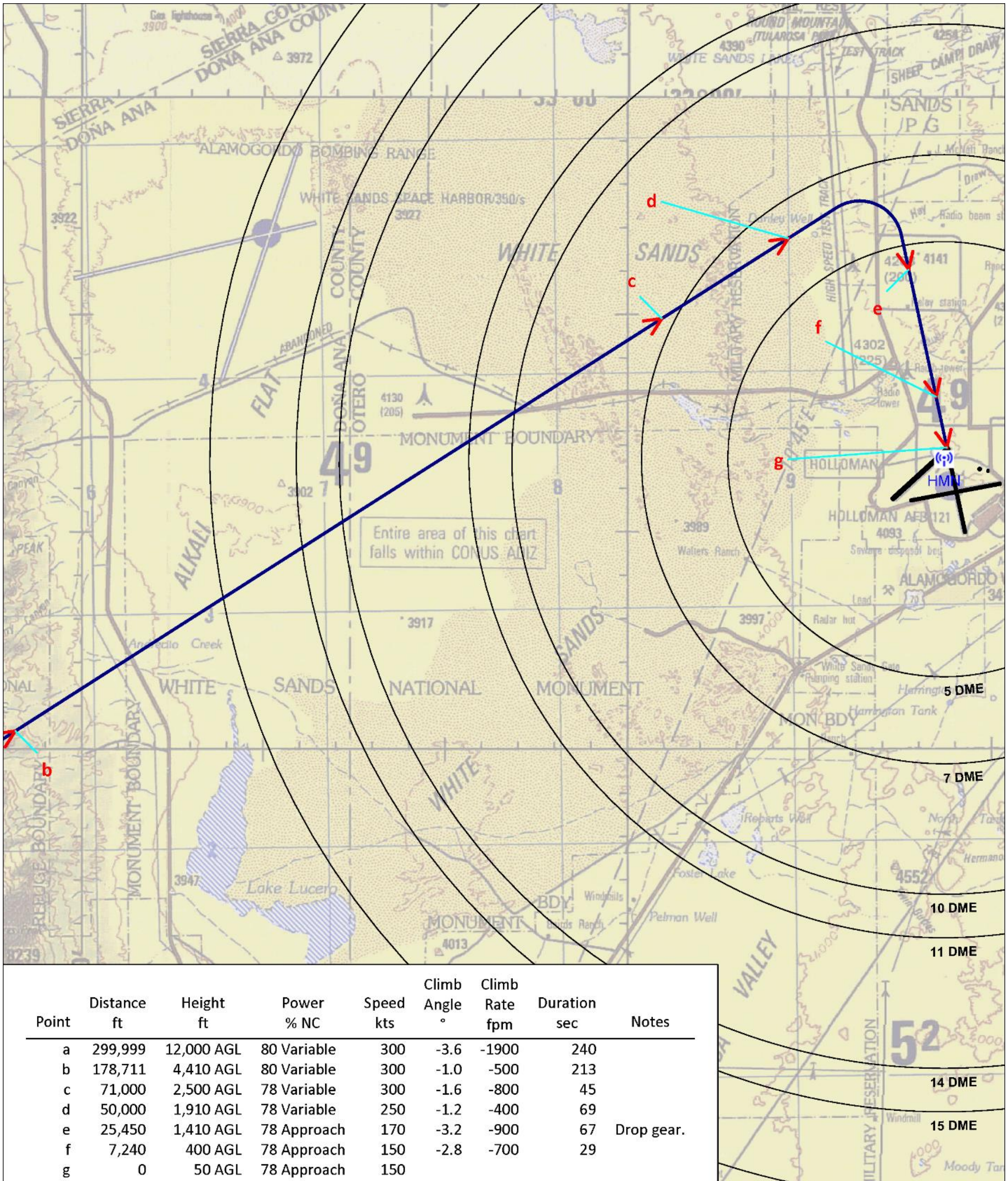


Flight Profile 16DC
MIL TAKEOFF TO 'ROMEO' LINE-REPRESENTATIVE

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000

Scale in Feet 1:98,000 (1 inch = 8,170 feet)

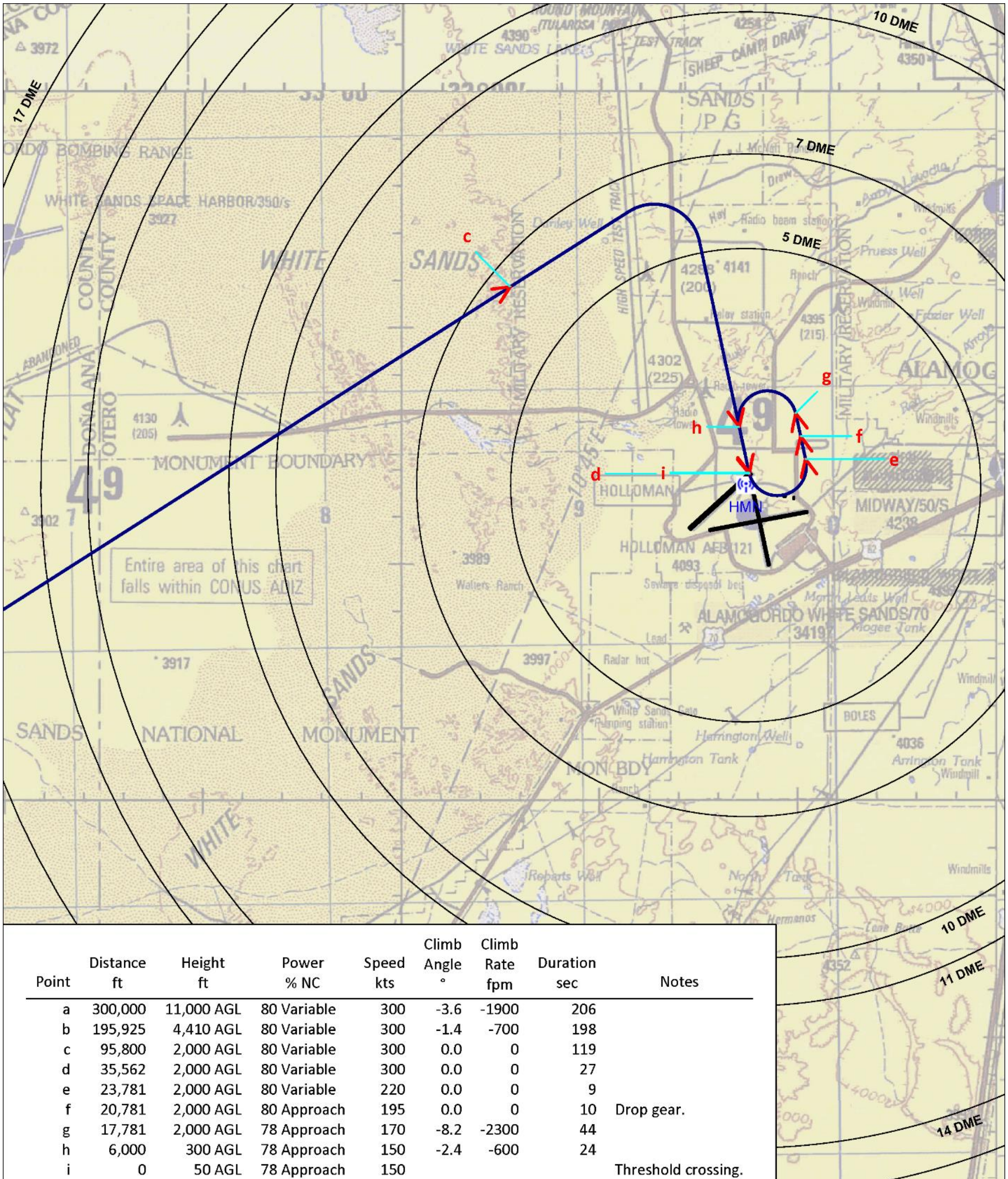
N



Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	299,999	12,000 AGL	80 Variable	300	-3.6	-1900	240	
b	178,711	4,410 AGL	80 Variable	300	-1.0	-500	213	
c	71,000	2,500 AGL	78 Variable	300	-1.6	-800	45	
d	50,000	1,910 AGL	78 Variable	250	-1.2	-400	69	
e	25,450	1,410 AGL	78 Approach	170	-3.2	-900	67	Drop gear.
f	7,240	400 AGL	78 Approach	150	-2.8	-700	29	
g	0	50 AGL	78 Approach	150				

Flight Profile 16AB
VFR WSMRS STRAIGHT-IN-REPRESENTATIVE

0 10,000 20,000 30,000 40,000 50,000 60,000
Scale in Feet 1:199,000 (1 inch = 16,600 feet)

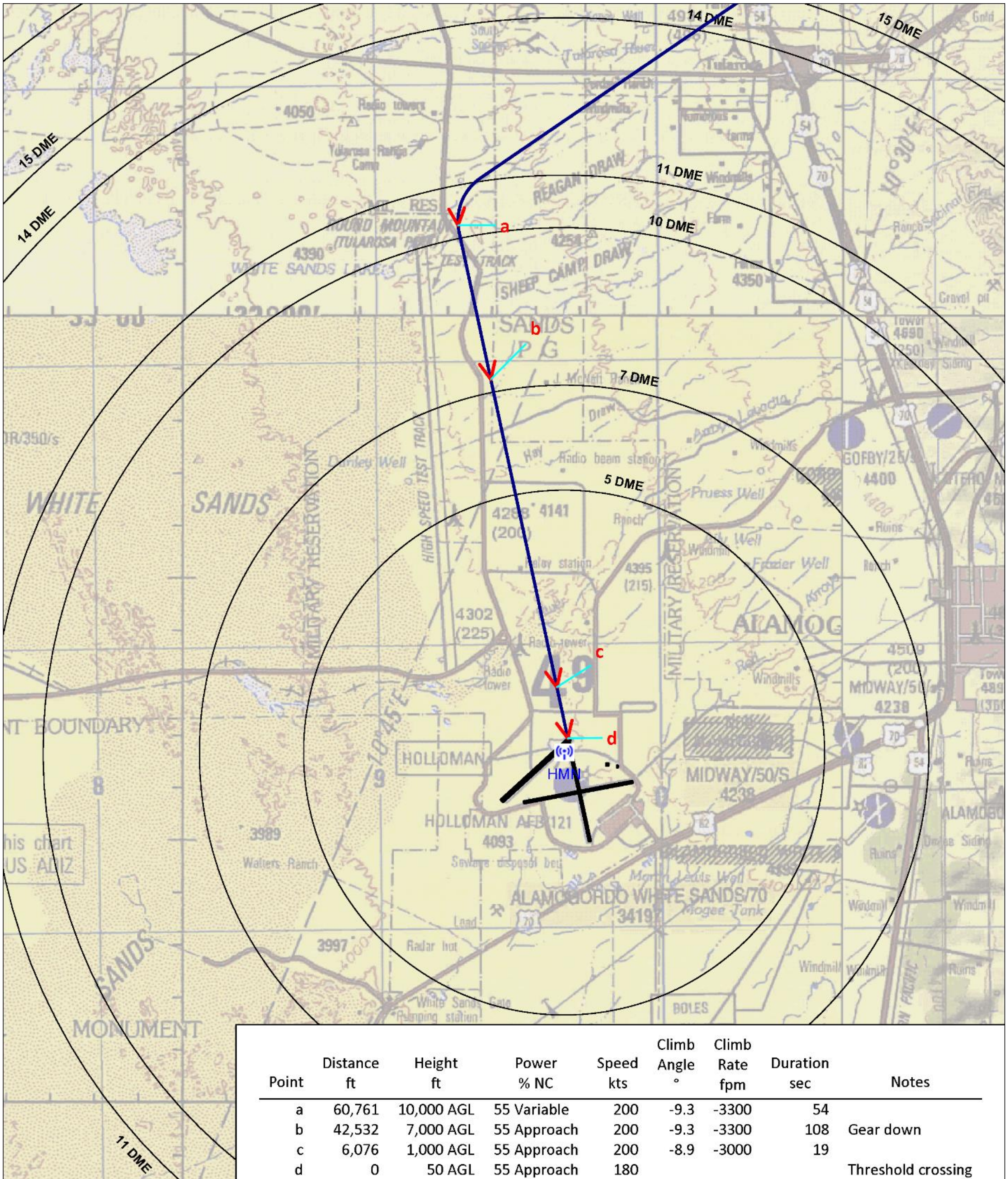


Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	300,000	11,000 AGL	80 Variable	300	-3.6	-1900	206	
b	195,925	4,410 AGL	80 Variable	300	-1.4	-700	198	
c	95,800	2,000 AGL	80 Variable	300	0.0	0	119	
d	35,562	2,000 AGL	80 Variable	300	0.0	0	27	
e	23,781	2,000 AGL	80 Variable	220	0.0	0	9	
f	20,781	2,000 AGL	80 Approach	195	0.0	0	10	Drop gear.
g	17,781	2,000 AGL	78 Approach	170	-8.2	-2300	44	
h	6,000	300 AGL	78 Approach	150	-2.4	-600	24	
i	0	50 AGL	78 Approach	150				Threshold crossing.

Flight Profile 16ABO
ARRIVAL WSMRS - PITCH - REPRESENTATIVE

0 10,000 20,000 30,000 40,000 50,000 60,000
Scale in Feet 1:183,000 (1 inch = 15,200 feet)

N

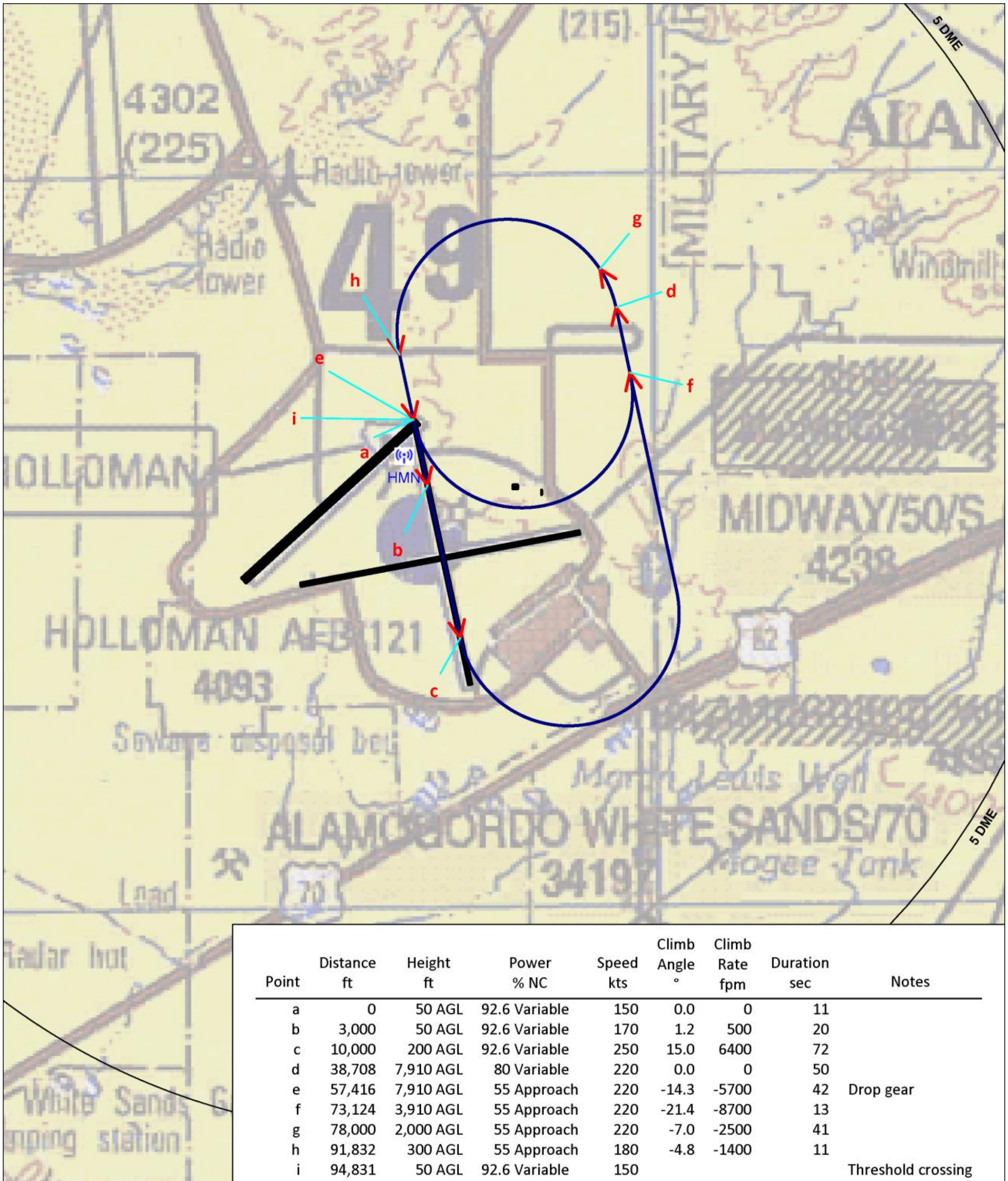


Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	60,761	10,000 AGL	55 Variable	200	-9.3	-3300	54	
b	42,532	7,000 AGL	55 Approach	200	-9.3	-3300	108	Gear down
c	6,076	1,000 AGL	55 Approach	200	-8.9	-3000	19	
d	0	50 AGL	55 Approach	180				Threshold crossing

Flight Profile 16AJ
RANDOM ENTRY SFO-REPRESENTATIVE

0 10,000 20,000 30,000 40,000 50,000

Scale in Feet 1:165,000 (1 inch = 13,700 feet)



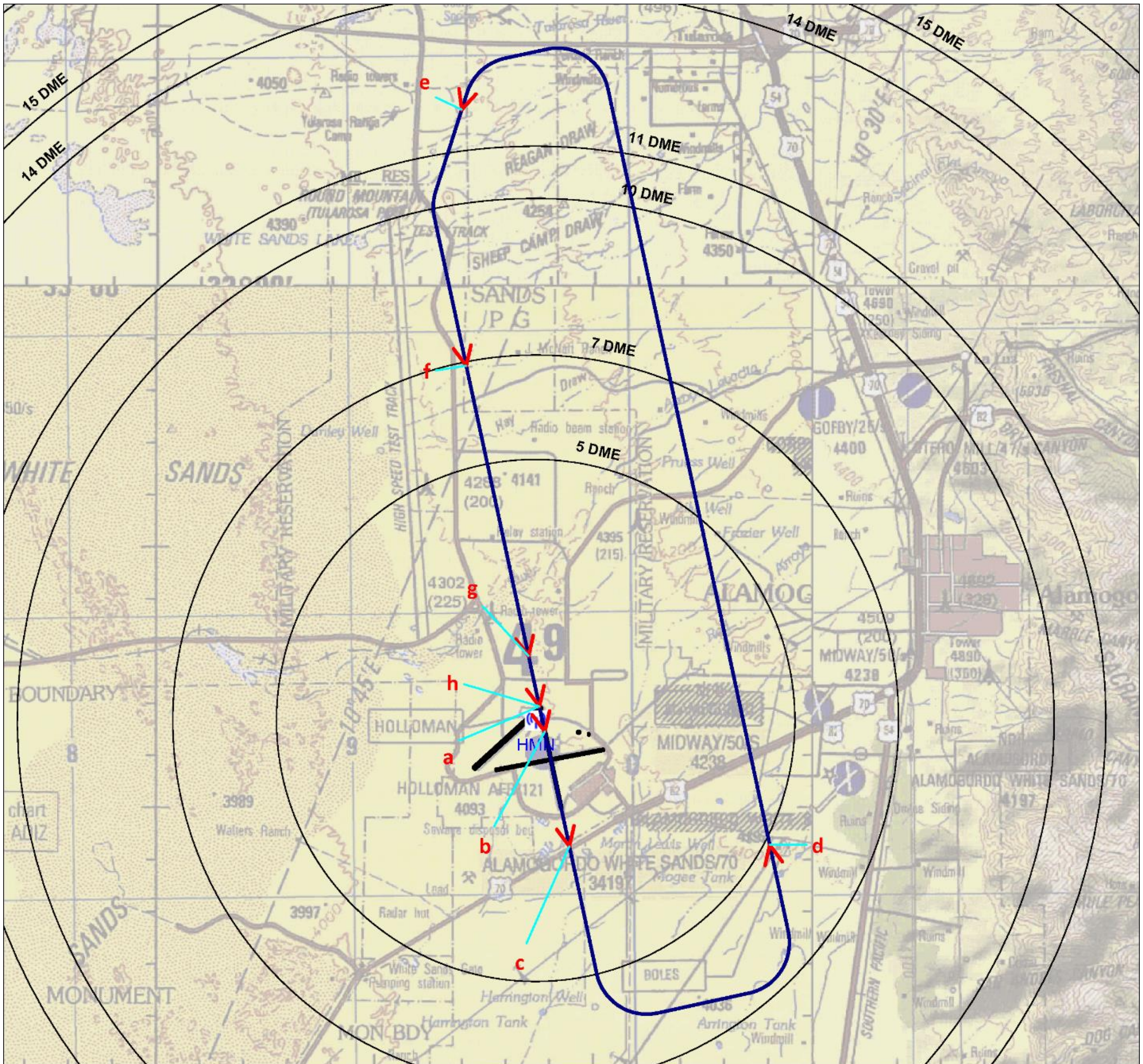
Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0	50 AGL	92.6 Variable	150	0.0	0	11	
b	3,000	50 AGL	92.6 Variable	170	1.2	500	20	
c	10,000	200 AGL	92.6 Variable	250	15.0	6400	72	
d	38,708	7,910 AGL	80 Variable	220	0.0	0	50	
e	57,416	7,910 AGL	55 Approach	220	-14.3	-5700	42	Drop gear
f	73,124	3,910 AGL	55 Approach	220	-21.4	-8700	13	
g	78,000	2,000 AGL	55 Approach	220	-7.0	-2500	41	
h	91,832	300 AGL	55 Approach	180	-4.8	-1400	11	
i	94,831	50 AGL	92.6 Variable	150				Threshold crossing

Flight Profile 16CA
SFO-REPRESENTATIVE

0 4,000 8,000 12,000 16,000 20,000

Scale in Feet 1:63,800 (1 inch = 5,320 feet)

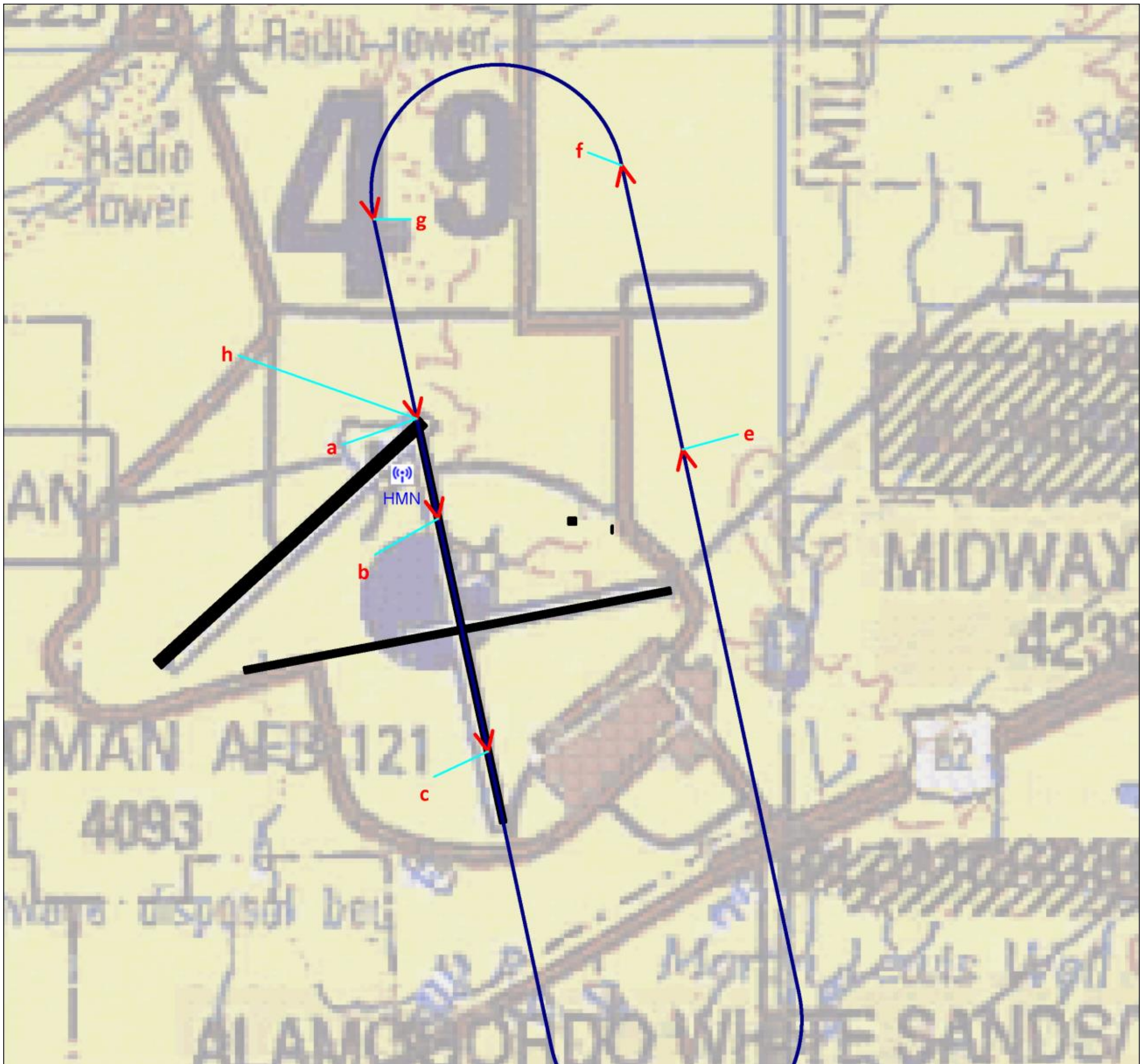
N



Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0	50 AGL	92.6 Variable	150	0.0	0	11	
b	3,000	50 AGL	92.6 Variable	170	8.1	3000	39	
c	16,655	2,000 AGL	92.6 Variable	250	0.0	0	131	
d	72,000	2,000 AGL	80 Variable	250	0.0	0	267	
e	184,796	2,000 AGL	78 Variable	250	0.0	0	73	
f	215,520	2,000 AGL	78 Approach	250	-2.8	-1000	102	Drop gear
g	250,091	300 AGL	78 Approach	150	-2.4	-600	24	
h	256,091	50 AGL	92.6 Variable	150				Threshold crossing

Flight Profile 16CB
RADAR PATTERN-REPRESENTATIVE

0 10,000 20,000 30,000 40,000 50,000 60,000
Scale in Feet 1:188,000 (1 inch = 15,600 feet)



Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0	50 AGL	92.6 Variable	150	0.0	0	9	
b	3,000	50 AGL	92.6 Variable	225	2.0	900	17	
c	10,000	300 AGL	92.6 Variable	270	7.0	3000	34	
d	23,912	2,000 AGL	80 Variable	210	0.0	0	65	
e	47,000	2,000 AGL	80 Approach	210	0.0	0	27	Drop gear
f	55,541	2,000 AGL	78 Approach	170	-8.2	-2300	44	
g	67,322	300 AGL	78 Approach	150	-2.4	-600	24	Final approach
h	73,322	50 AGL	92.6 Variable	150				Threshold crossing

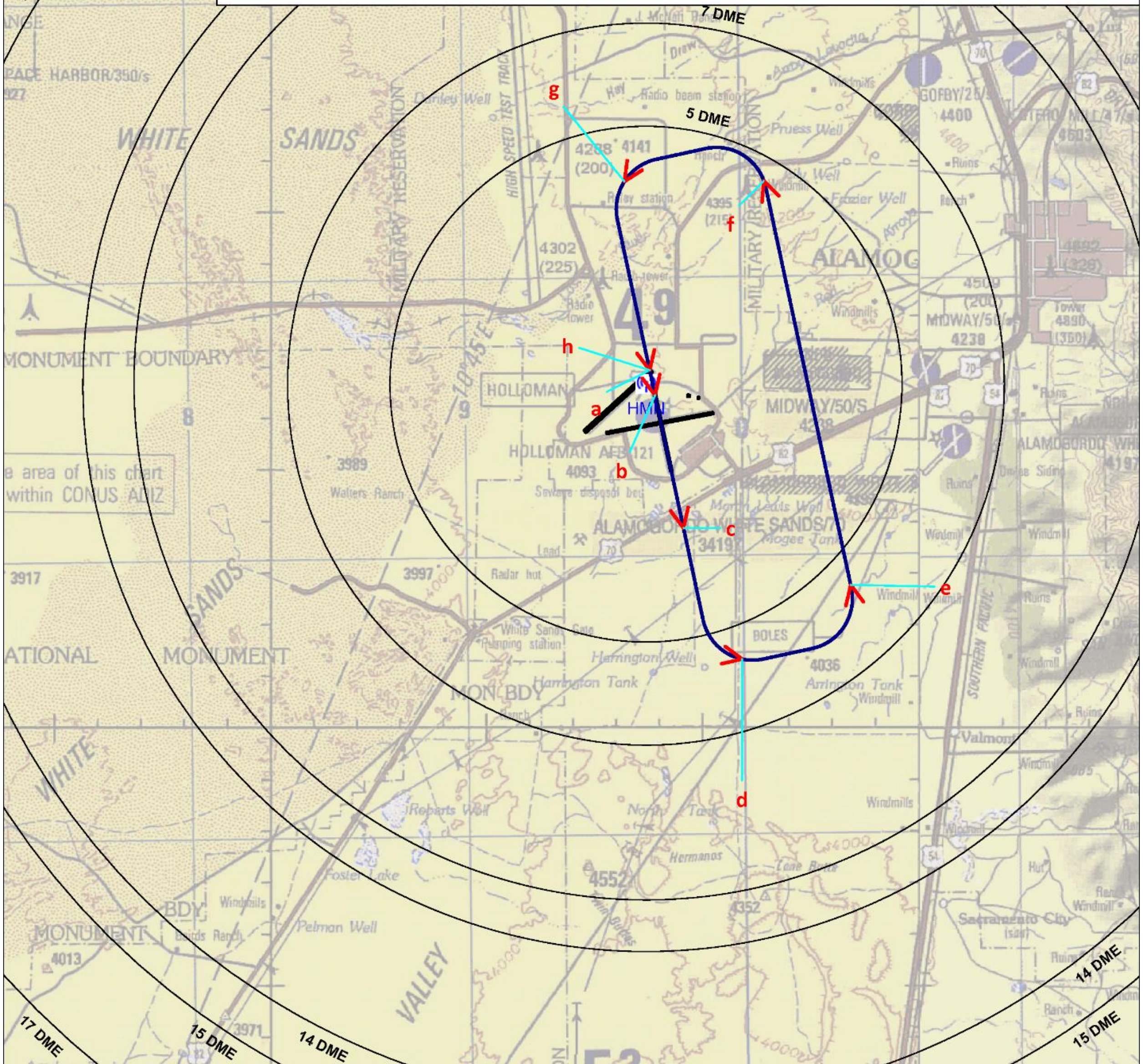
Flight Profile 16CC
VFR INSIDE-REPRESENTATIVE

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000

Scale in Feet 1:47,400 (1 inch = 3,950 feet)

N

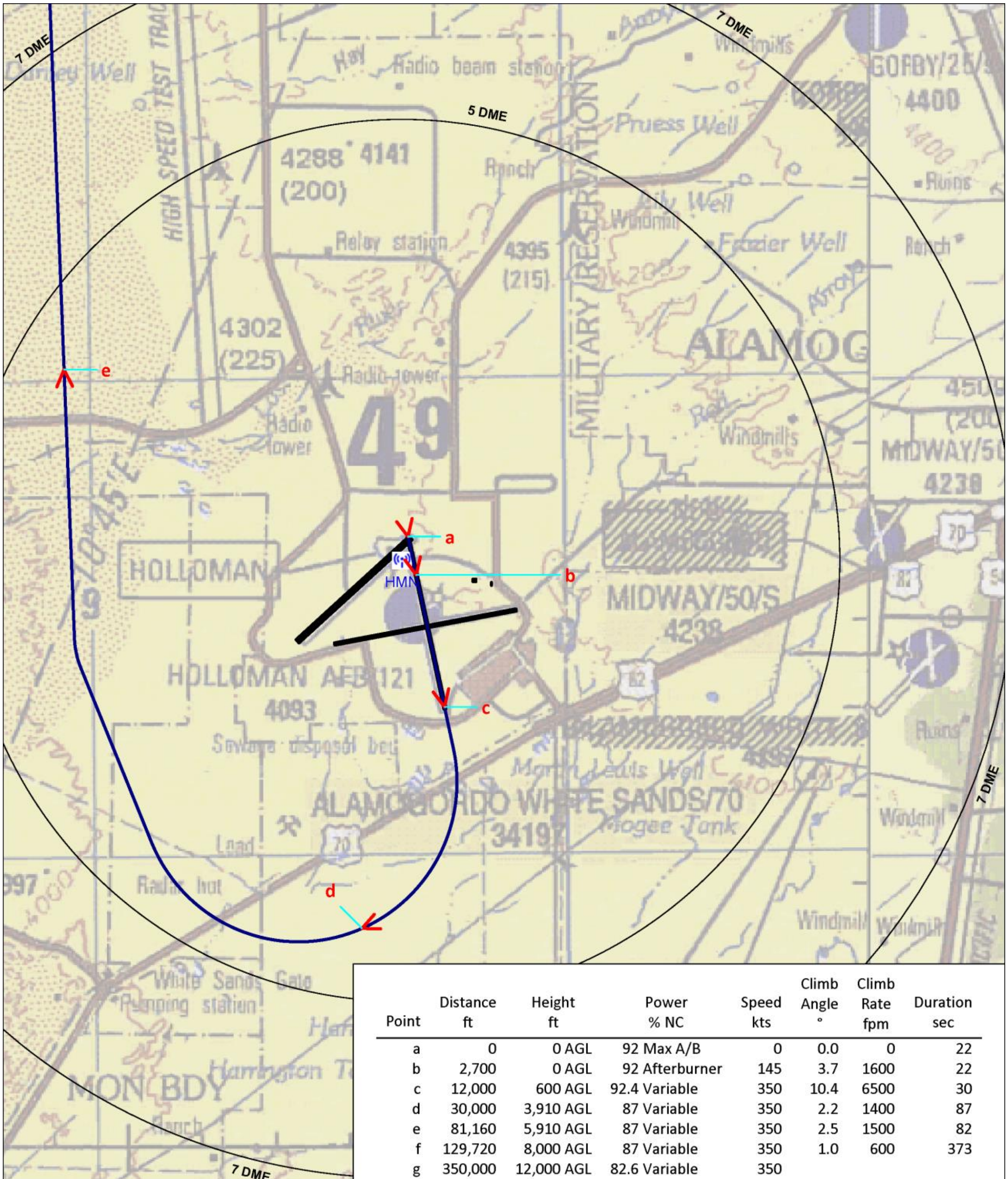
Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0	50 AGL	92.6 Variable	150	0.0	0	10	Threshold crossing
b	3,000	50 AGL	92.6 Variable	210	6.9	3000	39	Climb
c	19,000	2,000 AGL	92.6 Variable	270	0.0	0	37	
d	36,981	2,000 AGL	82.6 Variable	300	0.0	0	42	Reach pattern altitude
e	55,290	2,000 AGL	80 Variable	220	0.0	0	148	Begin Downwind
f	104,000	2,000 AGL	78 Approach	170	-5.0	-1400	71	End Downwind, Descend
g	123,300	300 AGL	78 Approach	150	-0.6	-200	90	
h	146,150	50 AGL	92.6 Variable	150				Threshold crossing



Flight Profile 16CS
VFR OUTSIDE-REPRESENTATIVE

0 10,000 20,000 30,000 40,000 50,000 60,000
Scale in Feet 1:190,000 (1 inch = 15,800 feet)

Flight Profiles for 82 ATRS/Det 1 QF-16Cs

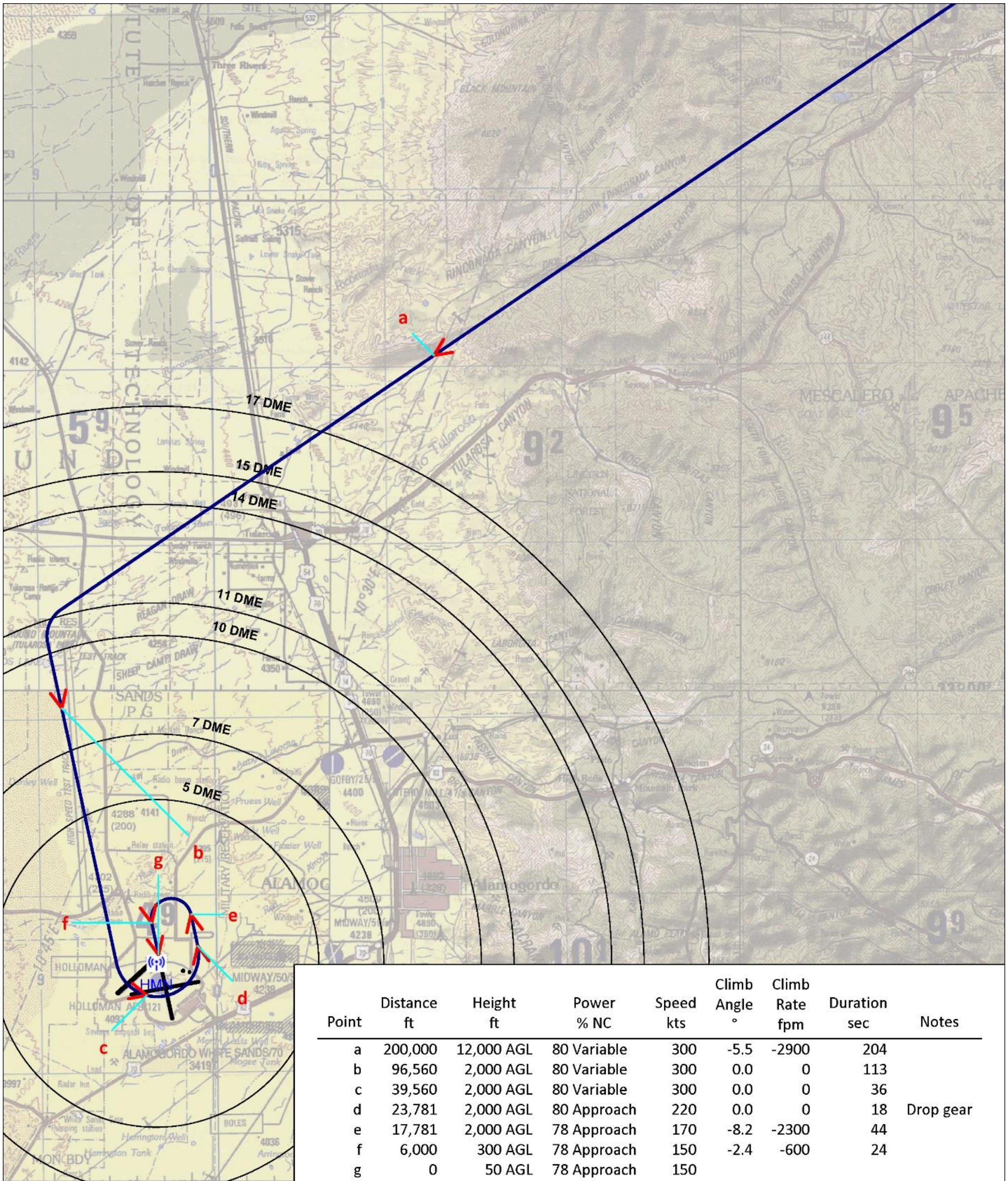


Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0	0 AGL	92 Max A/B	0	0.0	0	22
b	2,700	0 AGL	92 Afterburner	145	3.7	1600	22
c	12,000	600 AGL	92.4 Variable	350	10.4	6500	30
d	30,000	3,910 AGL	87 Variable	350	2.2	1400	87
e	81,160	5,910 AGL	87 Variable	350	2.5	1500	82
f	129,720	8,000 AGL	87 Variable	350	1.0	600	373
g	350,000	12,000 AGL	82.6 Variable	350			

Flight Profile QF-16DD
AB TAKEOFF TO 'ROMEO' LINE-REPRESENTATIVE

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000

Scale in Feet 1:98,000 (1 inch = 8,170 feet)



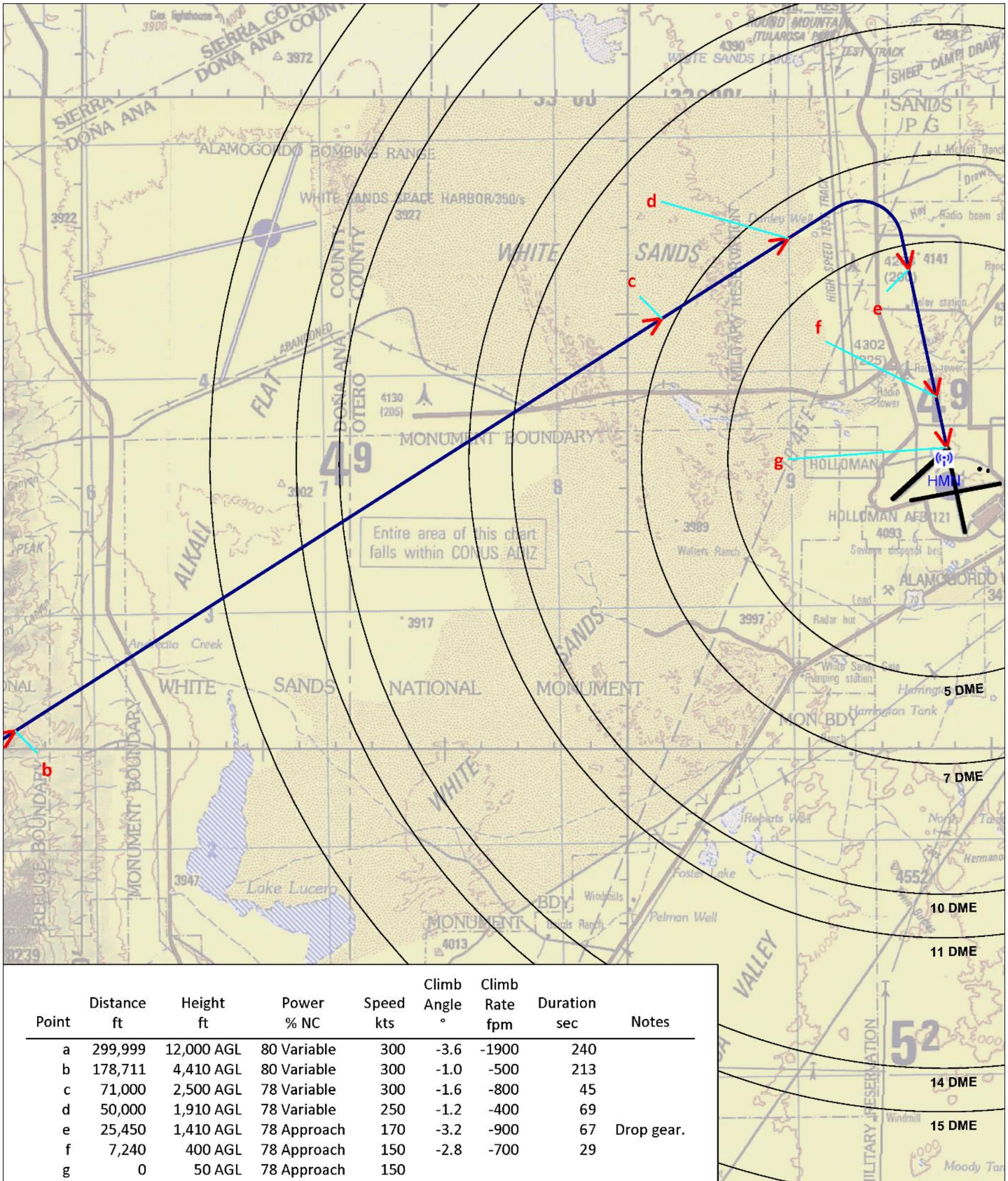
Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	200,000	12,000 AGL	80 Variable	300	-5.5	-2900	204	
b	96,560	2,000 AGL	80 Variable	300	0.0	0	113	
c	39,560	2,000 AGL	80 Variable	300	0.0	0	36	
d	23,781	2,000 AGL	80 Approach	220	0.0	0	18	Drop gear
e	17,781	2,000 AGL	78 Approach	170	-8.2	-2300	44	
f	6,000	300 AGL	78 Approach	150	-2.4	-600	24	
g	0	50 AGL	78 Approach	150				

Flight Profile QF-16A15
Tactical Approach

0 10,000 20,000 30,000 40,000 50,000 60,000 70,000 80,000 90,000

Scale in Feet 1:264,000 (1 inch = 22,000 feet)

N

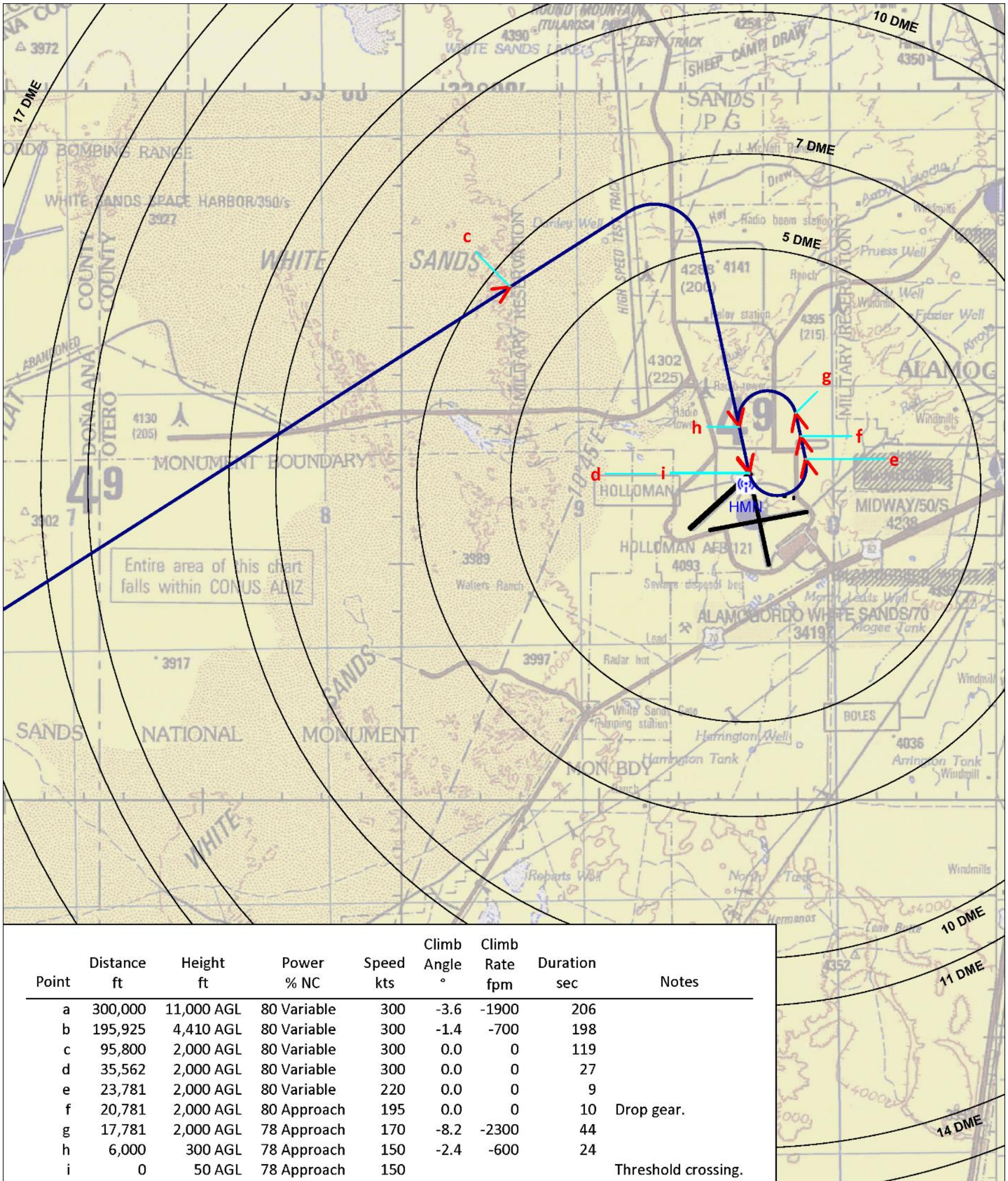


Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	299,999	12,000 AGL	80 Variable	300	-3.6	-1900	240	
b	178,711	4,410 AGL	80 Variable	300	-1.0	-500	213	
c	71,000	2,500 AGL	78 Variable	300	-1.6	-800	45	
d	50,000	1,910 AGL	78 Variable	250	-1.2	-400	69	
e	25,450	1,410 AGL	78 Approach	170	-3.2	-900	67	Drop gear.
f	7,240	400 AGL	78 Approach	150	-2.8	-700	29	
g	0	50 AGL	78 Approach	150				

Flight Profile QF-16AB
VFR WSMRS STRAIGHT-IN-REPRESENTATIVE

0 10,000 20,000 30,000 40,000 50,000 60,000

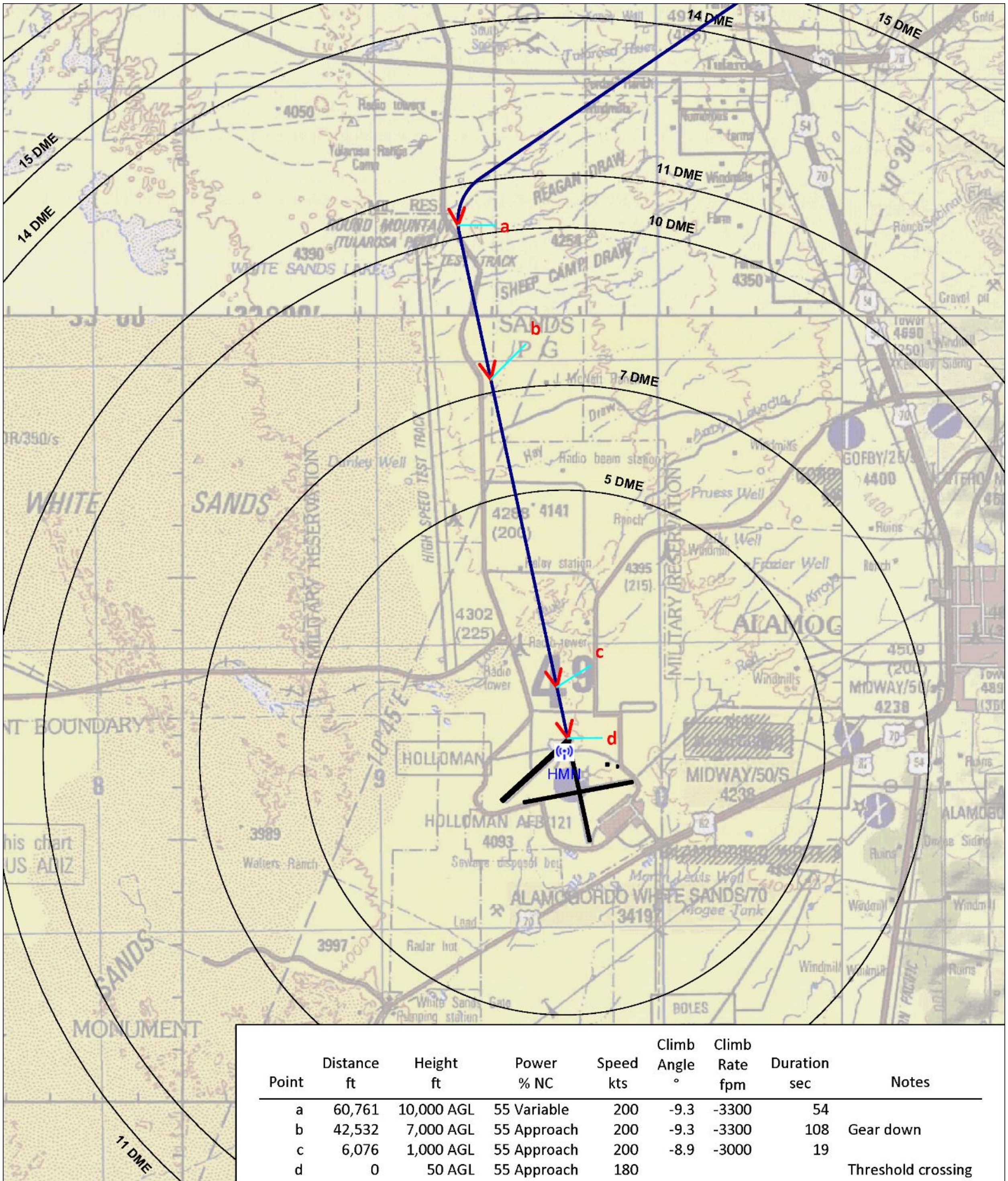
Scale in Feet 1:199,000 (1 inch = 16,600 feet)



Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	300,000	11,000 AGL	80 Variable	300	-3.6	-1900	206	
b	195,925	4,410 AGL	80 Variable	300	-1.4	-700	198	
c	95,800	2,000 AGL	80 Variable	300	0.0	0	119	
d	35,562	2,000 AGL	80 Variable	300	0.0	0	27	
e	23,781	2,000 AGL	80 Variable	220	0.0	0	9	
f	20,781	2,000 AGL	80 Approach	195	0.0	0	10	Drop gear.
g	17,781	2,000 AGL	78 Approach	170	-8.2	-2300	44	
h	6,000	300 AGL	78 Approach	150	-2.4	-600	24	
i	0	50 AGL	78 Approach	150				Threshold crossing.

