
APPENDIX D

Noise Report

FINAL

**Noise Study for the Holloman AFB
QF-4 to QF-16 Replacement Environmental Assessment**



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1.0 Introduction and Executive Summary

The United States Air Force (USAF) is conducting an Environmental Assessment (EA) for the transition of QF-4 to QF-16 aircraft at Holloman Air Force Base (AFB) in New Mexico. In support of the EA, this report presents subsonic and supersonic noise exposure. The EA documents the proposed replacement of aging QF-4 aircraft with QF-16 aircraft. Annual sorties and use of the airspace for the QF-16s would be the same as the QF-4s. The QF-16 would perform similar operations as the QF-4 near the airfield with the notable difference being Simulated Flame-out (SFO) operations.

The report presents results for two scenarios – Baseline and Proposed Action. Baseline excludes the QF-16 operations whereas Proposed Action excludes the QF-4 operations.

The noise analyses were performed with Department of Defense (DOD) computer-based tools and programs and produced applicable cumulative noise metrics for each category of aircraft operations, i.e., Day-Night Average Sound Level (DNL) for airfield operations, Onset Rate Adjusted Monthly Day-Night Average Sound Level (L_{dnmr}) for subsonic airspace operations and C-weighted DNL (CDNL or L_{Cdn}) for supersonic activity. For airfield operations, supplemental noise metrics of Number of Events Above (NA) and Time Above (TA) were also computed for thresholds of 35 dB Maximum Sound Level (L_{max}) and 65 dB L_{max} .

The DoD Noise Working Group (DNWG) provides guidance

The three subsections below summarize the pertinent results with regard to airfield operations, subsonic airspace activity and supersonic operations, respectively.

1.1 Airfield Activity

The annual flight operations for Baseline total nearly 100,000 with over half of those being closed pattern operations. Annual QF-4 operations consist of approximately 2,400. Per AFH 32-7084, the baseline noise analysis, including the QF-4, based F-16 and German Air Force (GAF) Tornado aircraft operations was updated relative to the Preliminary Draft EA with regard to runway utilization, flight tracks, track utilization, flight profiles and maintenance activity based on review and input by pilot personnel.

Twelve Points of Interest (POI) were selected for more detailed analyses. The POI are either on-base or within the White Sand National Monument (WNSA). No off-base residential POIs are within the vicinity of Holloman AFB. On-base POI consists of two child development centers, a place of worship and two schools.

For Baseline, the off-base noise exposure is as much as 74 dB DNL at and southeast of US 70. Southeast of the base, the 65 dB DNL contour extends 1.8 miles south of US 70. The 70 dB DNL contour extends nearly one mile south of US 70. The off-base exposure west of the base into the White Sands National Monument (WNSA) is as high as 70 dB DNL as the 70 dB DNL contour clips a corner of the WNSA. DNL for on-base POI range from 70 to 72 dB. DNL for WNSA POI range between 43 and 55 dB except for one location, named TrailWest, which has a DNL of 20 dB. See section 3.1.5 for a map of the POI.

Excluding WNSA's TrailWest, which is in the southwest corner of the Monument, WNSA POI NA ranges from 193 to 217 events for the 35 dB threshold and from 12 to 44 events for the 65 dB

threshold, per average flying day. TrailWest NA35ALM is 3 events. TrailWest NA65ALM is less than 0.5 event. Holloman POI NA are 190 events for the 65 dB threshold, per average flying day.

Excluding WHSA's TrailWest location, WHSA POI TA ranges from 141 to 383 minutes for the 35 dB threshold and from 5 to 47 minutes for the 65 dB threshold, per average flying day. TrailWest TA35ALM is 4 minutes. TrailEast and TrailWest TA65ALM is less than half of a minute. Holloman POI TA ranges from 151 to 165 minutes for the 65 dB threshold, per average flying day.

In general, QF-16 operations are slightly quieter than the older QF-4. Thus the Proposed scenario would cause a slight reduction in the extents of the DNL contours, most noticeably to the north of the airfield and in the WHSA. DNL for POI would be identical to Baseline except the DNL at WHSA POI High Use Visitor Areas #1 and #2 would decrease by up to 2 dB. NA would decrease by up to 2 events at all POI. TA would decrease at most POI, by up to 4 minutes.