Flight Profile QF-16ABO
ARRIVAL WSMRS - PITCH - REPRESENTATIVE

Scale in Feet 1:183,000 (1 inch = 15,200 feet)

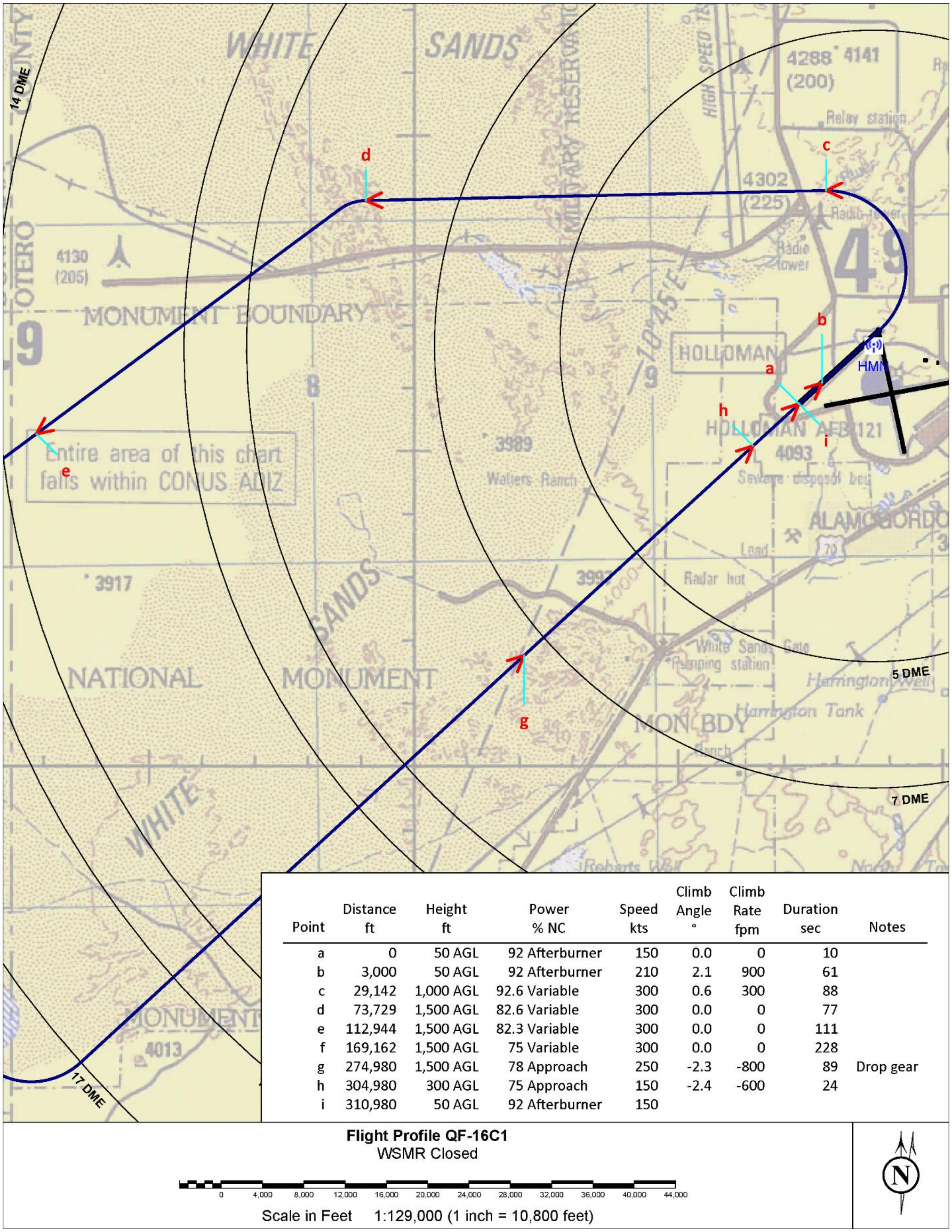


Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	60,761	10,000 AGL	55 Variable	200	-9.3	-3300	54	
b	42,532	7,000 AGL	55 Approach	200	-9.3	-3300	108	Gear down
c	6,076	1,000 AGL	55 Approach	200	-8.9	-3000	19	
d	0	50 AGL	55 Approach	180				Threshold crossing

Flight Profile QF-16AJ
RANDOM ENTRY SFO-REPRESENTATIVE

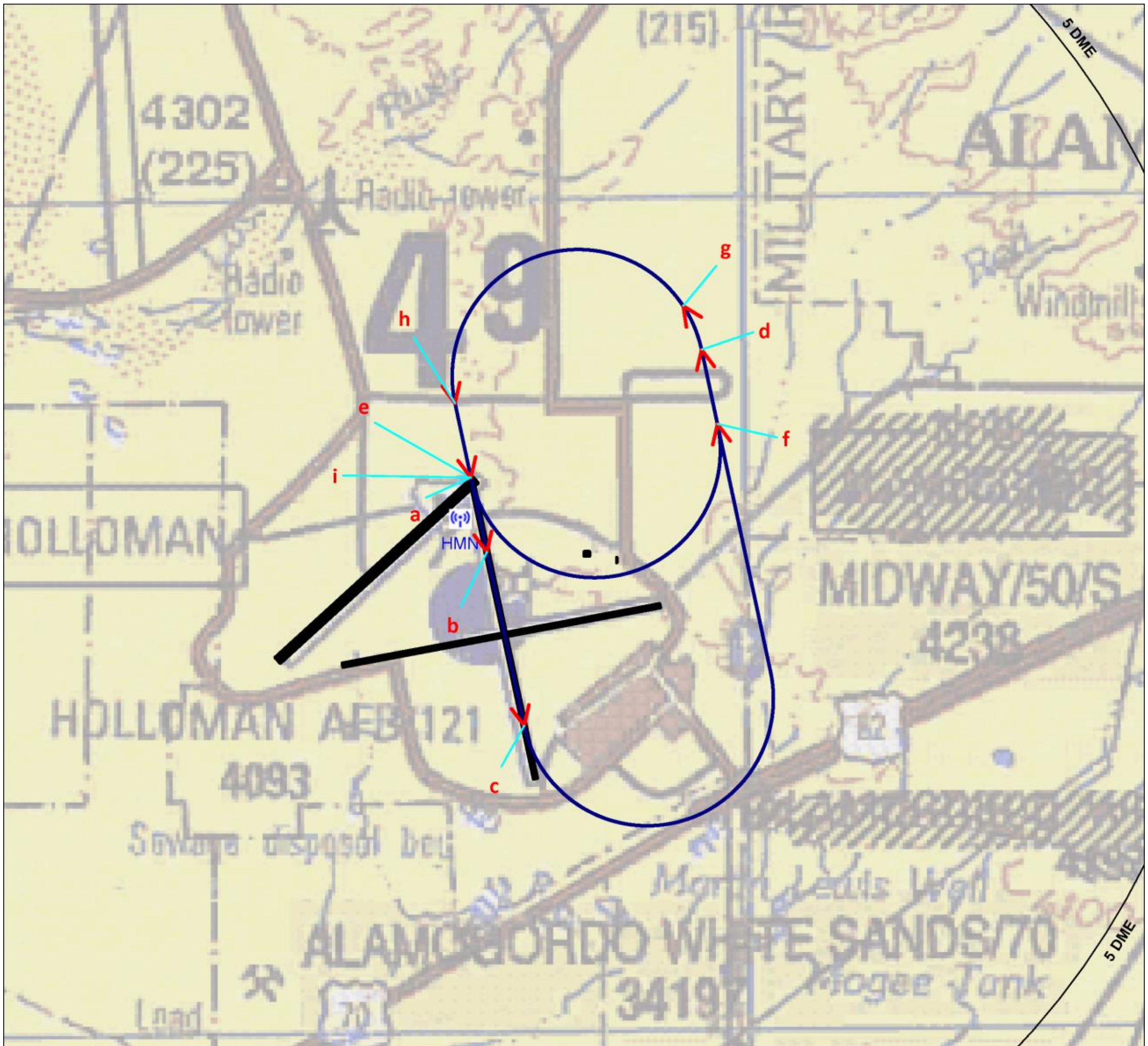
0 10,000 20,000 30,000 40,000 50,000

Scale in Feet 1:165,000 (1 inch = 13,700 feet)



Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0	50 AGL	92 Afterburner	150	0.0	0	10	
b	3,000	50 AGL	92 Afterburner	210	2.1	900	61	
c	29,142	1,000 AGL	92.6 Variable	300	0.6	300	88	
d	73,729	1,500 AGL	82.6 Variable	300	0.0	0	77	
e	112,944	1,500 AGL	82.3 Variable	300	0.0	0	111	
f	169,162	1,500 AGL	75 Variable	300	0.0	0	228	
g	274,980	1,500 AGL	78 Approach	250	-2.3	-800	89	Drop gear
h	304,980	300 AGL	75 Approach	150	-2.4	-600	24	
i	310,980	50 AGL	92 Afterburner	150				

Flight Profile QF-16C1
WSMR Closed



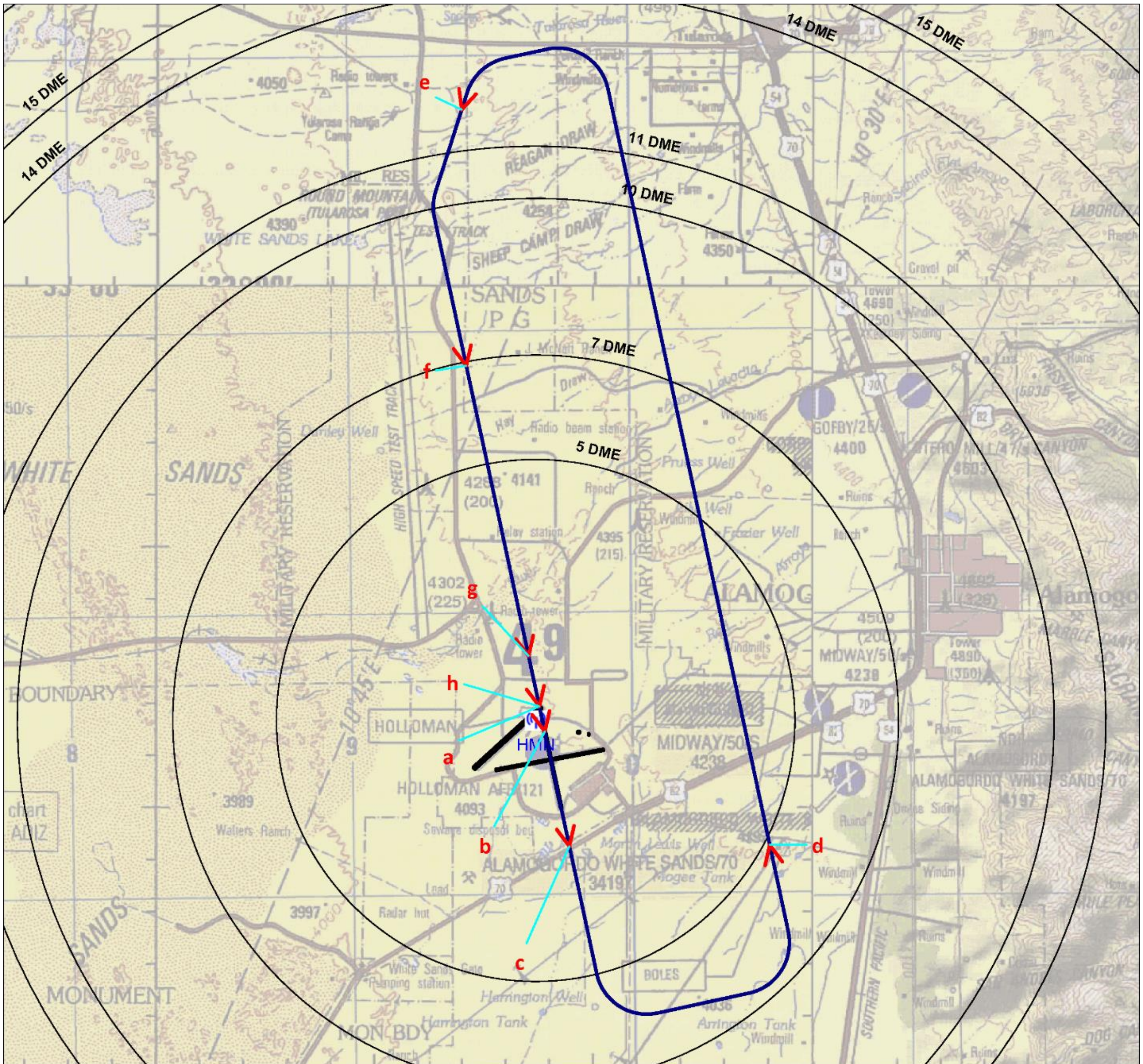
Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0	50 AGL	92.6 Variable	150	0.0	0	11	
b	3,000	50 AGL	92.6 Variable	170	1.2	500	20	
c	10,000	200 AGL	92.6 Variable	250	15.0	6400	72	
d	38,708	7,910 AGL	80 Variable	220	0.0	0	50	
e	57,416	7,910 AGL	55 Approach	220	-14.3	-5700	42	Gear down
f	73,124	3,910 AGL	55 Approach	220	-21.4	-8700	13	
g	78,000	2,000 AGL	55 Approach	220	-7.0	-2500	41	
h	91,832	300 AGL	55 Approach	180	-4.8	-1400	11	
i	94,831	50 AGL	92.6 Variable	150				Threshold crossing

Flight Profile QF-16CA
SFO-REPRESENTATIVE

0 4,000 8,000 12,000 16,000 20,000

Scale in Feet 1:63,800 (1 inch = 5,320 feet)

N

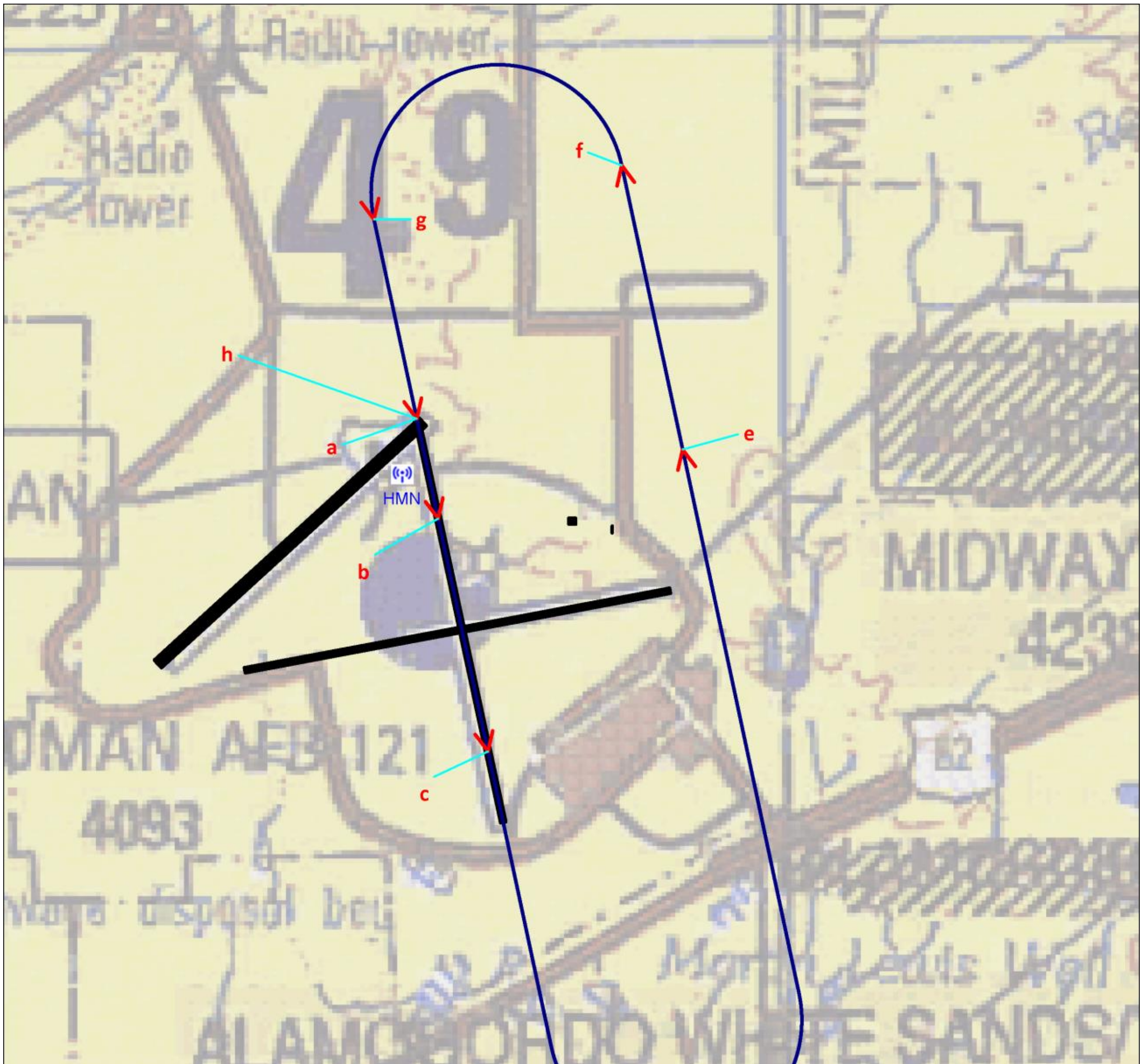


Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0	50 AGL	92.6 Variable	150	0.0	0	11	
b	3,000	50 AGL	92.6 Variable	170	8.1	3000	39	
c	16,655	2,000 AGL	92.6 Variable	250	0.0	0	131	
d	72,000	2,000 AGL	80 Variable	250	0.0	0	267	
e	184,796	2,000 AGL	78 Variable	250	0.0	0	73	
f	215,520	2,000 AGL	78 Approach	250	-2.8	-1000	102	Drop gear
g	250,091	300 AGL	78 Approach	150	-2.4	-600	24	
h	256,091	50 AGL	92.6 Variable	150				Threshold crossing

Flight Profile QF-16CB
RADAR PATTERN-REPRESENTATIVE

0 10,000 20,000 30,000 40,000 50,000 60,000

Scale in Feet 1:188,000 (1 inch = 15,600 feet)



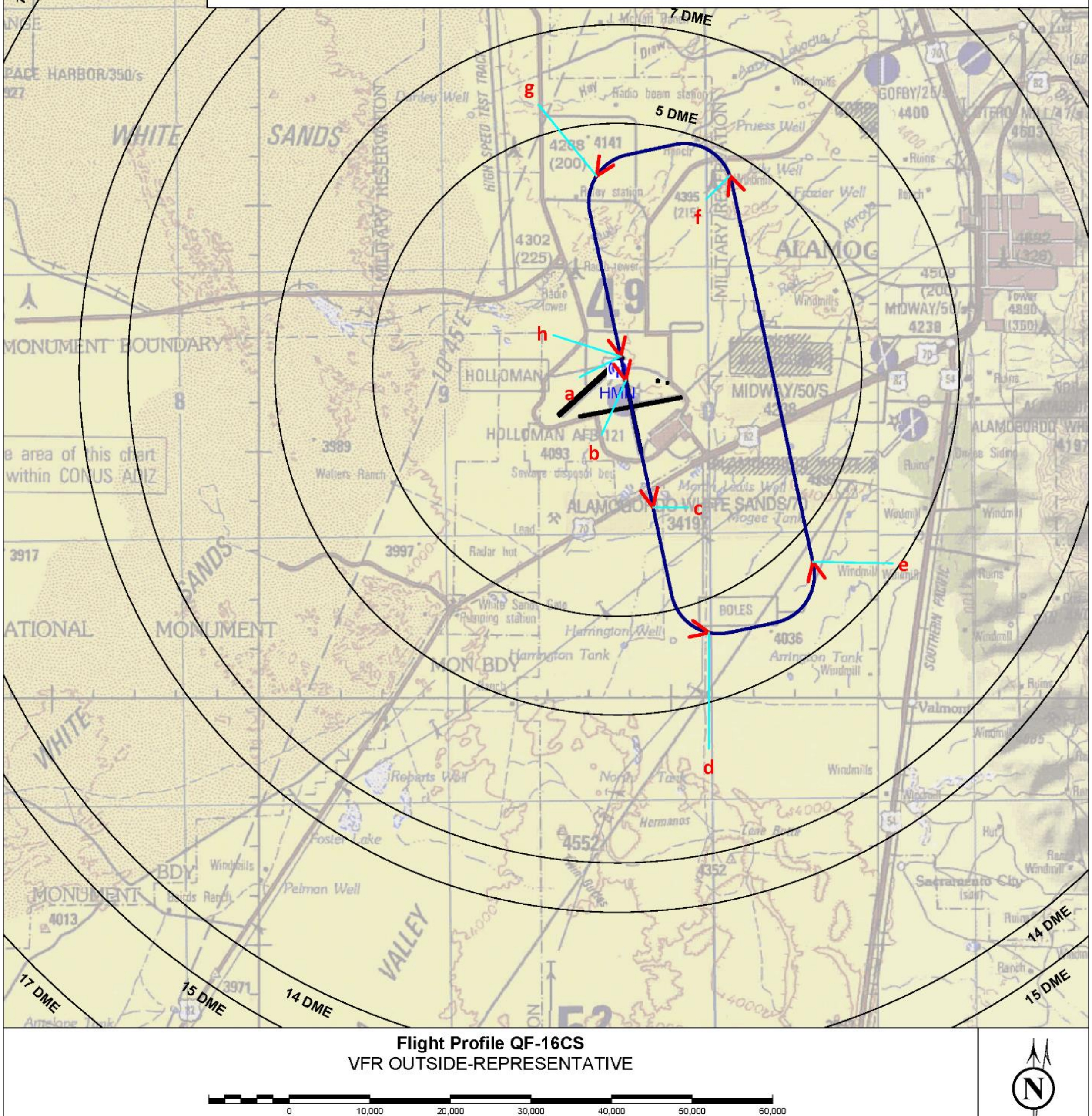
Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0	50 AGL	92.6 Variable	150	0.0	0	9	
b	3,000	50 AGL	92.6 Variable	225	2.0	900	17	
c	10,000	300 AGL	92.6 Variable	270	7.0	3000	34	
d	23,912	2,000 AGL	80 Variable	210	0.0	0	65	
e	47,000	2,000 AGL	80 Approach	210	0.0	0	27	Drop gear
f	55,541	2,000 AGL	78 Approach	170	-8.2	-2300	44	
g	67,322	300 AGL	78 Approach	150	-2.4	-600	24	Final approach
h	73,322	50 AGL	92.6 Variable	150				Threshold crossing

Flight Profile QF-16CC
VFR INSIDE-REPRESENTATIVE

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000

Scale in Feet 1:47,400 (1 inch = 3,950 feet)

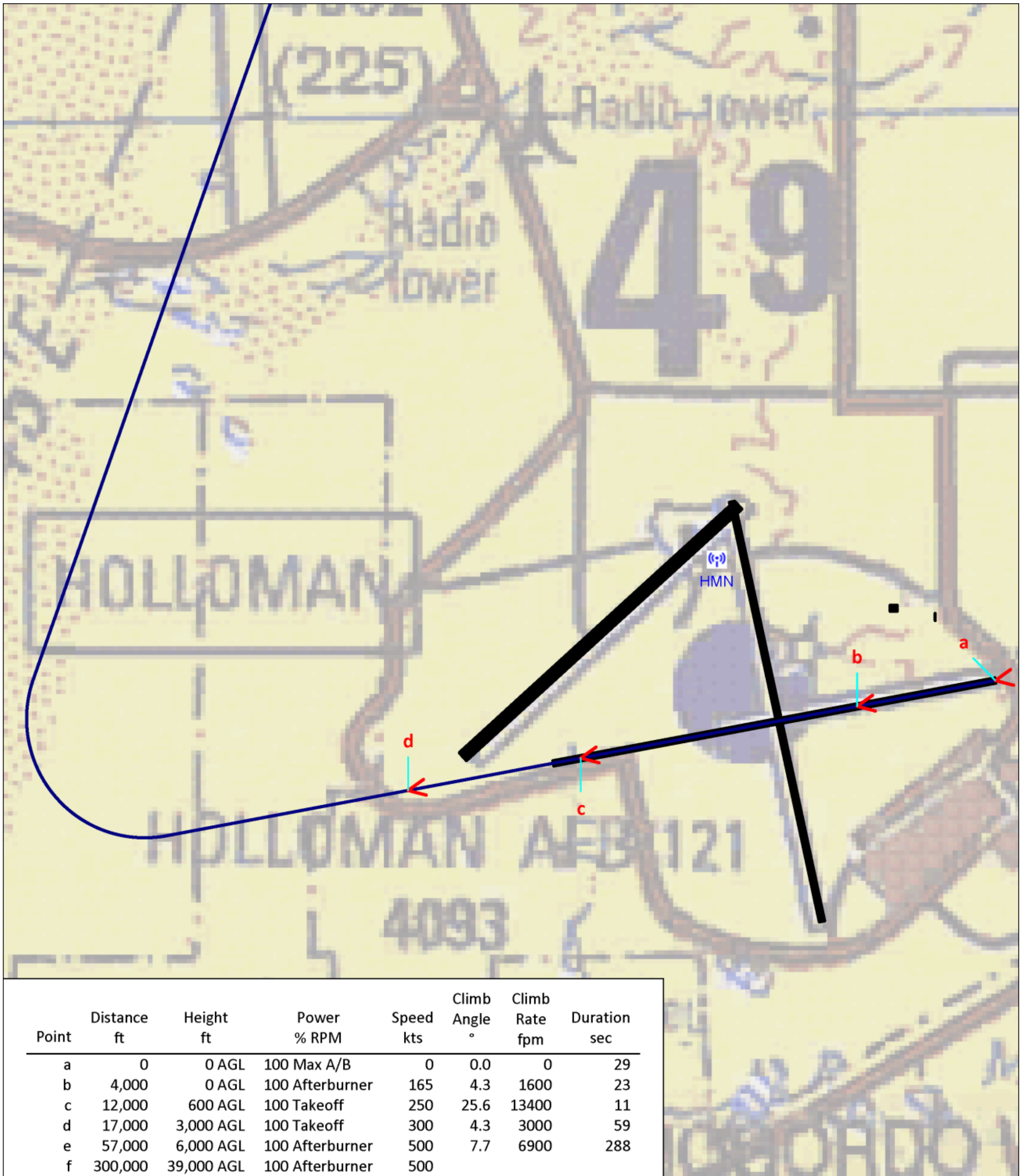
Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0	50 AGL	92.6 Variable	150	0.0	0	10	Threshold crossing
b	3,000	50 AGL	92.6 Variable	210	6.9	3000	39	Climb
c	19,000	2,000 AGL	92.6 Variable	270	0.0	0	37	
d	36,981	2,000 AGL	82.6 Variable	300	0.0	0	42	Reach pattern altitude
e	55,290	2,000 AGL	80 Variable	220	0.0	0	148	Begin Downwind
f	104,000	2,000 AGL	78 Approach	170	-5.0	-1400	71	End Downwind, Descend
g	123,300	300 AGL	78 Approach	150	-0.6	-200	90	
h	146,150	50 AGL	92.6 Variable	150				Threshold crossing



Flight Profile QF-16CS
VFR OUTSIDE-REPRESENTATIVE

Scale in Feet 1:190,000 (1 inch = 15,800 feet)

586 FLTS Flight Profiles for T-38Cs and ACC/AFGSC Flight Profiles for T-38A



Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0	0 AGL	100 Max A/B	0	0.0	0	29
b	4,000	0 AGL	100 Afterburner	165	4.3	1600	23
c	12,000	600 AGL	100 Takeoff	250	25.6	13400	11
d	17,000	3,000 AGL	100 Takeoff	300	4.3	3000	59
e	57,000	6,000 AGL	100 Afterburner	500	7.7	6900	288
f	300,000	39,000 AGL	100 Afterburner	500			

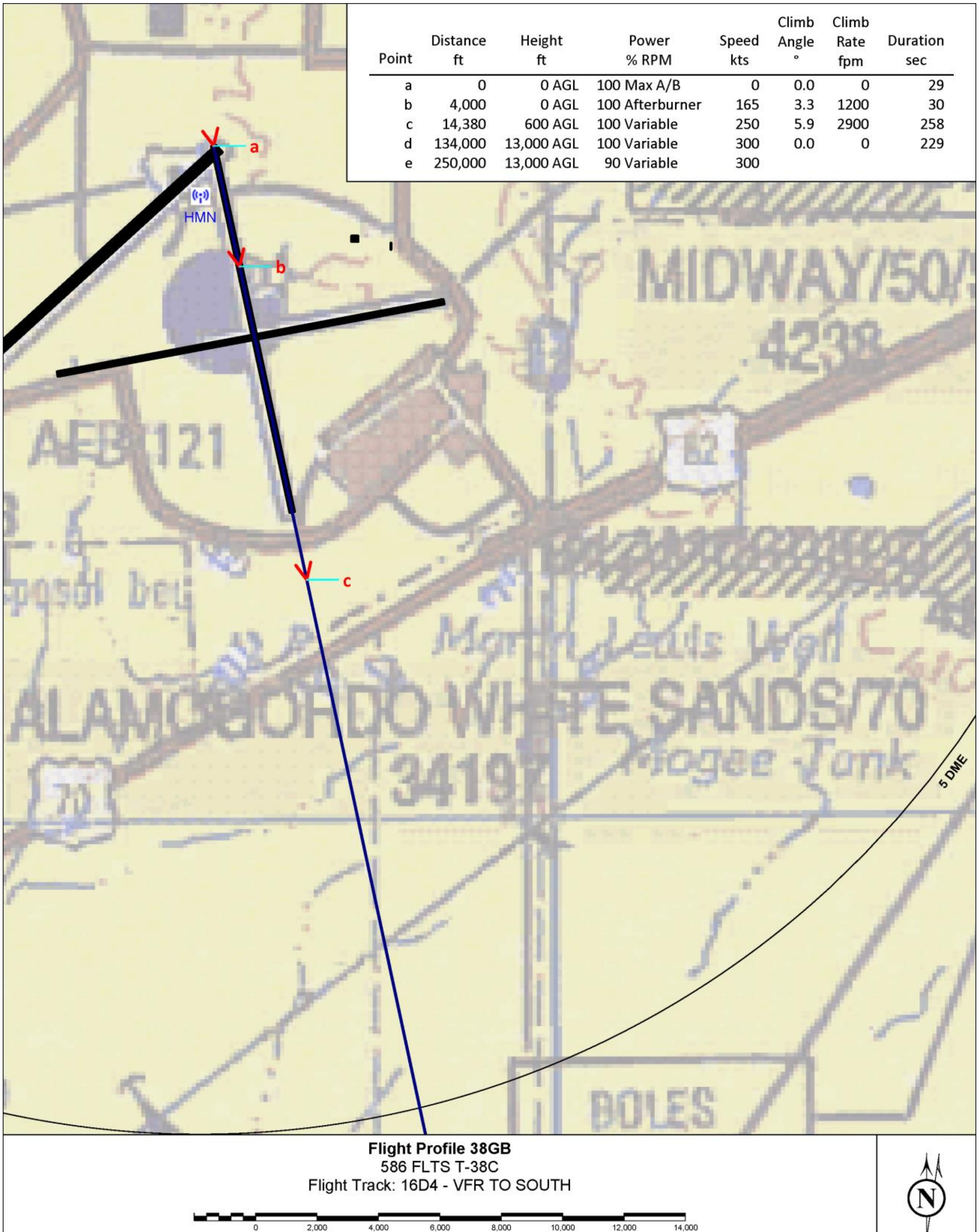
Flight Profile 38FCF
ACC/AFGSC T-38A
Flight Track: 25D14 - Functional Control Flight Track for T-38As

0 2,000 4,000 6,000 8,000 10,000 12,000

Scale in Feet 1:40,800 (1 inch = 3,400 feet)

N

Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0	0 AGL	100 Max A/B	0	0.0	0	29
b	4,000	0 AGL	100 Afterburner	165	3.3	1200	30
c	14,380	600 AGL	100 Variable	250	5.9	2900	258
d	134,000	13,000 AGL	100 Variable	300	0.0	0	229
e	250,000	13,000 AGL	90 Variable	300			



Flight Profile 38GB
586 FLTS T-38C
Flight Track: 16D4 - VFR TO SOUTH

Scale in Feet 1:44,700 (1 inch = 3,730 feet)

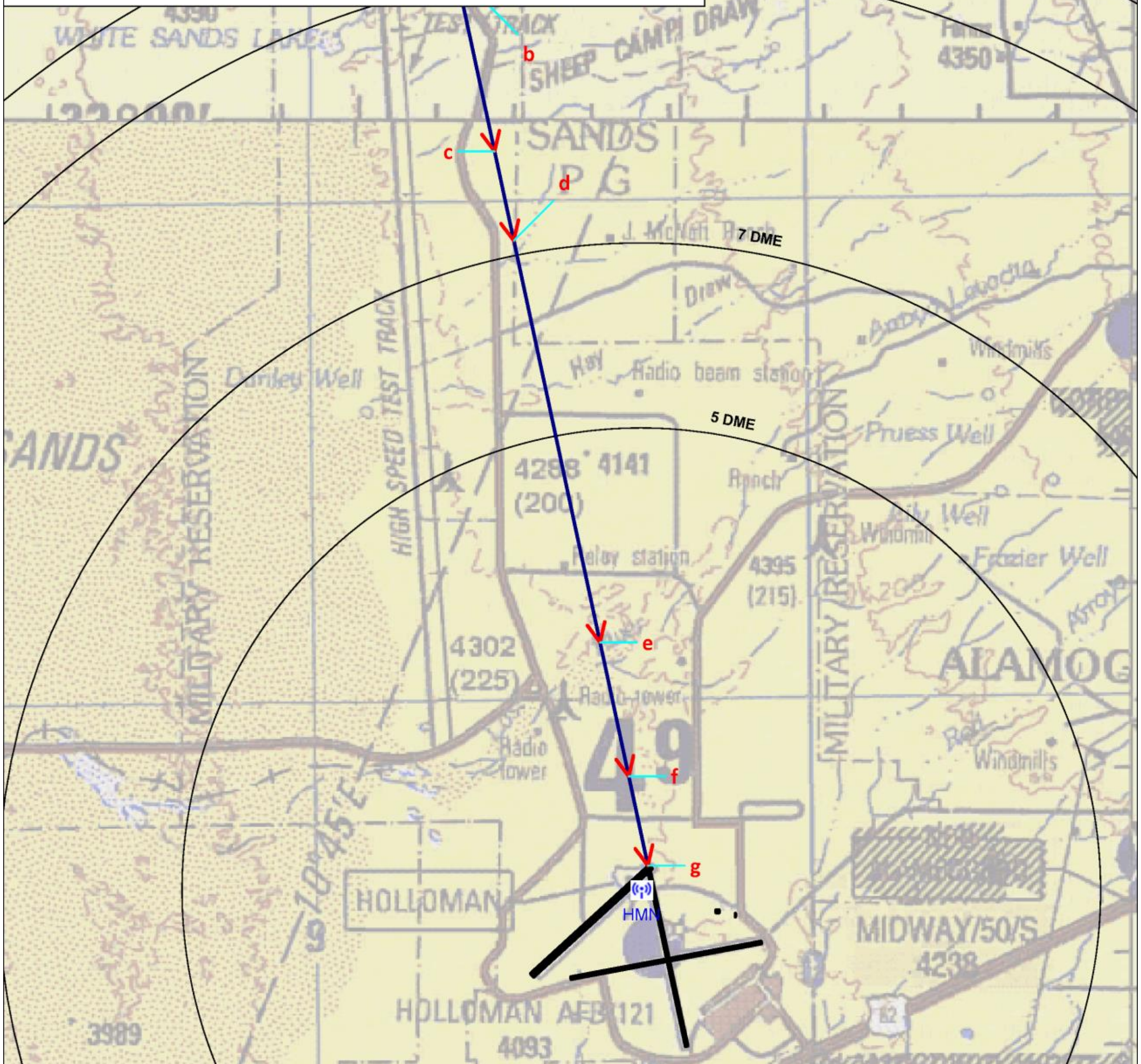
Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	200,000	8,900 AGL	90 Variable	300	-1.3	-600	263	
b	78,000	6,100 AGL	88 Variable	250	0.0	0	43	
c	60,000	6,100 AGL	88 Variable	250	-8.7	-3500	47	
d	42,000	3,340 AGL	95 Approach	202	-8.7	-2900	38	
e	30,000	1,500 AGL	88 Approach	170	-2.8	-800	111	
f	0	50 AGL	67 Approach	150				idle over threshold

Flight Profile 38BA
586 FLTS T-38C
Flight Track: 16A1 - IFR

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000 36,000 40,000 44,000

Scale in Feet 1:131,000 (1 inch = 10,900 feet)

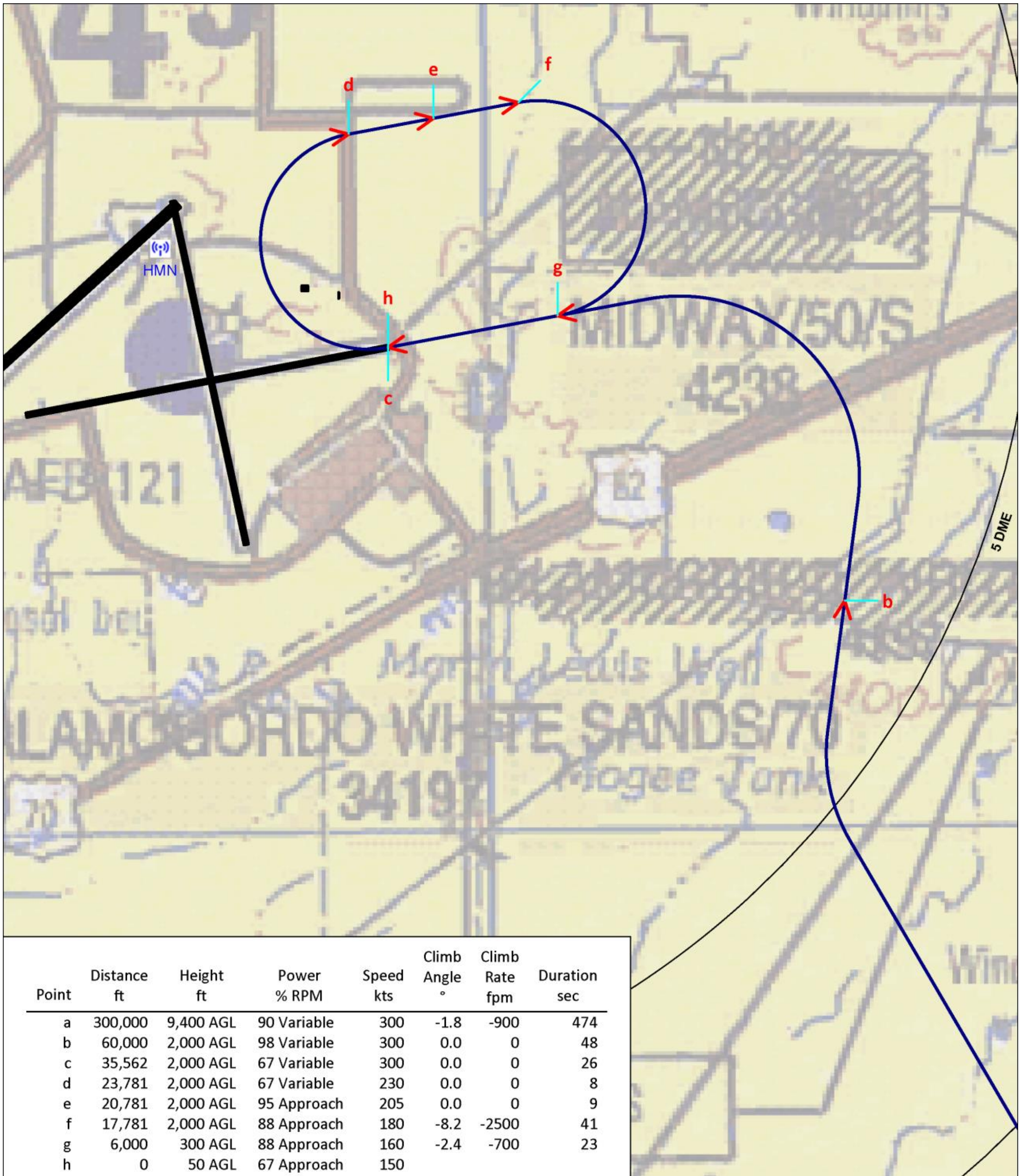
Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	300,000	9,400 AGL	90 Variable	300	-1.9	-1000	474
b	60,000	1,500 AGL	98 Variable	300	0.0	0	26
c	48,000	1,500 AGL	90 Variable	240	0.0	0	16
d	42,000	1,500 AGL	95 Approach	200	-1.9	-600	86
e	15,000	600 AGL	88 Approach	170	-1.9	-600	32
f	6,000	300 AGL	88 Approach	160	-2.4	-700	23
g	0	50 AGL	67 Approach	150			