1.2 Subsonic Airspace Activity

Nearly 11,000 annual sorties were modeled in flight areas associated with Restricted Areas R-5107, R-5103 and nearby MOAs, of which approximately 400 are by the QF-4. Nearly 900 sorties were modeled across 7 Military Training Routes (MTRs) used by Holloman aircraft. The QF-4 accounts for 34 annual sorties.

The maximum level for area-type operations of 50 dB L_{dnmr} occurs in R-5103 primarily due to the 56FW F-16 Close Air Support (CAS) and Surface Attack Tactics (SAT) training missions which occur at altitudes as low as 500 ft above ground level (AGL). The maximum MTR centerline level of 52 dB L_{dnmr} occurs along IR-133 as it ends in Red Rio primarily due to F-16 operations which occur at 300 to 500 ft AGL.

The POI are exposed to 43 dB L_{dnmr} for all points except the West Trail which is exposed to 45 dB L_{dnmr} .

L_{dnmr} for the Proposed scenario would decrease by up to 2 dB at any of the modeled flight areas or under any of the modeled MTRs and at the POI, relative to Baseline.

1.3 Supersonic Activity

The preponderance of supersonic activity over WSMR occurs above 10,000 ft mean sea level (MSL) (approximately 5,000 feet AGL and above) as detailed in Table 5-1. Of the 4,654 Air Combat Maneuvering (ACM) sorties with the potential to go supersonic, the 56FW F-16s account for 94 percent. The QF-4 accounts for only 10 annual sorties with potential to go supersonic. The boom environment in the center of R-5107 is estimated to be 47.3 dB CDNL and 0.21 booms per day. Consistent with Baseline, at a rate of one boom every 5 days or less, disturbance for the Proposed scenario would remain minimal. The Probability of Damage (POD) to the visitor center for Baseline and Proposed scenarios is approximately one chance in 2 million. The risk to the visitor center is thus very small. A study sponsored by the Navy which measured damage potential from sonic booms to a historic structure reached similar conclusions (James, et al., 2009). The study found that carpet sonic boom levels generated at altitudes above 5,000 ft MSL do not have the potential to damage any component of the [historic structure], regardless of distance away. The altitudes of supersonic activity over WSMR are comparable to the Navy study in terms of above ground level (AGL). Additionally, the probability of focus booms impacting the [site] is very low, given the size of the range complex relative to the size of the historic site. However, focus boom levels, generated at altitudes below 20,000 ft MSL and with aircraft accelerating supersonically toward the site from 4 to 12 miles, do have the potential to damage the most susceptible components of the [historic

structure]. The conclusive support the present findings that there exists a potential for damage but the probability is small very.

Supersonic activity in the low level corridor shown in Figure 5-2 could produce overpressures in Table 5-3 which are sufficiently high that personnel and non-range equipment should not be exposed. Accordingly, when there are operations that can result in low altitude booms at WHSA, they will be coordinated with the National Park Service and the monument would be evacuated, per the Interagency Agreement No. F1274100002. The visitor center is and would remain well outside of the area exposed to existing or proposed booms from the corridor.

2.0 Methodology

This section elaborates the noise metrics, computer models, and modeling parameters implemented in the noise analyses of this report. Section 2.1 describes noise metrics and “Noise Zones” used for planning purposes. Section 2.2 describes general characteristics of the noise models, and Section 2.3 further describes specific parameters of the noise models, such as weather and topography data used in the analyses.

2.1 Noise Metrics

Via US DOD Instruction 4165.57, cumulative aircraft noise exposure is described and presented in terms of Day-Night Average Sound Level (DNL). DNL is a composite noise metric accounting for the sound energy of all noise events in a 24-hour period. In order to account for increased human sensitivity to noise at night, a 10 dB penalty is applied to nighttime events (10:00 p.m. to 7:00 a.m. time period). With DNL, individual flight and run-up event noise exposure is estimated in terms of Sound Exposure Level (SEL) and instantaneous Maximum Sound Level (L_{max}), respectively. SEL is an integrated metric normalized to one second that accounts for the event duration. L_{max} is self-explanatory. SEL and L_{max} are expressed in A-weighted decibels (dB or dBA).

Military aircraft utilizing Special Use Airspace (SUA) such as Military Training Routes (MTRs), Military Operating Areas (MOAs) and Restricted Areas/Ranges, generate a noise environment that is somewhat different from that associated with airfield operations. As opposed to patterned or continuous noise environments associated with airfields, flight activity in SUAs is sporadic and often seasonal ranging from ten 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-air-speed flyover can have a rather sudden onset rate, causing an increase in the effective sound level.

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 SUA activity is the Onset-Rate Adjusted Monthly Day-Night Average Sound Level (L_{dnmr}). Onset rates between 15 to 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. 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. The term “aircraft sortie” is used to describe a single aircraft taking off, conducting an activity, and then returning. Multiple operations or mission events can be conducted within one aircraft sortie. One example would be multiple bombing target passes conducted during a single sortie.

The A-weighting in DNL and L_{dnmr} de-emphasizes low-frequency noise, i.e., noise containing components less than 200 Hertz (Hz), to approximate the response and sensitivity of the human ear. Noise from sonic booms, generated from aircraft in supersonic flight, is impulsive noise and

contains more low-frequency noise energy, and is best described in terms of C-weighted decibels (dBC), with little low-frequency de-emphasis as shown in Figure 2-1. Because they typically contain more low-frequency energy, impulsive sounds may induce secondary effects, such as shaking of a structure, rattling of windows, and inducing vibrations. These secondary effects can cause additional annoyance and complaints. For sonic boom, the appropriate noise metric for cumulative exposure is C-weighted DNL (CDNL or L_{Cdn}).

The community response to aircraft noise and sonic boom has long been a concern in the vicinity airfields and airspace training areas. For land use planning purposes, the DOD guidance generally divides noise exposure into three zones listed in Table 2-1 and described as follows:

- *Noise Zone I:* Defined as an area of minimal impact. This is also an area where social surveys show less than 15 percent of the population would be expected to be highly annoyed.
- *Noise Zone II:* Defined as an area of moderate impact. This is the area where social surveys show between 15 percent and 39 percent of the population would be expected to be highly annoyed.

Noise Zone III: Defined as an area of most severe impact. This is the area where social surveys show greater than 39 percent of the population would be expected to be highly annoyed.