Flight Profile 38BB
586 FLTS T-38C
Flight Track: 16A2 - TULIE RECOVERY

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000 36,000

Scale in Feet 1:106,000 (1 inch = 8,820 feet)

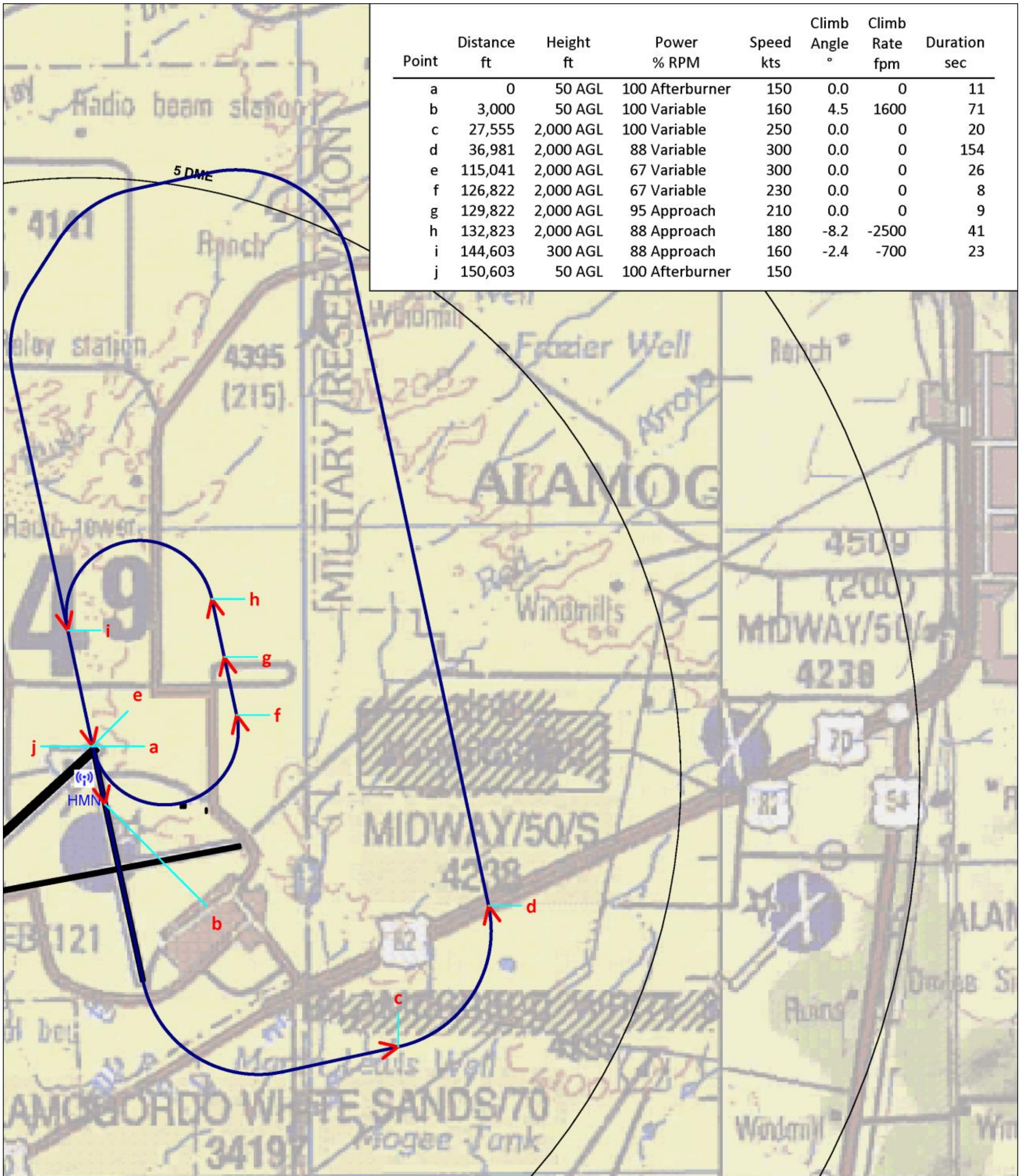


Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	300,000	9,400 AGL	90 Variable	300	-1.8	-900	474
b	60,000	2,000 AGL	98 Variable	300	0.0	0	48
c	35,562	2,000 AGL	67 Variable	300	0.0	0	26
d	23,781	2,000 AGL	67 Variable	230	0.0	0	8
e	20,781	2,000 AGL	95 Approach	205	0.0	0	9
f	17,781	2,000 AGL	88 Approach	180	-8.2	-2500	41
g	6,000	300 AGL	88 Approach	160	-2.4	-700	23
h	0	50 AGL	67 Approach	150			

Flight Profile 38DH
586 FLTS T-38C
Flight Track: 25A9OH - VFR FROM MCGREGOR-PITCH

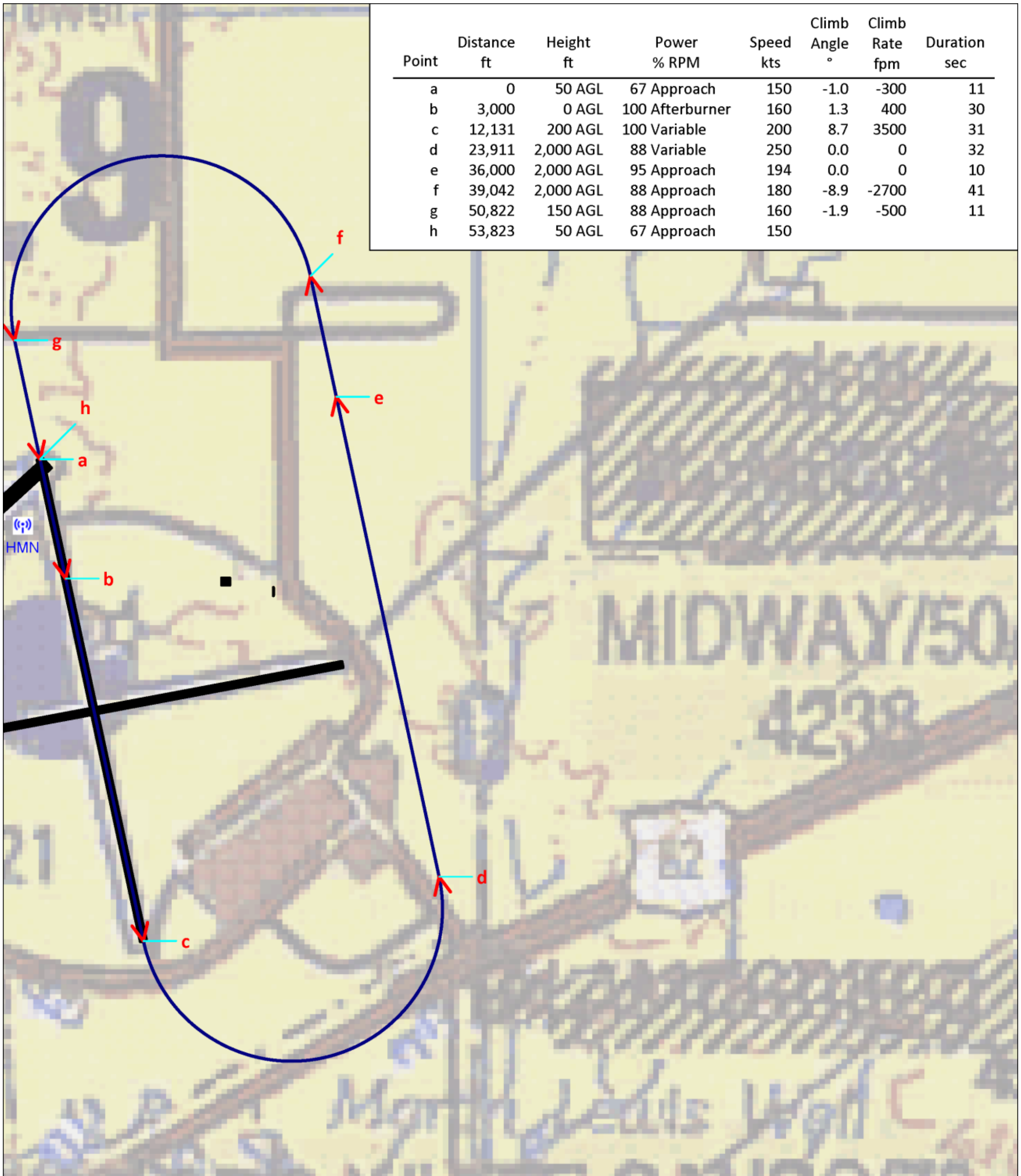
0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000
Scale in Feet 1:49,800 (1 inch = 4,150 feet)

Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0	50 AGL	100 Afterburner	150	0.0	0	11
b	3,000	50 AGL	100 Variable	160	4.5	1600	71
c	27,555	2,000 AGL	100 Variable	250	0.0	0	20
d	36,981	2,000 AGL	88 Variable	300	0.0	0	154
e	115,041	2,000 AGL	67 Variable	300	0.0	0	26
f	126,822	2,000 AGL	67 Variable	230	0.0	0	8
g	129,822	2,000 AGL	95 Approach	210	0.0	0	9
h	132,823	2,000 AGL	88 Approach	180	-8.2	-2500	41
i	144,603	300 AGL	88 Approach	160	-2.4	-700	23
j	150,603	50 AGL	100 Afterburner	150			



Flight Profile 38LB
586 FLTS T-38C
Flight Track: 16C2 - VFR OUTSIDE DOWNWIND - PITCH

0 4,000 8,000 12,000 16,000 20,000
Scale in Feet 1:72,800 (1 inch = 6,070 feet)

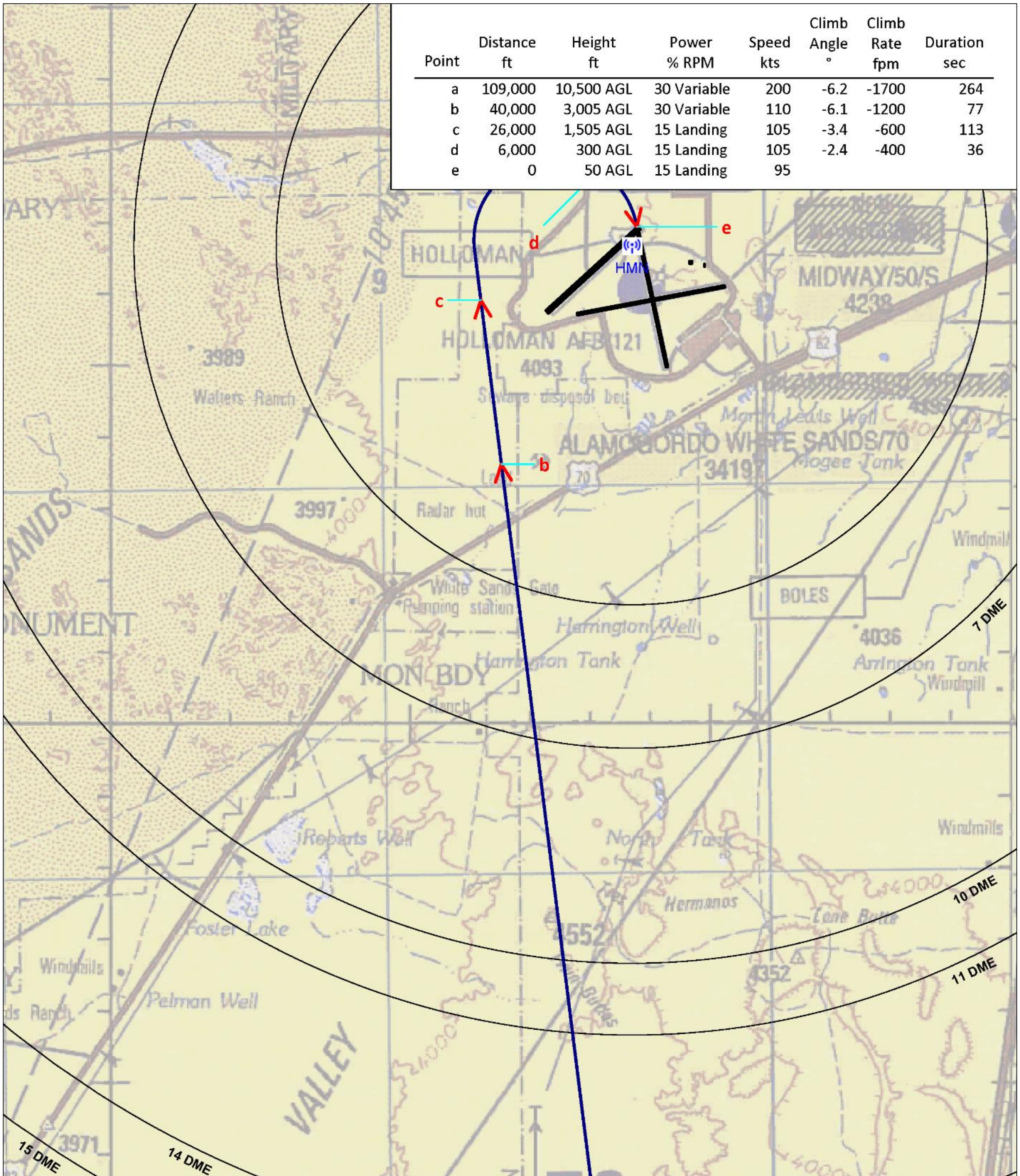


Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0	50 AGL	67 Approach	150	-1.0	-300	11
b	3,000	0 AGL	100 Afterburner	160	1.3	400	30
c	12,131	200 AGL	100 Variable	200	8.7	3500	31
d	23,911	2,000 AGL	88 Variable	250	0.0	0	32
e	36,000	2,000 AGL	95 Approach	194	0.0	0	10
f	39,042	2,000 AGL	88 Approach	180	-8.9	-2700	41
g	50,822	150 AGL	88 Approach	160	-1.9	-500	11
h	53,823	50 AGL	67 Approach	150			

Flight Profile 38LC
586 FLTS T-38C
Flight Track: 16C3o

Scale in Feet 1:35,500 (1 inch = 2,960 feet)

Flight Profiles for 49 OG MQ-9s

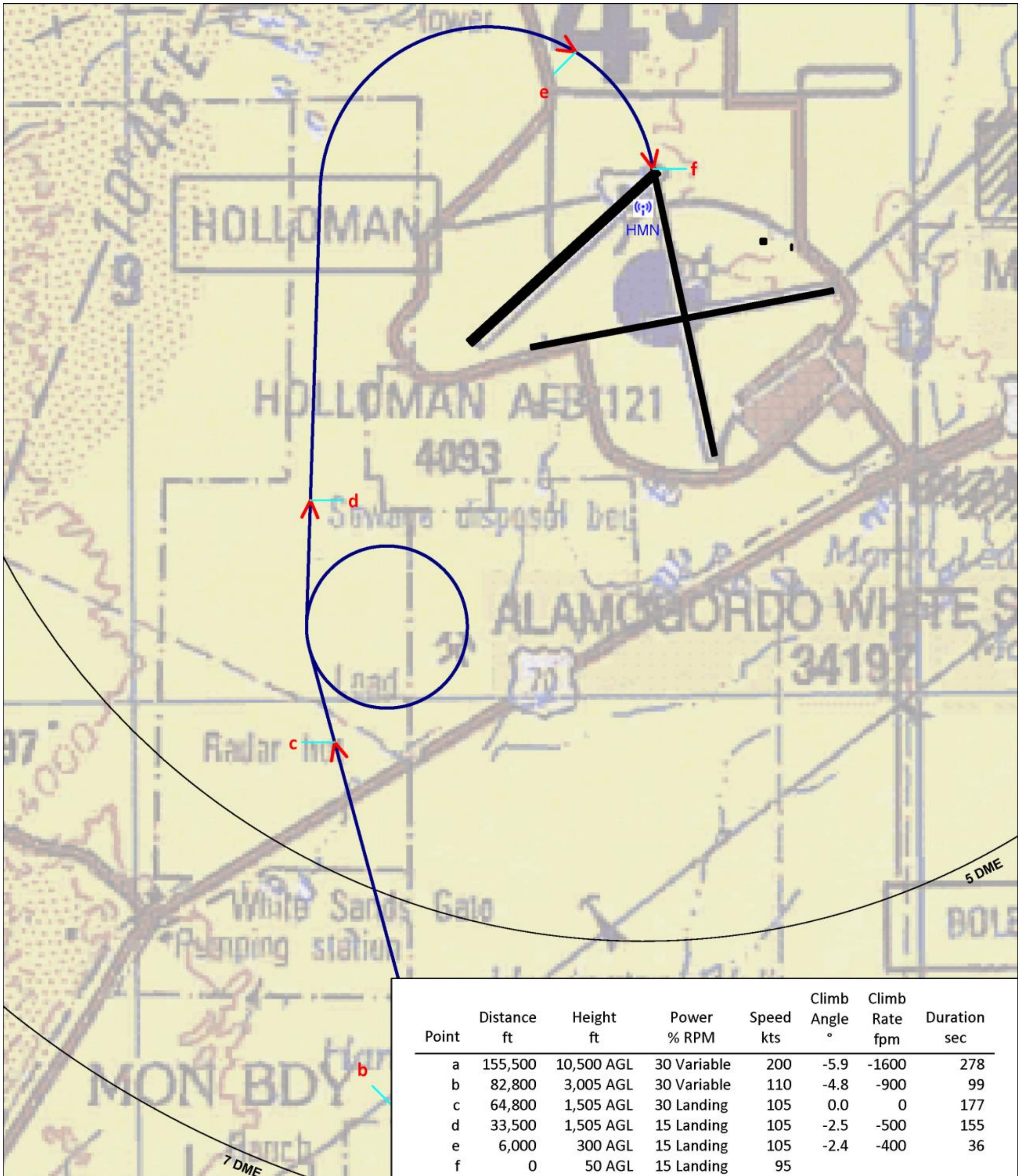


Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	109,000	10,500 AGL	30 Variable	200	-6.2	-1700	264
b	40,000	3,005 AGL	30 Variable	110	-6.1	-1200	77
c	26,000	1,505 AGL	15 Landing	105	-3.4	-600	113
d	6,000	300 AGL	15 Landing	105	-2.4	-400	36
e	0	50 AGL	15 Landing	95			

Flight Profile MQ9A5
49 OG MQ-9
Flight Track: 16A20 - RPA FROM SOUTH

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000 36,000 40,000

Scale in Feet 1:122,000 (1 inch = 10,200 feet)

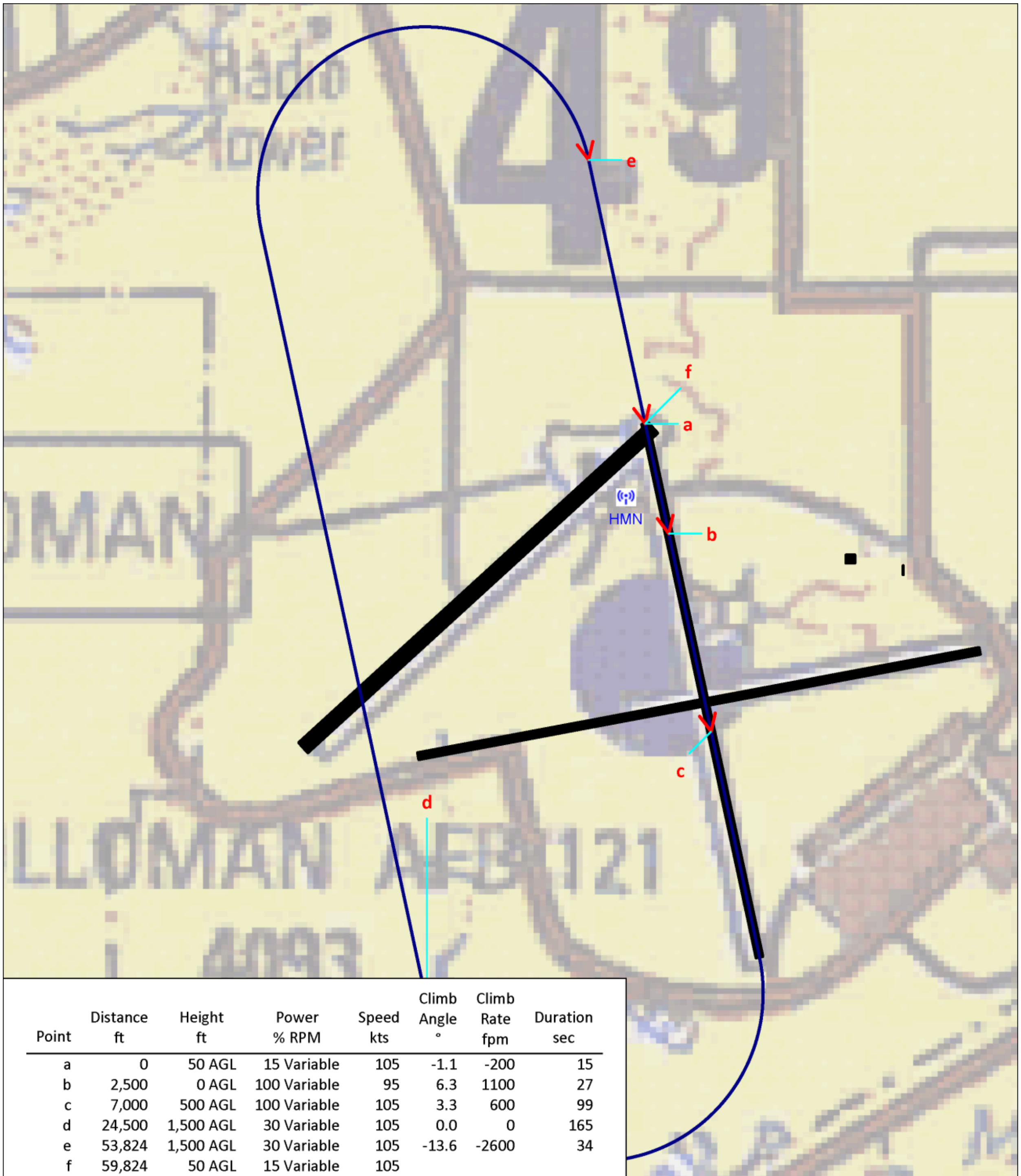


Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	155,500	10,500 AGL	30 Variable	200	-5.9	-1600	278
b	82,800	3,005 AGL	30 Variable	110	-4.8	-900	99
c	64,800	1,505 AGL	30 Landing	105	0.0	0	177
d	33,500	1,505 AGL	15 Landing	105	-2.5	-500	155
e	6,000	300 AGL	15 Landing	105	-2.4	-400	36
f	0	50 AGL	15 Landing	95			

Flight Profile MQ9A6
49 OG MQ-9
Flight Track: 16A21 - RPA FROM PHOENIX HOLDING PATTERN

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000 18,000 20,000

Scale in Feet 1:59,800 (1 inch = 4,980 feet)



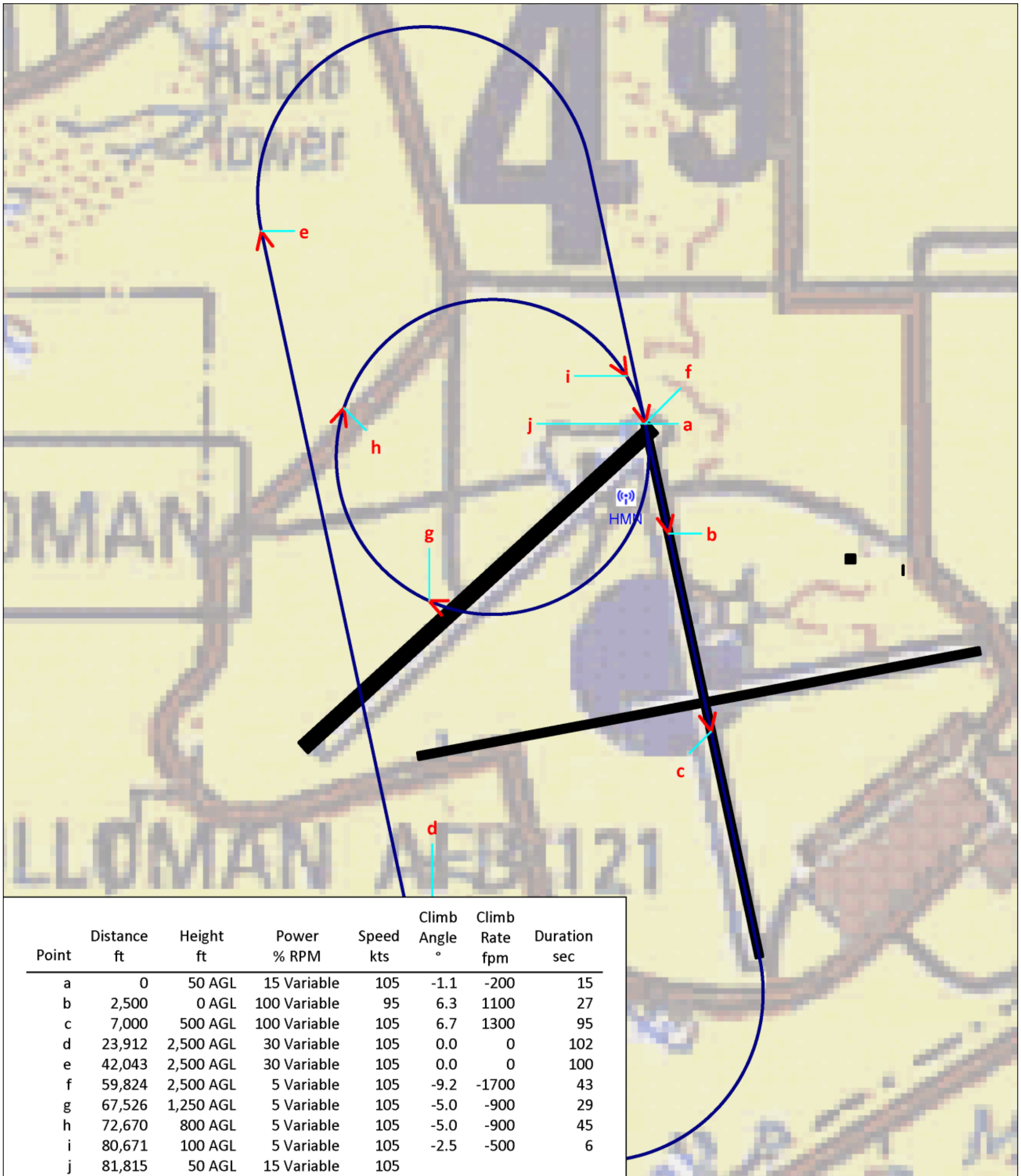
Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0	50 AGL	15 Variable	105	-1.1	-200	15
b	2,500	0 AGL	100 Variable	95	6.3	1100	27
c	7,000	500 AGL	100 Variable	105	3.3	600	99
d	24,500	1,500 AGL	30 Variable	105	0.0	0	165
e	53,824	1,500 AGL	30 Variable	105	-13.6	-2600	34
f	59,824	50 AGL	15 Variable	105			

Flight Profile MQ9C2
49 OG MQ-9
Flight Track: 16C3M - VFR INSIDE DOWNWIND

0 2,000 4,000 6,000 8,000 10,000

Scale in Feet 1:32,100 (1 inch = 2,670 feet)

N



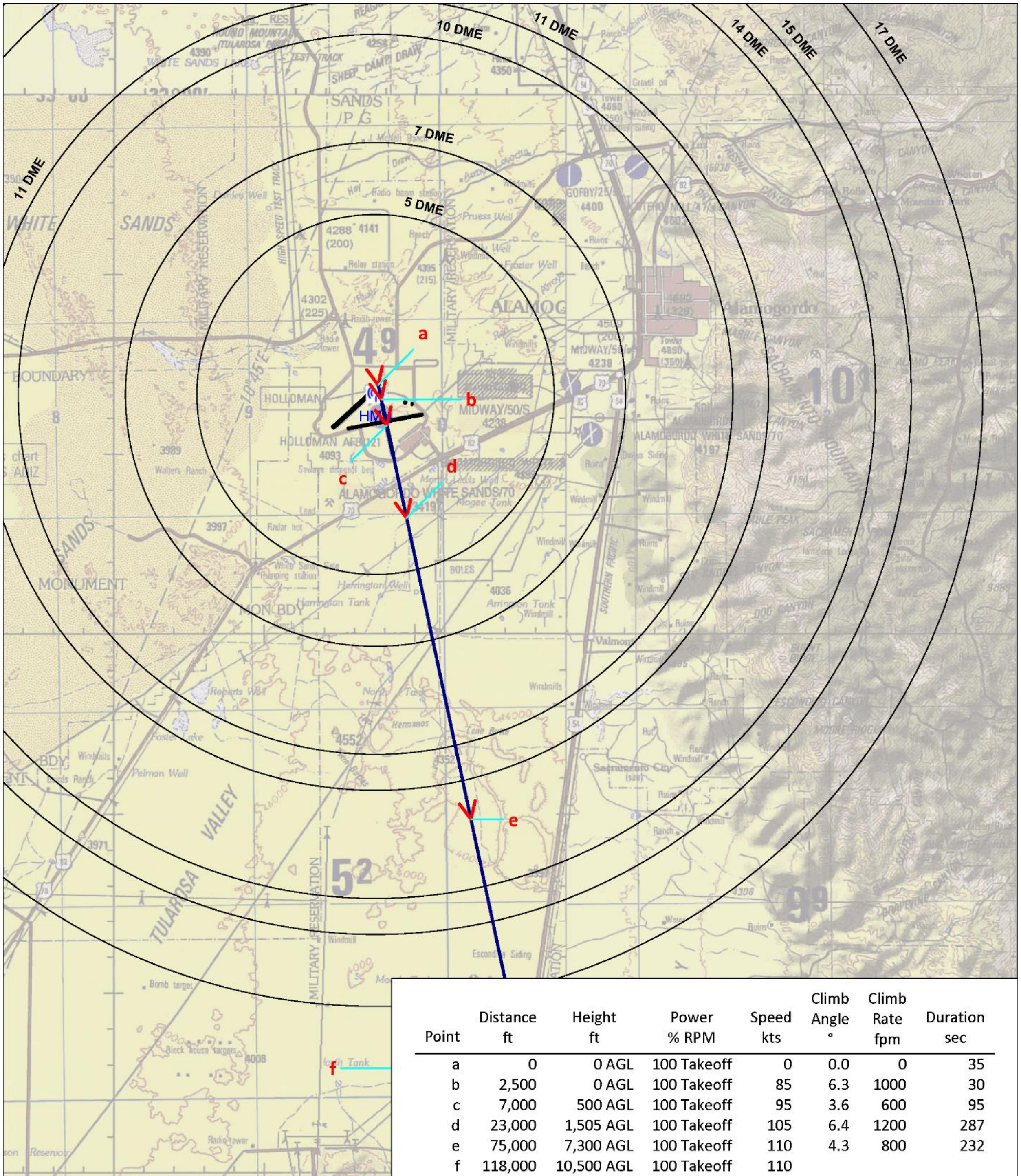
Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0	50 AGL	15 Variable	105	-1.1	-200	15
b	2,500	0 AGL	100 Variable	95	6.3	1100	27
c	7,000	500 AGL	100 Variable	105	6.7	1300	95
d	23,912	2,500 AGL	30 Variable	105	0.0	0	102
e	42,043	2,500 AGL	30 Variable	105	0.0	0	100
f	59,824	2,500 AGL	5 Variable	105	-9.2	-1700	43
g	67,526	1,250 AGL	5 Variable	105	-5.0	-900	29
h	72,670	800 AGL	5 Variable	105	-5.0	-900	45
i	80,671	100 AGL	5 Variable	105	-2.5	-500	6
j	81,815	50 AGL	15 Variable	105			

Flight Profile MQ9CS2
49 OG MQ-9
Flight Track: 16CS - VFR INSIDE DOWNWIND w SFO

0 2,000 4,000 6,000 8,000 10,000

Scale in Feet 1:32,100 (1 inch = 2,670 feet)

N



Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0	0 AGL	100 Takeoff	0	0.0	0	35
b	2,500	0 AGL	100 Takeoff	85	6.3	1000	30
c	7,000	500 AGL	100 Takeoff	95	3.6	600	95
d	23,000	1,505 AGL	100 Takeoff	105	6.4	1200	287
e	75,000	7,300 AGL	100 Takeoff	110	4.3	800	232
f	118,000	10,500 AGL	100 Takeoff	110			

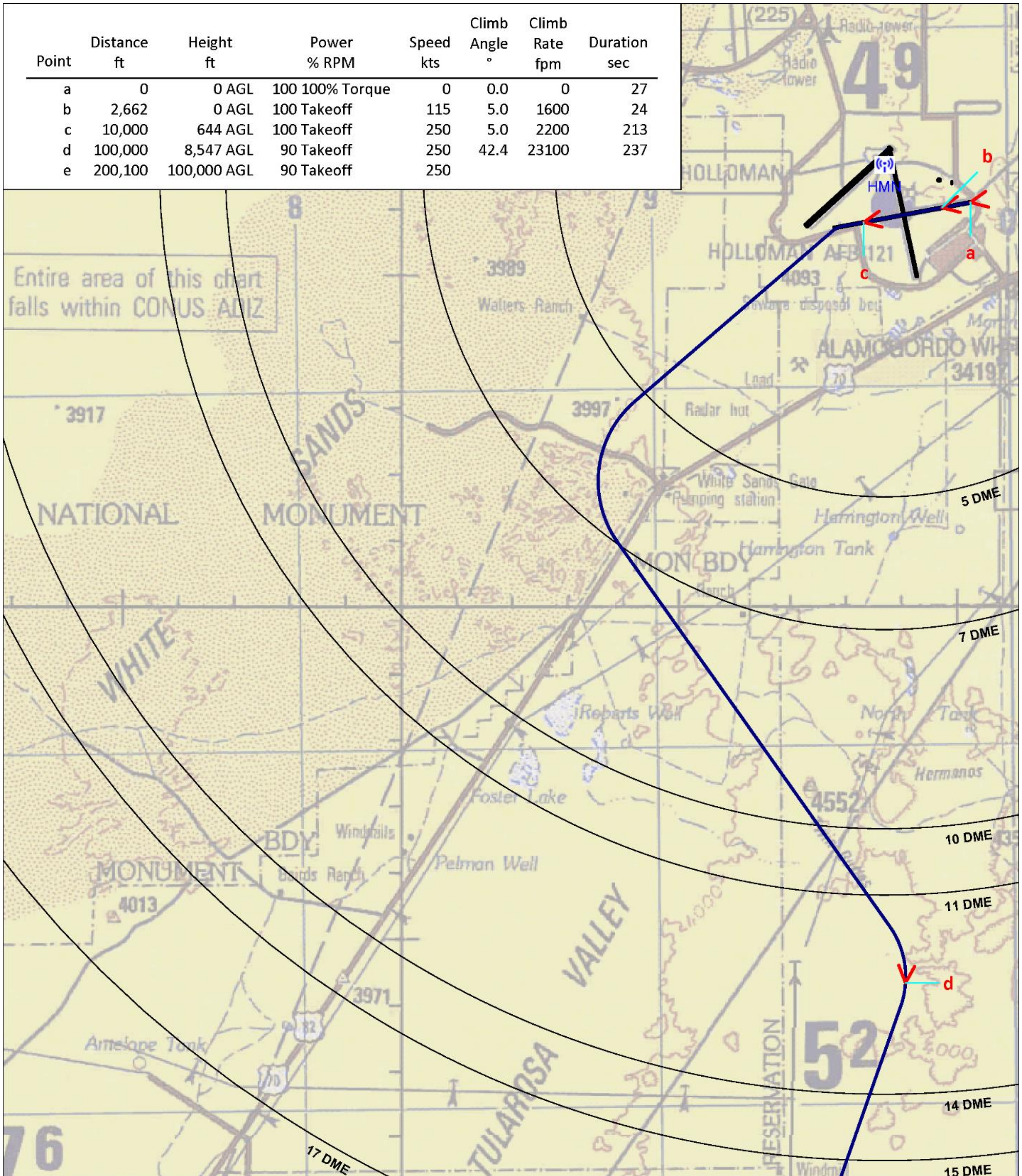
Flight Profile MQ9D2
49 OG MQ-9
Flight Track: 16D4 - VFR TO SOUTH

0 10,000 20,000 30,000 40,000 50,000 60,000 70,000 80,000

Scale in Feet 1:243,000 (1 inch = 20,300 feet)

Flight Profiles for 586 FLTS and Army C-12s

Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0	0 AGL	100 100% Torque	0	0.0	0	27
b	2,662	0 AGL	100 Takeoff	115	5.0	1600	24
c	10,000	644 AGL	100 Takeoff	250	5.0	2200	213
d	100,000	8,547 AGL	90 Takeoff	250	42.4	23100	237
e	200,100	100,000 AGL	90 Takeoff	250			



Flight Profile C1IB
586 FLTS C-12
Flight Track: 25D2o - VFR TO SOUTH/ LONE BUTTE

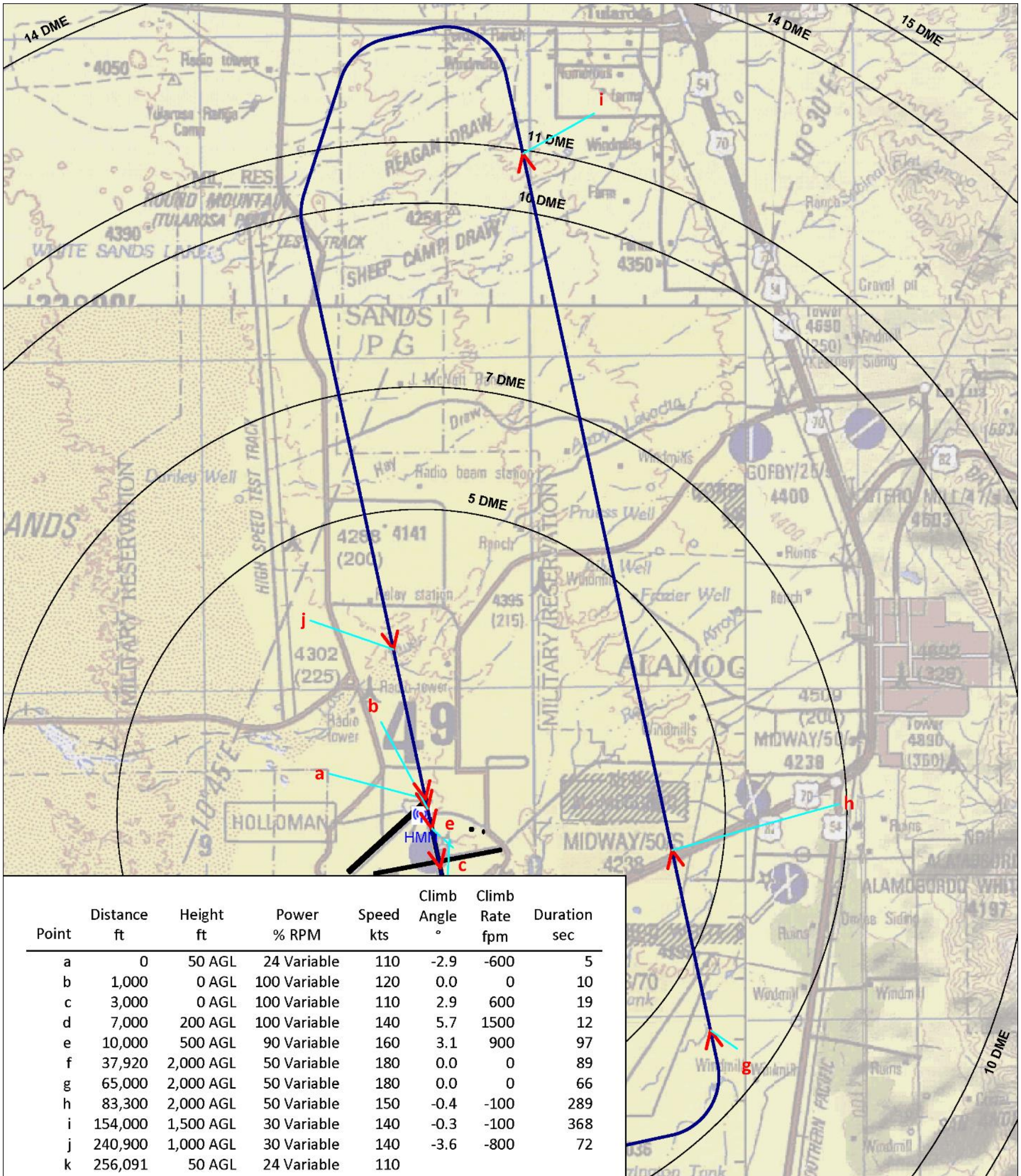
0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000 36,000 40,000 44,000
Scale in Feet 1:132,000 (1 inch = 11,000 feet)

Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	300,000	10,000 AGL	85 Landing	160	-1.9	-500	933
b	48,000	1,500 AGL	85 Landing	160	0.0	0	74
c	30,000	1,500 AGL	70 Landing	130	-2.8	-600	148
d	0	50 AGL	24 Landing	110			

Flight Profile C12_586A16a
586 FLTS C-12
Flight Track: 16A1 - IFR

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000 36,000

Scale in Feet 1:105,000 (1 inch = 8,710 feet)



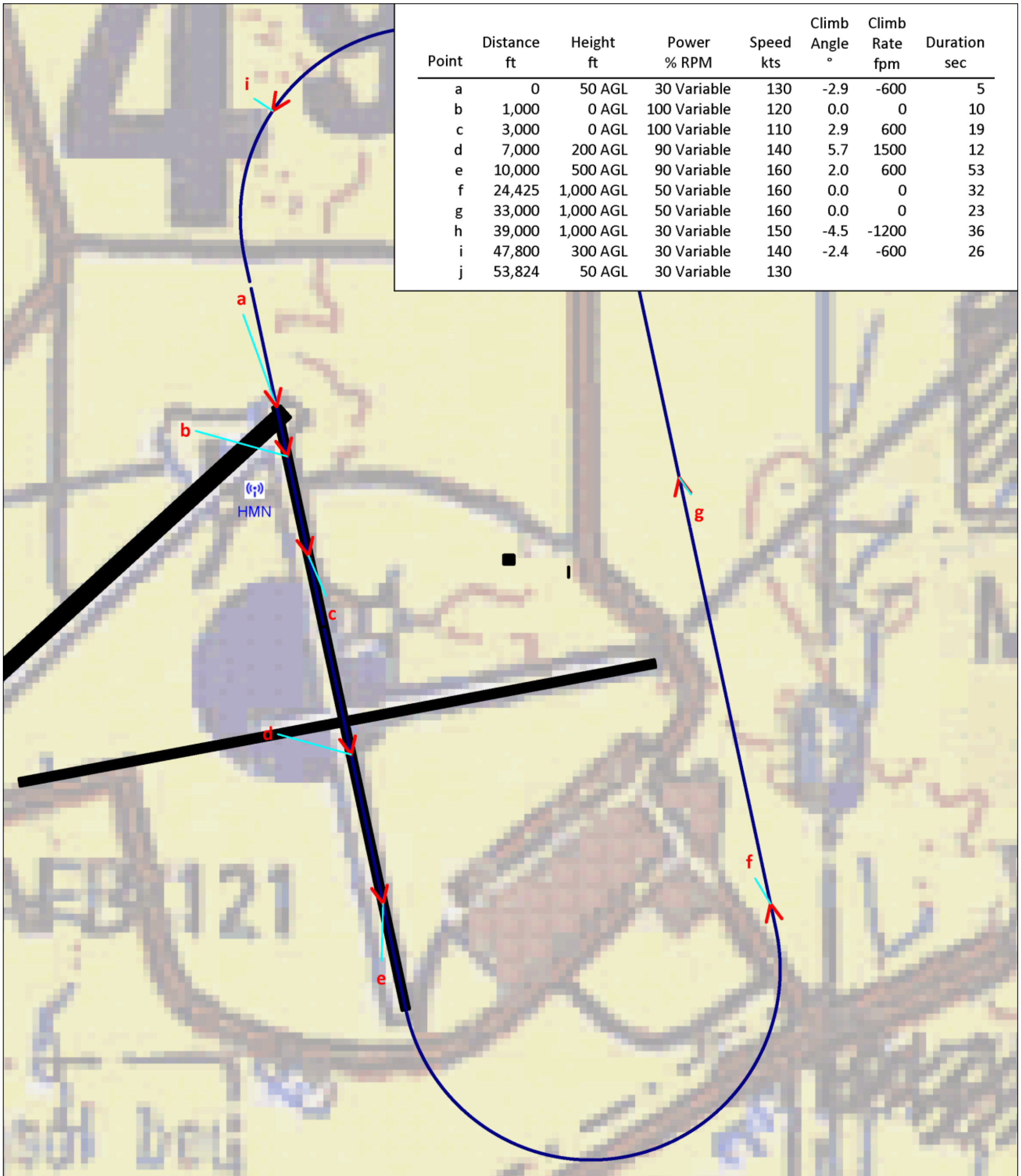
Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0	50 AGL	24 Variable	110	-2.9	-600	5
b	1,000	0 AGL	100 Variable	120	0.0	0	10
c	3,000	0 AGL	100 Variable	110	2.9	600	19
d	7,000	200 AGL	100 Variable	140	5.7	1500	12
e	10,000	500 AGL	90 Variable	160	3.1	900	97
f	37,920	2,000 AGL	50 Variable	180	0.0	0	89
g	65,000	2,000 AGL	50 Variable	180	0.0	0	66
h	83,300	2,000 AGL	50 Variable	150	-0.4	-100	289
i	154,000	1,500 AGL	30 Variable	140	-0.3	-100	368
j	240,900	1,000 AGL	30 Variable	140	-3.6	-800	72
k	256,091	50 AGL	24 Variable	110			

Flight Profile C12_586C16a
586 FLTS C-12
Flight Track: 16C1 - IFR CLOSED

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000 36,000 40,000 44,000 48,000

Scale in Feet 1:143,000 (1 inch = 11,900 feet)

N



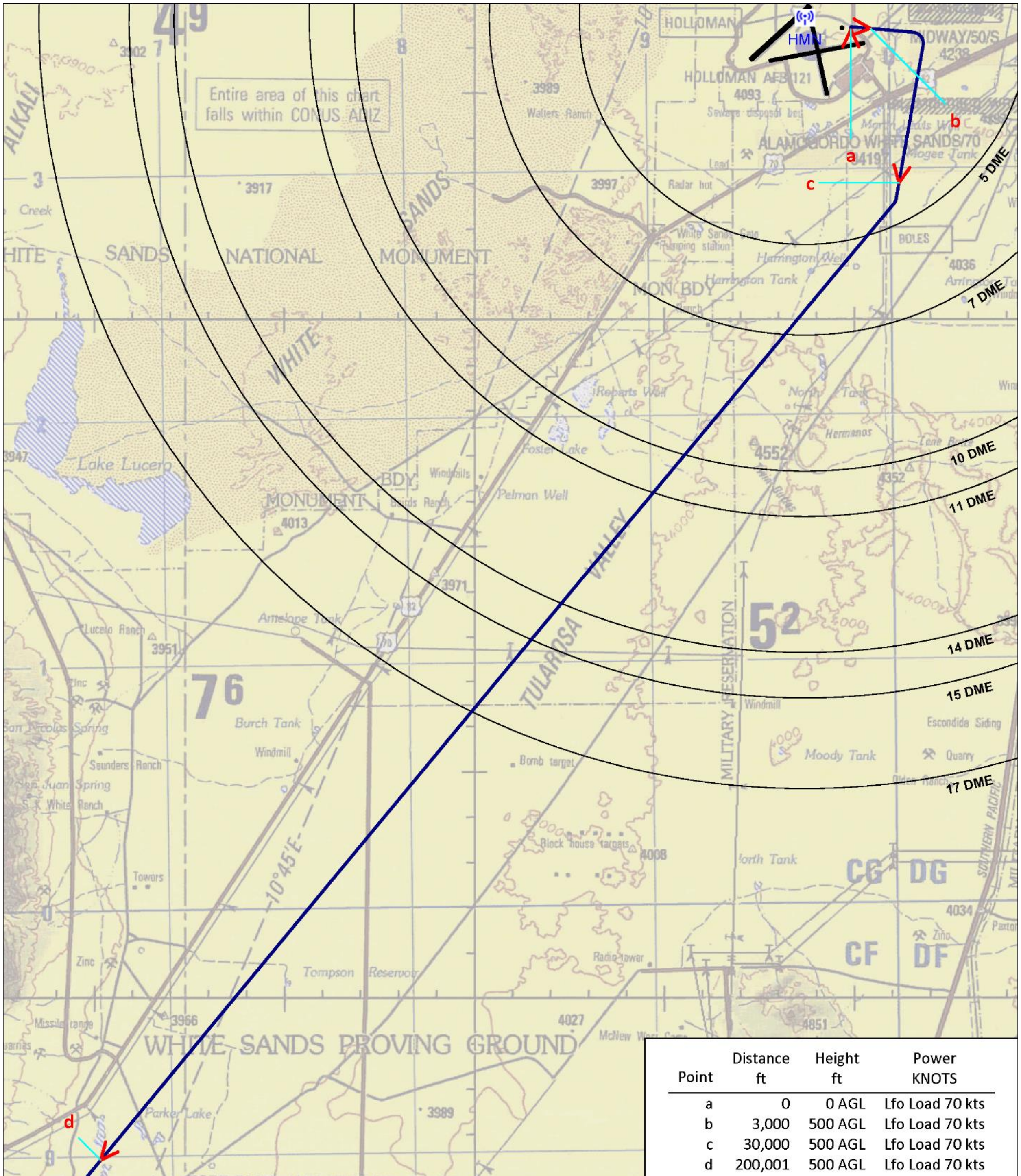
Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0	50 AGL	30 Variable	130	-2.9	-600	5
b	1,000	0 AGL	100 Variable	120	0.0	0	10
c	3,000	0 AGL	100 Variable	110	2.9	600	19
d	7,000	200 AGL	90 Variable	140	5.7	1500	12
e	10,000	500 AGL	90 Variable	160	2.0	600	53
f	24,425	1,000 AGL	50 Variable	160	0.0	0	32
g	33,000	1,000 AGL	50 Variable	160	0.0	0	23
h	39,000	1,000 AGL	30 Variable	150	-4.5	-1200	36
i	47,800	300 AGL	30 Variable	140	-2.4	-600	26
j	53,824	50 AGL	30 Variable	130			

Flight Profile C12_586C16b
586 FLTS C-12
Flight Track: 16C3o

0 1,000 2,000 3,000 4,000 5,000 6,000 7,000 8,000 9,000

Scale in Feet 1:28,300 (1 inch = 2,360 feet)

Flight Profiles for Army UH-60 Limas

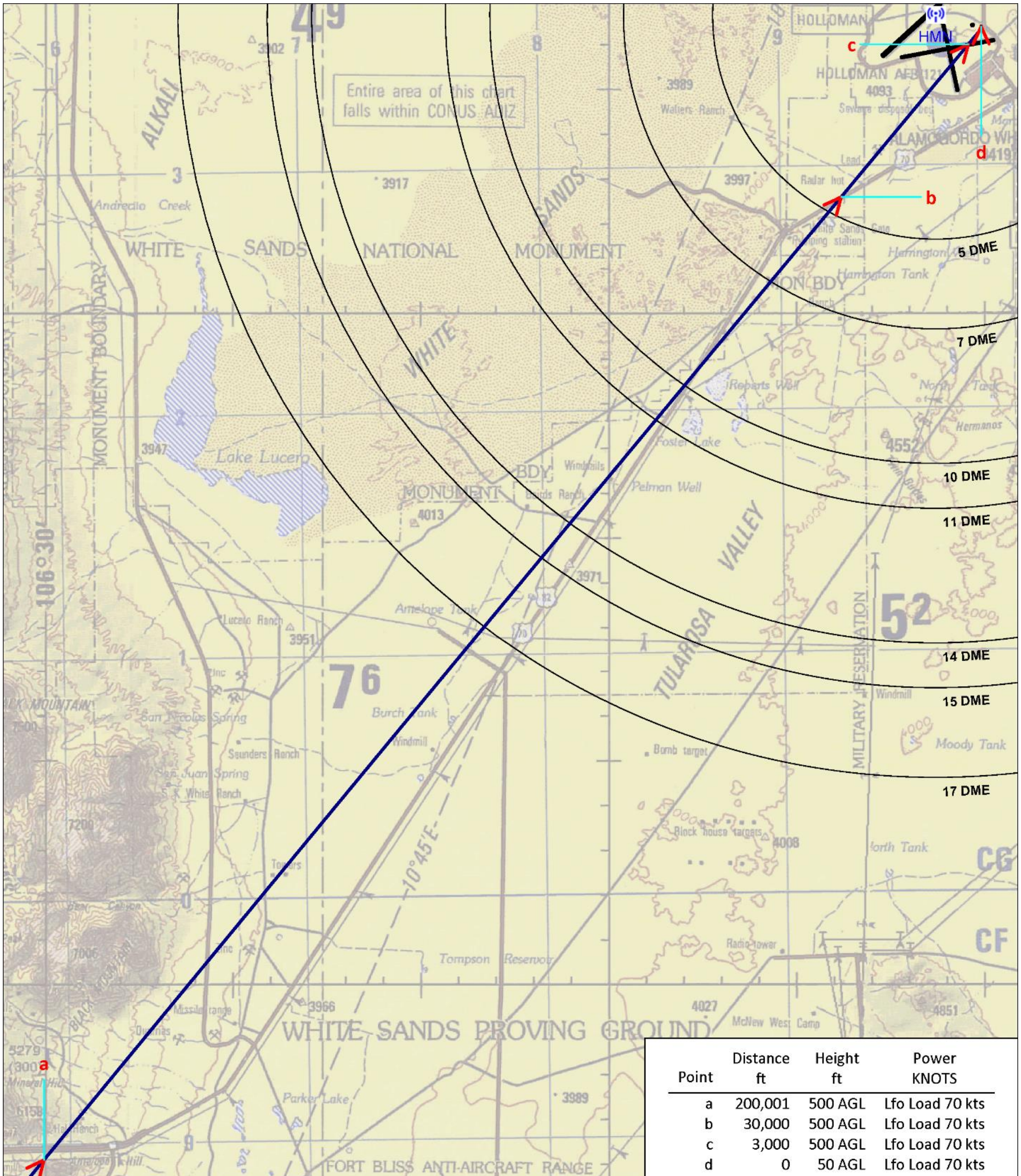


Point	Distance ft	Height ft	Power KNOTS
a	0	0 AGL	Lfo Load 70 kts
b	3,000	500 AGL	Lfo Load 70 kts
c	30,000	500 AGL	Lfo Load 70 kts
d	200,001	500 AGL	Lfo Load 70 kts

Flight Profile OHD4
Army UH60A
Flight Track: BOAD - cut East, then south

0 10,000 20,000 30,000 40,000 50,000 60,000

Scale in Feet 1:193,000 (1 inch = 16,100 feet)



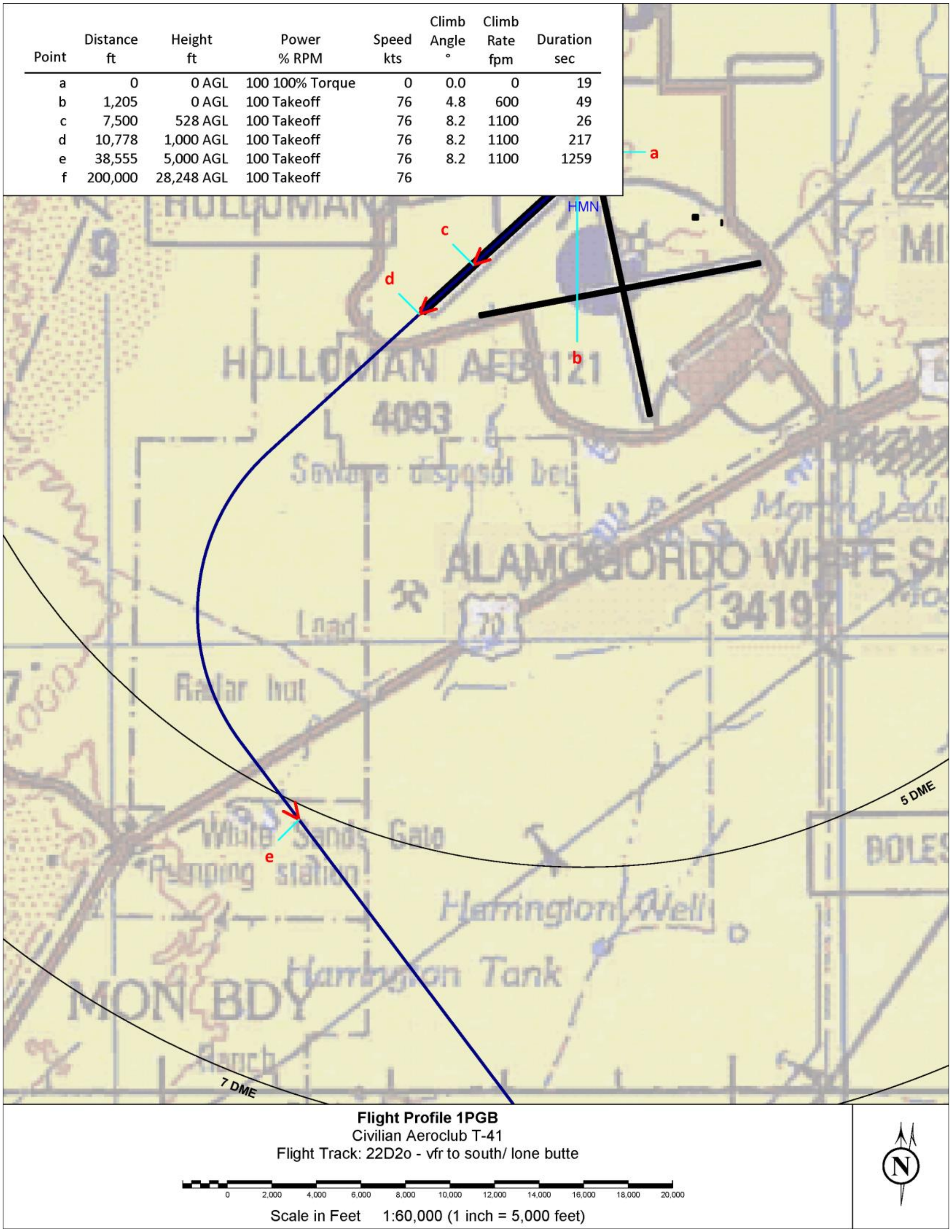
Point	Distance ft	Height ft	Power KNOTS
a	200,001	500 AGL	Lfo Load 70 kts
b	30,000	500 AGL	Lfo Load 70 kts
c	3,000	500 AGL	Lfo Load 70 kts
d	0	50 AGL	Lfo Load 70 kts

Flight Profile OHA1
Army UH60A
Flight Track: HSW - in from Southwest

Scale in Feet 1:195,000 (1 inch = 16,300 feet)

Flight Profiles for Aeroclub DA40s (T-3 Surrogate) and Cessna 172s (T-41 Surrogate)

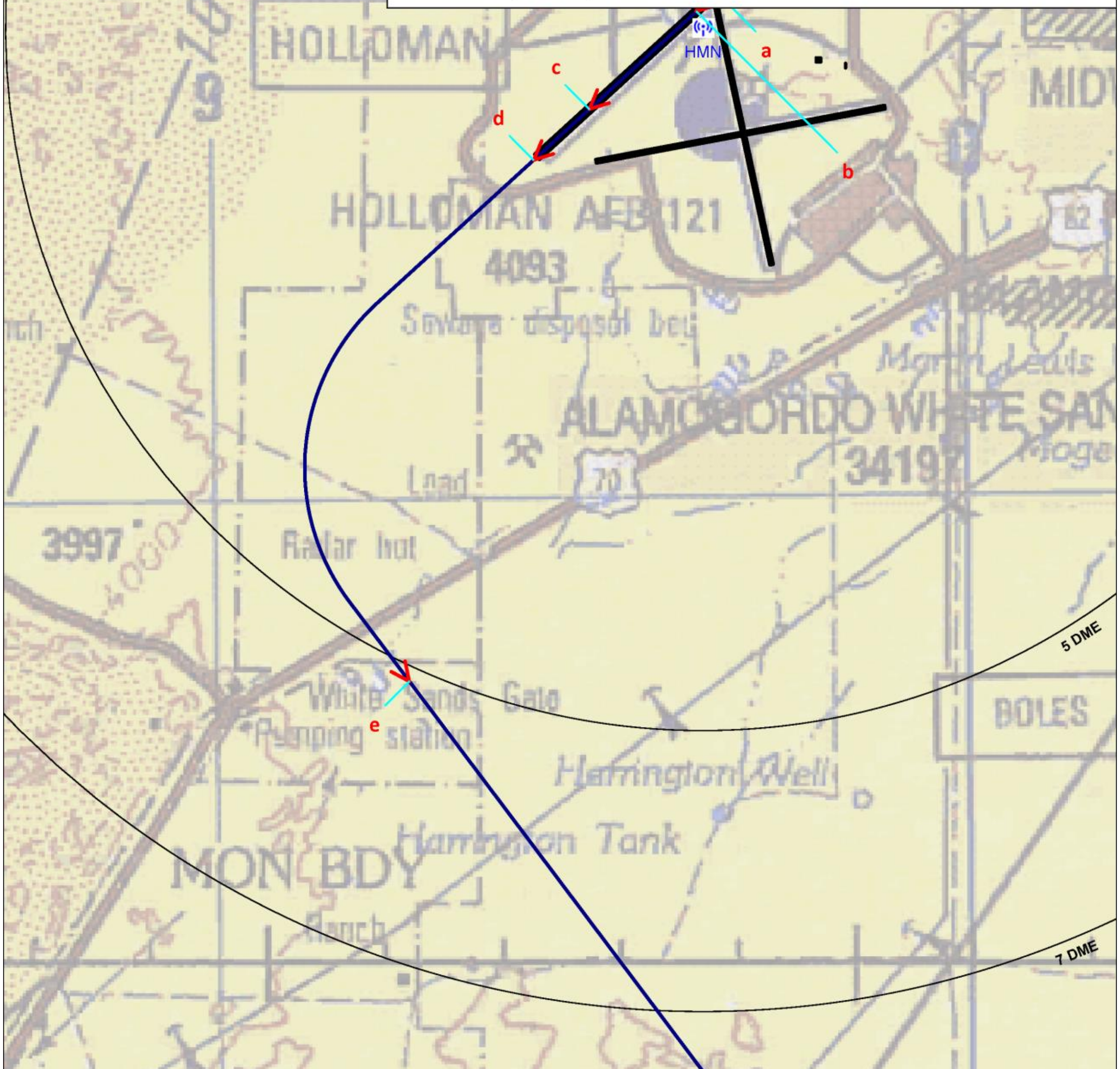
Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0	0 AGL	100 100% Torque	0	0.0	0	19
b	1,205	0 AGL	100 Takeoff	76	4.8	600	49
c	7,500	528 AGL	100 Takeoff	76	8.2	1100	26
d	10,778	1,000 AGL	100 Takeoff	76	8.2	1100	217
e	38,555	5,000 AGL	100 Takeoff	76	8.2	1100	1259
f	200,000	28,248 AGL	100 Takeoff	76			



Flight Profile 1PGB
Civilian Aeroclub T-41
Flight Track: 22D2o - vfr to south/ lone butte

Scale in Feet 1:60,000 (1 inch = 5,000 feet)

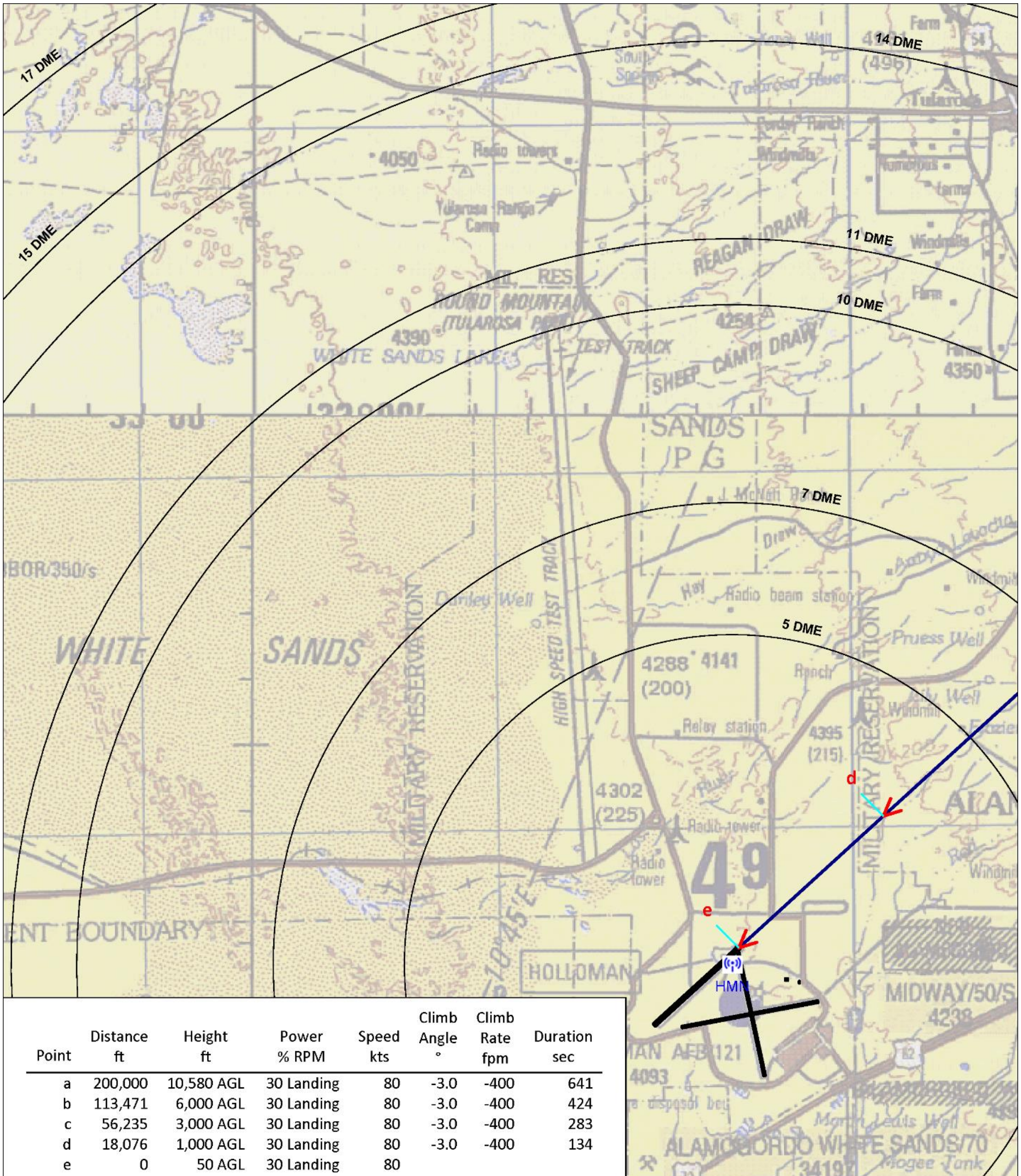
Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0	0 AGL	100 100% Torque	0	0.0	0	19
b	1,205	0 AGL	100 Takeoff	76	4.8	600	49
c	7,500	528 AGL	100 Takeoff	76	8.2	1100	26
d	10,778	1,000 AGL	100 Takeoff	76	8.2	1100	217
e	38,555	5,000 AGL	100 Takeoff	76	8.2	1100	1259
f	200,000	28,248 AGL	100 Takeoff	76			



Flight Profile 2PGB
Civilian Aeroclub T-3 (FIREFLY)
Flight Track: 22D2o - vfr to south/ lone butte

0 4,000 8,000 12,000 16,000 20,000

Scale in Feet 1:68,400 (1 inch = 5,700 feet)

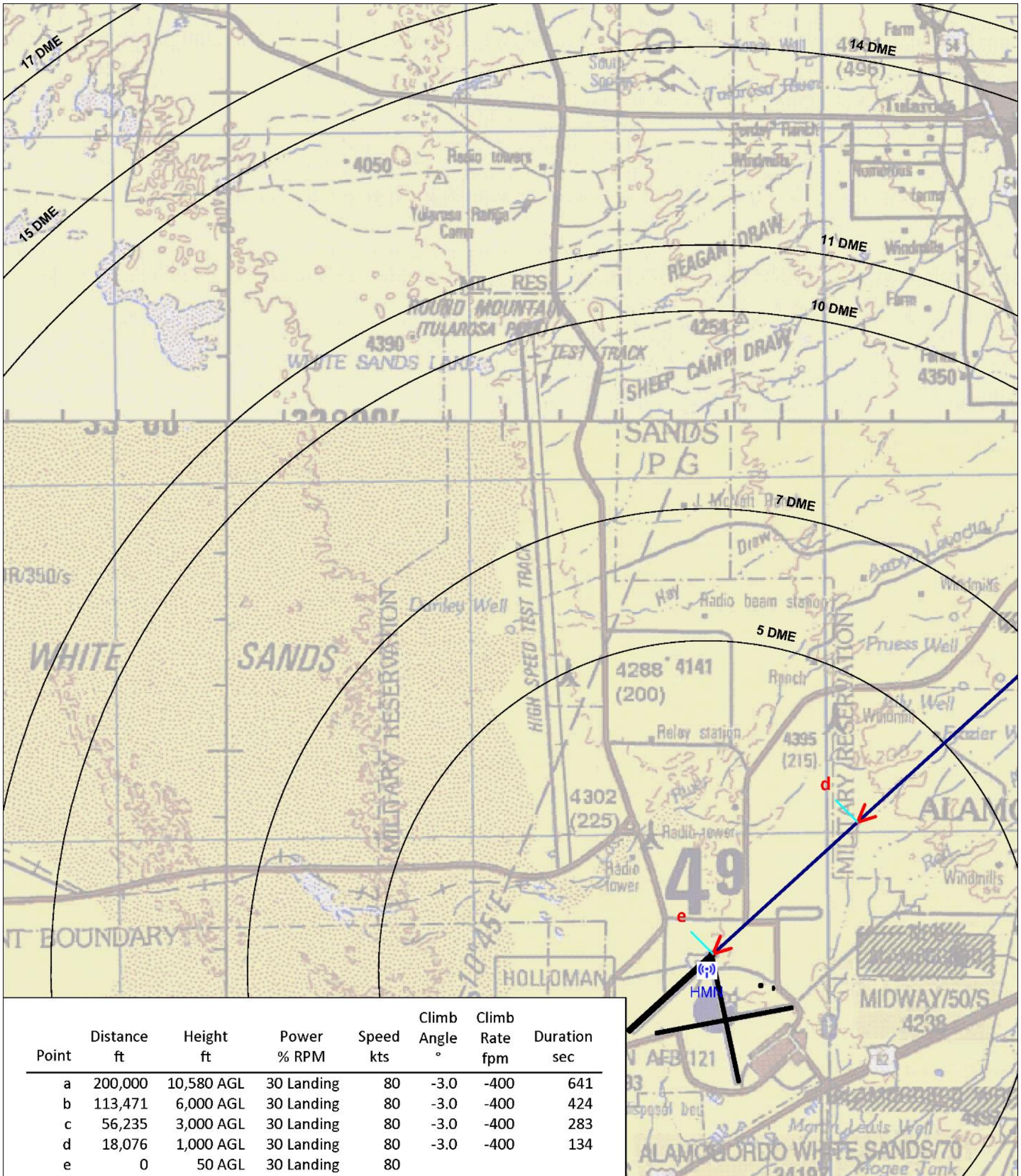


Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	200,000	10,580 AGL	30 Landing	80	-3.0	-400	641
b	113,471	6,000 AGL	30 Landing	80	-3.0	-400	424
c	56,235	3,000 AGL	30 Landing	80	-3.0	-400	283
d	18,076	1,000 AGL	30 Landing	80	-3.0	-400	134
e	0	50 AGL	30 Landing	80			

Flight Profile 2PBB
Civilian Aeroclub T-3 (FIREFLY)
Flight Track: 22A1 - IFR TO 22

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000 36,000 40,000 44,000
Scale in Feet 1:133,000 (1 inch = 11,100 feet)

N



Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	200,000	10,580 AGL	30 Landing	80	-3.0	-400	641
b	113,471	6,000 AGL	30 Landing	80	-3.0	-400	424
c	56,235	3,000 AGL	30 Landing	80	-3.0	-400	283
d	18,076	1,000 AGL	30 Landing	80	-3.0	-400	134
e	0	50 AGL	30 Landing	80			

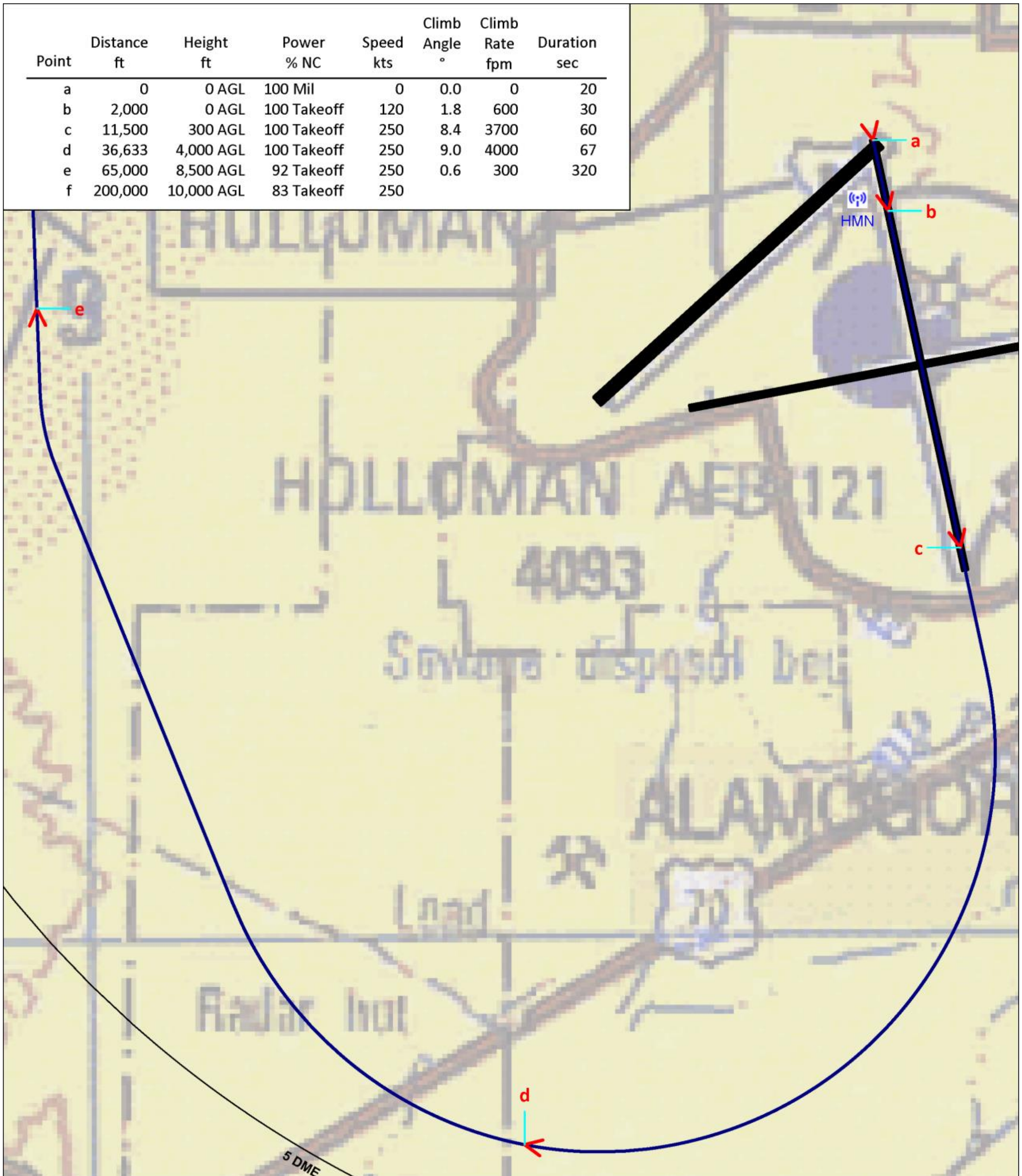
Flight Profile 1PBB
Civilian Aeroclub T-41
Flight Track: 22A1 - IFR TO 22

Scale in Feet 1:133,000 (1 inch = 11,100 feet)

B.2.3.2 Contract ADAIR Aircraft Representative Flight Profiles

<u>Contract ADAIR High Noise A-4N (A-4C Surrogate)</u>

Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0	0 AGL	100 Mil	0	0.0	0	20
b	2,000	0 AGL	100 Takeoff	120	1.8	600	30
c	11,500	300 AGL	100 Takeoff	250	8.4	3700	60
d	36,633	4,000 AGL	100 Takeoff	250	9.0	4000	67
e	65,000	8,500 AGL	92 Takeoff	250	0.6	300	320
f	200,000	10,000 AGL	83 Takeoff	250			



Flight Profile ADHD01
ADAIR Cat B High
Flight Track: 16D5 - VFR TO 'ROMEO' LINE

0 2,000 4,000 6,000 8,000 10,000 12,000

Scale in Feet 1:39,800 (1 inch = 3,320 feet)

N

Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	200,000	15,000 AGL	83 Cruise	300	-4.8	-1900	329
b	75,000	4,500 AGL	83 Cruise	150	-2.4	-600	186
c	28,000	2,500 AGL	93 Approach	150	-5.7	-1300	98
d	6,076	300 AGL	93 Approach	115	-2.4	-500	31
e	0	50 AGL	93 Approach	115			

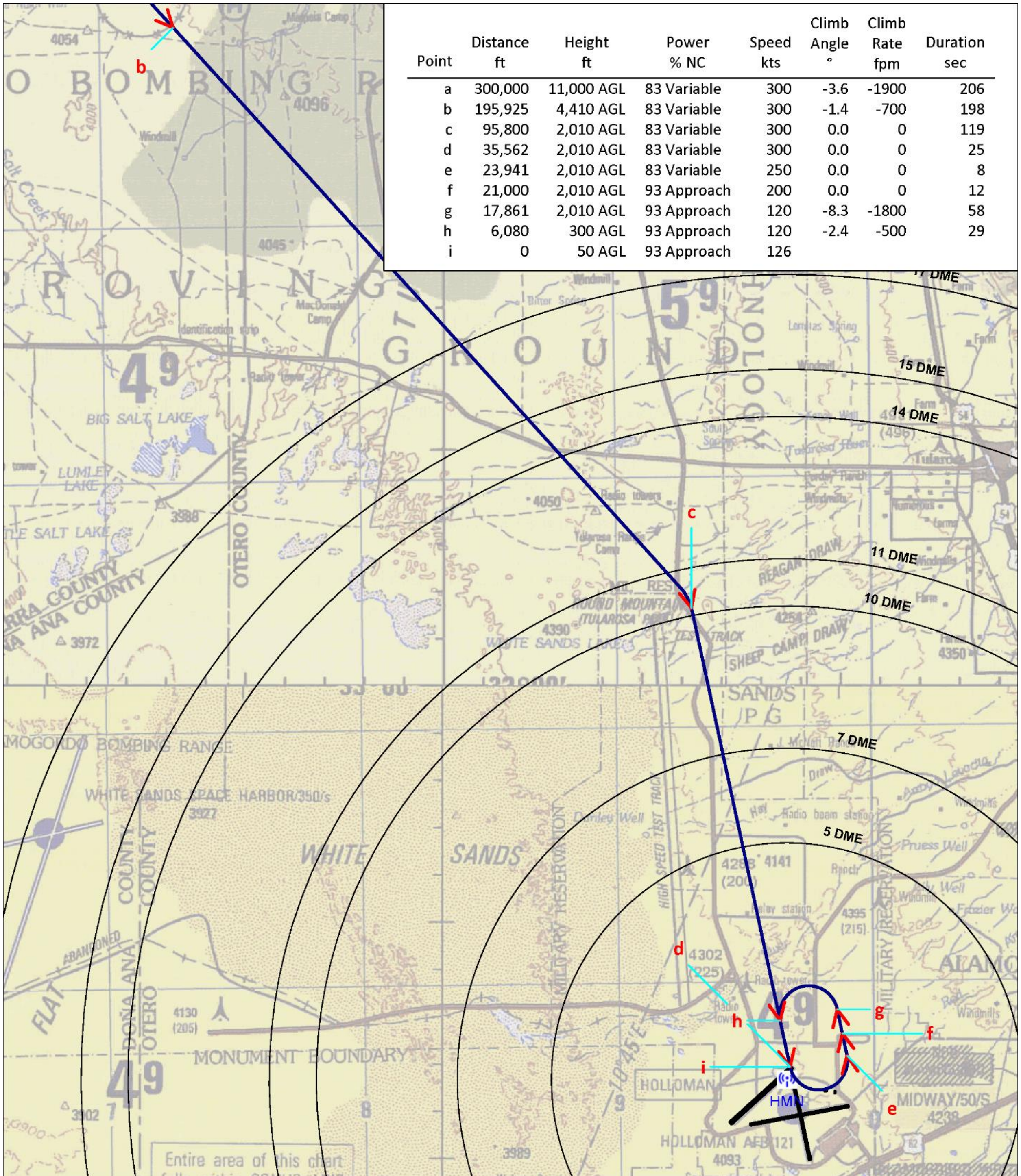
Flight Profile ADHA02
ADAIR Cat B High
Flight Track: 16A13N - ARRIVE FROM WSMR NORTH

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000 36,000

Scale in Feet 1:104,000 (1 inch = 8,690 feet)

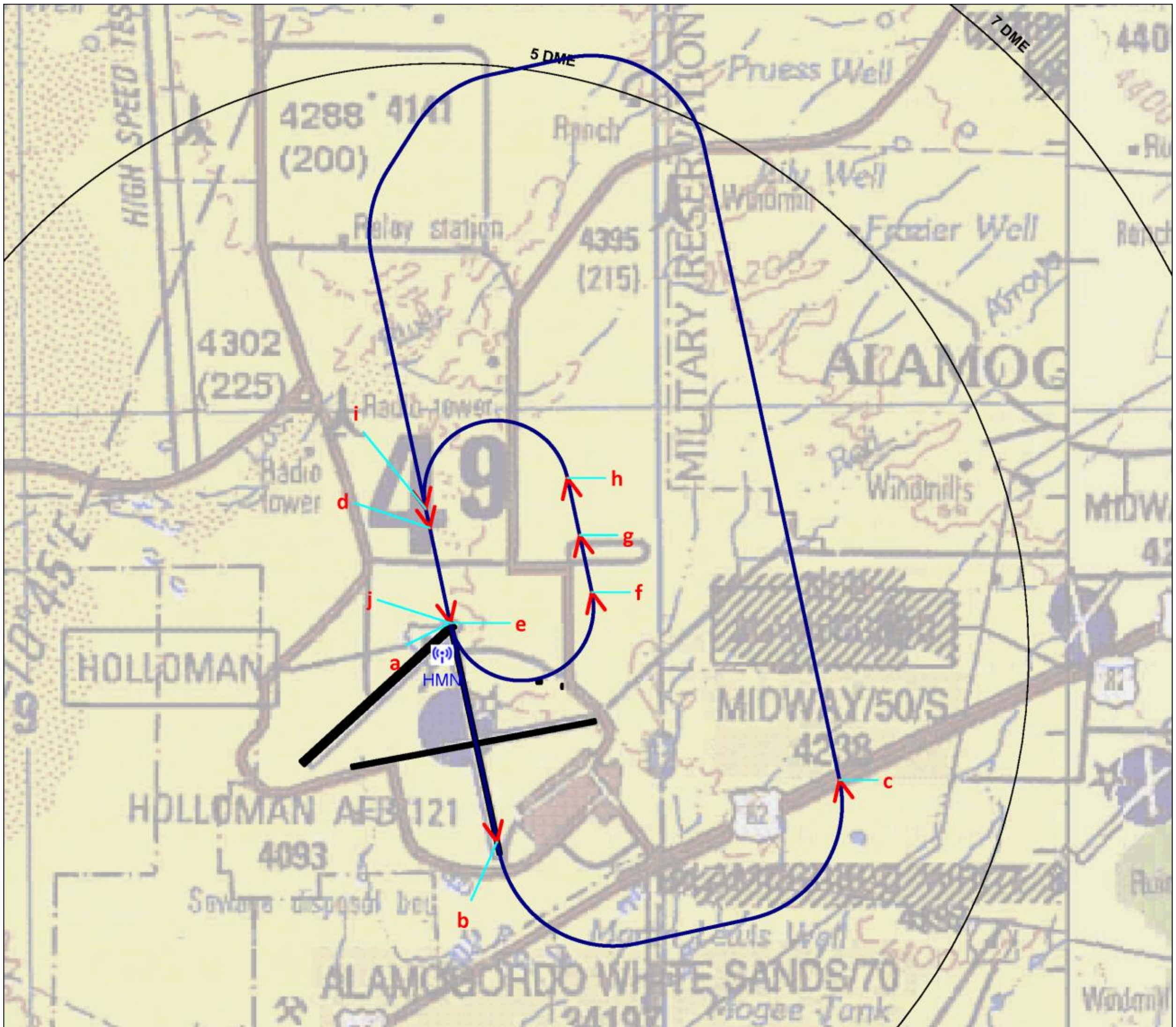
N

Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	300,000	11,000 AGL	83 Variable	300	-3.6	-1900	206
b	195,925	4,410 AGL	83 Variable	300	-1.4	-700	198
c	95,800	2,010 AGL	83 Variable	300	0.0	0	119
d	35,562	2,010 AGL	83 Variable	300	0.0	0	25
e	23,941	2,010 AGL	83 Variable	250	0.0	0	8
f	21,000	2,010 AGL	93 Approach	200	0.0	0	12
g	17,861	2,010 AGL	93 Approach	120	-8.3	-1800	58
h	6,080	300 AGL	93 Approach	120	-2.4	-500	29
i	0	50 AGL	93 Approach	126			



Flight Profile ADHA01
ADAIR Cat B High
Flight Track: 16A13NOH - ARRIVE FROM WSMR NORTH - PITCH

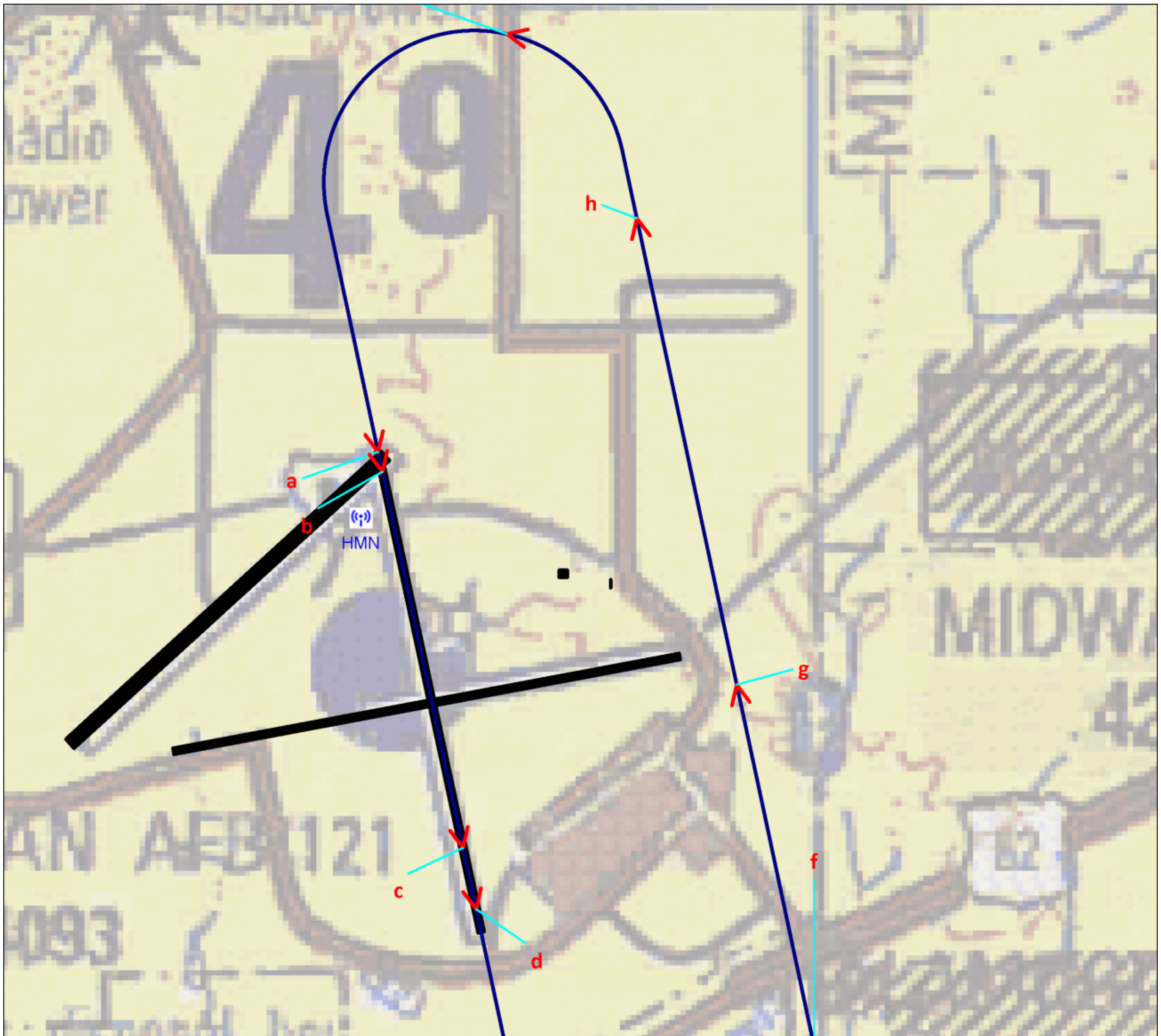
0 10,000 20,000 30,000 40,000 50,000 60,000
Scale in Feet 1:185,000 (1 inch = 15,400 feet)



Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0	50 AGL	100 Takeoff	115	1.2	400	37	
b	11,500	300 AGL	100 Takeoff	250	3.8	1900	55	
c	36,981	2,000 AGL	92 Variable	300	0.0	0	144	
d	110,039	2,000 AGL	83 Variable	300	0.0	0	10	
e	115,041	2,000 AGL	79 Variable	300	0.0	0	25	
f	126,822	2,000 AGL	83 Variable	250	0.0	0	8	
g	129,822	2,000 AGL	93 Approach	220	0.0	0	11	gear down
h	132,822	2,000 AGL	90 Approach	115	-8.2	-1700	61	
i	144,603	300 AGL	90 Approach	115	-2.4	-500	31	
j	150,603	50 AGL	100 Takeoff	115				Threshold crossing

Flight Profile ADHC02
ADAIR Cat B High
Flight Track: 16C2 - VFR OUTSIDE DOWNWIND - PITCH

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000
Scale in Feet 1:85,300 (1 inch = 7,110 feet)



Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0	50 AGL	90 Approach	115	-5.7	-1200	2	
b	500	0 AGL	100 Takeoff	126	1.8	500	35	
c	10,000	300 AGL	100 Takeoff	200	47.6	25000	4	
d	11,550	2,000 AGL	100 Variable	250	0.0	0	29	
e	23,912	2,000 AGL	83 Variable	250	0.0	0	23	
f	32,912	2,000 AGL	93 Approach	220	0.0	0	32	
g	42,043	2,000 AGL	90 Approach	115	-8.2	-1700	61	
h	53,824	300 AGL	90 Approach	115	-2.4	-500	31	
i	59,824	50 AGL	90 Approach	115				Threshold crossing

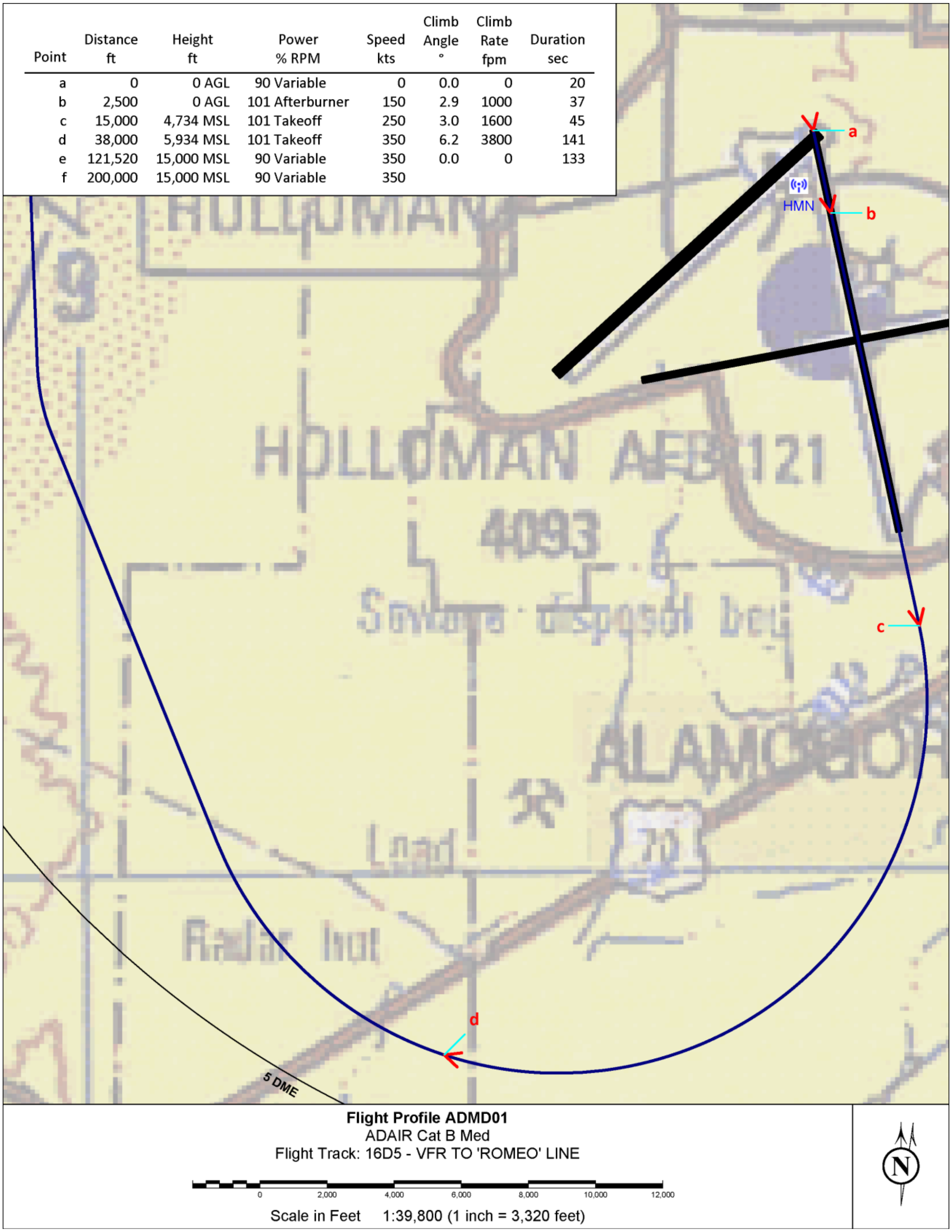
Flight Profile ADHC01
ADAIR Cat B High
Flight Track: 16C3L - VFR INSIDE DOWNWIND