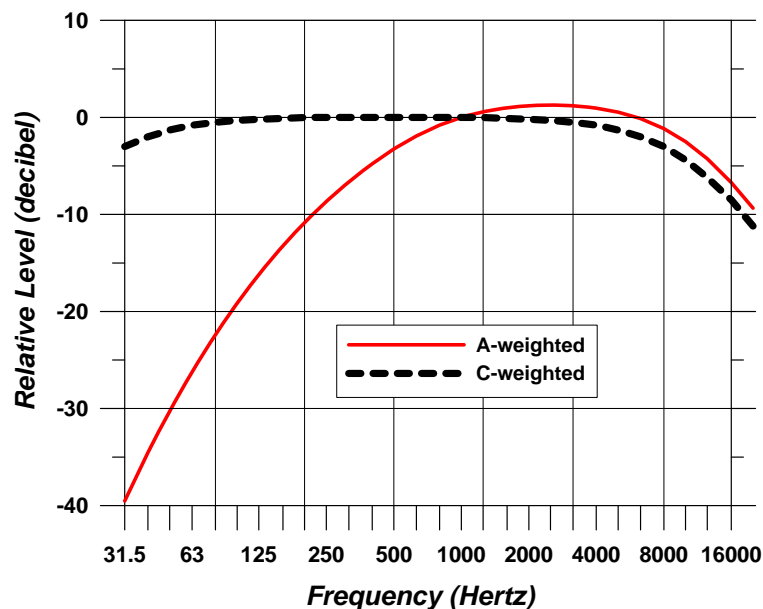


Figure 2-1. Frequency Response Characteristics of A- and C-Weighting Networks

Table 2-1 Noise Metrics, Zones, and Contours Computed

Noise Source:	Category of Expected Noise Impact	Percent "Highly Annoyed" by Noise	Aircraft (Airfield)	Aircraft (Airspace)	Sonic Boom
Cumulative Metric Relating Annoyance and Land Use Compatibility:	n/a	n/a	DNL (dBA)	L _{dnmr} (dBA)	CDNL (dBC)
Land Use Planning Zone (LUPZ):	Less than minimal; operational tempo is above average	Less than 15%	n/a	n/a	Greater than or equal to 57 but less than 62
Noise Zone I:	Minimal	Less than 15%	Less than 65	Less than 65	Less than 62
Noise Zone II:	Moderate	Between 15% and 39%	Greater than or equal to 65 but less than 75	Greater than or equal to 65 but less than 75	Greater than or equal to 62 but less than 70
Noise Zone III:	Most Severe	Greater than 39%	Greater than or equal to 75	Greater than or equal to 75	Greater than or equal to 70
Contours Shown:	n/a	n/a	65, 70, 75, 80, 85	Tabular values only; exposure less than 60 dB	57, 62, 70

Source: DODI 4165.57 (2011); AFI 32-7063 (2006), Army AR-200 (2007), Table 14-1.

In calculating time-average sound levels, the reliability of the results varies at lower levels (below 45 dB DNL/L_{dnmr}/CDNL). This arises from the increasing variability of individual event sound levels at longer propagation distances due to atmospheric effects on sound propagation and to the presence of other sources of noise. Also, when ordnance or flight activity is infrequent, the time-averaged sound levels are generated by only a few individual noise events, which may not be statistically representative of the given events modeled. Most of the guidelines for the acceptability of aircraft noise are on the order of 65 dB and higher. Therefore, DNL/L_{dnmr}/CDNL less than 45 dB are presented herein as "<45 dB".

2.2 Noise Models and Parameters

The models listed herein are the most accurate and useful for comparing "before-and-after" noise levels that would result from alternative scenarios when calculations are made in a consistent manner. The programs allow noise exposure prediction of such proposed actions without actual implementation and/or noise monitoring of those actions.

Table 2-2 summarizes the noise models and modeling parameters relevant to this report. More detail on weather and topography data are provided in Section 2.2.3. The noise analysis was conducted according to established US DOD guidelines and best practices and employed the US DOD NOISEMAP suite of computer-based modeling tools (Czech and Plotkin 1998; Page et al, 2012; Wasmer and Maunsell 2006a; Wasmer and Maunsell 2006b), the Military Operating Area and Range Noise Model (MR_NMAP; Lucas & Calamia 1994), and supersonic aircraft models BooMap, CABoom, CORBoom (Plotkin et al. 1989; Plotkin et al. 1992; Plotkin and Grandi 2002; and Carlson 1978). The core computational modules of the NOISEMAP suite are NMAP and the Advanced Acoustic Model (AAM). The Advanced Acoustic Model (AAM) was utilized for this project because of the supplemental noise metrics needed not yet supported by NMAP.

For airfield noise modeling, total annual flight operations were converted to Average Busy Day (ABD) flight operations by dividing annual flight operations by the number of flying days in a year -- 250 days per year for based aircraft and 365 days per year for transient and civilian aircraft at Holloman AFB.

All maps in this report depict a north arrow pointing to true north. Unlike NMAP and AAM, MR_NMAP does not have the capability to model varying terrain or ground impedance. MR_NMAP assumes all flight profiles' altitudes are relative to the elevation Above Ground Level (AGL). Aircraft flight altitudes provided from operators expressed in feet above Mean Sea Level

(MSL) were converted to AGL for use in the MR_NMAP. Due to variations in ground elevation of up to 2,000 ft this conversion was done for each individual modeled flight area separately. In a similar way, the sonic boom programs model the ground flat and aircraft activity altitudes in terms of AGL.

2.3 BOOMAP96

Supersonic flight can cause a sonic boom on the ground. Sonic boom is impulsive sound. BooMap96 is a program that computes CDNL contours in military Air Combat Maneuver (ACM) training airspaces based on published methodology (Frampton et al, 1993). CDNL contours in ACM arenas follow an elliptical pattern which depends on the size of the airspace and the sortie rate. BooMap96 utilizes sonic boom data gathered during three measurement programs conducted on the sonic boom environment in the Elgin MOA subsection of the Nellis Range Complex, White Sands Missile Range (WSMR) and Barry Goldwater Range East (R-2301E). Based upon that data, CDNL was determined as a function of the number of sorties per month and the dimensions of the elliptical flight area. The elliptical pattern is aligned with the "Available Airspace", or "Maneuver Ellipse" which is an elliptical maneuver region within the airspace. It is common for ACM arenas to have a single maneuver ellipse, with that region being the largest ellipse that can be inscribed within the airspace boundaries. Many supersonic areas have several maneuver ellipses, with operations divided among them. BooMap96 allows the user to define up to 10 maneuver ellipses per airspace, and assign monthly operations to each. The program draws upon published definitions of existing MOAs and Restricted areas or user-defined airspace boundaries.

Table 2-2 Aircraft Noise Model, Methodology, and Weather

Airfield Noise Model		
Software	Analysis	Version
NoiseMap	Airfield DNL	7.2
AAM	Airfield / WSNM NA & TA	1.4.10
Parameter	Description	
Receiver Grid Spacing	500 ft in x and y (DNL) / 1000 ft in x and y (NA & TA)	
Modeled Annual Flying Days	250 (Based Aircraft) / 365 (Transient Aircraft)	
Topography		
Elevation Data Source	1/3 arc-second NED	
Elevation and Impedance Grid spacing	500 ft in x and y	
Flow Resistivity of Land Areas (soft)	200 kPa-s/m ²	
Flow Resistivity of Water Areas	1,000,000 kPa-s/m ²	
Weather		
Temperature	46 °F	
Relative Humidity	47%	
Barometric Pressure	29.92 inHG	
Airspace Noise Model		
Software	Activity Modeled	Version
MR_NMAP	Subsonic	2.2b
BooMap	Supersonic	1996
CABoom	Supersonic	
CORBoom	Supersonic	
Parameter	Description	
Receiver Grid Spacing	626 ft in x and y	
Modeled Flying Days	Busiest Month Concept	
Topography		
Fixed Flow Resistivity for all areas	Soft 200 kPa-s/m ²	
Weather		
Standard Temperature	46 °F	
Standard Relative Humidity	47%	

3.0 Holloman AFB

Section 3.1 addresses the Baseline scenario and its associated noise exposure while Section 3.2 presents the noise exposure associated with the Proposed scenario.

3.1 Baseline Scenario

The Baseline scenario is described in sections 3.1.1 through 3.1.4. Section 3.1.5 contains the noise exposure resulting from the operations described in the aforementioned sections.

3.1.1 Flight Operations

The most recent, publically-available noise analysis data was the 2012 F-35A AETC Training Beddown EIS Holloman Scenario (USAF 2012). Per AFH 32-7063, this baseline was revalidated via pilot interviews to revise flight profiles. Table 3-1 contains the annual baseline flight operations. Annual flight operations total nearly 100,000 with over half of those being closed pattern operations. The QF-4 conducts nearly 2,400 annual flight operations, with none during the environmental

nighttime period (2200 to 0700). Ninety percent of the flight operations are by based 56FW F-16 aircraft and GAF Tornado aircraft. One percent of the annual flight operations are during the environmental nighttime period with 86 percent of those being conducted by the GAF Tornado aircraft. Approximately half of the nighttime operations are departures (GAF Tornado with afterburner) and IFR arrivals and half are VFR closed pattern operations.

Table 3-1. Annual Flight Operations at Holloman AFB for Baseline Scenario

a) Summary

Aircraft		Departure			Arrival			Pattern*			Grand Total		
Category	Type	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 (250 annual flying days)	QF-4C	601	-	601	601	-	601	1,200	-	1,200	2,402	-	2,402
	F-16C (PW220)	10,292	-	10,292	10,114	179	10,293	23,175	-	23,175	43,581	179	43,760
	C-12	113	-	113	113	-	113	-	-	-	226	-	226
	OH-58	1,000	-	1,000	1,000	-	1,000	-	-	-	2,000	-	2,000
	T-38	22	-	22	22	-	22	90	-	90	134	-	134
	TORNADO	6,725	246	6,971	6,810	161	6,971	31,133	656	31,789	44,668	1,063	45,731
Transient (365 flying days)	A-10A	66	-	66	66	-	66	-	-	-	132	-	132
	C-130E	175	-	175	175	-	175	-	-	-	350	-	350
	C-17	44	-	44	44	-	44	-	-	-	88	-	88
	C-5A	44	-	44	44	-	44	-	-	-	88	-	88
	F-16C (PW220)	168	-	168	168	-	168	-	-	-	336	-	336
	F-15E (PW229)	113	-	113	113	-	113	-	-	-	226	-	226
	F/A-18C/D	142	-	142	142	-	142	-	-	-	284	-	284
T-37B	51	-	51	51	-	51	-	-	-	102	-	102	
Civilian (365 flying days)	CNA441	409	-	409	409	-	409	-	-	-	818	-	818
	COMP1985	1,643	-	1,643	1,643	-	1,643	-	-	-	3,286	-	3,286
Baseline Total		21,608	246	21,854	21,515	340	21,855	55,598	656	56,254	98,721	1,242	99,963