0 2,000 4,000 6,000 8,000 10,000 12,000
Scale in Feet 1:40,500 (1 inch = 3,370 feet)

N

Contract ADAIR Medium Noise F-5 (F-E Surrogate)

Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0	0 AGL	90 Variable	0	0.0	0	20
b	2,500	0 AGL	101 Afterburner	150	2.9	1000	37
c	15,000	4,734 MSL	101 Takeoff	250	3.0	1600	45
d	38,000	5,934 MSL	101 Takeoff	350	6.2	3800	141
e	121,520	15,000 MSL	90 Variable	350	0.0	0	133
f	200,000	15,000 MSL	90 Variable	350			



Flight Profile ADMD01
ADAIR Cat B Med
Flight Track: 16D5 - VFR TO 'ROMEO' LINE

Scale in Feet 1:39,800 (1 inch = 3,320 feet)

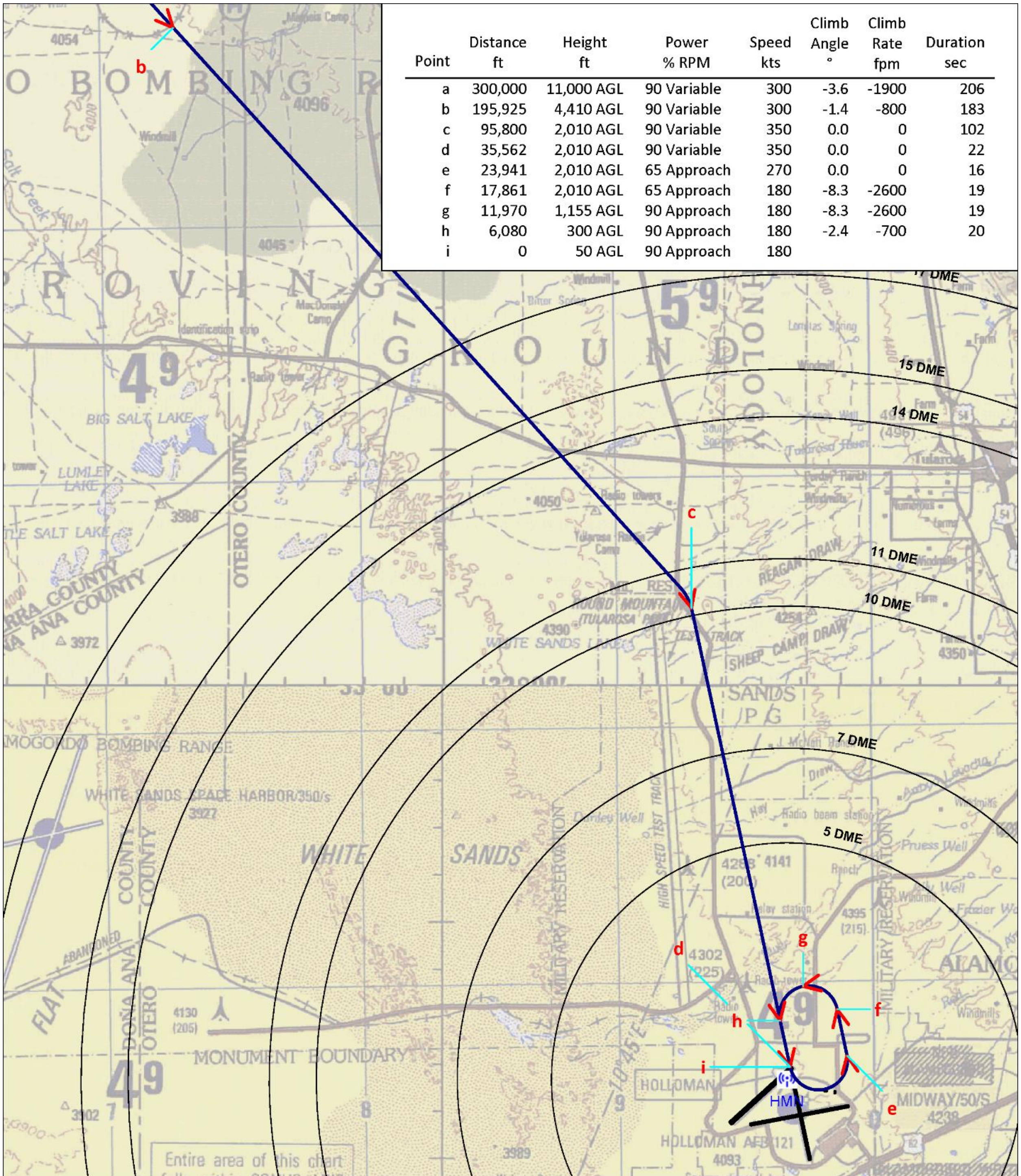
Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	200,000	15,000 AGL	85 Variable	300	-4.8	-2000	309
b	75,000	4,500 AGL	90 Approach	180	-2.4	-800	155
c	28,000	2,500 AGL	85 Approach	180	-5.7	-1800	74
d	6,076	300 AGL	85 Approach	170	-2.4	-700	21
e	0	50 AGL	85 Approach	170			

Flight Profile ADMA02
ADAIR Cat B Med
Flight Track: 16A13N - ARRIVE FROM WSMR NORTH

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000 36,000

Scale in Feet 1:104,000 (1 inch = 8,690 feet)

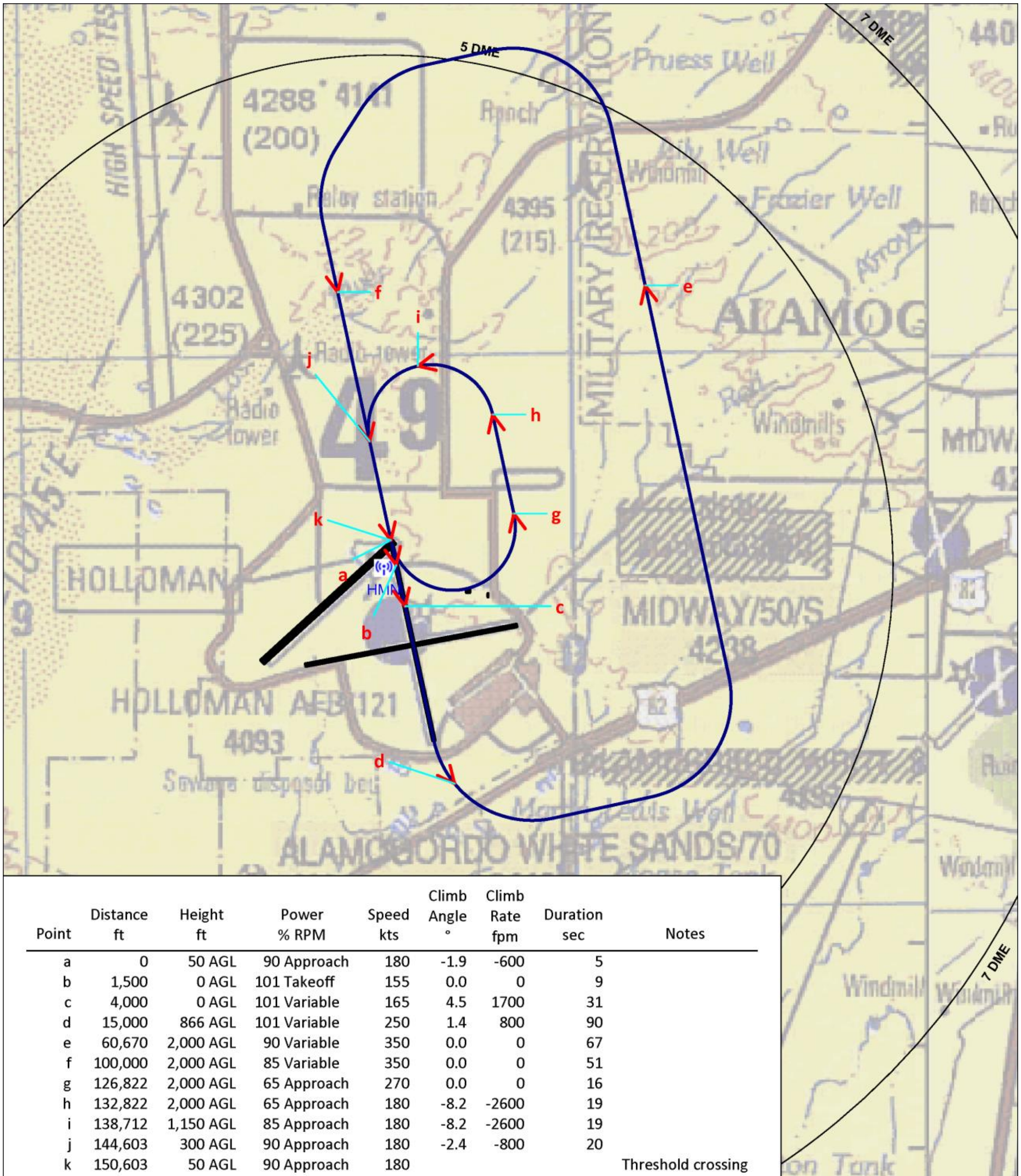
N



Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	300,000	11,000 AGL	90 Variable	300	-3.6	-1900	206
b	195,925	4,410 AGL	90 Variable	300	-1.4	-800	183
c	95,800	2,010 AGL	90 Variable	350	0.0	0	102
d	35,562	2,010 AGL	90 Variable	350	0.0	0	22
e	23,941	2,010 AGL	65 Approach	270	0.0	0	16
f	17,861	2,010 AGL	65 Approach	180	-8.3	-2600	19
g	11,970	1,155 AGL	90 Approach	180	-8.3	-2600	19
h	6,080	300 AGL	90 Approach	180	-2.4	-700	20
i	0	50 AGL	90 Approach	180			

Flight Profile ADMA01
ADAIR Cat B Med
Flight Track: 16A13NOH - ARRIVE FROM WSMR NORTH - PITCH

0 10,000 20,000 30,000 40,000 50,000 60,000
Scale in Feet 1:185,000 (1 inch = 15,400 feet)



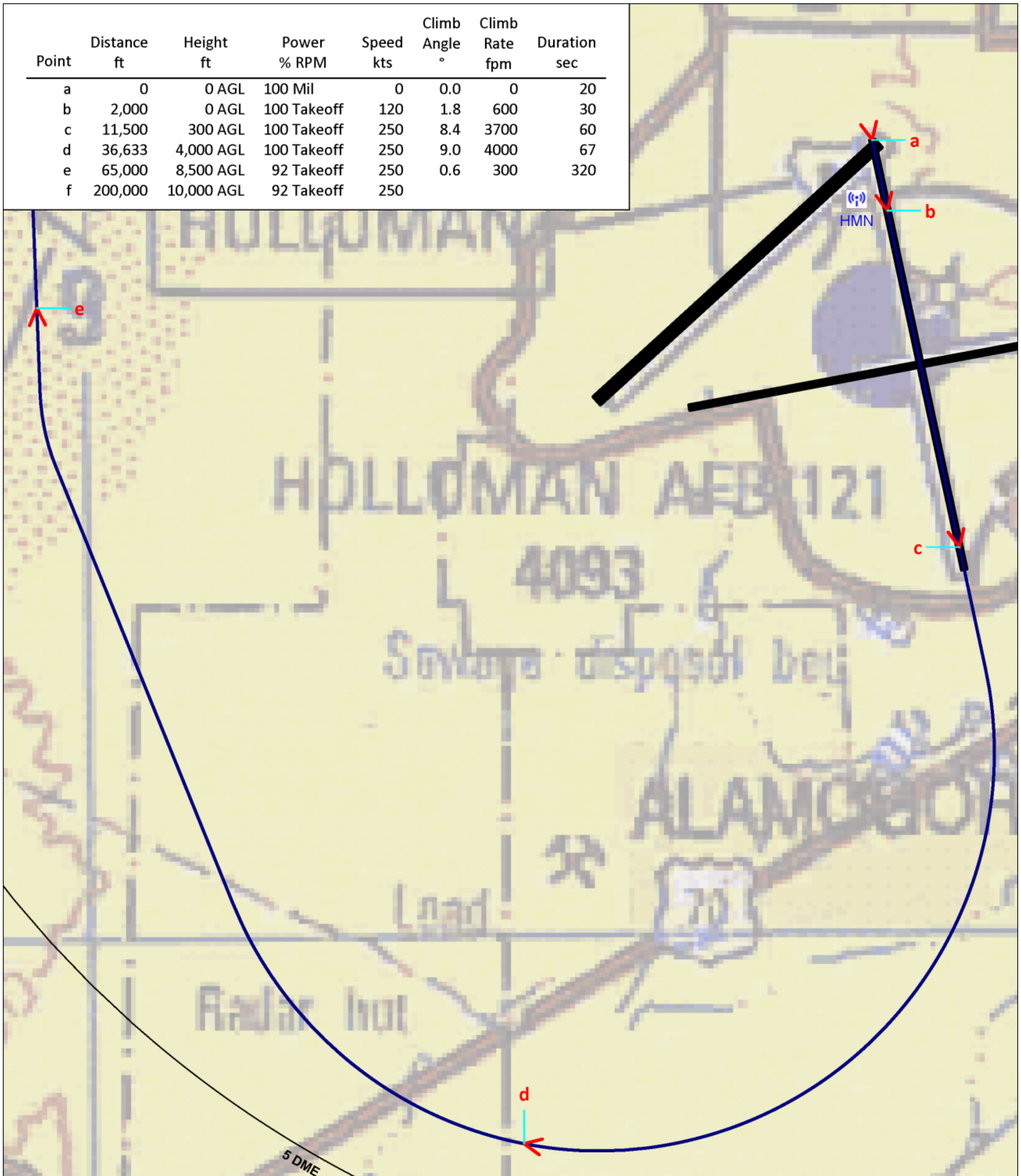
Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0	50 AGL	90 Approach	180	-1.9	-600	5	
b	1,500	0 AGL	101 Takeoff	155	0.0	0	9	
c	4,000	0 AGL	101 Variable	165	4.5	1700	31	
d	15,000	866 AGL	101 Variable	250	1.4	800	90	
e	60,670	2,000 AGL	90 Variable	350	0.0	0	67	
f	100,000	2,000 AGL	85 Variable	350	0.0	0	51	
g	126,822	2,000 AGL	65 Approach	270	0.0	0	16	
h	132,822	2,000 AGL	65 Approach	180	-8.2	-2600	19	
i	138,712	1,150 AGL	85 Approach	180	-8.2	-2600	19	
j	144,603	300 AGL	90 Approach	180	-2.4	-800	20	
k	150,603	50 AGL	90 Approach	180				Threshold crossing

Flight Profile ADMC02
ADAIR Cat B Med
Flight Track: 16C2 - VFR OUTSIDE DOWNWIND - PITCH

Scale in Feet 1:85,300 (1 inch = 7,110 feet)

Contract ADAIR Low Noise T-59 Hawk (T-45 Surrogate)

Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0	0 AGL	100 Mil	0	0.0	0	20
b	2,000	0 AGL	100 Takeoff	120	1.8	600	30
c	11,500	300 AGL	100 Takeoff	250	8.4	3700	60
d	36,633	4,000 AGL	100 Takeoff	250	9.0	4000	67
e	65,000	8,500 AGL	92 Takeoff	250	0.6	300	320
f	200,000	10,000 AGL	92 Takeoff	250			



Flight Profile ADLD01
ADAIR Cat B Low
Flight Track: 16D5 - VFR TO 'ROMEO' LINE

0 2,000 4,000 6,000 8,000 10,000 12,000

Scale in Feet 1:39,800 (1 inch = 3,320 feet)

N

Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	200,000	15,000 AGL	89.3 Cruise	300	-4.8	-1900	329
b	75,000	4,500 AGL	89.3 Cruise	150	-2.4	-600	186
c	28,000	2,500 AGL	95 Approach	150	-5.7	-1300	98
d	6,076	300 AGL	95 Approach	115	-2.4	-500	31
e	0	50 AGL	95 Approach	115			

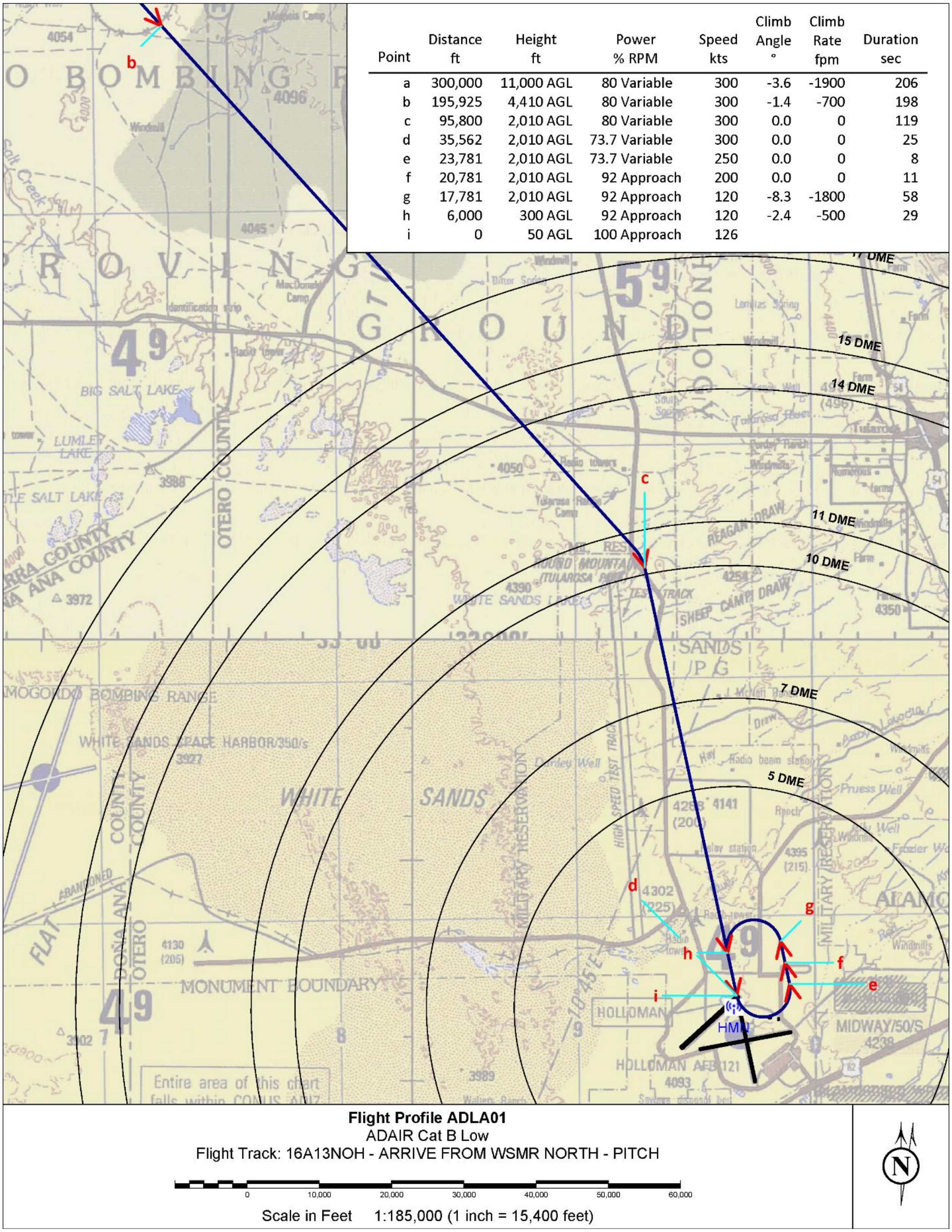
Flight Profile ADLA02
ADAIR Cat B Low
Flight Track: 16A13N - ARRIVE FROM WSMR NORTH

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000 36,000

Scale in Feet 1:104,000 (1 inch = 8,690 feet)

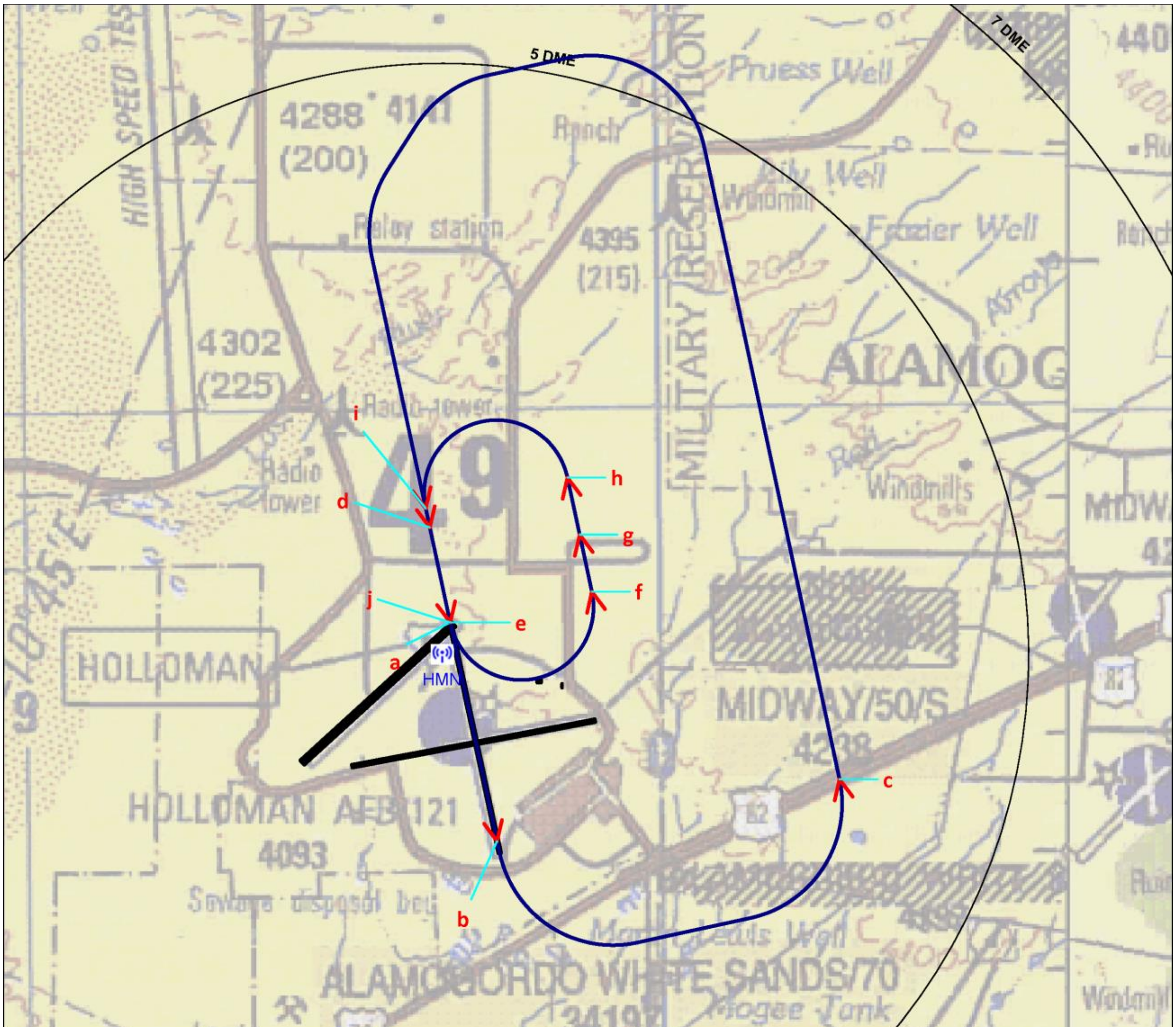
N

Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	300,000	11,000 AGL	80 Variable	300	-3.6	-1900	206
b	195,925	4,410 AGL	80 Variable	300	-1.4	-700	198
c	95,800	2,010 AGL	80 Variable	300	0.0	0	119
d	35,562	2,010 AGL	73.7 Variable	300	0.0	0	25
e	23,781	2,010 AGL	73.7 Variable	250	0.0	0	8
f	20,781	2,010 AGL	92 Approach	200	0.0	0	11
g	17,781	2,010 AGL	92 Approach	120	-8.3	-1800	58
h	6,000	300 AGL	92 Approach	120	-2.4	-500	29
i	0	50 AGL	100 Approach	126			



Flight Profile ADLA01
ADAIR Cat B Low
Flight Track: 16A13NOH - ARRIVE FROM WSMR NORTH - PITCH

Scale in Feet 1:185,000 (1 inch = 15,400 feet)

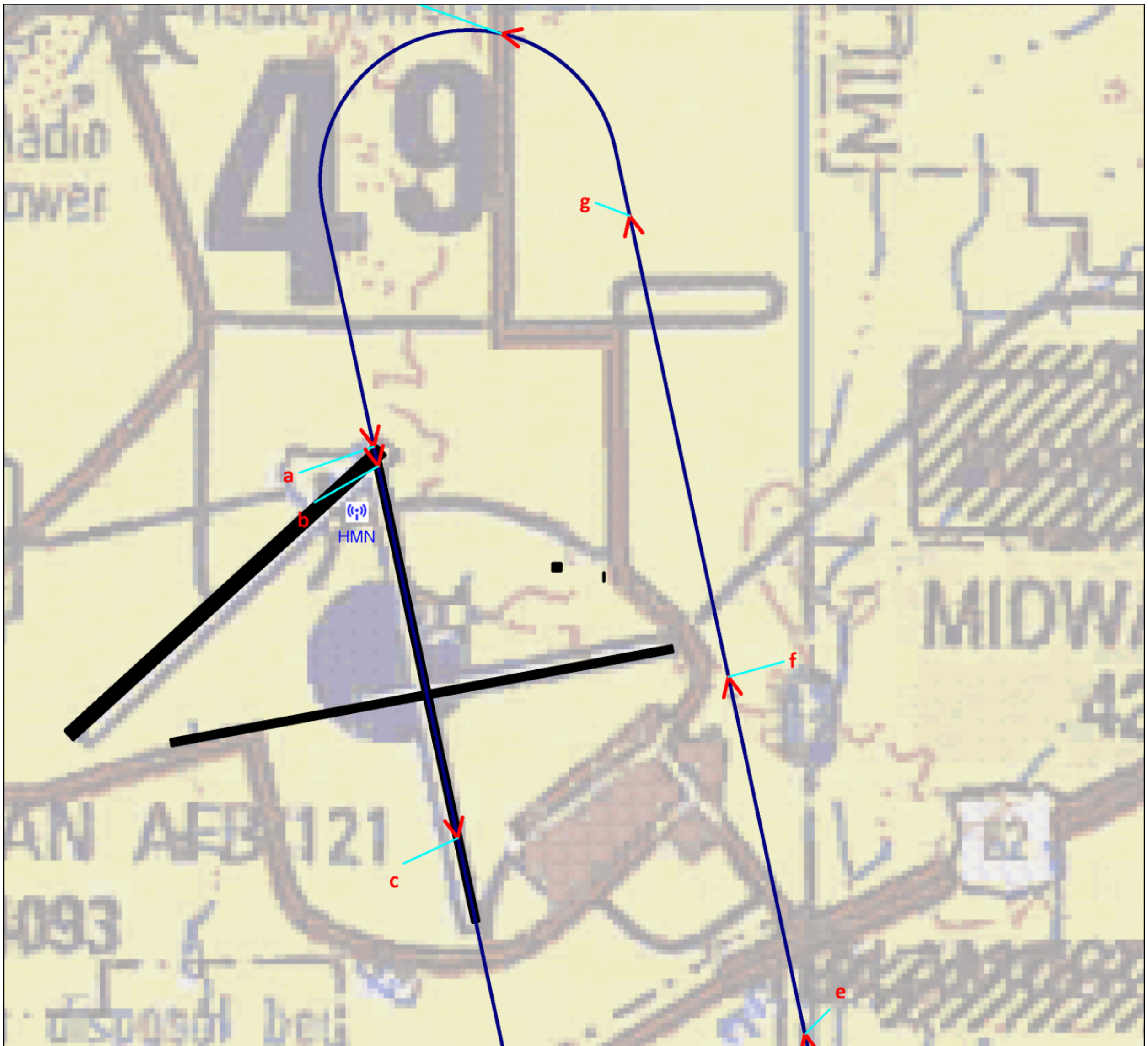


Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0	50 AGL	100 Takeoff	120	2.7	900	37	
b	11,500	600 AGL	100 Takeoff	250	3.1	1500	55	
c	36,981	2,000 AGL	80 Variable	300	0.0	0	144	
d	110,039	2,000 AGL	80 Variable	300	0.0	0	10	
e	115,041	2,000 AGL	73.7 Variable	300	0.0	0	25	
f	126,822	2,000 AGL	73.7 Variable	250	0.0	0	8	
g	129,822	2,000 AGL	90 Approach	215	0.0	0	9	
h	132,822	2,000 AGL	87.5 Approach	180	-8.2	-2400	42	
i	144,603	300 AGL	87.5 Approach	150	-2.4	-600	26	
j	150,603	50 AGL	100 Takeoff	120				Threshold crossing

Flight Profile ADLC02
ADAIR Cat B Low
Flight Track: 16C2 - VFR OUTSIDE DOWNWIND - PITCH

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000
Scale in Feet 1:85,300 (1 inch = 7,110 feet)

N



Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0	50 AGL	87.5 Approach	115	-5.7	-1200	2	
b	500	0 AGL	100 Takeoff	126	1.8	400	44	
c	10,000	300 AGL	100 Takeoff	130	7.0	1600	63	
d	23,912	2,000 AGL	85.5 Variable	130	0.0	0	41	
e	32,912	2,000 AGL	90 Approach	130	0.0	0	44	
f	42,043	2,000 AGL	87.5 Approach	115	-8.2	-1700	61	
g	53,824	300 AGL	87.5 Approach	115	-2.4	-500	31	
h	59,824	50 AGL	87.5 Approach	115				Threshold crossing

Flight Profile ADLC01
ADAIR Cat B Low
Flight Track: 16C3L - VFR INSIDE DOWNWIND

0 2,000 4,000 6,000 8,000 10,000 12,000

Scale in Feet 1:40,500 (1 inch = 3,370 feet)

B.2.4 Ground/Maintenance Run-ups

This section details the number, type, and duration of the ground and maintenance engine run-up operations at the airfield. Contract ADAIR aircraft maintenance would include routine inspections and minor unscheduled repairs on the flightline. Aircraft requiring major scheduled (depot level maintenance) or unscheduled maintenance would be expected to be flown back to the contractor's home base for repairs. The only ground operations expected to increase with the addition of contract ADAIR aircraft would be the preflight run-up checks, postflight idling, and trim tests. **Figure B-16** shows the location of all the static run-up locations at Holloman AFB. The proposed location for contract ADAIR aircraft parking is also noted on the figure. The locations at the ends of the runway are the locations for the arming and dearming of the F-16C aircraft. The trim pad is where trim test operations for ADAIR aircraft would be performed as well as the based F-16C aircraft. **Table B-9** details the number, type, and duration of the on-field maintenance operations.

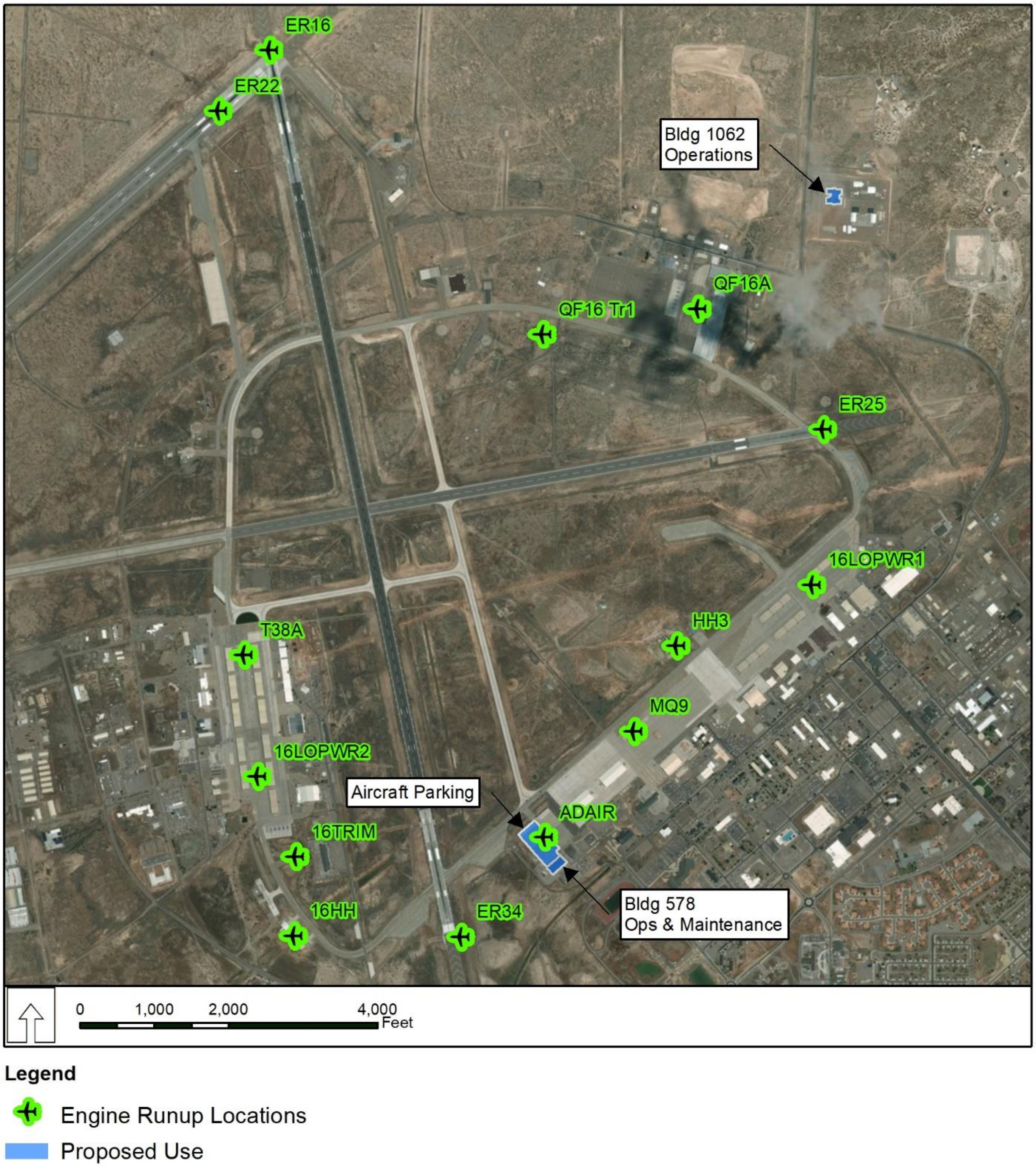


Figure B-16. Static Operations Locations.

Table B-9
Location, Type, and Duration of Ground/Maintenance Run-Up Operations at Holloman Air Force Base

Aircraft Type	Engine Type	Run-up Type	Annual Events	Percent Day (0700-2200)	Percent Night (2200-0700)	Run-up Pad ID	Percent Pad used	Magnetic Heading (degrees)	Engine Power Setting	Duration (Seconds) Per Event	# of Engines Running Per Event
54 FG F-16C[1]	F100-PW-220/ F100-GE-100	Pre/Postflight Engine Run	1/sortie	95%	5%	16_LOPWR1/2	50%/50%	80/260	67%	900	1
		Oil Consumption, APU Check	66	100%	0%	16_LOPWR1/2	50%/50%	80/260	67% NC 80% NC	600 150	1
		Flight Controls and Engine Change	870	100%	0%	16_LOPWR1/2	50%/50%	80/260	67% NC	900	1
		Trim	104	100%	0%	16_HH	100%	80	67% NC 80% NC 85% NC	600 605 300	1
		Arming	1/sortie	95%	5%	Rwy 16 EOR F/ Rwy 34 EOR A/ Rwy 25 EOR B/ Rwy22 EOR F	70%/ 10%/ 15%/ 5%	160/ 220/ 250/ 340	67% NC	1200	1
		Dearming	1/sortie	93%	7%	Rwy 16 EOR F/ Rwy 34 EOR A/ Rwy 25 EOR B/ Rwy22 EOR F	84%/ 10%/ 1%/ 5%	160/ 220/ 250/ 340	67% NC	420	1
	GRADE III	Uninstalled	30	95%	5%	16_HH-hush house	100%	45%	80% NC 91.5% NC Max A/B	3000 780 120	1
	GRADE III	Hush House	208	95%	5%	16_HH-hush house	100%	45%	80% NC 91.5% NC Max A/B	3000 780 120	1
82 ATRS/Det 1 QF-16C	F110-GE-100	Pre/Postflight Engine Run	1/sortie	100.0%	0.0%	QF16A	100.00%	130	67% NC	3600	1
		Oil Consumption, APU Check	52	100%	0%	QF16A	50%/50%	130/260	67% NC 80% NC	600 150	1
		Flight Controls and Engine Change	208	100%	0%	QF16A	50%/50%	130/260	67% NC	900	1
		Trim	73	100%	0%	QF16_Trim	1	30	67% NC 80% NC 85% NC	600 605 300	1
	GRADE III	Hush House	104	95%	5%	16_HH-hush house	100%	45	80% NC 91.5% NC Max A/B	3000 780 120	1
586 FLTS T-38Cs/ ACC AFACGS T-38As	J85-GE-5A	Pre/Posflight Engine Run	1/sortie	96%	4%	T38A	100%	140/320	48% RPM	1200	2
		Ops Check	52	100%	0%	T38A	100%	140/320	48% RPM	960	2
	GRADE III	Uninstalled	216	100%	0%	HH3	100%	135	48% RPM 88% RPM 99.5% RPM Max A/B	300 600 600 120	1
	GRADE III	T-38 Supressor	79	100%	0%	HH3	100%	135	48% RPM 88% RPM 99.5% RPM Max A/B	300 600 600 120	1
MQ-9	TPE331-8	Preflight Engine Run	1/sortie	44%	56%	MQ-9 Parking	100%	0	65% RPM	900	1
		Postflight Engine Run	1/sortie	100%	0%				65% RPM	900	
		Ops Check	81	100%	0%				80% RPM	1800	
ADAIR Category B[2]		Pre/Postflight Engine Run	1/sortie	95.0%	5.0%	ADAIR Parking	100%	230	Idle	600	All
		Trim	288	100%	0	16_HH	100%	30	Idle Approach Intermediate Military	720 1620 540 540	1 or 2

Notes:

(1) F-16 engine maintenance is representative of four based squadrons with maximum of four maintenance runs per week for the GE and PW engines combined including stand up of JEIM. Flightline op records scaled for four based squadrons.

(2) Air Conformity Applicability Model defaults assumed for ADAIR aircraft. Expect the ADAIR contractor to perform major aircraft maintenance off-base except for minor aircraft maintenance (i.e., preflight run-up, postflight idling, and trim tests). Based on 24 test/year/aircraft expecting 12 ADAIR aircraft.

APPENDIX C

AIR QUALITY

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Appendix C-1

Air Conformity Applicability Analysis

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C.1 AIR QUALITY

This appendix presents an overview of the Clean Air Act (CAA) and the state of New Mexico air quality regulations. It also presents calculations, including the assumptions used for the air quality analyses presented in the Air Quality sections of this Environmental Assessment.

C.1.1 Air Quality Program Overview

To protect public health and welfare, the United States Environmental Protection Agency (USEPA) has developed numerical concentration-based standards, or National Ambient Air Quality Standards (NAAQS), for six "criteria" pollutants (based on health-related criteria) under the provisions of the CAA Amendments of 1970. There are two kinds of NAAQS: Primary and Secondary standards. Primary standards prescribe the maximum permissible concentration in the ambient air to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards prescribe the maximum concentration or level of air quality required to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings (40 Code of Federal Regulations [CFR] Part 50).

The CAA gives states the authority to establish air quality rules and regulations. These rules and regulations must be equivalent to, or more stringent than, the federal program. The New Mexico Environment Department (NMED) oversees the state's air pollution control program under the authority of the federal CAA and amendments, federal regulations, and state laws. They have jurisdiction over all New Mexico counties except Bernalillo County and facilities on tribal lands. New Mexico has adopted the federal NAAQS (20 New Mexico Administrative Code Chapter 2, Part 3). These standards are shown in **Table C-1**.

Based on measured ambient air pollutant concentrations, the USEPA designates areas of the United States as having air quality better than (attainment) the NAAQS, worse than (nonattainment) the NAAQS, and unclassifiable. The areas that cannot be classified (on the basis of available information) as meeting or not meeting the NAAQS for a particular pollutant are "unclassifiable" and are treated as attainment until proven otherwise. Attainment areas can be further classified as "maintenance" areas, which are areas previously classified as nonattainment but where air pollutant concentrations have been successfully reduced to below the standard. Maintenance areas are under special maintenance plans and must operate under some of the nonattainment area plans to ensure compliance with the NAAQS.

Section 176(c) (1) of the CAA contains legislation that ensures federal activities conform to relevant State Implementation Plans (SIPs) and thus do not hamper local efforts to control air pollution. Conformity to a SIP is defined as conformity to a SIP's purpose of eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of such standards. As such, a general conformity analysis is required for areas of nonattainment or maintenance where a federal action is proposed.

The action can be shown to conform by demonstrating that the total direct and indirect emissions are below the *de minimis* levels (Table C-2) and/or showing that the proposed action emissions are within the state- or tribe-approved budget of the facility as part of the SIP or Tribal Implementation Plan (USEPA, 2010). A conformity determination is required for each criteria pollutant or precursor where the total of direct and indirect emissions of that pollutant equal or exceed its de minimis rates (20 New Mexico Administrative Code 2.99).

Direct emissions are those that occur as a direct result of the action. For example, emissions from new equipment that are a permanent component of the completed action (e.g., boilers, heaters, generators, paint booths) are considered direct emissions. Indirect emissions are those that occur at a later time or at a distance from the proposed action. For example, increased vehicular/commuter traffic because of the action is considered an indirect emission. Construction emissions must also be considered. For example, the emissions from vehicles and equipment used to clear and grade building sites, build new buildings, and construct new roads must be evaluated. These types of emissions are considered direct.

Table C-1
National Ambient Air Quality Standards

Pollutant	Standard Value[6]		Standard Type
Carbon Monoxide (CO)			
8-hour average	9 ppm	(10 mg/m^3)	Primary
1-hour average	35 ppm	(40 mg/m^3)	Primary
Nitrogen Dioxide (NO_2)			
Annual arithmetic mean	0.053 ppm	(100 µg/m^3)	Primary and Secondary
1-hour average[1]	0.100 ppm	(188 µg/m^3)	Primary
Ozone (O_3)			
8-hour average[2]	0.070 ppm	(137 µg/m^3)	Primary and Secondary
Lead (Pb)			
3-month average[3]		0.15 µg/m^3	Primary and Secondary
Particulate <10 Micrometers (PM_{10})			
24-hour average[4]		150 µg/m^3	Primary and Secondary
Particulate <2.5 Micrometers ($PM_{2.5}$)			
Annual arithmetic mean[4]		12 µg/m^3	Primary
Annual arithmetic mean[4]		15 µg/m^3	Secondary
24-hour average[4]		35 µg/m^3	Primary and Secondary
Sulfur Dioxide (SO_2)			
1-hour average[5]	0.075 ppm	(196 µg/m^3)	Primary
3-hour average[5]	0.5 ppm	(1,300 µg/m^3)	Secondary

Source: USEPA, 2016, 2020

Notes:

1 In February 2010, the USEPA established a new 1-hour standard for NO_2 at a level of 0.100 ppm, based on the 3-year average of the 98th percentile of the yearly distribution concentration, to supplement the then-existing annual standard.

2 In October 2015, the USEPA revised the level of the 8-hour standard to 0.070 ppm, based on the annual 4th highest daily maximum concentration, averaged over 3 years; the regulation became effective on 28 December 2015. The previous (2008) standard of 0.075 ppm remains in effect for some areas. A 1-hour standard no longer exists.

3 In November 2008, USEPA revised the primary lead standard to 0.15 µg/m^3. USEPA revised the averaging time to a rolling 3-month average.

4 In October 2006, USEPA revised the level of the 24-hour $PM_{2.5}$ standard to 35 µg/m^3 and retained the level of the annual $PM_{2.5}$ standard at 15 µg/m^3. In 2012, USEPA split standards for primary and secondary annual $PM_{2.5}$. All are averaged over 3 years, with the 24-hour average determined at the 98th percentile for the 24-hour standard. USEPA retained the 24-hour primary standard and revoked the annual primary standard for PM_{10}.

5 In 2012, the USEPA retained a secondary 3-hour standard, which is not to be exceeded more than once per year. In June 2010, USEPA established a new 1-hour SO_2 standard at a level of 75 ppb, based on the 3-year average of the annual 99th percentile of 1-hour daily maximum concentrations.

6 Parenthetical value is an approximately equivalent concentration for NO_2, O_3, and SO_2.

µg/m^3 = microgram(s) per cubic meter; mg/m^3 = milligram(s) per cubic meter; ppb = part(s) per billion; ppm = part(s) per million; USEPA = United States Environmental Protection Agency

Table C-2
General Conformity Rule *De Minimis* Emission Thresholds

Pollutant	Attainment Classification	Tons per year
Ozone (VOC and NO_x)	Serious nonattainment	50
	Severe nonattainment	25
	Extreme nonattainment	10
	Other areas outside an ozone transport region (applicable to Holloman Air Force Base)	100
Ozone (NO_x)	Marginal and moderate nonattainment inside an ozone transport region	100
	Maintenance	100
Ozone (VOC)	Marginal and moderate nonattainment inside an ozone transport region	50
	Maintenance within an ozone transport region	50
	Maintenance outside an ozone transport region	100
Carbon Monoxide, SO_2 and NO_2	All nonattainment and maintenance	100
PM_{10}	Serious nonattainment	70
	Moderate nonattainment and maintenance	100
$PM_{2.5}$ Direct emissions, SO_2, NO_x (unless determined not to be a significant precursor), VOC and ammonia (if determined to be significant precursors)	All nonattainment and maintenance	100
Lead (Pb)	All nonattainment and maintenance	25

Source: USEPA, 2017

Notes:
NO_2 = nitrogen dioxide; NO_x = nitrogen oxide; $PM_{2.5}$ = particulate matter with a diameter of less than 2.5 micrometers; PM_{10} = particulate matter with a diameter of less than 10 micrometers; SO_2 = sulfur dioxide; USEPA = United States Environmental Protection Agency; VOC = volatile organic compound

Each state is required to develop a SIP that sets forth how CAA provisions will be imposed within the state. The SIP is the primary means for the implementation, maintenance, and enforcement of the measures needed to attain and maintain the NAAQS within each state and includes control measures, emissions limitations, and other provisions required to attain and maintain the ambient air quality standards. The purpose of the SIP is twofold. First, it must provide a control strategy that will result in the attainment and maintenance of the NAAQS. Second, it must demonstrate that progress is being made in attaining the standards in each nonattainment area.

In attainment areas, major new or modified stationary sources of air emissions on and in the area are subject to Prevention of Significant Deterioration (PSD) review to ensure that these sources are constructed without causing significant adverse deterioration of the clean air in the area. A major new source is defined as one that has the potential to emit any pollutant regulated under the CAA in amounts equal to or exceeding specific major source thresholds; that is, 100 or 250 tons/year based on the source's industrial category. These thresholds are applicable to stationary sources. A major modification is a physical change or change in the method of operation at an existing major source that causes a significant "net emissions increase" at that source of any regulated pollutant. **Table C-3** provides a tabular listing of the PSD significant emissions rate thresholds for selected criteria pollutants (USEPA, 1990). Air quality modeling analysis for a PSD proposed facility is required to demonstrate that its emissions of specific pollutants will not cause or significantly contribute to a violation of any ambient air quality standard.

Table C-3
Criteria Pollutant Significant Emissions Rate Increases Under Prevention of Significant Deterioration Regulations

Pollutant	Significant Emission Rate (ton/year)
PM_{10}	15
$PM_{2.5}$	10
TSP	25
SO_2	40
NO_x	40
Ozone (VOCs)	40
CO	100

Source: Title 40 Code of Federal Regulations Part 52 Subpart A, § 52.21

Notes:
CO = carbon monoxide; NO_x = nitrogen oxide; $PM_{2.5}$ = particulate matter with a diameter of less than 2.5 micrometers; PM_{10} = particulate matter with a diameter of less than 10 micrometers; SO_2 = sulfur dioxide; TCP = total suspended particulate; VOC = volatile organic compound

The goals of the PSD program are to (1) ensure economic growth while preserving existing air quality; (2) protect public health and welfare from adverse effects that might occur even at pollutant levels better than the NAAQS; and (3) preserve, protect, and enhance the air quality in areas of special natural recreational, scenic, or historic value, such as national parks and wilderness areas. Sources subject to PSD review are required by the CAA to obtain a permit before commencing construction. The permit process requires an extensive review of all other major sources within a 50-mile radius and all Class I areas within a 62-mile radius of the facility. Emissions from any new or modified source must be controlled using Best Available Control Technology. The air quality, in combination with other PSD sources in the area, must not exceed the maximum allowable incremental increase identified in **Table C-4**. National parks and wilderness areas are designated as Class I areas, where any appreciable deterioration in air quality is considered significant. Class II areas are those where moderate, well-controlled industrial growth could be permitted. Class III areas allow for greater industrial development. There are no Class I areas near Holloman Air Force Base (AFB); however, the Talon Low MOA is located close to two Class 1 Areas: Carlsbad Caverns National Park and Guadalupe Mountains National Park. These areas are given special air quality and visibility protection under the CAA.

The Air Quality Monitoring Program monitors ambient air throughout the state. The purpose is to monitor, assess, and provide information on statewide ambient air quality conditions and trends as specified by the state and federal CAA. The Air Quality Monitoring Program works in conjunction with local air pollution agencies and some industries, measuring air quality throughout the states.

The air quality monitoring network is used to identify areas where the ambient air quality standards are being violated and plans are needed to reduce pollutant concentration levels to be in attainment with the standards. Also included are areas where the ambient standards are being met, but plans are necessary to ensure maintenance of acceptable levels of air quality in the face of anticipated population or industrial growth.

The USEPA has specific requirements for a minimum number of monitoring sites, known as National Air Monitoring Sites. New Mexico has augmented these with additional sites with ambient air monitors to provide additional air quality data for NMED needs. Locations of these monitoring sites are determined by factors such as emissions sources, population density, permitting needs, modeling results, and site accessibility.

Table C-4
Federal Allowable Pollutant Concentration Increases Under Prevention of Significant Deterioration Regulations

Pollutant	Averaging Time	Maximum Allowable Concentration (μg/m^3)		
		Class I	Class II	Class III
$PM_{2.5}$	Annual	1	4	8
	24-hour	2	9	18
PM_{10}	Annual	4	17	34
	24-hour	8	30	60
SO_2	Annual	2	20	40
	24-hour	5	91	182
	3-hour	25	512	700
NO_2	Annual	2.5	25	50

Source: Title 40 Code of Federal Regulations Part 52 Subpart A, § 52.21

Notes:
μg/m^3 = microgram(s) per cubic meter; NO_2 = nitrogen dioxide; $PM_{2.5}$ = particulate matter with a diameter of less than 2.5 micrometers; PM_{10} = particulate matter with a diameter of less than 10 micrometers; SO_2 = sulfur dioxide

The result of this attainment/maintenance analysis is the development of local and statewide strategies for controlling emissions of criteria air pollutants from stationary and mobile sources. The first step in this process is the annual compilation of the ambient air monitoring results, and the second step is the analysis of the monitoring data for general air quality, exceedances of air quality standards, and pollutant trends.

C.1.2 Assumptions

The following are assumptions were used in the air quality analysis for the proposed and alternative actions:

1. No construction activities would be associated with Alternatives 1 or 2. This includes no demolition, earth moving, hauling, or paving. Some minor interior building fabrication possible but affected square footage is too small to result in outdoor air quality impacts.
2. No installation of new boilers or generators is assumed.
3. No new storage tanks would be installed; additional Jet A fuel needed by contract aircraft will be calculated based on engine type, number of sorties, and engine fuel consumption rate. Emissions of volatile organic compounds are based on the additional fuel handled using the emission estimated procedures in *AP-42*, Section 7.1.3 that have been incorporated into ACAM.
4. Air Force personnel would deliver fuel to the contractor at the airfield using tank trucks. Gas and diesel/Jet A fuel for the contractor's aerospace ground equipment (AGE) and flight line special purpose vehicles would be obtained by contract ADAIR personnel from Air Force personnel.
5. Assume chaff and flares to be used by contractor would be stored using current facilities (assumed additional/new storage facilities not needed).
6. No new Hush House/Engine Test Cell facilities would be installed, and existing Hush House/Engine Test Cell facilities would not be used for ADAIR contractor aircraft.
7. No new paint booth facilities would be installed, and existing paint booths would not be used for ADAIR contract aircraft.
8. Contractor may bring their own parts cleaner (or share already installed unit unknown at this time) - for either case, it is assumed contractor use would be minimal (no more than 0.5 gallon/month solvent used/lost).
9. Maintenance for contractor aircraft would be limited to minor repairs and minor routine maintenance/inspections (significant repairs, schedule/phased maintenance, and inspections to be conducted off site).

10. For the purposes of modeling, ADAIR targeted performance is assumed to start in July 2020 with 10-year contract.
11. Contractor aircraft takeoff and landing cycles – use/assume Air Conformity Applicability Model (ACAM) default "times in mode" to be conservative. Power mode type (climb out/intermediate) in airspace for ADAIR sorties was based on guidance from the Air Force Civil Engineer Center subject matter experts.
12. Assume once an aircraft is out of the landing and take-off (LTO) cycle the time (5 to 10 minutes) spent traveling to/from the special use airspace is at an altitude above 3,000 feet (ft).
13. Assume mixing height is 3,000 ft above ground level (AGL) (this matches USEPA and Air Force Guidance).
14. Air Force training sorties would not increase as result of this action. Roles may change (i.e., the Air Force no longer need to play the adversary, but this will not change in any substantial way the number of Air Force sorties flown); thus, the change (increase) in emissions for AOPS will be strictly due to the addition of the contract ADAIR aircraft and associated ground and maintenance activities.
15. Air Force use of engine test cells/hush house would not change as a result of the Proposed Action. No changes to Air Force trim tests also assumed.
16. For the low emission scenario represented by the F-5 aircraft there are two potential engine types. We have assumed J85-GE-13 for the engine model.
17. For contactor aerospace ground equipment auxiliary power units, until the contractor is selected, what they would bring/use in terms of equipment is unknown; thus, ACAM defaults will be used based on the surrogate aircraft and engine type.
18. Assume contract aircraft would engage in LTO cycles, and touch and go or low approach activities only in the vicinity of the airfield.
19. Assume 5 percent of on-airfield daytime sorties (3,040) will include multiple patterns for contractor proficiency.
20. It is unknown what contractor requirements would be for trim tests; thus, ACAM defaults will be assumed based on surrogate aircraft and engine type.
21. Assume all new ADAIR contractor personnel (pilots and maintenance staff) would live in the nearby community and will commute to the base 5 days per week. Will use ACAM defaults for commute distances.
22. All ADAIR training sorties would utilize chaff and flare. Only RR-188 chaff and M206 flares would be utilized (no other materials will be considered in the analysis).
23. Assume air quality impacts from chaff releases under actual flight conditions would be low and would have negligible impact on the particulate matter with a diameter of less than 10 and 2.5 micrometers NAAQS (Air Force, 1997); thus, only the use of flares and impulse cartridges (if applicable) used at or below 3,000 ft will be considered in the air quality analysis, if signficant. Flares used above 3,000 ft would disperse and not affect air quality in the lowest 3,000 ft AGL.
24. All ADAIR related training at Holloman AFB would occur in the special use airspace as described in **Chapter 1**.
25. For the low emission sceniario, the aircraft type is the F-5 with engine model J85-GE-13.
26. For the medium air emission scenario, the surrogate for the T-59 Hawk is the A-10A with engine model TF34-GE-100.
27. For the high air emission scenario, the surrogate for the A-4K is the A4-F with engine model J52-P-8B.
28. Estimated amount of time each ADAIR contract aircraft would spend within the special use airspace at or below 3,000 ft AGL is proportioned based on percent time spent between 500 to 4,000 ft. Assuming an average mission time of 40 minutes, the time spent at or below 3,000 ft AGL would be 18.7 minutes (see **Table C-5**).
29. ACAM does not have separate inputs for time spent within a Military Operations Area (MOA) or restricted areas. To represent the time spent within a MOA or restricted area, the expected flight time at or below 3,000 ft (18.7 minutes) was assigned to climb out/intermediate power mode within the ACAM LTO input fields. No time was assigned to any other power modes, but default ACAM output also lists Trim Tests and touch and gos (TGOs); however, all inputs for these fields were set to zero (see **Table C-6**).
30. Assume time spent below 3,000 ft is the same for all sorties.

31. No changes to large force exercise baseline due to the addition of the proposed contract ADAIR.
32. No increases to baseline Air Force Aircraft AOPS (sorties) due to contract ADAIR.
33. No/little changes to transit and civilian AOPS due to contract ADAIR.
34. **Tables C-5** and **C-6** below show the data and assumptions used as input to ACAM for flight operations.

Table C-5
Airspace Assumptions and Air Conformity Applicability Model Data Inputs

MOAs/Restricted Areas	Percent of Total Sorties	No. of Sorties in MOAs or Restricted Areas[1]	Mission Altitude	Total Mission Time (minutes) ≤3,000 ft AGL	Power Mode[3]
WSMR Restricted Areas (R-5107 and R-5111)	56	1,761	Surface to Unlimited	18.7[2]	Intermediate/ Climb out
Beak MOAs	33	1,038	12,500 ft MSL to, but not including, FL180	0	N/A
Talon MOA High East/West	6	196	12,500 ft MSL to, but not including, FL180	0	N/A
Talon MOA Low[B]	4	118	300 ft AGL to, but not including, 12,500 ft MSL	18.7[2]	Intermediate/ Climb out
McGregor Range Restricted Areas (R-5103B and C)	1	31	Surface to Unlimited[3]	18.7[2]	Intermediate/ Climb out

Notes:
[1] Based on 3,144 Total Sorties in MOAs/restricted areas.
[2] Based on 40 minutes per sortie and proportioned based on percent of time spent between 500 to 5,000 ft
Minutes @ 500 to 4,000 ft = 40 minutes * 60 percent (percent time in altitude range) = 24 minutes
Minutes @ 500 to 3,000 ft = 24 minutes - (24 minutes * 1000 ft/4,500 ft) = 18.7 minutes
[3] ACAM does not have separate inputs for time spent within a MOA. To represent the time spent within a MOA, the expected flight time at or below 3,000 ft (18.7 minutes) was assigned to Intermediate/Climb out power mode within the ACAM LTO input fields. No time was assigned to any other power modes.

ACAM = Air Conformity Applicability Model; ADAIR = adversary air; AGL = above ground level; ASL = above sea level; CAF = Combat Air Forces; DOPAA = Description of Proposed Action and Alternatives; EIS = Environmental Impact Statement; FL = flight level (vertical altitude expressed in hundreds of feet); ft = feet; LTO = landing and take-off; MOA = Military Operations Area; N/A = not applicable; NEPA = National Environmental Policy Act

Table C-6
Times in Mode[1] (minutes) for Aircraft Operations

Type of Operation	Number of Sorties	Taxi/ Idle (out)	Take-off (Military and/or Afterburn	Climb Out	Approach	Taxi/ Idle (in)
LTO	3,200	18.5	0.4	0.8	3.5	11.3
TGO[2]	456	-	-	0.8	3.5	-

Notes:
[1] Given time in mode applicable to all emission scenarios (High, Medium, and Low)
[2] 5 percent of on-airfield daytime sorties (3,040) are expected to include multiple patterns for contractor proficiency. Each of those 5 percent sorties is assumed to include three TGO/low approaches.

LTO = landing and take-off; TGO = touch and go

C.1.3 Regulatory Comparisons

The CAA Section 176(c), General Conformity, requires federal agencies to demonstrate that their proposed activities would conform to the applicable SIP for attainment of the NAAQS. General conformity applies only to nonattainment and maintenance areas. If the emissions from a federal action proposed in a nonattainment area exceed annual *de minimis* thresholds identified in the rule, a formal conformity determination is required of that action. The thresholds are more restrictive as the severity of the nonattainment status of the region increases. The Council on Environmental Quality (CEQ) defines significance in terms of context and intensity in 40 CFR § 1508.27. This requires that the significance of the action be analyzed with respect to the setting of the proposed action and based relative to the severity of the impact. The CEQ NEPA regulations (40 CFR § 1508.27[b]) provide 10 key factors to consider in determining an impact's intensity.

Emissions from the proposed action in the vicinity of the Holloman AFB were assessed in **Chapter 4** and compared to regional emissions and the applicable regulatory thresholds. An overview of ACAM inputs and the methodologies used to estimate emissions are summarized in **Appendix C-2** of this Air Quality summary report.

C.2 References

USEPA. 1990. Office of Air Quality Planning and Standards. *Draft New Source Review Workshop Manual: Prevention of Significant Deterioration and Nonattainment Permitting.* October.

USEPA. 2010. *40 CFR Parts 51 and 93, Revisions to the General Conformity Regulations*. 75 Federal Register 14283, EPA-HQ-OAR-2006-0669; FRL-9131-7. 24 March.

USEPA. 2016. *NAAQS Table*. <https://www.epa.gov/criteria-air-pollutants/naaqs-table>. 20 December.

USEPA. 2017. *General Conformity: De Minimis Tables*. <https://www.epa.gov/general-conformity/de-minimis-tables>. 04 August.

USEPA. 2020. *NAAQS Table*. <https://www.epa.gov/ground-level-ozone-pollution/table-historical-ozone-national-ambient-air-quality-standards-naaqs>. 16 April.

Appendix C-2

Detailed Air Conformity Applicability Model Report
(Holloman Air Force Base – Airfield Operations – High Scenario)

(For General Conformity Applicability Determination and National Environmental Policy Act Air Quality Assessment)

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1. General Information

- Action Location

Base: HOLLOMAN AFB
State: New Mexico
County(s): Otero
Regulatory Area(s): NOT IN A REGULATORY AREA

- Action Title: Holloman AFB, New Mexico - Combat Air Forces Adversary Air

- Project Number/s (if applicable): N/A

- Projected Action Start Date: 7 / 2020

- Action Purpose and Need:

The purpose of the Proposed Action is to provide dedicated contract ADAIR sorties to improve the quality of training and readiness of pilots of the 49 WG located at Holloman AFB. Contract ADAIR support would employ adversary tactics across the training spectrum from basic fighter maneuvers to higher-end, advanced, simulated, combat training missions. The objective of the Proposed Action at Holloman AFB is to increase the quality of training for F-16 pilots by providing dedicated, realistic adversary threat aircraft during syllabus training missions. Dedicated contract ADAIR would also allow the unit to free up resources used to self-generate ADAIR and more effectively use those available flying hours.

The need for the action is to provide better and more realistic training for the F-16 flight training program at Holloman AFB. Dedicated contract ADAIR is critical to improving pilot readiness as it provides realistic training opportunities to employ CAF tactics and procedures that optimize the training value of every mission.

- Action Description:

Alternative 1 – Establish contract ADAIR capabilities (an estimated 12 aircraft) providing 3,200 annual training sorties at Holloman AFB with 3,144 sorties in the WSMR and McGregor Range Restricted Area and Beak and Talon MOAs. Operations and AMU activities would be consolidated in Building 578, and aircraft parking would be located adjacent to Building 578.
Alternative 2 – Establish contract ADAIR capabilities (an estimated 12 aircraft) providing 3,200 annual training sorties at Holloman AFB with 3,144 sorties in the WSMR and McGregor Range Restricted Area and Beak and Talon MOAs. Operations would be located in Building 1062 in shared space with the F-16 FTU squadrons. The AMU would be located in Building 578, and aircraft would be located adjacent to Building 578. No MILCON is anticipated for this action.

Airfield and airspace flight operations are identical for all alternatives. In addition, ground support operations are the same for both alternatives and construction activities are negligible.

- Point of Contact

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- Activity List:

Activity Type		Activity Title
2.	Aircraft	Airfield Operations
3.	Personnel	Workday Commute
4.	Degreaser	Minor Parts Cleaning-ADAIR Contractor Aircraft
5.	Tanks	Jet A Storage

Emission factors and air emission estimating methods come from the United States Air Force's Air Emissions Guide for Air Force Stationary Sources, Air Emissions Guide for Air Force Mobile Sources, and Air Emissions Guide for Air Force Transitory Sources.

2. Aircraft

2.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Otero
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Airfield Operations

- Activity Description:
Contract ADAIR ground operations, sorties, and proficiency training in vicinity of the airfield - High Emission Scenario: Aircraft A-4F, J52-P-8B Engine (Surrogate engine type for A4-K). ACAM default time in mode used.

- Activity Start Date
Start Month: 7
Start Year: 2020

- Activity End Date
Indefinite: No
End Month: 6
End Year: 2030

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	340.285250
SO_x	26.360393
NO_x	251.688813
CO	505.908271
PM 10	19.118073

Pollutant	Total Emissions (TONs)
PM 2.5	18.378990
Pb	0.000000
NH_3	0.000000
CO_2e	54184.7

- Activity Emissions [Flight Operations (includes Trim Test & APU) part]:

Pollutant	Total Emissions (TONs)
VOC	283.622829
SO_x	14.946240
NO_x	88.640614
CO	406.483663
PM 10	2.310156

Pollutant	Total Emissions (TONs)
PM 2.5	2.073729
Pb	0.000000
NH_3	0.000000
CO_2e	45600.1

- Activity Emissions [Aerospace Ground Equipment (AGE) part]:

Pollutant	Total Emissions (TONs)
VOC	56.662421
SO_x	11.414152
NO_x	163.048198
CO	99.424608
PM 10	16.807916

Pollutant	Total Emissions (TONs)
PM 2.5	16.305261
Pb	0.000000
NH_3	0.000000
CO_2e	8584.6

2.2 Aircraft & Engines

2.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine
Aircraft Designation: A-4F
Engine Model: J52-P-8B
Primary Function: Combat
Number of Engines: 1

- Aircraft & Engine Surrogate
Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

2.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Emissions Factors (lb/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CO_2e
Idle	680.00	48.53	1.06	1.79	63.78	0.18	0.16	3234
Approach	2300.00	1.98	1.06	6.34	10.54	0.18	0.16	3234
Intermediate	4320.00	0.67	1.06	10.10	3.00	0.13	0.12	3234
Military	7370.00	1.07	1.06	13.05	0.71	0.13	0.12	3234
After Burn	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3234

2.3 Flight Operations

2.3.1 Flight Operations Assumptions

- Flight Operations
Number of Aircraft: 12
Number of Annual LTOs (Landing and Take-off) cycles for all Aircraft: 3200
Number of Annual TGOs (Touch-and-Go) cycles for all Aircraft: 456
Number of Annual Trim Test(s) per Aircraft: 24

- Default Settings Used: Yes

- Flight Operations TIMs (Time In Mode)
Taxi/Idle Out [Idle] (mins): 18.5 (default)
Takeoff [Military and/or After Burn] (mins): 0.4 (default)
Climb Out [Intermediate] (mins): 0.8 (default)
Approach [Approach] (mins): 3.5 (default)
Taxi/Idle In [Idle] (mins): 11.3 (default)

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner.

- Trim Test
Idle (mins): 12 (default)
Approach (mins): 27 (default)
Intermediate (mins): 9 (default)
Military (mins): 12 (default)
AfterBurn (mins): 0 (default)

2.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for LTOs per Year

AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * LTO / 2000

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)
TIM: Time in Mode (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
LTO: Number of Landing and Take-off Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for LTOs per Year

AE_{LTO} = AEM_{IDLE_IN} + AEM_{IDLE_OUT} + $AEM_{APPROACH}$ + $AEM_{CLIMBOUT}$ + $AEM_{TAKEOFF}$

AE_{LTO}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for TGOs per Year

AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * TGO / 2000

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)
TIM: Time in Mode (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
TGO: Number of Touch-and-Go Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for TGOs per Year

AE_{TGO} = $AEM_{APPROACH}$ + $AEM_{CLIMBOUT}$ + $AEM_{TAKEOFF}$

AE_{TGO}: Aircraft Emissions (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$AEPS_{POL}$ = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines

NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year
$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

2.4 Auxiliary Power Unit (APU)

2.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: Yes

- Auxiliary Power Unit (APU) (default)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

2.4.2 Auxiliary Power Unit (APU) Emission Factor(s)

- Auxiliary Power Unit (APU) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CO_2e

2.4.3 Auxiliary Power Unit (APU) Formula(s)

- Auxiliary Power Unit (APU) Emissions per Year
$APU_{POL} = APU * OH * LTO * EF_{POL} / 2000$

APU_{POL}: Auxiliary Power Unit (APU) Emissions per Pollutant (TONs)
APU: Number of Auxiliary Power Units
OH: Operation Hours for Each LTO (hour)
LTO: Number of LTOs
EF_{POL}: Emission Factor for Pollutant (lb/hr)
2000: Conversion Factor pounds to tons

2.5 Aerospace Ground Equipment (AGE)

2.5.1 Aerospace Ground Equipment (AGE) Assumptions

- Default Settings Used: Yes

- AGE Usage
Number of Annual LTO (Landing and Take-off) cycles for AGE: 3200

- Aerospace Ground Equipment (AGE) (default)

Total Number of AGE	Operation Hours for Each LTO	Exempt Source?	AGE Type	Designation
1	0.33	No	Air Compressor	MC-1A - 18.4hp
1	1	No	Bomb Lift	MJ-1B
1	0.33	No	Generator Set	A/M32A-86D
1	0.5	No	Heater	H1
1	0.5	No	Hydraulic Test Stand	MJ-2/TTU-228 - 130hp
1	8	No	Light Cart	NF-2
1	0.33	No	Start Cart	A/M32A-60A

2.5.2 Aerospace Ground Equipment (AGE) Emission Factor(s)

- Aerospace Ground Equipment (AGE) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CO_2e
MC-1A - 18.4hp	1.1	0.267	0.008	0.419	0.267	0.071	0.068	24.8
MJ-1B	0.0	3.040	0.219	4.780	3.040	0.800	0.776	141.2
A/M32A-86D	6.5	0.294	0.046	6.102	0.457	0.091	0.089	147.0
H1	0.4	0.100	0.011	0.160	0.180	0.006	0.006	8.9
MJ-2/TTU-228 - 130hp	7.4	0.195	0.053	3.396	0.794	0.089	0.086	168.8
NF-2	0.0	0.010	0.043	0.110	0.080	0.010	0.010	22.1
A/M32A-60A	0.0	0.270	0.306	1.820	5.480	0.211	0.205	221.1

2.5.3 Aerospace Ground Equipment (AGE) Formula(s)

- Aerospace Ground Equipment (AGE) Emissions per Year
$AGE_{POL} = AGE * OH * LTO * EF_{POL} / 2000$

AGE_{POL}: Aerospace Ground Equipment (AGE) Emissions per Pollutant (TONs)
AGE: Total Number of Aerospace Ground Equipment
OH: Operation Hours for Each LTO (hour)
LTO: Number of LTOs
EF_{POL}: Emission Factor for Pollutant (lb/hr)
2000: Conversion Factor pounds to tons

3. Personnel

3.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Otero
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Workday Commute

- Activity Description:
ADAIR Contractor Personnel Commute from off-base (78 Maintenance Personnel & 15 Pilots)

- Activity Start Date
Start Month: 7
Start Year: 2020

- Activity End Date
Indefinite: No
End Month: 6
End Year: 2030

- Activity Emissions:

Pollutant	Total Emissions (TONs)	Pollutant	Total Emissions (TONs)
VOC	2.101255	PM 2.5	0.040141
SO_x	0.014004	Pb	0.000000
NO_x	1.912833	NH_3	0.128903
CO	23.361264	CO_2e	2006.2
PM 10	0.045775		

3.2 Personnel Assumptions

- Number of Personnel
Active Duty Personnel: 0
Civilian Personnel: 0
Support Contractor Personnel: 93
Air National Guard (ANG) Personnel: 0
Reserve Personnel: 0

- Default Settings Used: Yes

- Average Personnel Round Trip Commute (mile): 20 (default)

- Personnel Work Schedule
Active Duty Personnel: 5 Days Per Week (default)
Civilian Personnel: 5 Days Per Week (default)
Support Contractor Personnel: 5 Days Per Week (default)
Air National Guard (ANG) Personnel: 4 Days Per Week (default)
Reserve Personnel: 4 Days Per Month (default)

3.3 Personnel On Road Vehicle Mixture

- On Road Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	37.55	60.32	0	0.03	0.2	0	1.9
GOVs	54.49	37.73	4.67	0	0	3.11	0

3.4 Personnel Emission Factor(s)

- On Road Vehicle Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.309	000.002	000.239	003.421	000.007	000.006		000.023	00318.896
LDGT	000.374	000.003	000.418	004.700	000.009	000.008		000.024	00411.188
HDGV	000.696	000.005	001.076	015.187	000.021	000.019		000.044	00758.535
LDDV	000.115	000.003	000.139	002.492	000.004	000.004		000.008	00309.094
LDDT	000.250	000.004	000.394	004.238	000.007	000.006		000.008	00438.938
HDDV	000.572	000.013	005.669	001.917	000.170	000.156		000.030	01506.304
MC	002.734	000.003	000.845	013.302	000.027	000.023		000.055	00396.858

3.5 Personnel Formula(s)

- Personnel Vehicle Miles Travel for Work Days per Year
$VMT_P = NP * WD * AC$

VMT_P: Personnel Vehicle Miles Travel (miles/year)
NP: Number of Personnel
WD: Work Days per Year
AC: Average Commute (miles)

- Total Vehicle Miles Travel per Year
$VMT_{Total} = VMT_{AD} + VMT_C + VMT_{SC} + VMT_{ANG} + VMT_{AFRC}$

VMT_{Total}: Total Vehicle Miles Travel (miles)
VMT_{AD}: Active Duty Personnel Vehicle Miles Travel (miles)
VMT_C: Civilian Personnel Vehicle Miles Travel (miles)
VMT_{SC}: Support Contractor Personnel Vehicle Miles Travel (miles)
VMT_{ANG}: Air National Guard Personnel Vehicle Miles Travel (miles)
VMT_{AFRC}: Reserve Personnel Vehicle Miles Travel (miles)

- Vehicle Emissions per Year
$V_{POL} = (VMT_{Total} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{Total}: Total Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Personnel On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

4. Degreaser

4.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Otero
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Minor Parts Cleaning-ADAIR Contractor Aircraft

- Activity Description:
Small Parts Cleaning (assume 0.5 gallon/month consumed). Major repairs and maintenance done off-site.

- Activity Start Date
Start Month: 7
Start Year: 2020

- Activity End Date
Indefinite: No
End Month: 6
End Year: 2030

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.195390
SO_x	0.000000
NO_x	0.000000
CO	0.000000
PM 10	0.000000

Pollutant	Total Emissions (TONs)
PM 2.5	0.000000
Pb	0.000000
NH_3	0.000000
CO_2e	0.0

4.2 Degreaser Assumptions

- Degreaser
Net solvent usage (total less recycle) (gallons/year): 6

- Default Settings Used: Yes

- Degreaser Consumption
Solvent used: Mineral Spirits CAS#64475-85-0 (default)
Specific gravity of solvent: 0.78 (default)
Solvent VOC content (%): 100 (default)
Efficiency of control device (%): 0 (default)

4.3 Degreaser Formula(s)

- Degreaser Emissions per Year
DE_{VOC}= (VOC / 100) * NS * SG * 8.35 * (1 - (CD / 100)) / 2000

DE_{VOC}: Degreaser VOC Emissions (TONs per Year)
VOC: Solvent VOC content (%)
(VOC / 100): Conversion Factor percent to decimal
NS: Net solvent usage (total less recycle) (gallons/year)
SG: Specific gravity of solvent
8.35: Conversion Factor the density of water
CD: Efficiency of control device (%)
(1 - (CD / 100)): Conversion Factor percent to decimal (Not effected by control device)
2000: Conversion Factor pounds to tons

5. Tanks

5.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Otero
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Jet A Storage

- Activity Description:
1,050,000 K AST. Accounts for additional fuel throughput due to contract ADAIR sorties. Fuel use estimated based on number of sorties and time in mode. Includes fuel used in MOAs and in the vicinity of the airfield.

Approx. Throughput Calculation: An F-16 aircraft requires about 1,200 gallons of JET-A per sortie. At 3,200 extra sorties, this amounts to an additional 3,840,000 gal per year.

- Activity Start Date
Start Month: 7
Start Year: 2020

- Activity End Date
Indefinite: No
End Month: 6
End Year: 2030

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	5.550700
SO_x	0.000000
NO_x	0.000000
CO	0.000000
PM 10	0.000000

Pollutant	Total Emissions (TONs)
PM 2.5	0.000000
Pb	0.000000
NH_3	0.000000
CO_2e	0.0

5.2 Tanks Assumptions

- Chemical
Chemical Name: Jet kerosene (JP-5, JP-8 or Jet-A)
Chemical Category: Petroleum Distillates
Chemical Density: 7
Vapor Molecular Weight (lb/lb-mole): 130
Stock Vapor Density (lb/ft^3): 0.000170775135930213
Vapor Pressure: 0.00725
Vapor Space Expansion Factor (dimensionless): 0.068

- Tank
Type of Tank: Vertical Tank
Tank Height (ft): 50
Tank Diameter (ft): 63
Annual Net Throughput (gallon/year): 3800000

5.3 Tank Formula(s)

- Vapor Space Volume
VSV = (PI / 4) * D^2 * H / 2

VSV: Vapor Space Volume (ft^3)
PI: PI Math Constant
D^2: Tank Diameter (ft)
H: Tank Height (ft)
2: Convertion Factor (Vapor Space Volume is assumed to be one-half of the tank volume)

- Vented Vapor Saturation Factor
VVSF = 1 / (1 + (0.053 * VP * H / 2))

VVSF: Vented Vapor Saturation Factor (dimensionless)
0.053: Constant
VP: Vapor Pressure (psia)
H: Tank Height (ft)

- Standing Storage Loss per Year

SSL_{VOC} = 365 * VSV * SVD * VSEF * VVSF / 2000

SSL_{VOC}: Standing Storage Loss Emissions (TONs)
365: Number of Daily Events in a Year (Constant)
VSV: Vapor Space Volume (ft^3)
SVD: Stock Vapor Density (lb/ft^3)
VSEF: Vapor Space Expansion Factor (dimensionless)
VVSF: Vented Vapor Saturation Factor (dimensionless)
2000: Conversion Factor pounds to tons

- Number of Turnovers per Year

NT = (7.48 * ANT) / ((PI / 4.0) * D * H)

NT: Number of Turnovers per Year
7.48: Constant
ANT: Annual Net Throughput
PI: PI Math Constant
D^2: Tank Diameter (ft)
H: Tank Height (ft)

- Working Loss Turnover (Saturation) Factor per Year

WLSF = (18 + NT) / (6 * NT)

WLSF: Working Loss Turnover (Saturation) Factor per Year
18: Constant
NT: Number of Turnovers per Year
6: Constant

- Working Loss per Year

WL_{VOC} = 0.0010 * VMW * VP * ANT * WLSF / 2000

0.0010: Constant
VMW: Vapor Molecular Weight (lb/lb-mole)
VP: Vapor Pressure (psia)
ANT: Annual Net Throughput
WLSF: Working Loss Turnover (Saturation) Factor
2000: Conversion Factor pounds to tons

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Appendix C-3

Summary Air Conformity Applicability Model Reports
Record of Air Analysis (ROAA)

(For General Conformity Applicability Determination and National Environmental Policy Act Air Quality Assessment)

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HOLLOMAN AIR FORCE BASE LOW SCENARIO SUMMARY

1. General Information: The Air Force's Air Conformity Applicability Model (ACAM) was used to perform an analysis to assess the potential air quality impact/s associated with the action in accordance with the Air Force Instruction 32-7040, Air Quality Compliance And Resource Management; the Environmental Impact Analysis Process (EIAP, 32 CFR Part 989); and the General Conformity Rule (GCR, 40 CFR Part 93 Subpart B). This report provides a summary of the ACAM analysis.

a. Action Location:
Base: HOLLOMAN AFB
State: New Mexico
County(s): Otero
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: Holloman AFB, New Mexico - Combat Air Force Adversary Air

c. Project Number/s (if applicable): N/A

d. Projected Action Start Date: 7 / 2020

e. Action Description:

Alternative 1 – Establish contract ADAIR capabilities (an estimated 12 aircraft) providing 3,200 annual training sorties at Holloman AFB with 3,144 sorties in the WSMR and McGregor Range Restricted Areas and Beak and Talon MOAs. Operations and AMU activities would be consolidated in Building 578, and aircraft parking would be located adjacent to Building 578.
Alternative 2 – Establish contract ADAIR capabilities (an estimated 12 aircraft) providing 3,200 annual training sorties at Holloman AFB with 3,144 sorties in the WSMR and McGregor Range Restricted Area and Beak and Talon MOAs. Operations would be located in Building 1062 in shared space with the F-16 FTU squadrons. The AMU would be located in Building 578, and aircraft would be located adjacent to Building 578. No MILCON is anticipated for this action.

Airfield and airspace flight operations are identical for all alternatives. In addition, ground support operations are the same for both alternatives and construction activities are negligible.

f. Point of Contact:
Name: Radhika Narayanan
Title: Environmental Scientist
Organization: Versar Inc.
Email: rnarayanan@versar.com
Phone Number: 301-358-5150

2. Air Impact Analysis: Based on the attainment status at the action location, the requirements of the General Conformity Rule are:

_____ applicable
__X__ not applicable

Total combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action fully implemented) emissions.

"Air Quality Indicators" were used to provide an indication of the significance of potential impacts to air quality. These air quality indicators are EPA General Conformity Rule (GCR) thresholds (*de minimis* levels) that are applied out of context to their intended use. Therefore, these indicators do not trigger a regulatory

requirement; however, they provide a warning that the action is potentially significant. It is important to note that these indicators only provide a clue to the potential impacts to air quality.

Given the GCR *de minimis* threshold values are the maximum net change an action can acceptably emit in non-attainment and maintenance areas, these threshold values would also conservatively indicate an actions emissions within an attainment would also be acceptable. An air quality indicator value of 100 tons/yr is used based on the GCR *de minimis* threshold for the least severe non-attainment classification for all criteria pollutants (see 40 CFR 93.153). Therefore, the worst-case year emissions were compared against the GCR Indicator and are summarized below.

Analysis Summary:

2020

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	20.715	100	No
NOx	9.949	100	No
CO	109.653	100	Yes
SOx	1.596	100	No
PM 10	0.849	100	No
PM 2.5	0.823	100	No
Pb	0.000	25	No
NH3	0.006	100	No
CO2e	3534.9		

2021

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	41.430	100	No
NOx	19.898	100	No
CO	219.305	100	Yes
SOx	3.193	100	No
PM 10	1.699	100	No
PM 2.5	1.647	100	No
Pb	0.000	25	No
NH3	0.013	100	No
CO2e	7069.7		

2022

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	41.430	100	No
NOx	19.898	100	No
CO	219.305	100	Yes
SOx	3.193	100	No
PM 10	1.699	100	No
PM 2.5	1.647	100	No
Pb	0.000	25	No
NH3	0.013	100	No
CO2e	7069.7		

2023

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	41.430	100	No
NOx	19.898	100	No
CO	219.305	100	Yes
SOx	3.193	100	No
PM 10	1.699	100	No
PM 2.5	1.647	100	No
Pb	0.000	25	No
NH3	0.013	100	No
CO2e	7069.7		

2024

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	41.430	100	No
NOx	19.898	100	No
CO	219.305	100	Yes
SOx	3.193	100	No
PM 10	1.699	100	No
PM 2.5	1.647	100	No
Pb	0.000	25	No
NH3	0.013	100	No
CO2e	7069.7		

2025

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	41.430	100	No
NOx	19.898	100	No
CO	219.305	100	Yes
SOx	3.193	100	No
PM 10	1.699	100	No
PM 2.5	1.647	100	No
Pb	0.000	25	No
NH3	0.013	100	No
CO2e	7069.7		

2026

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	41.430	100	No
NOx	19.898	100	No
CO	219.305	100	Yes
SOx	3.193	100	No
PM 10	1.699	100	No
PM 2.5	1.647	100	No
Pb	0.000	25	No
NH3	0.013	100	No
CO2e	7069.7		

2027

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	41.430	100	No
NOx	19.898	100	No
CO	219.305	100	Yes
SOx	3.193	100	No
PM 10	1.699	100	No
PM 2.5	1.647	100	No
Pb	0.000	25	No
NH3	0.013	100	No
CO2e	7069.7		

2028

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	41.430	100	No
NOx	19.898	100	No
CO	219.305	100	Yes
SOx	3.193	100	No
PM 10	1.699	100	No
PM 2.5	1.647	100	No
Pb	0.000	25	No
NH3	0.013	100	No
CO2e	7069.7		

2029

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	41.430	100	No
NOx	19.898	100	No
CO	219.305	100	Yes
SOx	3.193	100	No
PM 10	1.699	100	No
PM 2.5	1.647	100	No
Pb	0.000	25	No
NH3	0.013	100	No
CO2e	7069.7		

2030

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	20.715	100	No
NOx	9.949	100	No
CO	109.653	100	Yes
SOx	1.596	100	No
PM 10	0.849	100	No
PM 2.5	0.823	100	No
Pb	0.000	25	No
NH3	0.006	100	No
CO2e	3534.9		

2031 - (Steady State)

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.000	100	No
NOx	0.000	100	No
CO	0.000	100	No
SOx	0.000	100	No
PM 10	0.000	100	No
PM 2.5	0.000	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	0.0		

Some estimated emissions associated with this action are above the GCR indicators, indicating a significant impact to air quality; therefore, further air assessment is needed.

Radhika

_____11/15/2019___

Radhika Narayanan, Environmental Scientist DATE

HOLLOMAN AIR FORCE BASE MEDIUM SCENARIO SUMMARY

1. General Information: The Air Force's Air Conformity Applicability Model (ACAM) was used to perform an analysis to assess the potential air quality impact/s associated with the action in accordance with the Air Force Instruction 32-7040, Air Quality Compliance And Resource Management; the Environmental Impact Analysis Process (EIAP, 32 CFR Part 989); and the General Conformity Rule (GCR, 40 CFR Part 93 Subpart B). This report provides a summary of the ACAM analysis.

a. Action Location:
Base: HOLLOMAN AFB
State: New Mexico
County(s): Otero
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: Holloman AFB, New Mexico - Combat Air Force Adversary Air

c. Project Number/s (if applicable): N/A

d. Projected Action Start Date: 7 / 2020

e. Action Description:

Alternative 1 – Establish contract ADAIR capabilities (an estimated 12 aircraft) providing 3,200 annual training sorties at Holloman AFB with 3,144 sorties in the WSMR and McGregor Range Restricted Area and Beak and Talon MOAs. Operations and AMU activities would be consolidated in Building 578, and aircraft parking would be located adjacent to Building 578.
Alternative 2 – Establish contract ADAIR capabilities (an estimated 12 aircraft) providing 3,200 annual training sorties at Holloman AFB with 3,144 sorties in the WSMR and McGregor Range Restricted Area and Beak and Talon MOAs. Operations would be located in Building 1062 in shared space with the F-16 FTU squadrons. The AMU would be located in Building 578, and aircraft would be located adjacent to Building 578. No MILCON is anticipated for this action.

Airfield and airspace flight operations are identical for all alternatives. In addition, ground support operations are the same for both alternatives and construction activities are negligible.

f. Point of Contact:
Name: Radhika Narayanan
Title: Environmental Scientist
Organization: Versar Inc.
Email: rnarayanan@versar.com
Phone Number: 301-358-5150

2. Air Impact Analysis: Based on the attainment status at the action location, the requirements of the General Conformity Rule are:

_____ applicable
__X__ not applicable

Total combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action fully implemented) emissions.

"Air Quality Indicators" were used to provide an indication of the significance of potential impacts to air quality. These air quality indicators are EPA General Conformity Rule (GCR) thresholds (*de minimis* levels) that are applied out of context to their intended use. Therefore, these indicators do not trigger a regulatory

requirement; however, they provide a warning that the action is potentially significant. It is important to note that these indicators only provide a clue to the potential impacts to air quality.

Given the GCR *de minimis* threshold values are the maximum net change an action can acceptably emit in non-attainment and maintenance areas, these threshold values would also conservatively indicate an actions emissions within an attainment would also be acceptable. An air quality indicator value of 100 tons/yr is used based on the GCR *de minimis* threshold for the least severe non-attainment classification for all criteria pollutants (see 40 CFR 93.153). Therefore, the worst-case year emissions were compared against the GCR Indicator and are summarized below.

Analysis Summary:

2020

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	35.119	100	No
NOx	47.900	100	No
CO	71.855	100	No
SOx	3.025	100	No
PM 10	9.771	100	No
PM 2.5	7.285	100	No
Pb	0.000	25	No
NH3	0.006	100	No
CO2e	4314.4		

2021

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	70.238	100	No
NOx	95.800	100	No
CO	143.709	100	Yes
SOx	6.049	100	No
PM 10	19.542	100	No
PM 2.5	14.571	100	No
Pb	0.000	25	No
NH3	0.013	100	No
CO2e	8628.9		

2022

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	70.238	100	No
NOx	95.800	100	No
CO	143.709	100	Yes
SOx	6.049	100	No
PM 10	19.542	100	No
PM 2.5	14.571	100	No
Pb	0.000	25	No
NH3	0.013	100	No
CO2e	8628.9		

2023

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	70.238	100	No
NOx	95.800	100	No
CO	143.709	100	Yes
SOx	6.049	100	No
PM 10	19.542	100	No
PM 2.5	14.571	100	No
Pb	0.000	25	No
NH3	0.013	100	No
CO2e	8628.9		

2024

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	70.238	100	No
NOx	95.800	100	No
CO	143.709	100	Yes
SOx	6.049	100	No
PM 10	19.542	100	No
PM 2.5	14.571	100	No
Pb	0.000	25	No
NH3	0.013	100	No
CO2e	8628.9		

2025

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	70.238	100	No
NOx	95.800	100	No
CO	143.709	100	Yes
SOx	6.049	100	No
PM 10	19.542	100	No
PM 2.5	14.571	100	No
Pb	0.000	25	No
NH3	0.013	100	No
CO2e	8628.9		

2026

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	70.238	100	No
NOx	95.800	100	No
CO	143.709	100	Yes
SOx	6.049	100	No
PM 10	19.542	100	No
PM 2.5	14.571	100	No
Pb	0.000	25	No
NH3	0.013	100	No
CO2e	8628.9		

2027

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	70.238	100	No
NOx	95.800	100	No
CO	143.709	100	Yes
SOx	6.049	100	No
PM 10	19.542	100	No
PM 2.5	14.571	100	No
Pb	0.000	25	No
NH3	0.013	100	No
CO2e	8628.9		

2028

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	70.238	100	No
NOx	95.800	100	No
CO	143.709	100	Yes
SOx	6.049	100	No
PM 10	19.542	100	No
PM 2.5	14.571	100	No
Pb	0.000	25	No
NH3	0.013	100	No
CO2e	8628.9		

2029

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	70.238	100	No
NOx	95.800	100	No
CO	143.709	100	Yes
SOx	6.049	100	No
PM 10	19.542	100	No
PM 2.5	14.571	100	No
Pb	0.000	25	No
NH3	0.013	100	No
CO2e	8628.9		

2030

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	35.119	100	No
NOx	47.900	100	No
CO	71.855	100	No
SOx	3.025	100	No
PM 10	9.771	100	No
PM 2.5	7.285	100	No
Pb	0.000	25	No
NH3	0.006	100	No
CO2e	4314.4		

2031 - (Steady State)

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.000	100	No
NOx	0.000	100	No
CO	0.000	100	No
SOx	0.000	100	No
PM 10	0.000	100	No
PM 2.5	0.000	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	0.0		

Some estimated emissions associated with this action are above the GCR indicators, indicating a significant impact to air quality; therefore, further air assessment is needed.

Radhika

Radhika Narayanan, Environmental Scientist

11/15/2019
DATE

HOLLOMAN AIR FORCE BASE HIGH SCENARIO SUMMARY

1. General Information: The Air Force's Air Conformity Applicability Model (ACAM) was used to perform an analysis to assess the potential air quality impact/s associated with the action in accordance with the Air Force Instruction 32-7040, Air Quality Compliance And Resource Management; the Environmental Impact Analysis Process (EIAP, 32 CFR Part 989); and the General Conformity Rule (GCR, 40 CFR Part 93 Subpart B). This report provides a summary of the ACAM analysis.

a. Action Location:
Base: HOLLOMAN AFB
State: New Mexico
County(s): Otero
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: Holloman AFB, New Mexico - Combat Air Force Adversary Air

c. Project Number/s (if applicable): N/A

d. Projected Action Start Date: 7 / 2020

e. Action Description:

Alternative 1 – Establish contract ADAIR capabilities (an estimated 12 aircraft) providing 3,200 annual training sorties at Holloman AFB with 3,144 sorties in the WSMR and McGregor Range Restricted Area and Beak and Talon MOAs. Operations and AMU activities would be consolidated in Building 578, and aircraft parking would be located adjacent to Building 578.
Alternative 2 – Establish contract ADAIR capabilities (an estimated 12 aircraft) providing 3,200 annual training sorties at Holloman AFB with 3,144 sorties in the WSMR and McGregor Range Restricted Area and Beak and Talon MOAs. Operations would be located in Building 1062 in shared space with the F-16 FTU squadrons. The AMU would be located in Building 578, and aircraft would be located adjacent to Building 578. No MILCON is anticipated for this action.

Airfield and airspace flight operations are identical for all alternatives. In addition, ground support operations are the same for both alternatives and construction activities are negligible.

f. Point of Contact:
Name: Radhika Narayanan
Title: Environmental Scientist
Organization: Versar Inc.
Email: rnarayanan@versar.com
Phone Number: 301-358-5150

2. Air Impact Analysis: Based on the attainment status at the action location, the requirements of the General Conformity Rule are:

_____ applicable
__X__ not applicable

Total combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action fully implemented) emissions.