b) Departures detail

Aircraft		Departures								
		Regular/Military Power			Afterburner-assisted			Afterburner Chase		
Category	Type	Day (0700- 2200)	Night (2200- 0700)	Total	Day (0700- 2200)	Night (2200- 0700)	Total	Day (0700- 2200)	Night (2200- 0700)	Total
Based (250 annual flying days)	QF-4C	-	-	-	582	-	582	19	-	19
	F-16C (PW220)	6,175	-	6,175	4,117	-	4,117	-	-	-
	C-12	113	-	113	-	-	-	-	-	-
	OH-58	1,000	-	1,000	-	-	-	-	-	-
	T-38	-	-	-	22	-	22	-	-	-
	TORNADO	-	-	-	6,725	246	6,971	-	-	-
Transient (365 flying days)	A-10A	66	-	66	-	-	-	-	-	-
	C-130E	175	-	175	-	-	-	-	-	-
	C-17	44	-	44	-	-	-	-	-	-
	C-5A	44	-	44	-	-	-	-	-	-
	F-16C (PW220)	-	-	-	168	-	168	-	-	-
	F-15E (PW229)	113	-	113	-	-	-	-	-	-
	F/A-18C/D	-	-	-	142	-	142	-	-	-
T-37B	51	-	51	-	-	-	-	-	-	
Civilian (365 flying days)	CNA441	409	-	409	-	-	-	-	-	-
	COMP1985	1,643	-	1,643	-	-	-	-	-	-
Baseline Totals		9,833	-	9,833	11,756	246	12,002	19	-	19

Table 3-1. Annual Flight Operations at Holloman AFB for Baseline Scenario - *continued*

c) Arrival detail

Aircraft		Arrivals																	
Category	Type	VFR Non-break/pitch			IFR Non-break/pitch			Pitch/Overhead			Tactical Approach			SFO Straight-in Arrival			SFO Overhead		
		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 (250 annual flying days)	QF-4C	163	-	163	79	-	79	337	-	337	22	-	22	-	-	-	-	-	-
	F-16C (PW220)	1,652	-	1,652	2,427	128	2,555	5,013	51	5,064	-	-	-	1,022	-	1,022	-	-	-
	C-12	113	-	113	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	OH-58	1,000	-	1,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	T-38	5	-	5	5	-	5	12	-	12	-	-	-	-	-	-	-	-	-
	TORNADO	1,819	-	1,819	111	161	272	4,880	-	4,880	-	-	-	-	-	-	-	-	-
Transient (365 flying days)	A-10A	66	-	66	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	C-130E	175	-	175	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	C-17	44	-	44	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	C-5A	44	-	44	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	F-16C (PW220)	-	-	-	-	-	-	168	-	168	-	-	-	-	-	-	-	-	-
	F-15E (PW229)	-	-	-	-	-	-	113	-	113	-	-	-	-	-	-	-	-	-
	F/A-18C/D	-	-	-	-	-	-	142	-	142	-	-	-	-	-	-	-	-	-
T-37B	-	-	-	-	-	-	51	-	51	-	-	-	-	-	-	-	-	-	
Civilian (365 flying days)	CNA441	409	-	409	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	COMP1985	1,643	-	1,643	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Baseline Totals		7,133	-	7,133	2,622	289	2,911	10,716	51	10,767	22	-	22	1,022	-	1,022	-	-	-