"Air Quality Indicators" were used to provide an indication of the significance of potential impacts to air quality. These air quality indicators are EPA General Conformity Rule (GCR) thresholds (*de minimis* levels) that are applied out of context to their intended use. Therefore, these indicators do not trigger a regulatory

requirement; however, they provide a warning that the action is potentially significant. It is important to note that these indicators only provide a clue to the potential impacts to air quality.

Given the GCR *de minimis* threshold values are the maximum net change an action can acceptably emit in non-attainment and maintenance areas, these threshold values would also conservatively indicate an actions emissions within an attainment would also be acceptable. An air quality indicator value of 100 tons/yr is used based on the GCR *de minimis* threshold for the least severe non-attainment classification for all criteria pollutants (see 40 CFR 93.153). Therefore, the worst-case year emissions were compared against the GCR Indicator and are summarized below.

Analysis Summary:

2020

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	17.407	100	No
NOx	12.680	100	No
CO	26.463	100	No
SOx	1.319	100	No
PM 10	0.958	100	No
PM 2.5	0.921	100	No
Pb	0.000	25	No
NH3	0.006	100	No
CO2e	2809.5		

2021

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	34.813	100	No
NOx	25.360	100	No
CO	52.927	100	No
SOx	2.637	100	No
PM 10	1.916	100	No
PM 2.5	1.842	100	No
Pb	0.000	25	No
NH3	0.013	100	No
CO2e	5619.1		

2022

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	34.813	100	No
NOx	25.360	100	No
CO	52.927	100	No
SOx	2.637	100	No
PM 10	1.916	100	No
PM 2.5	1.842	100	No
Pb	0.000	25	No
NH3	0.013	100	No
CO2e	5619.1		

2023

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	34.813	100	No
NOx	25.360	100	No
CO	52.927	100	No
SOx	2.637	100	No
PM 10	1.916	100	No
PM 2.5	1.842	100	No
Pb	0.000	25	No
NH3	0.013	100	No
CO2e	5619.1		

2024

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	34.813	100	No
NOx	25.360	100	No
CO	52.927	100	No
SOx	2.637	100	No
PM 10	1.916	100	No
PM 2.5	1.842	100	No
Pb	0.000	25	No
NH3	0.013	100	No
CO2e	5619.1		

2025

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	34.813	100	No
NOx	25.360	100	No
CO	52.927	100	No
SOx	2.637	100	No
PM 10	1.916	100	No
PM 2.5	1.842	100	No
Pb	0.000	25	No
NH3	0.013	100	No
CO2e	5619.1		

2026

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	34.813	100	No
NOx	25.360	100	No
CO	52.927	100	No
SOx	2.637	100	No
PM 10	1.916	100	No
PM 2.5	1.842	100	No
Pb	0.000	25	No
NH3	0.013	100	No
CO2e	5619.1		

2027

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	34.813	100	No
NOx	25.360	100	No
CO	52.927	100	No
SOx	2.637	100	No
PM 10	1.916	100	No
PM 2.5	1.842	100	No
Pb	0.000	25	No
NH3	0.013	100	No
CO2e	5619.1		

2028

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	34.813	100	No
NOx	25.360	100	No
CO	52.927	100	No
SOx	2.637	100	No
PM 10	1.916	100	No
PM 2.5	1.842	100	No
Pb	0.000	25	No
NH3	0.013	100	No
CO2e	5619.1		

2029

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	34.813	100	No
NOx	25.360	100	No
CO	52.927	100	No
SOx	2.637	100	No
PM 10	1.916	100	No
PM 2.5	1.842	100	No
Pb	0.000	25	No
NH3	0.013	100	No
CO2e	5619.1		

2030

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	17.407	100	No
NOx	12.680	100	No
CO	26.463	100	No
SOx	1.319	100	No
PM 10	0.958	100	No
PM 2.5	0.921	100	No
Pb	0.000	25	No
NH3	0.006	100	No
CO2e	2809.5		

2031 - (Steady State)

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.000	100	No
NOx	0.000	100	No
CO	0.000	100	No
SOx	0.000	100	No
PM 10	0.000	100	No
PM 2.5	0.000	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	0.0		

None of estimated emissions associated with this action are above the GCR indicators, indicating no significant impact to air quality; therefore, no further air assessment is needed.

Radhika

11/15/2019

Radhika Narayanan, Environmental Scientist — DATE

MCGREGOR RANGE RESTRICTED AREA LOW SCENARIO SUMMARY

1. General Information: The Air Force's Air Conformity Applicability Model (ACAM) was used to perform an analysis to assess the potential air quality impact/s associated with the action in accordance with the Air Force Instruction 32-7040, Air Quality Compliance And Resource Management; the Environmental Impact Analysis Process (EIAP, 32 CFR 989); and the General Conformity Rule (GCR, 40 CFR 93 Subpart B). This report provides a summary of the ACAM analysis.

a. Action Location:
Base: HOLLOMAN AFB
State: New Mexico
County(s): Otero
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: Holloman AFB, New Mexico - Combat Air Force Adversary Air

c. Project Number/s (if applicable): N/A

d. Projected Action Start Date: 7 / 2020

e. Action Description:

Alternative 1 – Establish contract ADAIR capabilities (an estimated 12 aircraft) providing 3,200 annual training sorties at Holloman AFB with 3,144 sorties in the WSMR and McGregor Range restricted airspace and Beak and Talon MOAs. Operations and AMU activities would be consolidated in Building 578, and aircraft parking would be located adjacent to Building 578.
Alternative 2 – Establish contract ADAIR capabilities (an estimated 12 aircraft) providing 3,200 annual training sorties at Holloman AFB with 3,144 sorties in the WSMR and McGregor Range restricted airspace and Beak and Talon MOAs. Operations would be located in Building 1062 in shared space with the F-16 FTU squadrons. The AMU would be located in Building 578, and aircraft would be located adjacent to Building 578. No MILCON is anticipated for this action.

Airfield and airspace flight operations are identical for all alternatives. In addition, ground support operations are the same for both alternatives and construction activities are negligible.

f. Point of Contact:
Name: Radhika Narayanan
Title: Environmental Scientist
Organization: Versar Inc.
Email: rnarayanan@versar.com
Phone Number: 301-358-5150

2. Air Impact Analysis: Based on the attainment status at the action location, the requirements of the General Conformity Rule are:

_____ applicable
__X__ not applicable

Total combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action fully implemented) emissions.

"Air Quality Indicators" were used to provide an indication of the significance of potential impacts to air quality. These air quality indicators are EPA General Conformity Rule (GCR) thresholds (de minimis levels) that are applied out of context to their intended use. Therefore, these indicators do not trigger a regulatory

requirement; however, they provide a warning that the action is potentially significant. It is important to note that these indicators only provide a clue to the potential impacts to air quality.

Given the GCR de minimis threshold values are the maximum net change an action can acceptably emit in non-attainment and maintenance areas, these threshold values would also conservatively indicate an actions emissions within an attainment would also be acceptable. An air quality indicator value of 100 tons/yr is used based on the GCR de minimis threshold for the least severe non-attainment classification for all criteria pollutants (see 40 CFR 93.153). Therefore, the worst-case year emissions were compared against the GCR Indicator and are summarized below.

Analysis Summary:

2020

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.043	100	No
NOx	0.025	100	No
CO	0.462	100	No
SOx	0.011	100	No
PM 10	0.000	100	No
PM 2.5	0.000	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	34.7		

2021

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.086	100	No
NOx	0.049	100	No
CO	0.923	100	No
SOx	0.023	100	No
PM 10	0.000	100	No
PM 2.5	0.000	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	69.4		

2022

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.086	100	No
NOx	0.049	100	No
CO	0.923	100	No
SOx	0.023	100	No
PM 10	0.000	100	No
PM 2.5	0.000	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	69.4		

2023

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.086	100	No
NOx	0.049	100	No
CO	0.923	100	No
SOx	0.023	100	No
PM 10	0.000	100	No
PM 2.5	0.000	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	69.4		

2024

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.086	100	No
NOx	0.049	100	No
CO	0.923	100	No
SOx	0.023	100	No
PM 10	0.000	100	No
PM 2.5	0.000	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	69.4		

2025

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.086	100	No
NOx	0.049	100	No
CO	0.923	100	No
SOx	0.023	100	No
PM 10	0.000	100	No
PM 2.5	0.000	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	69.4		

2026

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.086	100	No
NOx	0.049	100	No
CO	0.923	100	No
SOx	0.023	100	No
PM 10	0.000	100	No
PM 2.5	0.000	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	69.4		

2027

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.086	100	No
NOx	0.049	100	No
CO	0.923	100	No
SOx	0.023	100	No
PM 10	0.000	100	No
PM 2.5	0.000	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	69.4		

2028

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.086	100	No
NOx	0.049	100	No
CO	0.923	100	No
SOx	0.023	100	No
PM 10	0.000	100	No
PM 2.5	0.000	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	69.4		

2029

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.086	100	No
NOx	0.049	100	No
CO	0.923	100	No
SOx	0.023	100	No
PM 10	0.000	100	No
PM 2.5	0.000	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	69.4		

2030

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.043	100	No
NOx	0.025	100	No
CO	0.462	100	No
SOx	0.011	100	No
PM 10	0.000	100	No
PM 2.5	0.000	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	34.7		

2031 - (Steady State)

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.000	100	No
NOx	0.000	100	No
CO	0.000	100	No
SOx	0.000	100	No
PM 10	0.000	100	No
PM 2.5	0.000	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	0.0		

None of estimated emissions associated with this action are above the GCR indicators, indicating no significant impact to air quality; therefore, no further air assessment is needed.

Radhika

Radhika Narayanan, Environmental Scientist

4/16/2020
DATE

MCGREGOR RANGE RESTRICTED AREA MEDIUM SCENARIO SUMMARY

1. General Information: The Air Force's Air Conformity Applicability Model (ACAM) was used to perform an analysis to assess the potential air quality impact/s associated with the action in accordance with the Air Force Instruction 32-7040, Air Quality Compliance And Resource Management; the Environmental Impact Analysis Process (EIAP, 32 CFR 989); and the General Conformity Rule (GCR, 40 CFR 93 Subpart B). This report provides a summary of the ACAM analysis.

a. Action Location:
Base: HOLLOMAN AFB
State: New Mexico
County(s): Otero
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: Holloman AFB, New Mexico - Combat Air Force Adversary Air

c. Project Number/s (if applicable): N/A

d. Projected Action Start Date: 7 / 2020

e. Action Description:

Alternative 1 – Establish contract ADAIR capabilities (an estimated 12 aircraft) providing 3,200 annual training sorties at Holloman AFB with 3,144 sorties in the WSMR and McGregor Range restricted airspace and Beak and Talon MOAs. Operations and AMU activities would be consolidated in Building 578, and aircraft parking would be located adjacent to Building 578.
Alternative 2 – Establish contract ADAIR capabilities (an estimated 12 aircraft) providing 3,200 annual training sorties at Holloman AFB with 3,144 sorties in the WSMR and McGregor Range restricted airspace and Beak and Talon MOAs. Operations would be located in Building 1062 in shared space with the F-16 FTU squadrons. The AMU would be located in Building 578, and aircraft would be located adjacent to Building 578. No MILCON is anticipated for this action.

Airfield and airspace flight operations are identical for all alternatives. In addition, ground support operations are the same for both alternatives and construction activities are negligible.

f. Point of Contact:

Name:	Radhika Narayanan
Title:	Environmental Scientist
Organization:	Versar Inc.
Email:	rnarayanan@versar.com
Phone Number:	301-358-5150

2. Air Impact Analysis: Based on the attainment status at the action location, the requirements of the General Conformity Rule are:

_____ applicable
__X__ not applicable

Total combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action fully implemented) emissions.

"Air Quality Indicators" were used to provide an indication of the significance of potential impacts to air quality. These air quality indicators are EPA General Conformity Rule (GCR) thresholds (de minimis levels) that are applied out of context to their intended use. Therefore, these indicators do not trigger a regulatory

requirement; however, they provide a warning that the action is potentially significant. It is important to note that these indicators only provide a clue to the potential impacts to air quality.

Given the GCR de minimis threshold values are the maximum net change an action can acceptably emit in non-attainment and maintenance areas, these threshold values would also conservatively indicate an actions emissions within an attainment would also be acceptable. An air quality indicator value of 100 tons/yr is used based on the GCR de minimis threshold for the least severe non-attainment classification for all criteria pollutants (see 40 CFR 93.153). Therefore, the worst-case year emissions were compared against the GCR Indicator and are summarized below.

Analysis Summary:

2020

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.052	100	No
NOx	0.006	100	No
CO	0.173	100	No
SOx	0.002	100	No
PM 10	0.020	100	No
PM 2.5	0.015	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	7.2		

2021

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.104	100	No
NOx	0.012	100	No
CO	0.347	100	No
SOx	0.005	100	No
PM 10	0.040	100	No
PM 2.5	0.031	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	14.4		

2022

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.104	100	No
NOx	0.012	100	No
CO	0.347	100	No
SOx	0.005	100	No
PM 10	0.040	100	No
PM 2.5	0.031	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	14.4		

2023

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.104	100	No
NOx	0.012	100	No
CO	0.347	100	No
SOx	0.005	100	No
PM 10	0.040	100	No
PM 2.5	0.031	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	14.4		

2024

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.104	100	No
NOx	0.012	100	No
CO	0.347	100	No
SOx	0.005	100	No
PM 10	0.040	100	No
PM 2.5	0.031	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	14.4		

2025

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.104	100	No
NOx	0.012	100	No
CO	0.347	100	No
SOx	0.005	100	No
PM 10	0.040	100	No
PM 2.5	0.031	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	14.4		

2026

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.104	100	No
NOx	0.012	100	No
CO	0.347	100	No
SOx	0.005	100	No
PM 10	0.040	100	No
PM 2.5	0.031	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	14.4		

2027

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.104	100	No
NOx	0.012	100	No
CO	0.347	100	No
SOx	0.005	100	No
PM 10	0.040	100	No
PM 2.5	0.031	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	14.4		

2028

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.104	100	No
NOx	0.012	100	No
CO	0.347	100	No
SOx	0.005	100	No
PM 10	0.040	100	No
PM 2.5	0.031	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	14.4		

2029

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.104	100	No
NOx	0.012	100	No
CO	0.347	100	No
SOx	0.005	100	No
PM 10	0.040	100	No
PM 2.5	0.031	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	14.4		

2030

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.052	100	No
NOx	0.006	100	No
CO	0.173	100	No
SOx	0.002	100	No
PM 10	0.020	100	No
PM 2.5	0.015	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	7.2		

2031 - (Steady State)

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.000	100	No
NOx	0.000	100	No
CO	0.000	100	No
SOx	0.000	100	No
PM 10	0.000	100	No
PM 2.5	0.000	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	0.0		

None of estimated emissions associated with this action are above the GCR indicators, indicating no significant impact to air quality; therefore, no further air assessment is needed.

Radhika

____ ____4/16/2020___

Radhika Narayanan, Environmental Scientist DATE

MCGREGOR RANGE RESTRICTED AREA HIGH SCENARIO SUMMARY

1. General Information: The Air Force's Air Conformity Applicability Model (ACAM) was used to perform an analysis to assess the potential air quality impact/s associated with the action in accordance with the Air Force Instruction 32-7040, Air Quality Compliance And Resource Management; the Environmental Impact Analysis Process (EIAP, 32 CFR 989); and the General Conformity Rule (GCR, 40 CFR 93 Subpart B). This report provides a summary of the ACAM analysis.

a. Action Location:
Base: HOLLOMAN AFB
State: New Mexico
County(s): Otero
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: Holloman AFB, New Mexico - Combat Air Force Adversary Air

c. Project Number/s (if applicable): N/A

d. Projected Action Start Date: 7 / 2020

e. Action Description:

Alternative 1 – Establish contract ADAIR capabilities (an estimated 12 aircraft) providing 3,200 annual training sorties at Holloman AFB with 3,144 sorties in the WSMR and McGregor Range restricted airspace and Beak and Talon MOAs. Operations and AMU activities would be consolidated in Building 578, and aircraft parking would be located adjacent to Building 578.
Alternative 2 – Establish contract ADAIR capabilities (an estimated 12 aircraft) providing 3,200 annual training sorties at Holloman AFB with 3,144 sorties in the WSMR and McGregor Range restricted airspace and Beak and Talon MOAs. Operations would be located in Building 1062 in shared space with the F-16 FTU squadrons. The AMU would be located in Building 578, and aircraft would be located adjacent to Building 578. No MILCON is anticipated for this action.

Airfield and airspace flight operations are identical for all alternatives. In addition, ground support operations are the same for both alternatives and construction activities are negligible.

f. Point of Contact:
Name: Radhika Narayanan
Title: Environmental Scientist
Organization: Versar Inc.
Email: rnarayanan@versar.com
Phone Number: 301-358-5150

2. Air Impact Analysis: Based on the attainment status at the action location, the requirements of the General Conformity Rule are:

_____ applicable
__X__ not applicable

Total combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action fully implemented) emissions.

"Air Quality Indicators" were used to provide an indication of the significance of potential impacts to air quality. These air quality indicators are EPA General Conformity Rule (GCR) thresholds (de minimis levels) that are applied out of context to their intended use. Therefore, these indicators do not trigger a regulatory

requirement; however, they provide a warning that the action is potentially significant. It is important to note that these indicators only provide a clue to the potential impacts to air quality.

Given the GCR de minimis threshold values are the maximum net change an action can acceptably emit in non-attainment and maintenance areas, these threshold values would also conservatively indicate an actions emissions within an attainment would also be acceptable. An air quality indicator value of 100 tons/yr is used based on the GCR de minimis threshold for the least severe non-attainment classification for all criteria pollutants (see 40 CFR 93.153). Therefore, the worst-case year emissions were compared against the GCR Indicator and are summarized below.

Analysis Summary:

2020

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.007	100	No
NOx	0.105	100	No
CO	0.031	100	No
SOx	0.011	100	No
PM 10	0.001	100	No
PM 2.5	0.001	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	33.7		

2021

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.014	100	No
NOx	0.211	100	No
CO	0.063	100	No
SOx	0.022	100	No
PM 10	0.003	100	No
PM 2.5	0.003	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	67.5		

2022

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.014	100	No
NOx	0.211	100	No
CO	0.063	100	No
SOx	0.022	100	No
PM 10	0.003	100	No
PM 2.5	0.003	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	67.5		

2023

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.014	100	No
NOx	0.211	100	No
CO	0.063	100	No
SOx	0.022	100	No
PM 10	0.003	100	No
PM 2.5	0.003	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	67.5		

2024

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.014	100	No
NOx	0.211	100	No
CO	0.063	100	No
SOx	0.022	100	No
PM 10	0.003	100	No
PM 2.5	0.003	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	67.5		

2025

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.014	100	No
NOx	0.211	100	No
CO	0.063	100	No
SOx	0.022	100	No
PM 10	0.003	100	No
PM 2.5	0.003	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	67.5		

2026

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.014	100	No
NOx	0.211	100	No
CO	0.063	100	No
SOx	0.022	100	No
PM 10	0.003	100	No
PM 2.5	0.003	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	67.5		

2027

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.014	100	No
NOx	0.211	100	No
CO	0.063	100	No
SOx	0.022	100	No
PM 10	0.003	100	No
PM 2.5	0.003	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	67.5		

2028

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.014	100	No
NOx	0.211	100	No
CO	0.063	100	No
SOx	0.022	100	No
PM 10	0.003	100	No
PM 2.5	0.003	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	67.5		

2029

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.014	100	No
NOx	0.211	100	No
CO	0.063	100	No
SOx	0.022	100	No
PM 10	0.003	100	No
PM 2.5	0.003	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	67.5		

2030

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.007	100	No
NOx	0.105	100	No
CO	0.031	100	No
SOx	0.011	100	No
PM 10	0.001	100	No
PM 2.5	0.001	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	33.7		

2031 - (Steady State)

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.000	100	No
NOx	0.000	100	No
CO	0.000	100	No
SOx	0.000	100	No
PM 10	0.000	100	No
PM 2.5	0.000	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	0.0		

None of estimated emissions associated with this action are above the GCR indicators, indicating no significant impact to air quality; therefore, no further air assessment is needed.

Radhika

Radhika Narayanan, Environmental Scientist

4/16/2020
DATE

TALON MILITARY OPERATIONS AREAS LOW SCENARIO SUMMARY

1. General Information: The Air Force's Air Conformity Applicability Model (ACAM) was used to perform an analysis to assess the potential air quality impact/s associated with the action in accordance with the Air Force Instruction 32-7040, Air Quality Compliance And Resource Management; the Environmental Impact Analysis Process (EIAP, 32 CFR 989); and the General Conformity Rule (GCR, 40 CFR 93 Subpart B). This report provides a summary of the ACAM analysis.

a. Action Location:
Base: HOLLOMAN AFB
State: New Mexico
County(s): Otero; Eddy
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: Holloman AFB, New Mexico - Combat Air Force Adversary Air

c. Project Number/s (if applicable): N/A

d. Projected Action Start Date: 7 / 2020

e. Action Description:

Alternative 1 – Establish contract ADAIR capabilities (an estimated 12 aircraft) providing 3,200 annual training sorties at Holloman AFB with 3,144 sorties in the WSMR and McGregor Range restricted airspace and Beak and Talon MOAs. Operations and AMU activities would be consolidated in Building 578, and aircraft parking would be located adjacent to Building 578.
Alternative 2 – Establish contract ADAIR capabilities (an estimated 12 aircraft) providing 3,200 annual training sorties at Holloman AFB with 3,144 sorties in the WSMR and McGregor Range restricted airspace and Beak and Talon MOAs. Operations would be located in Building 1062 in shared space with the F-16 FTU squadrons. The AMU would be located in Building 578, and aircraft would be located adjacent to Building 578. No MILCON is anticipated for this action.

Airfield and airspace flight operations are identical for all alternatives. In addition, ground support operations are the same for both alternatives and construction activities are negligible.

f. Point of Contact:
Name: Radhika Narayanan
Title: Environmental Scientist
Organization: Versar Inc.
Email: rnarayanan@versar.com
Phone Number: 301-358-5150

2. Air Impact Analysis: Based on the attainment status at the action location, the requirements of the General Conformity Rule are:

_____ applicable
__X__ not applicable

Total combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action fully implemented) emissions.

"Air Quality Indicators" were used to provide an indication of the significance of potential impacts to air quality. These air quality indicators are EPA General Conformity Rule (GCR) thresholds (de minimis levels) that are applied out of context to their intended use. Therefore, these indicators do not trigger a regulatory

requirement; however, they provide a warning that the action is potentially significant. It is important to note that these indicators only provide a clue to the potential impacts to air quality.

Given the GCR de minimis threshold values are the maximum net change an action can acceptably emit in non-attainment and maintenance areas, these threshold values would also conservatively indicate an actions emissions within an attainment would also be acceptable. An air quality indicator value of 100 tons/yr is used based on the GCR de minimis threshold for the least severe non-attainment classification for all criteria pollutants (see 40 CFR 93.153). Therefore, the worst-case year emissions were compared against the GCR Indicator and are summarized below.

Analysis Summary:

2020

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.164	100	No
NOx	0.094	100	No
CO	1.757	100	No
SOx	0.043	100	No
PM 10	0.000	100	No
PM 2.5	0.000	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	132.1		

2021

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.329	100	No
NOx	0.188	100	No
CO	3.514	100	No
SOx	0.087	100	No
PM 10	0.001	100	No
PM 2.5	0.001	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	264.3		

2022

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.329	100	No
NOx	0.188	100	No
CO	3.514	100	No
SOx	0.087	100	No
PM 10	0.001	100	No
PM 2.5	0.001	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	264.3		

2023

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.329	100	No
NOx	0.188	100	No
CO	3.514	100	No
SOx	0.087	100	No
PM 10	0.001	100	No
PM 2.5	0.001	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	264.3		

2024

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.329	100	No
NOx	0.188	100	No
CO	3.514	100	No
SOx	0.087	100	No
PM 10	0.001	100	No
PM 2.5	0.001	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	264.3		

2025

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.329	100	No
NOx	0.188	100	No
CO	3.514	100	No
SOx	0.087	100	No
PM 10	0.001	100	No
PM 2.5	0.001	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	264.3		

2026

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.329	100	No
NOx	0.188	100	No
CO	3.514	100	No
SOx	0.087	100	No
PM 10	0.001	100	No
PM 2.5	0.001	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	264.3		

2027

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.329	100	No
NOx	0.188	100	No
CO	3.514	100	No
SOx	0.087	100	No
PM 10	0.001	100	No
PM 2.5	0.001	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	264.3		

2028

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.329	100	No
NOx	0.188	100	No
CO	3.514	100	No
SOx	0.087	100	No
PM 10	0.001	100	No
PM 2.5	0.001	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	264.3		

2029

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.329	100	No
NOx	0.188	100	No
CO	3.514	100	No
SOx	0.087	100	No
PM 10	0.001	100	No
PM 2.5	0.001	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	264.3		

2030

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.164	100	No
NOx	0.094	100	No
CO	1.757	100	No
SOx	0.043	100	No
PM 10	0.000	100	No
PM 2.5	0.000	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	132.1		

2031 - (Steady State)

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.000	100	No
NOx	0.000	100	No
CO	0.000	100	No
SOx	0.000	100	No
PM 10	0.000	100	No
PM 2.5	0.000	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	0.0		

None of estimated emissions associated with this action are above the GCR indicators, indicating no significant impact to air quality; therefore, no further air assessment is needed.

Radhika

Radhika Narayanan, Environmental Scientist — 4/16/2020 DATE

TALON MILITARY OPERATIONS AREAS MEDIUM SCENARIO SUMMARY

1. General Information: The Air Force's Air Conformity Applicability Model (ACAM) was used to perform an analysis to assess the potential air quality impact/s associated with the action in accordance with the Air Force Instruction 32-7040, Air Quality Compliance And Resource Management; the Environmental Impact Analysis Process (EIAP, 32 CFR 989); and the General Conformity Rule (GCR, 40 CFR 93 Subpart B). This report provides a summary of the ACAM analysis.

a. Action Location:
Base: HOLLOMAN AFB
State: New Mexico
County(s): Otero; Eddy
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: Holloman AFB, New Mexico - Combat Air Force Adversary Air

c. Project Number/s (if applicable): N/A

d. Projected Action Start Date: 7 / 2020

e. Action Description:

Alternative 1 – Establish contract ADAIR capabilities (an estimated 12 aircraft) providing 3,200 annual training sorties at Holloman AFB with 3,144 sorties in the WSMR and McGregor Range restricted airspace and Beak and Talon MOAs. Operations and AMU activities would be consolidated in Building 578, and aircraft parking would be located adjacent to Building 578.
Alternative 2 – Establish contract ADAIR capabilities (an estimated 12 aircraft) providing 3,200 annual training sorties at Holloman AFB with 3,144 sorties in the WSMR and McGregor Range restricted airspace and Beak and Talon MOAs. Operations would be located in Building 1062 in shared space with the F-16 FTU squadrons. The AMU would be located in Building 578, and aircraft would be located adjacent to Building 578. No MILCON is anticipated for this action.

Airfield and airspace flight operations are identical for all alternatives. In addition, ground support operations are the same for both alternatives and construction activities are negligible.

f. Point of Contact:
Name: Radhika Narayanan
Title: Environmental Scientist
Organization: Versar Inc.
Email: rnarayanan@versar.com
Phone Number: 301-358-5150

2. Air Impact Analysis: Based on the attainment status at the action location, the requirements of the General Conformity Rule are:

_____ applicable
__X__ not applicable

Total combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action fully implemented) emissions.

"Air Quality Indicators" were used to provide an indication of the significance of potential impacts to air quality. These air quality indicators are EPA General Conformity Rule (GCR) thresholds (de minimis levels) that are applied out of context to their intended use. Therefore, these indicators do not trigger a regulatory

requirement; however, they provide a warning that the action is potentially significant. It is important to note that these indicators only provide a clue to the potential impacts to air quality.

Given the GCR de minimis threshold values are the maximum net change an action can acceptably emit in non-attainment and maintenance areas, these threshold values would also conservatively indicate an actions emissions within an attainment would also be acceptable. An air quality indicator value of 100 tons/yr is used based on the GCR de minimis threshold for the least severe non-attainment classification for all criteria pollutants (see 40 CFR 93.153). Therefore, the worst-case year emissions were compared against the GCR Indicator and are summarized below.

Analysis Summary:

2020

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.197	100	No
NOx	0.022	100	No
CO	0.660	100	No
SOx	0.009	100	No
PM 10	0.076	100	No
PM 2.5	0.059	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	27.4		

2021

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.395	100	No
NOx	0.044	100	No
CO	1.320	100	No
SOx	0.018	100	No
PM 10	0.151	100	No
PM 2.5	0.118	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	54.7		

2022

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.395	100	No
NOx	0.044	100	No
CO	1.320	100	No
SOx	0.018	100	No
PM 10	0.151	100	No
PM 2.5	0.118	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	54.7		

2023

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.395	100	No
NOx	0.044	100	No
CO	1.320	100	No
SOx	0.018	100	No
PM 10	0.151	100	No
PM 2.5	0.118	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	54.7		

2024

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.395	100	No
NOx	0.044	100	No
CO	1.320	100	No
SOx	0.018	100	No
PM 10	0.151	100	No
PM 2.5	0.118	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	54.7		

2025

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.395	100	No
NOx	0.044	100	No
CO	1.320	100	No
SOx	0.018	100	No
PM 10	0.151	100	No
PM 2.5	0.118	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	54.7		

2026

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.395	100	No
NOx	0.044	100	No
CO	1.320	100	No
SOx	0.018	100	No
PM 10	0.151	100	No
PM 2.5	0.118	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	54.7		

2027

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.395	100	No
NOx	0.044	100	No
CO	1.320	100	No
SOx	0.018	100	No
PM 10	0.151	100	No
PM 2.5	0.118	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	54.7		

2028

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.395	100	No
NOx	0.044	100	No
CO	1.320	100	No
SOx	0.018	100	No
PM 10	0.151	100	No
PM 2.5	0.118	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	54.7		

2029

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.395	100	No
NOx	0.044	100	No
CO	1.320	100	No
SOx	0.018	100	No
PM 10	0.151	100	No
PM 2.5	0.118	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	54.7		

2030

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.197	100	No
NOx	0.022	100	No
CO	0.660	100	No
SOx	0.009	100	No
PM 10	0.076	100	No
PM 2.5	0.059	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	27.4		

2031 - (Steady State)

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.000	100	No
NOx	0.000	100	No
CO	0.000	100	No
SOx	0.000	100	No
PM 10	0.000	100	No
PM 2.5	0.000	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	0.0		

None of estimated emissions associated with this action are above the GCR indicators, indicating no significant impact to air quality; therefore, no further air assessment is needed.

Radhika

Radhika Narayanan, Environmental Scientist

4/16/2020
DATE

TALON MILITARY OPERATIONS AREAS HIGH SCENARIO SUMMARY

1. General Information: The Air Force's Air Conformity Applicability Model (ACAM) was used to perform an analysis to assess the potential air quality impact/s associated with the action in accordance with the Air Force Instruction 32-7040, Air Quality Compliance And Resource Management; the Environmental Impact Analysis Process (EIAP, 32 CFR 989); and the General Conformity Rule (GCR, 40 CFR 93 Subpart B). This report provides a summary of the ACAM analysis.

a. Action Location:
Base: HOLLOMAN AFB
State: New Mexico
County(s): Otero; Eddy
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: Holloman AFB, New Mexico - Combat Air Force Adversary Air

c. Project Number/s (if applicable): N/A

d. Projected Action Start Date: 7 / 2020

e. Action Description:

Alternative 1 – Establish contract ADAIR capabilities (an estimated 12 aircraft) providing 3,200 annual training sorties at Holloman AFB with 3,144 sorties in the WSMR and McGregor Range restricted airspace and Beak and Talon MOAs. Operations and AMU activities would be consolidated in Building 578, and aircraft parking would be located adjacent to Building 578.
Alternative 2 – Establish contract ADAIR capabilities (an estimated 12 aircraft) providing 3,200 annual training sorties at Holloman AFB with 3,144 sorties in the WSMR and McGregor Range restricted airspace and Beak and Talon MOAs. Operations would be located in Building 1062 in shared space with the F-16 FTU squadrons. The AMU would be located in Building 578, and aircraft would be located adjacent to Building 578. No MILCON is anticipated for this action.

Airfield and airspace flight operations are identical for all alternatives. In addition, ground support operations are the same for both alternatives and construction activities are negligible.

f. Point of Contact:

Name:	Radhika Narayanan
Title:	Environmental Scientist
Organization:	Versar Inc.
Email:	rnarayanan@versar.com
Phone Number:	301-358-5150

2. Air Impact Analysis: Based on the attainment status at the action location, the requirements of the General Conformity Rule are:

_____ applicable
__X__ not applicable

Total combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action fully implemented) emissions.

"Air Quality Indicators" were used to provide an indication of the significance of potential impacts to air quality. These air quality indicators are EPA General Conformity Rule (GCR) thresholds (de minimis levels) that are applied out of context to their intended use. Therefore, these indicators do not trigger a regulatory

requirement; however, they provide a warning that the action is potentially significant. It is important to note that these indicators only provide a clue to the potential impacts to air quality.

Given the GCR de minimis threshold values are the maximum net change an action can acceptably emit in non-attainment and maintenance areas, these threshold values would also conservatively indicate an actions emissions within an attainment would also be acceptable. An air quality indicator value of 100 tons/yr is used based on the GCR de minimis threshold for the least severe non-attainment classification for all criteria pollutants (see 40 CFR 93.153). Therefore, the worst-case year emissions were compared against the GCR Indicator and are summarized below.

Analysis Summary:

2020

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.026	100	No
NOx	0.401	100	No
CO	0.119	100	No
SOx	0.042	100	No
PM 10	0.005	100	No
PM 2.5	0.005	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	128.5		

2021

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.053	100	No
NOx	0.802	100	No
CO	0.238	100	No
SOx	0.084	100	No
PM 10	0.010	100	No
PM 2.5	0.010	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	256.9		

2022

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.053	100	No
NOx	0.802	100	No
CO	0.238	100	No
SOx	0.084	100	No
PM 10	0.010	100	No
PM 2.5	0.010	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	256.9		

2023

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.053	100	No
NOx	0.802	100	No
CO	0.238	100	No
SOx	0.084	100	No
PM 10	0.010	100	No
PM 2.5	0.010	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	256.9		

2024

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.053	100	No
NOx	0.802	100	No
CO	0.238	100	No
SOx	0.084	100	No
PM 10	0.010	100	No
PM 2.5	0.010	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	256.9		

2025

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.053	100	No
NOx	0.802	100	No
CO	0.238	100	No
SOx	0.084	100	No
PM 10	0.010	100	No
PM 2.5	0.010	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	256.9		

2026

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.053	100	No
NOx	0.802	100	No
CO	0.238	100	No
SOx	0.084	100	No
PM 10	0.010	100	No
PM 2.5	0.010	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	256.9		

2027

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.053	100	No
NOx	0.802	100	No
CO	0.238	100	No
SOx	0.084	100	No
PM 10	0.010	100	No
PM 2.5	0.010	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	256.9		

2028

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.053	100	No
NOx	0.802	100	No
CO	0.238	100	No
SOx	0.084	100	No
PM 10	0.010	100	No
PM 2.5	0.010	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	256.9		

2029

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.053	100	No
NOx	0.802	100	No
CO	0.238	100	No
SOx	0.084	100	No
PM 10	0.010	100	No
PM 2.5	0.010	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	256.9		

2030

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.026	100	No
NOx	0.401	100	No
CO	0.119	100	No
SOx	0.042	100	No
PM 10	0.005	100	No
PM 2.5	0.005	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	128.5		

2031 - (Steady State)

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.000	100	No
NOx	0.000	100	No
CO	0.000	100	No
SOx	0.000	100	No
PM 10	0.000	100	No
PM 2.5	0.000	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	0.0		

None of estimated emissions associated with this action are above the GCR indicators, indicating no significant impact to air quality; therefore, no further air assessment is needed.

Radhika

Radhika Narayanan, Environmental Scientist

4/16/2020
DATE

WHITE SANDS MISSILE RANGE RESTRICTED AREA LOW SCENARIO SUMMARY

1. General Information: The Air Force's Air Conformity Applicability Model (ACAM) was used to perform an analysis to assess the potential air quality impact/s associated with the action in accordance with the Air Force Instruction 32-7040, Air Quality Compliance And Resource Management; the Environmental Impact Analysis Process (EIAP, 32 CFR 989); and the General Conformity Rule (GCR, 40 CFR 93 Subpart B). This report provides a summary of the ACAM analysis.

a. Action Location:
Base: HOLLOMAN AFB
State: New Mexico
County(s): Otero; Lincoln; Socorro; Torrance; Sierra; Dona Ana
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: Holloman AFB, New Mexico - Combat Air Force Adversary Air

c. Project Number/s (if applicable): N/A

d. Projected Action Start Date: 7 / 2020

e. Action Description:

Alternative 1 – Establish contract ADAIR capabilities (an estimated 12 aircraft) providing 3,200 annual training sorties at Holloman AFB with 3,144 sorties in the WSMR and McGregor Range restricted airspace and Beak and Talon MOAs. Operations and AMU activities would be consolidated in Building 578, and aircraft parking would be located adjacent to Building 578.
Alternative 2 – Establish contract ADAIR capabilities (an estimated 12 aircraft) providing 3,200 annual training sorties at Holloman AFB with 3,144 sorties in the WSMR and McGregor Range restricted airspace and Beak and Talon MOAs. Operations would be located in Building 1062 in shared space with the F-16 FTU squadrons. The AMU would be located in Building 578, and aircraft would be located adjacent to Building 578. No MILCON is anticipated for this action.

Airfield and airspace flight operations are identical for all alternatives. In addition, ground support operations are the same for both alternatives and construction activities are negligible.

f. Point of Contact:
Name: Radhika Narayanan
Title: Environmental Scientist
Organization: Versar Inc.
Email: rnarayanan@versar.com
Phone Number: 301-358-5150

2. Air Impact Analysis: Based on the attainment status at the action location, the requirements of the General Conformity Rule are:

_____ applicable
__X__ not applicable

Total combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action fully implemented) emissions.

"Air Quality Indicators" were used to provide an indication of the significance of potential impacts to air quality. These air quality indicators are EPA General Conformity Rule (GCR) thresholds (de minimis levels) that are applied out of context to their intended use. Therefore, these indicators do not trigger a regulatory

requirement; however, they provide a warning that the action is potentially significant. It is important to note that these indicators only provide a clue to the potential impacts to air quality.

Given the GCR de minimis threshold values are the maximum net change an action can acceptably emit in non-attainment and maintenance areas, these threshold values would also conservatively indicate an actions emissions within an attainment would also be acceptable. An air quality indicator value of 100 tons/yr is used based on the GCR de minimis threshold for the least severe non-attainment classification for all criteria pollutants (see 40 CFR 93.153). Therefore, the worst-case year emissions were compared against the GCR Indicator and are summarized below.

Analysis Summary:

2020

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	2.454	100	No
NOx	1.402	100	No
CO	26.220	100	No
SOx	0.646	100	No
PM 10	0.007	100	No
PM 2.5	0.006	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	1972.0		

2021

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	4.909	100	No
NOx	2.805	100	No
CO	52.440	100	No
SOx	1.293	100	No
PM 10	0.013	100	No
PM 2.5	0.012	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	3944.0		

2022

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	4.909	100	No
NOx	2.805	100	No
CO	52.440	100	No
SOx	1.293	100	No
PM 10	0.013	100	No
PM 2.5	0.012	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	3944.0		

2023

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	4.909	100	No
NOx	2.805	100	No
CO	52.440	100	No
SOx	1.293	100	No
PM 10	0.013	100	No
PM 2.5	0.012	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	3944.0		

2024

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	4.909	100	No
NOx	2.805	100	No
CO	52.440	100	No
SOx	1.293	100	No
PM 10	0.013	100	No
PM 2.5	0.012	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	3944.0		

2025

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	4.909	100	No
NOx	2.805	100	No
CO	52.440	100	No
SOx	1.293	100	No
PM 10	0.013	100	No
PM 2.5	0.012	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	3944.0		

2026

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	4.909	100	No
NOx	2.805	100	No
CO	52.440	100	No
SOx	1.293	100	No
PM 10	0.013	100	No
PM 2.5	0.012	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	3944.0		

2027

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	4.909	100	No
NOx	2.805	100	No
CO	52.440	100	No
SOx	1.293	100	No
PM 10	0.013	100	No
PM 2.5	0.012	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	3944.0		

2028

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	4.909	100	No
NOx	2.805	100	No
CO	52.440	100	No
SOx	1.293	100	No
PM 10	0.013	100	No
PM 2.5	0.012	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	3944.0		

2029

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	4.909	100	No
NOx	2.805	100	No
CO	52.440	100	No
SOx	1.293	100	No
PM 10	0.013	100	No
PM 2.5	0.012	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	3944.0		

2030

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	2.454	100	No
NOx	1.402	100	No
CO	26.220	100	No
SOx	0.646	100	No
PM 10	0.007	100	No
PM 2.5	0.006	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	1972.0		

2031 - (Steady State)

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.000	100	No
NOx	0.000	100	No
CO	0.000	100	No
SOx	0.000	100	No
PM 10	0.000	100	No
PM 2.5	0.000	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	0.0		

None of estimated emissions associated with this action are above the GCR indicators, indicating no significant impact to air quality; therefore, no further air assessment is needed.

Radhika

Radhika Narayanan, Environmental Scientist

4/16/2020
DATE

WHITE SANDS MISSILE RANGE RESTRICTED AREA MEDIUM SCENARIO SUMMARY

1. General Information: The Air Force's Air Conformity Applicability Model (ACAM) was used to perform an analysis to assess the potential air quality impact/s associated with the action in accordance with the Air Force Instruction 32-7040, Air Quality Compliance And Resource Management; the Environmental Impact Analysis Process (EIAP, 32 CFR 989); and the General Conformity Rule (GCR, 40 CFR 93 Subpart B). This report provides a summary of the ACAM analysis.

a. Action Location:
Base: HOLLOMAN AFB
State: New Mexico
County(s): Otero; Dona Ana; Sierra; Socorro; Lincoln; Torrance
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: Holloman AFB, New Mexico - Combat Air Force Adversary Air

c. Project Number/s (if applicable): N/A

d. Projected Action Start Date: 7 / 2020

e. Action Description:

Alternative 1 – Establish contract ADAIR capabilities (an estimated 12 aircraft) providing 3,200 annual training sorties at Holloman AFB with 3,144 sorties in the WSMR and McGregor Range restricted airspace and Beak and Talon MOAs. Operations and AMU activities would be consolidated in Building 578, and aircraft parking would be located adjacent to Building 578.
Alternative 2 – Establish contract ADAIR capabilities (an estimated 12 aircraft) providing 3,200 annual training sorties at Holloman AFB with 3,144 sorties in the WSMR and McGregor Range restricted airspace and Beak and Talon MOAs. Operations would be located in Building 1062 in shared space with the F-16 FTU squadrons. The AMU would be located in Building 578, and aircraft would be located adjacent to Building 578. No MILCON is anticipated for this action.

Airfield and airspace flight operations are identical for all alternatives. In addition, ground support operations are the same for both alternatives and construction activities are negligible.

f. Point of Contact:
Name: Radhika Narayanan
Title: Environmental Scientist
Organization: Versar Inc.
Email: rnarayanan@versar.com
Phone Number: 301-358-5150

2. Air Impact Analysis: Based on the attainment status at the action location, the requirements of the General Conformity Rule are:

_____ applicable
__X__ not applicable

Total combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action fully implemented) emissions.

"Air Quality Indicators" were used to provide an indication of the significance of potential impacts to air quality. These air quality indicators are EPA General Conformity Rule (GCR) thresholds (de minimis levels) that are applied out of context to their intended use. Therefore, these indicators do not trigger a regulatory

requirement; however, they provide a warning that the action is potentially significant. It is important to note that these indicators only provide a clue to the potential impacts to air quality.

Given the GCR de minimis threshold values are the maximum net change an action can acceptably emit in non-attainment and maintenance areas, these threshold values would also conservatively indicate an actions emissions within an attainment would also be acceptable. An air quality indicator value of 100 tons/yr is used based on the GCR de minimis threshold for the least severe non-attainment classification for all criteria pollutants (see 40 CFR 93.153). Therefore, the worst-case year emissions were compared against the GCR Indicator and are summarized below.

Analysis Summary:

2020

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	2.947	100	No
NOx	0.328	100	No
CO	9.846	100	No
SOx	0.134	100	No
PM 10	1.127	100	No
PM 2.5	0.877	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	408.2		

2021

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	5.894	100	No
NOx	0.656	100	No
CO	19.693	100	No
SOx	0.268	100	No
PM 10	2.255	100	No
PM 2.5	1.755	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	816.5		

2022

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	5.894	100	No
NOx	0.656	100	No
CO	19.693	100	No
SOx	0.268	100	No
PM 10	2.255	100	No
PM 2.5	1.755	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	816.5		

2023

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	5.894	100	No
NOx	0.656	100	No
CO	19.693	100	No
SOx	0.268	100	No
PM 10	2.255	100	No
PM 2.5	1.755	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	816.5		

2024

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	5.894	100	No
NOx	0.656	100	No
CO	19.693	100	No
SOx	0.268	100	No
PM 10	2.255	100	No
PM 2.5	1.755	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	816.5		

2025

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	5.894	100	No
NOx	0.656	100	No
CO	19.693	100	No
SOx	0.268	100	No
PM 10	2.255	100	No
PM 2.5	1.755	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	816.5		

2026

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	5.894	100	No
NOx	0.656	100	No
CO	19.693	100	No
SOx	0.268	100	No
PM 10	2.255	100	No
PM 2.5	1.755	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	816.5		

2027

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	5.894	100	No
NOx	0.656	100	No
CO	19.693	100	No
SOx	0.268	100	No
PM 10	2.255	100	No
PM 2.5	1.755	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	816.5		

2028

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	5.894	100	No
NOx	0.656	100	No
CO	19.693	100	No
SOx	0.268	100	No
PM 10	2.255	100	No
PM 2.5	1.755	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	816.5		

2029

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	5.894	100	No
NOx	0.656	100	No
CO	19.693	100	No
SOx	0.268	100	No
PM 10	2.255	100	No
PM 2.5	1.755	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	816.5		

2030

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	2.947	100	No
NOx	0.328	100	No
CO	9.846	100	No
SOx	0.134	100	No
PM 10	1.127	100	No
PM 2.5	0.877	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	408.2		

2031 - (Steady State)

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.000	100	No
NOx	0.000	100	No
CO	0.000	100	No
SOx	0.000	100	No
PM 10	0.000	100	No
PM 2.5	0.000	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	0.0		

None of estimated emissions associated with this action are above the GCR indicators, indicating no significant impact to air quality; therefore, no further air assessment is needed.

Radhika

Radhika Narayanan, Environmental Scientist

4/16/2020
DATE

WHITE SANDS MISSILE RANGE RESTRICTED AREA HIGH SCENARIO SUMMARY

1. General Information: The Air Force's Air Conformity Applicability Model (ACAM) was used to perform an analysis to assess the potential air quality impact/s associated with the action in accordance with the Air Force Instruction 32-7040, Air Quality Compliance And Resource Management; the Environmental Impact Analysis Process (EIAP, 32 CFR 989); and the General Conformity Rule (GCR, 40 CFR 93 Subpart B). This report provides a summary of the ACAM analysis.

a. Action Location:
Base: HOLLOMAN AFB
State: New Mexico
County(s): Otero; Dona Ana; Lincoln; Sierra; Socorro; Torrance
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: Holloman AFB, New Mexico - Combat Air Force Adversary Air

c. Project Number/s (if applicable): N/A

d. Projected Action Start Date: 7 / 2020

e. Action Description:

Alternative 1 – Establish contract ADAIR capabilities (an estimated 12 aircraft) providing 3,200 annual training sorties at Holloman AFB with 3,144 sorties in the WSMR and McGregor Range restricted airspace and Beak and Talon MOAs. Operations and AMU activities would be consolidated in Building 578, and aircraft parking would be located adjacent to Building 578.
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f. Point of Contact:
Name: Radhika Narayanan
Title: Environmental Scientist
Organization: Versar Inc.
Email: rnarayanan@versar.com
Phone Number: 301-358-5150

2. Air Impact Analysis: Based on the attainment status at the action location, the requirements of the General Conformity Rule are:

_____ applicable
__X__ not applicable

Total combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action fully implemented) emissions.

"Air Quality Indicators" were used to provide an indication of the significance of potential impacts to air quality. These air quality indicators are EPA General Conformity Rule (GCR) thresholds (de minimis levels) that are applied out of context to their intended use. Therefore, these indicators do not trigger a regulatory

requirement; however, they provide a warning that the action is potentially significant. It is important to note that these indicators only provide a clue to the potential impacts to air quality.

Given the GCR de minimis threshold values are the maximum net change an action can acceptably emit in non-attainment and maintenance areas, these threshold values would also conservatively indicate an actions emissions within an attainment would also be acceptable. An air quality indicator value of 100 tons/yr is used based on the GCR de minimis threshold for the least severe non-attainment classification for all criteria pollutants (see 40 CFR 93.153). Therefore, the worst-case year emissions were compared against the GCR Indicator and are summarized below.

Analysis Summary:

2020

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.395	100	No
NOx	5.987	100	No
CO	1.778	100	No
SOx	0.628	100	No
PM 10	0.077	100	No
PM 2.5	0.071	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	1917.0		

2021

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.791	100	No
NOx	11.974	100	No
CO	3.557	100	No
SOx	1.257	100	No
PM 10	0.154	100	No
PM 2.5	0.142	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	3833.9		

2022

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.791	100	No
NOx	11.974	100	No
CO	3.557	100	No
SOx	1.257	100	No
PM 10	0.154	100	No
PM 2.5	0.142	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	3833.9		

2023

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.791	100	No
NOx	11.974	100	No
CO	3.557	100	No
SOx	1.257	100	No
PM 10	0.154	100	No
PM 2.5	0.142	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	3833.9		

2024

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.791	100	No
NOx	11.974	100	No
CO	3.557	100	No
SOx	1.257	100	No
PM 10	0.154	100	No
PM 2.5	0.142	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	3833.9		

2025

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.791	100	No
NOx	11.974	100	No
CO	3.557	100	No
SOx	1.257	100	No
PM 10	0.154	100	No
PM 2.5	0.142	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	3833.9		

2026

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.791	100	No
NOx	11.974	100	No
CO	3.557	100	No
SOx	1.257	100	No
PM 10	0.154	100	No
PM 2.5	0.142	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	3833.9		

2027

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.791	100	No
NOx	11.974	100	No
CO	3.557	100	No
SOx	1.257	100	No
PM 10	0.154	100	No
PM 2.5	0.142	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	3833.9		

2028

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.791	100	No
NOx	11.974	100	No
CO	3.557	100	No
SOx	1.257	100	No
PM 10	0.154	100	No
PM 2.5	0.142	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	3833.9		

2029

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.791	100	No
NOx	11.974	100	No
CO	3.557	100	No
SOx	1.257	100	No
PM 10	0.154	100	No
PM 2.5	0.142	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	3833.9		

2030

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.395	100	No
NOx	5.987	100	No
CO	1.778	100	No
SOx	0.628	100	No
PM 10	0.077	100	No
PM 2.5	0.071	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	1917.0		

2031 - (Steady State)

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.000	100	No
NOx	0.000	100	No
CO	0.000	100	No
SOx	0.000	100	No
PM 10	0.000	100	No
PM 2.5	0.000	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	0.0		

None of estimated emissions associated with this action are above the GCR indicators, indicating no significant impact to air quality; therefore, no further air assessment is needed.

Radhika

Radhika Narayanan, Environmental Scientist

4/16/2020
DATE

APPENDIX D

LISTED SPECIES POTENTIALLY OCCURRING IN THE ACTION AREA

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THREATENED AND ENDANGERED SPECIES/CRITICAL HABITAT

A list of species that could potentially be found at Holloman Air Force Base (AFB) and in the special use airspaces where contract adversary air (ADAIR) training is proposed was obtained from the Holloman AFB Integrated Natural Resources Management Plan (Holloman AFB, 2018), United States Fish and Wildlife Service (USFWS) Information for Planning and Consultation website (USFWS, 2019), and the New Mexico Department of Game and Fish's (NMDGF) Biota Information System of New Mexico (BISON-M) database, (NMDGF, 2019) and are provided in **Table D-1**. Descriptions for federally listed spcies that could be potentially impacted by the proposed contract ADAIR were provided in the Environmental Assessment; the descriptions for state-listed species potentially impacted by contract ADAIR at Holloman AFB and in the special use airspaces are provided here.

State Listed Species Descriptions

Baird's Sparrow. The Baird's sparrow (*Centronyx bairdii*) is a member of a complex of small ground-dwelling finches typically found in grassland habitats. The ground nest of the Baird's sparrow is typically concealed in tall grass of prairie habitats. This species breeds in the southern portion of the Canadian Prairie Provinces to southern South Dakota and west-central Minnesota, and winters from Arizona to north-central Texas and into northern Mexico. Baird's sparrows are found almost exclusively in grasslands at lower elevations in New Mexico (NMDGF, 2019).

Bald Eagle. The bald eagle (*Haliaeetus leucocephalus*) was federally delisted in 2008 and is currently in recovery. The bald eagle has a wingspan of approximately 7 feet, with a dark brown body and wings, a white head and tail, and a yellow beak. The species has a broad range across the United States and is often associated with large bodies of water. The bald eagle is an opportunistic forager and preys upon fish, birds, and mammals, and will eat carrion. The bald eagle builds large stick nests in large roost trees that are open and constructs nests at the highest point where large branches join the tree trunk. Breeding in New Mexico extends from early October to late May (Texas Breeding Bird Atlas, 2018; NMGDF, 2019).

Bell's Vireo. Bell's vireos (*Vireo bellii*) are difficult to find and identify visually due to their dull coloration and use of dense shrubby habitats; they are most easily identified by their unique song. They resemble warblers or kinglets in size with a wingspan of approximately 7 inches. They breed in North America including New Mexico and winter in Central and South America. In New Mexico, they most commonly occur in dense shrubland and woodland along streams dominated by willows, mesquite, and seep willows. Bell's vireo nests are heavily parasitized by cowbirds (*Molothrus ater)* (NMDGF, 2019).

Brown Pelican. Brown pelicans (*Pelecanus occidentalis*) are very large waterbirds with long necks and huge bills and are typically found in warm coastal environments. Their large bills are characterized by a distensible throat pouch. Brown pelicans exclusively nest on islands. The brown pelican feeds exclusively on fish which it captures by diving head first into water from as high as 65 feet. The brown pelican is rare in New Mexico, and most recorded observations are of subadults and have been found near water (NMDGF, 2019).

Broad-billed Hummingbird. The broad-billed hummingbird (*Cynanthus latirostris*) is primarily found in riparian woodlands at low to moderate elevations. It is relatively widespread and common throughout western Mexico but is much more limited in distribution in the southwestern United States. It is known to nest in Guadalupe Canyon in New Mexico where it occurs in woodlands dominated by Fremont cottonwood (*Populus fremontii*), Arizona sycamore (*Platanus wrightii*), Arizona white oak (*Quercus arizonica*), and netleaf hackberry (*Celtis reticulata*). The broad-billed hummingbird feeds on both nectar and small arthropods (NMDGF, 2019).

Common Black Hawk. The common black-hawk (*Buteogallus anthracinus*) has been reported breeding in riparian areas containing cottonwood and willow (*Salix* spp.) trees. In the United States, most breeding sites are in Arizona, with some limited breeding locations in New Mexico and Texas. The common black-hawk is a year-round resident in most of its range from Mexico to northern South America. One breeding site was reported in the lower Rio Grande during surveys conducted for the Texas Breeding Bird Atlas, but most breeding sites in Texas and New Mexico are in, or close to, the Trans-Pecos region (Texas Breeding Bird Atlas, 2018; NMDGF, 2019).

Common Ground-Dove. The common ground-dove (*Columbina passerina*) is a very small dove typically found in agricultural and undeveloped areas at low elevations. It nests in shrubs and small trees within 6 feet of the ground. They forage along the ground eating seeds and other plant materials. The common ground-dove occurs from southeastern California to south Texas, in parts of the southeastern United States, and southward to Central America. It is most commonly observed in spring and summer in New Mexico (NMDGF, 2019).

Costa's Hummingbird. Costa's hummingbird (*Calypte costae*) breeds in North America and winters in Central and South America. It typically breeds in arid habitats and occasionally in agricultural areas. The Costa's hummingbird feeds on both nectar and small arthropods. In New Mexico, it is typically found at lower elevation areas (NMDGF, 2019)

Elegant Trogon. The elegant trogon (*Trogon elegans*) is a short-billed, long-tailed bird with green and red underparts separated by a white band. It nests in holes in trees and are typically lethargic birds with long periods of perching. Their flight to capture insects and other small prey or to pluck fruits is quick and direct. They are typically identified by their song as they are difficult to observe even with their bright and colorful plumage. Although relatively common in Mexico, the elegant trogon is a rare visitor to New Mexico and has been most often observed in the southwestern part of New Mexico (NMDGF, 2019).

Gray Vireo. The gray vireo (*Vireo vicinior*) is typically more active than other vireos; however, their song is the best means for identification. It occurs in New Mexico in spring and summer and breeds in open woodlands and shrublands with evergreen trees. Cowbird parasitism of nests is a problem for this species in North America. The gray vireo is relatively common in Arizona, New Mexico, Colorado, and Utah, as well as southern California and Texas (NMDGF, 2019).

Lucifer Hummingbird. The Lucifer hummingbird (*Calothorax lucifer*) is a small hummingbird with a forked tail and an elongated purple gorget. It is present in New Mexico from March through September and occurs on slopes and in canyons of arid montane areas in association with flowering plants such as agaves (*Agave* spp.), ocotillo (*Fouquieria splendens*), and other chaparral-type plants. It typically feeds on nectar but also occasionally on small arthropods as well (NMDGF, 2019).

Neotropic Cormorant. The neotropic cormorant (*Phalacrocorax brasilianus*) is a medium-sized long-necked waterbird with very dark plumage and a hooked bill. They nest in vegetation near or over water. The neotropic cormorant occurs from New Mexico to Louisiana and across Mexico, Central America, and into South America. They are always associated with bodies of water and in New Mexico are found on or near reservoirs (NMDGF, 2019).

Northern Beardless Tyrannulet. The northern beardless tyrannulet (*Camptostoma imberbe ridgwayi*) is a small flycatcher that is often difficult to identify as it has a similar appearance to vireos or a verdin. It is insectivorous and is primarily associated with low elevation habitats dominated by shrub such as mesquite, typically along streams and rivers. It occurs from southwestern Arizona, southern New Mexico, southern Texas, and through Mexico south to Costa Rica. It only occurs in New Mexico during the summer months (NMDGF, 2019).

Peregrine Falcon. The peregrine falcon (*Falco peregrinus*) has long pointed wings and a long tail and is similar in appearance to the prairie falcon except for having a heavier malar mark and with gray plumage in the underparts instead of brown. With a wingspan of 3.5 feet, the peregrine falcon is a medium-sized raptor. The peregrine falcon dives for prey, which consist almost entirely of birds, and nests on cliffs, especially near wooded areas. The peregrine falcon occurs in all of New Mexico's mountain ranges (NMDGF, 2019).

Thick-billed Kingbird. The thick-billed kingbird (*Tyrannus crassirostris*) is a large flycatcher that inhabits scrub habitats throughout its range in the southwestern United States through western Mexico and

Guatemala; however, in New Mexico, it is almost exclusively limited to riparian habitats. Thick-billed kingbirds have behavior similar to other kingbirds, perching on the upper branches of trees, catching insects in flight, and responding rapidly to predators. In New Mexico, this species is primarily limited in distribution to southwestern New Mexico with occasional vagrants found in other portions of the state (NMDGF, 2019).

Yellow-eyed Junco. The yellow-eyed junco (*Junco phaeonotus palliatus*) is a moderate-sized finch that resembles the gray-headed races of the dark-eyed junco with the exception of a yellow iris, is rustier in color above, and walks instead of hops. They occur in higher elevation woodlands, forested foothills, and canyons. There distribution extends southward to Guatemala and is found year-round in New Mexico where it undergoes an altitudinal migration seasonally (NMDGF, 2019).

Varied Bunting. The varied bunting (*Passerina versicolor*) is a small finch with plum-colored plumage with a red nape and eye-ring and blue rump, crown, and face. Females are typically mostly brown in color. Varied buntings more commonly occur in Mexico in shrubland and second growth woodland habitats. In New Mexico, they typically occur in canyon bottoms in association with dense stands of mesquite. Breeding occurs primarily south of the US-Mexico border and this species typically only occurs in New Mexico during the summer months (NMDGF, 2019).

Violet-crowned Hummingbird. The violet-crowned hummingbird (*Amazilia violiceps ellioti*) is characterized by white underparts, an orange-red bill with a dark tip, a violet-blue crown, and a dark tail. In the southwestern United States, it is typically found in riparian habitats at low to moderate elevations, but in Mexico, it occurs in more varied habitat types. It occurs in New Mexico and Arizona and its range extends southward to southern Mexico. This species winters in New Mexico and breeds in Mexico. Most occurrences in New Mexico have been recorded in Guadalupe Canyon in Hidalgo County (NMDGF, 2019).

White-eared Hummingbird. The white-eared hummingbird (*Hylocharis leucotis borealis*) is a medium-sized hummingbird with a prominent white postocular line. The male is mostly greenish in color with a violet crown and throat. The females have an appearance similar to many other species of hummingbirds but the throat area has spotted green sides. This species is rare in New Mexico and its range extends through the Mexico highlands into Nicaragua. The species is associated with pine and pine-oak forests throughout its range, including in New Mexico. It breeds south of the US-Mexico border. Observations in New Mexico have primarily been in the most southern mountain ranges (NMDGF, 2019).

Least Shrew. The least shrew (*Cryptotis parvus*) is a small mammal similar in size to a mouse but with a long pointed snout and characterized by the presence of four unicuspid teeth, whereas other New Mexico shrews have either three or five unicuspid teeth. The least shrew is widely distributed across the United States from northeastern Colorado and southern South Dakota eastward to Connecticut and southward to the Gulf Coast and through Mexico into Panama. It is rare and localized in occurrence in New Mexico where it is typically associated with moist soils (NMDGF, 2019).

Organ Mountains Colorado Chipmunk. The Organ Mountains Colorado chipmunk (*Neotamias quadrivittatus australis*) like all chipmunks in New Mexico can be distinguished by stripes on their dorsum and that extend onto their face. There are no other chipmunks in the Organ Mountains that would be confused in identification with the Organ Mountains Colorado chipmunk. It is a diurnal rodent, very active, and readily climbs trees but spend most time on fallen logs, rocks, and the ground surface. They apparently do not hibernate in the Organ Mountains. This subspecies of the Colorado chipmunk is limited in distribution to the Organ Mountains in New Mexico (NMDGF, 2019).

Oscura Mountains Colorado Chipmunk. The Oscura Mountains Colorado chipmunk (*Neotamias quadrivittatus oscuraensis*) like all chipmunks in New Mexico can be distinguished by stripes on their dorsum and that extend onto their face. There are no other chipmunks in the Oscura Mountains that would be confused in identification with the Oscura Mountains Colorado chipmunk. It is a diurnal rodent, very active, and readily climbs trees but spend most time on fallen logs, rocks, and the ground surface. This subspecies of the Colorado chipmunk is limited in distribution to the Oscura Mountains in New Mexico (NMDGF, 2019).

Spotted Bat. The spotted bat (*Euderma maculatum*) has blackish upper-body parts with two large, white, circular spots on the shoulders, another circular spot at the base of the tail, and small white patches at the posterior base of each ear. This coloration along with pinkish-red ears makes the spotted bat easily distinguishable from other New World bats. Echolocation calls and feeding buzzes are audible to humans. They roost in crevices in cliffs or under loose rocks and moths are their principal food source. Its distribution ranges from British Columbia to Montana southward to the Big Bend region in Texas and central Mexico. The spotted bat is found throughout New Mexico but is often associated with the nearby presence of water (NMDGF, 2019).

Western Yellow Bat. The western yellow bat (*Dasypterus xanthinus*) is medium-sized, yellow bat distinguished from other yellow bats by having fur restricted to the anterior third of the upper surface of the interfemoral membrane. The western yellow bat likely roosts in solitary in trees and other vegetation except for a mother and her young. Although the western yellow bat is distributed across the southwestern United States, through Mexico and Central America, and southward to South America, it has been recorded in New Mexico only in late spring and summer (May-September), and it likely migrates southward to winter. Food is primarily small arthropods with the majority being flying insects (NMDGF, 2019).

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Table D-1
Federal- and State-Listed Species with the Potential to Occur at Holloman Air Force Base and the Special Use Airspace

Species	Federal Status[1]	State Status[2]	Holloman Air Force Base	Special Use Airspace			
				Beak MOAs	Talon MOAs	White Sands Missile Range Restricted Area	McGregor Range Restricted Area
Birds							
Aplomado falcon (*Falco femoralis*)	NEP	E		X	X	X	X
Baird's sparrow (*Centronyx bairdii*)	-	T	X	X	X	X	X
Bald eagle (*Haliaeetus leucocephalus*)	-	T	X	X	X	X	X
Bell's vireo (*Vireo bellii*)	-	T		X	X	X	X
Broad-billed hummingbird (*Cynanthus latirostris*)	-	T		X	X	X	X
Brown pelican (*Pelecanus occidentalis*)	-	E		X	X	X	X
Common black hawk (*Buteogallus anthracinus*)	-	T		X	X	X	X
Common ground-dove (*Columbina passerina*)	-	E		X	X	X	X
Costa's hummingbird (*Calypte costae*)	-	T				X	
Elegant trogon (*Trogon elegans*)	-	E		X	X	X	X
Gray vireo (*Vireo vicinior*)	-	T		X	X	X	X
Least tern (*Sternula antillarum*)	E	E	X	X	X	X	X
Lucifer hummingbird (*Calothorax lucifer*)	-	T			X	X	
Mexican spotted owl (*Strix occidentalis lucida*)	T	-		X	X	X	X
Neotropic cormorant (*Phalacrocorax brasilianus*)	-	T	X	X	X	X	X

Table D-1
Federal- and State-Listed Species with the Potential to Occur at Holloman Air Force Base and the Special Use Airspace

Species	Federal Status[1]	State Status[2]	Holloman Air Force Base	Special Use Airspace			
				Beak MOAs	Talon MOAs	White Sands Missile Range Restricted Area	McGregor Range Restricted Area
Northern beardless-tyrannulet (*Camptostoma imberbe*)	-	E			X		
Peregrine falcon (*Falco peregrinus*)	-	T	X	X	X	X	
Piping plover (Charadrius melodus)	T	T		X	X	X	
Southwestern willow flycatcher (*Empidonax traillii extimus*)	E	E		X	X	X	X
Thick-billed kingbird (*Tyrannus crassirostris*)	-	E			X	X	
Yellow-billed cuckoo (*Bartramia longicauda*)	T	-		X	X	X	
Yellow-eyed junco (*Junco phaeonotus*)	-	T		X	X	X	X
Varied bunting (*Passerina versicolor*)	-	T		X	X	X	X
Violet-crowned hummingbird (*Amazilia violiceps*)	-	T				X	
White-eared hummingbird (*Hylocharis leucotis*)	-	T		X	X	X	X
Mammals							
Least shrew (*Cryptotis parvus*)	-	T		X	X		
New Mexico madow jumping mouse (*Zapus luteus luteus*)	E	E		X	X	X	X
Mexican gray wolf (*Canis lupus baileyi*)	E	E				X	
Organ Mountains Colorado chipmunk (*Neotamias quadrivittatus australis*)	-	T				X	
Oscura Mountains Colorado chipmunk (*Neotamias quadrivittatus oscuraensis*)	-	T		X		X	

Table D-1
Federal- and State-Listed Species with the Potential to Occur at Holloman Air Force Base and the Special Use Airspace

Species	Federal Status[1]	State Status[2]	Holloman Air Force Base	Special Use Airspace			
				Beak MOAs	Talon MOAs	White Sands Missile Range Restricted Area	McGregor Range Restricted Area
Penasco least chipmunk (*Neotamias minimus atristriatus*)	C	E		X	X	X	X
Spotted bat (*Euderma maculatum*)	-	T		X	X		X
Western yellow bat (*Dasypterus xanthinus*)	-	T				X	
Reptiles							
Arid land ribbonsnake (*Thamnophis proximus*)	-	T		X	X		
Dunes sagebrush lizard (*Sceloporus arenicolus*)	-	E		X	X		
Gray-banded kingsnake (*Lampropeltis alterna*)	-	E		X	X	X	X
Mottled rock rattlesnake (*Crotalus lepidus lepidus*)	-	T		X		X	X
Plain-bellied watersnake (*Nerodia erythrogaster*)	-	E			X		
Reticulated Gila monster (*Heloderma suspectum suspectum*)	-	E				X	
Texas horned lizard (*Phrynosoma cornutum*)	-	FP	X				
Western river cooter (*Pseudemys gorzugi*)	-	T		X	X	X	
Amphibians							
Chiricahua leopard frog (*Lithobates chiricahuensis*)	-	T				X	
Great Plains narrowmouth toad (*Gastrophryne olivacea*)	-	E			X		
Sacramento Mountain salamander *(Aneides hardii)*	-	T		X	X	X	X

Table D-1
Federal- and State-Listed Species with the Potential to Occur at Holloman Air Force Base and the Special Use Airspace

Species	Federal Status[1]	State Status[2]	Holloman Air Force Base	Special Use Airspace			
				Beak MOAs	Talon MOAs	White Sands Missile Range Restricted Area	McGregor Range Restricted Area
Fish							
Bigscale logperch (Native Population) *(Percina macrolepida)*	-	T		X	X		
Blue sucker (*Cycleptus elongates*)	-	E			X		
Gila trout (*Oncorhynchus gilae*)	T	T				X	
Gray redhorse (*Moxostoma congestum*)	-	E			X		
Greenthroat darter (*Etheostoma lepidum*)	-	T		X	X		
Headwater chub (*Gila nigra*)	-	E					
Mexican tetra (*Astyanax mexicanus*)	-	T			X		
Pecos bluntnose shiner (*Notropis simus pecosensis*)	T	E		X	X		
Pecos gambusia (*Gambusia nobilis*)	E	E		X	X		
Pecos pupfish (*Cyprinodon pecosensis*)	-	T		X	X		
Rio Grande silvery minnow (*Hybognathus amarus*)	E	E				X	
Suckermouth minnow (*Phenacobius mirabilis*)	-	T			X		
White Sands pupfish (*Cyprinodon tularosa*)	-	T	X	X	X	X	X
Molluscs							
Alamosa springsnail (*Pseudotryonia alamosae*)	E	E				X	
Chupadera springsnail (*Pyrgulopsis chupaderae*)	E	E				X	

Table D-1
Federal- and State-Listed Species with the Potential to Occur at Holloman Air Force Base and the Special Use Airspace

Species	Federal Status[1]	State Status[2]	Holloman Air Force Base	Special Use Airspace			
				Beak MOAs	Talon MOAs	White Sands Missile Range Restricted Area	McGregor Range Restricted Area
Dona Ana talussnail (*Sonorella todseni*)	-	T				X	
Koster's springsnail (*Juturnia kosteri*)	E	E		X	X		
Mineral Creek mountainsnail (*Oreohelix pilsbryi*)	-	T				X	
Ovate vertigo snail (*Vertigo ovata*)	-	T			X		
Pecos assiminea (*Assiminea pecos*)	E	E		X	X		
Pecos springsnail (*Pyrgulopsis pecosensis*)	-	T			X		
Roswell springsnail (*Pyrgulopsis roswellensis*)	E	E		X	X		
Socorro springsnail (*Pyrgulopsis neomexicana*)	E	E				X	
Texas hornshell (*Popenaias popeii*)	E	E			X		
Wrinkled marshsnail (*Stagnicola caperata*)	-	E		X	X		
Crustaceans							
Noel's amphipod (*Gammarus desperatus*)	E	E		X	X		
Socorro isopod (*Thermosphaeroma thermophilum*)	E	E				X	
Plants							
Beehive cactus (*Coryphantha robustispina* ssp. *scheeri*)	-	E			X		
Dune pricklypear (*Opuntia arenaria*)	-	E				X	
Gooding's onion (*Allium gooddingii*)	-	E		X		X	

Table D-1
Federal- and State-Listed Species with the Potential to Occur at Holloman Air Force Base and the Special Use Airspace

Species	Federal Status[1]	State Status[2]	Holloman Air Force Base	Special Use Airspace			
				Beak MOAs	Talon MOAs	White Sands Missile Range Restricted Area	McGregor Range Restricted Area
Gypsum wild-buckwheat (*Eriogonum gypsophilum*)	T	E			X		
Kuenzler hedgehog cactus (*Echinocereus fendleri* var. *kuenzleri*)	T	E		X	X	X	X
Lee's pincushion cactus (*Coryphantha sneedii* var. *leei)*	T	E			X		
Mescalero milkwort (*Polygala rimulicola* var. *mescalerorum*)	-	E				X	
Night-blooming cereus (*Peniocereus greggii* var. *greggii*)	-	E				X	
Organ Mountains pincushion cactus (*Escobaria organensis*)	-	E				X	
Pecos (=puzzle, =paradox) sunflower (*Helianthus paradoxus*)	T	E				X	
Sacramento Mountains thistle (*Cirsium vinaceum*)	T	E		X			
Sacramento prickly poppy (*Argemone pleiacantha* ssp. *pinnatisecta*)	E	E		X			
Sneed pincushion cactus (*Coryphantha sneedii* var. *sneedii*)	E	E				X	
Shining crested coralroot (*Hexalectris nitida*)	-	E			X	X	
Tharp's blue-star (*Amsonia tharpii*)	-	E			X		
Todsen's pennyroyal (*Hedeoma todsenii*)	E	E		X		X	
Wright's marsh thistle (*Cirsium wrightii*)	C	E		X	X	X	

Sources:
[1] USFWS, 2019
[2] NMDGF, 2019

C = Candidate;E = Endangered; FP = Fully Protected; MOA = Military Operations Area; NEP = Nonessential Experimental Population; T = Threatened

APPENDIX E

HOLLOMAN AIR FORCE BASE SPECIAL USE AIRSPACE OPTIMIZATION DRAFT ENVIRONMENTAL IMPACT STATEMENT EXISTING AND PROPOSED SPECIAL USE AIRSPACE FIGURES

Existing and newly proposed special use airspace west of the White Sands Missile Range was considered for contract adversary air training operations but given the travel distances involved, they were determined to not meet the selection criteria as an alternative for implementing the Proposed Action (refer to Sections 2.2 through 2.4).

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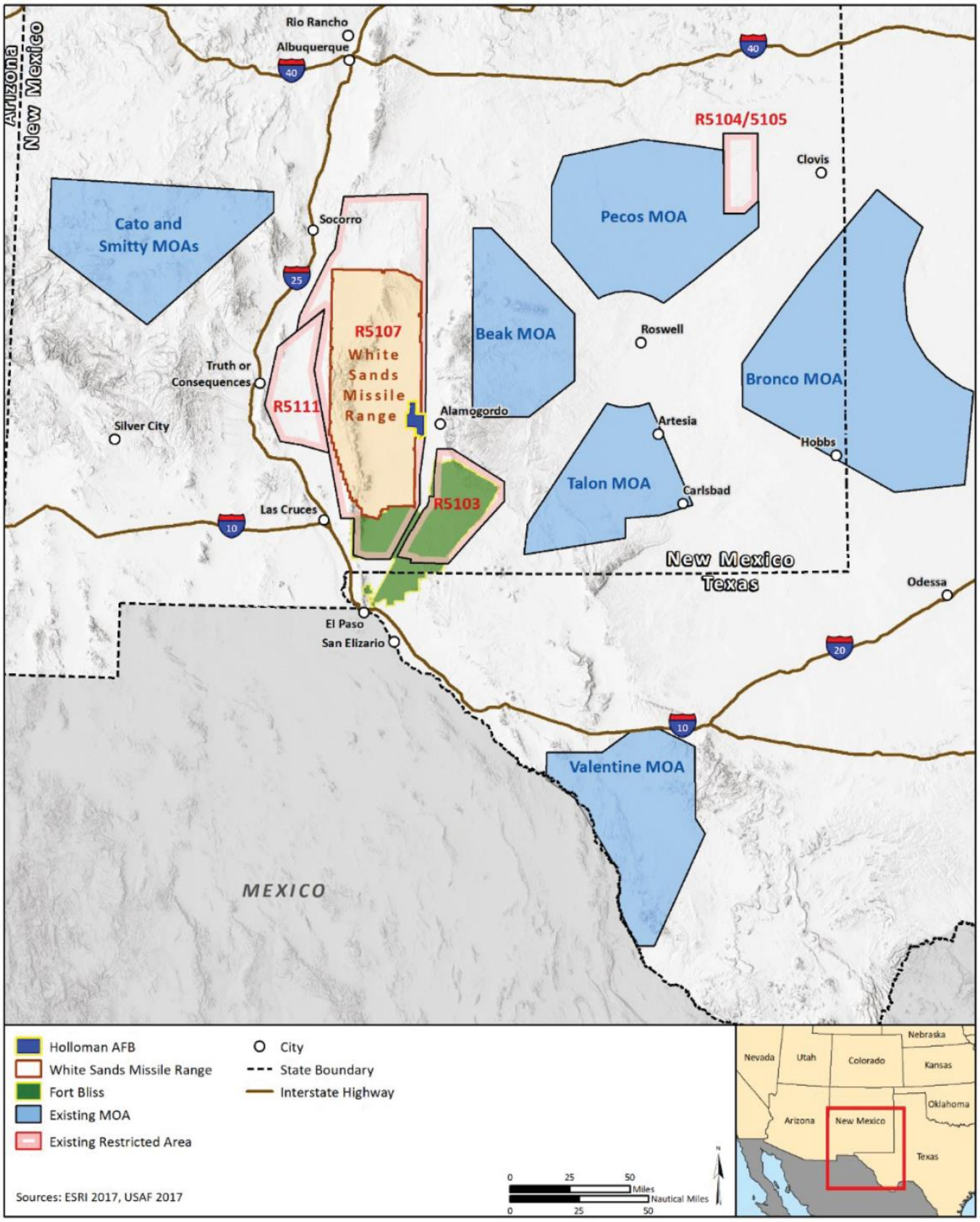
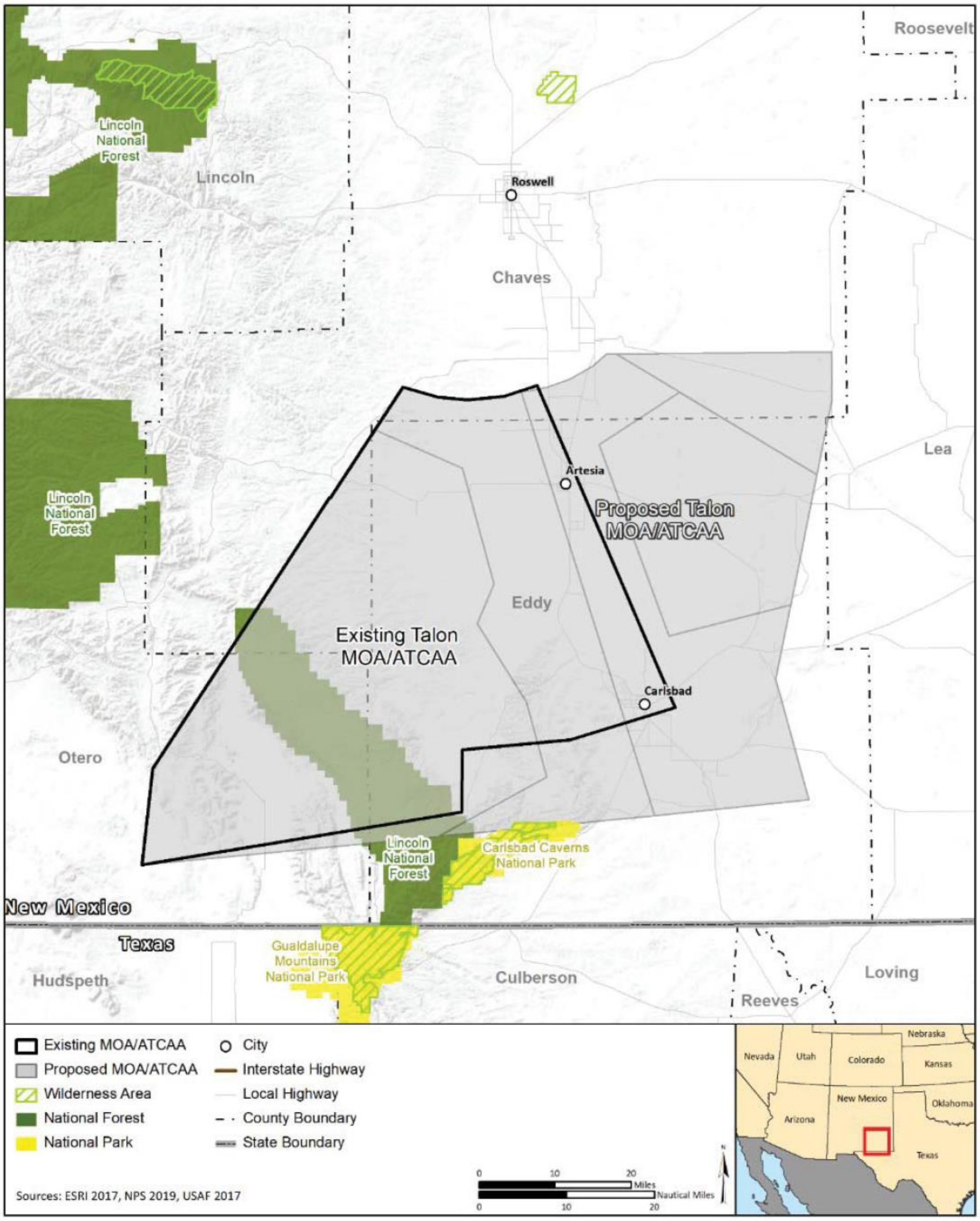


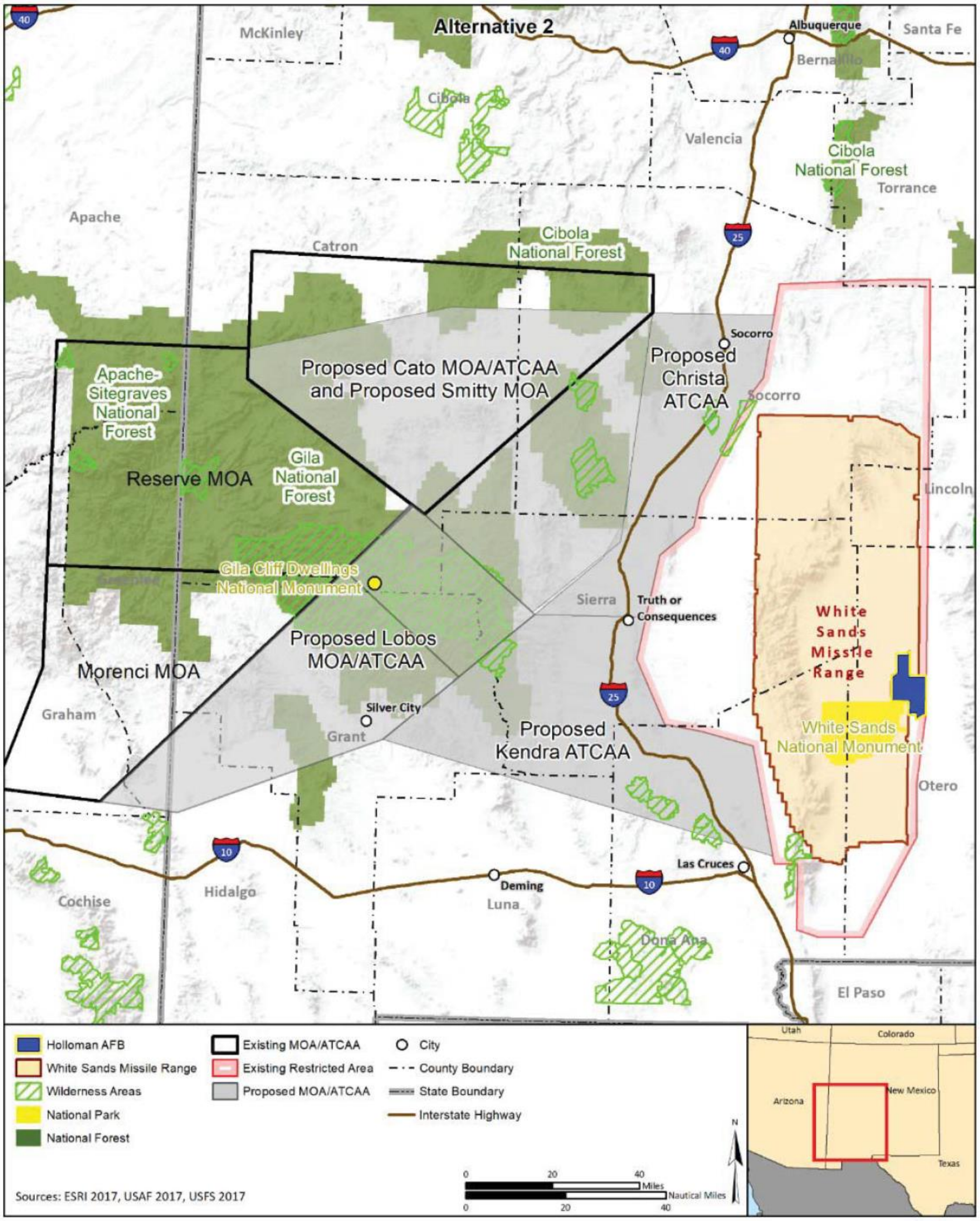
Legend: AFB-Air Force Base; MOA-Military Operations Area.

Figure 1.2-3. Airspace Available for F-16 Pilot Training



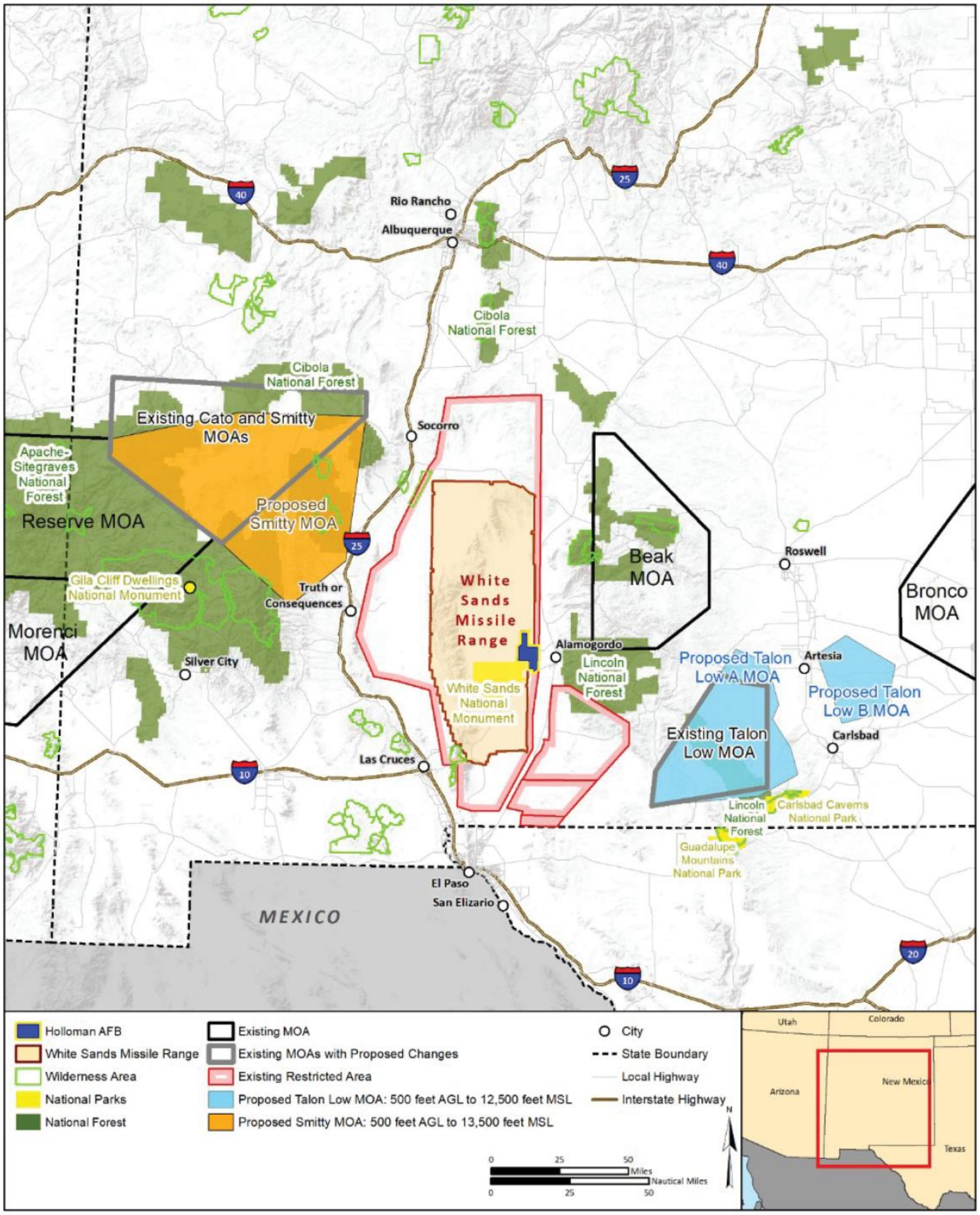
Legend: ATCAA – Air Traffic Control Assigned Airspace; MOA-Military Operations Area.

Figure 2.8-1. Alternative 1: Overview of Existing and Proposed Talon MOA



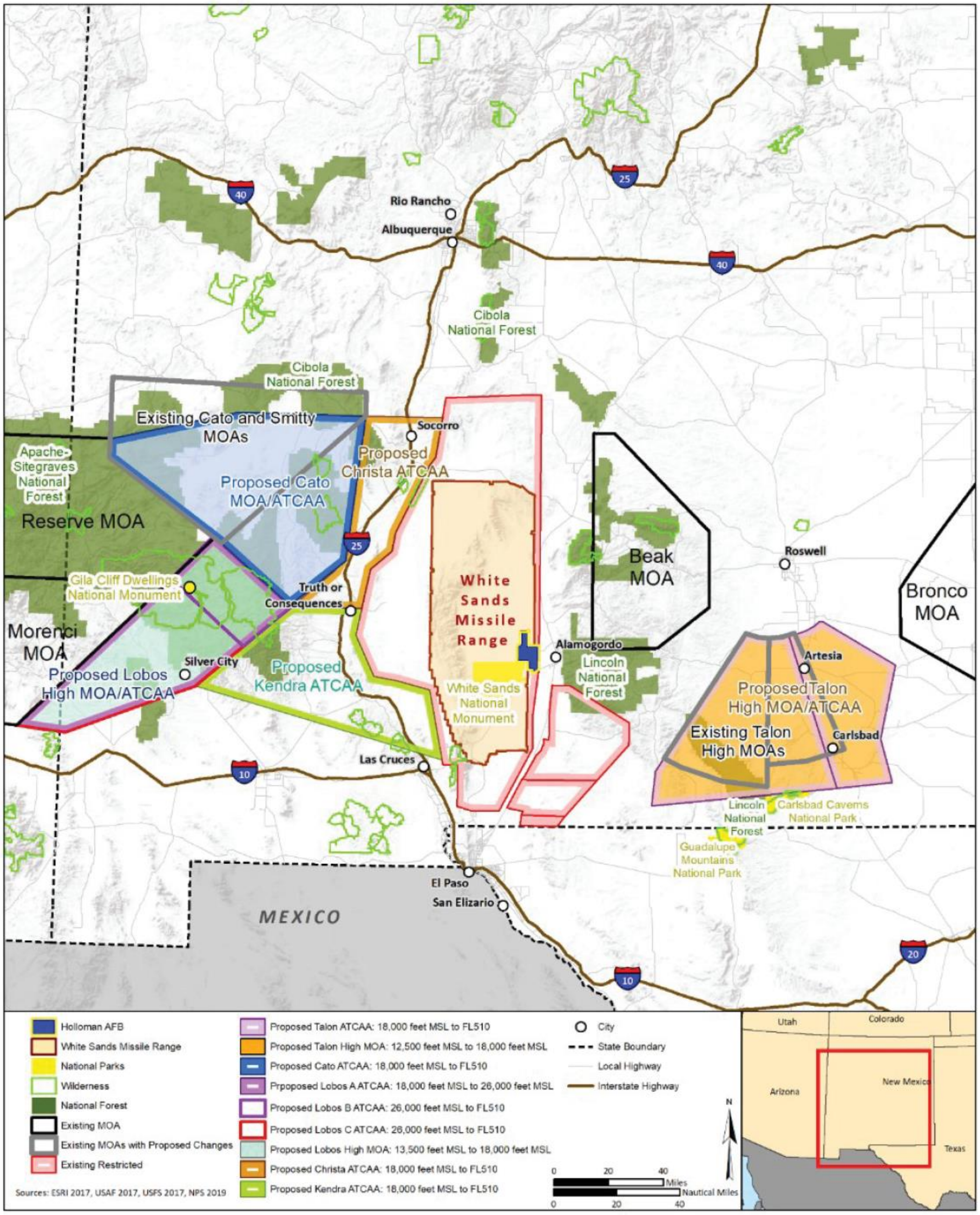
Legend: AFB-Air Force Base; ATCAA-Air Traffic Control Assigned Airspace; MOA-Military Operations Area.

Figure 2.8-6. Alternative 2: Overview of Cato, Smitty, Lobos MOAs and Christa and Kendra ATCAAs



Legend: AFB-Air Force Base; AGL-above ground level; MOA-Military Operations Area; MSL-mean sea level.

Figure 2.8-11. Alternative 3: Proposed Low MOAs



Legend: AFB-Air Force Base; ATCAA-Air Traffic Control Assigned Airspace; FL-Flight Level; MOA-Military Operations Area; MSL-mean sea level.

Figure 2.8-12. Alternative 3: Proposed High MOAs and ATCAAs

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