Table 3-1. Annual Flight Operations at Holloman AFB for Baseline Scenario - *concluded*

d) Pattern detail

Aircraft		Closed Pattern*																	
		VFR Inside			VFR Outside			VFR Outside w/Pitch			IFR Box			Drone Box			SFO		
Category	Type	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 (250 annual flying days)	QF-4C	453	-	453	170	-	170	327	-	327	5	-	5	245	-	245	-	-	-
	F-16C (PW220)	3,586	-	3,586	-	-	-	16,933	-	16,933	1,328	-	1,328	-	-	-	1,328	-	1,328
	C-12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	OH-58	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	T-38	70	-	70	1	-	1	6	-	6	13	-	13	-	-	-	-	-	-
	TORNADO	21,024	656	21,680	9,321	-	9,321	788	-	788	-	-	-	-	-	-	-	-	-
Transient (365 flying days)	A-10A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	C-130E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	C-17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	C-5A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	F-16C (PW220)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	F-15E (PW229)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	F/A-18C/D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T-37B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Civilian (365 flying days)	CNA441	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	COMP1985	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Baseline Totals		25,133	656	25,789	9,492	-	9,492	18,054	-	18,054	1,346	-	1,346	245	-	245	1,328	-	1,328

*Each circuit counted as 2 operations.

3.1.2 Runway and Track Utilization

Runway and flight track utilization was initially based on previous modeling from the 2012 F-35A AETC Training Beddown EIS. USAF maintained previously modeled utilization percentages for the based QF-4 and transient aircraft, and slightly modified and validated utilization percentages for based 56 FW F-16 aircraft (MacFarlane 2013a). GAF personnel validated previously modeled utilization percentages for the Tornado aircraft (Schumann 2013).

Flight tracks for each type of operation on each applicable runway were initially based on the previous modeling but updated by USAF personnel for this project (MacFarlane 2013b).

3.1.3 Flight Profiles (refer to appendix)

Flight profiles (i.e., schedules of altitude, power setting and airspeed along each flight tracks) were initially based on previous modeling. Representative based QF-4 and F-16 flight profiles were reviewed and updated by the USAF (Swyt 2013a). Representative GAF Tornado flight profiles were reviewed and updated by the GAF (Schumann 2013).

Appendix A contains maps of the representative flight profiles for the based QF-4, F-16 and Tornado aircraft.

3.1.4 Run-Up Operations

Tables A-1 and A-2 of Appendix A contain the modeled pre-flight and maintenance run-up operations. QF-4 and QF-16 run-up operations were updated from previous modeling based on new inputs from USAF (Swyt 2013b). Run-up modeling for all other aircraft remains unchanged from previous modeling. Pre-flight run-ups refer to run-ups conducted prior to each departure. Pre-flight run-ups may be conducted on the runway prior to brake release and associated with each departure flight profile or may be conducted at other locations on the airfield. Figure 3-1 shows the locations of the run-up pads.

As shown in Table A-2 (Appendix A), QF-4 aircraft perform a single-engine run-up on the runway prior to brake release, 10 minutes at 65% RPM and 20 seconds at 85%RPM. Single-engine high-power maintenance run-ups are conducted at the trim pad at a rate of 1 every 10 days, on average, with afterburner being used for as much as 2.5 minutes for each event. None of the QF-4 run-ups are during the DNL nighttime period.

3.1.5 Noise Exposure

Figure 3-2 shows the resultant 65-85 dB DNL contours, in 5 dB increments. DNL is also shown as color-shading in the figure. The off-base exposure is as much as 74 dB DNL at and southeast of US 70. Southeast of the base, the 65 dB DNL contour extends 1.8 miles south of US 70. The 70 dB DNL contour extends nearly one mile south of US 70. The off-base exposure west of the base into the White Sands National Monument (WNSA) is as high as 70 dB DNL as the 70 dB DNL contour clips a corner of the WNSA.

Points of Interest (POI) are either on-base or within the WNSA. No off-base residential POI are within the vicinity of Holloman AFB. On-base POI consist of two child development centers, a place of worship and two schools. Table 3-2 lists the DNL at each POI for the Baseline scenario. DNL for on-base POI range from 70 to 72 dB. DNL for WNSA POI range between 43 and 55 dB except for TrailWest which has a DNL of 20 dB.



Figure 3-1. Run-up Pad Locations

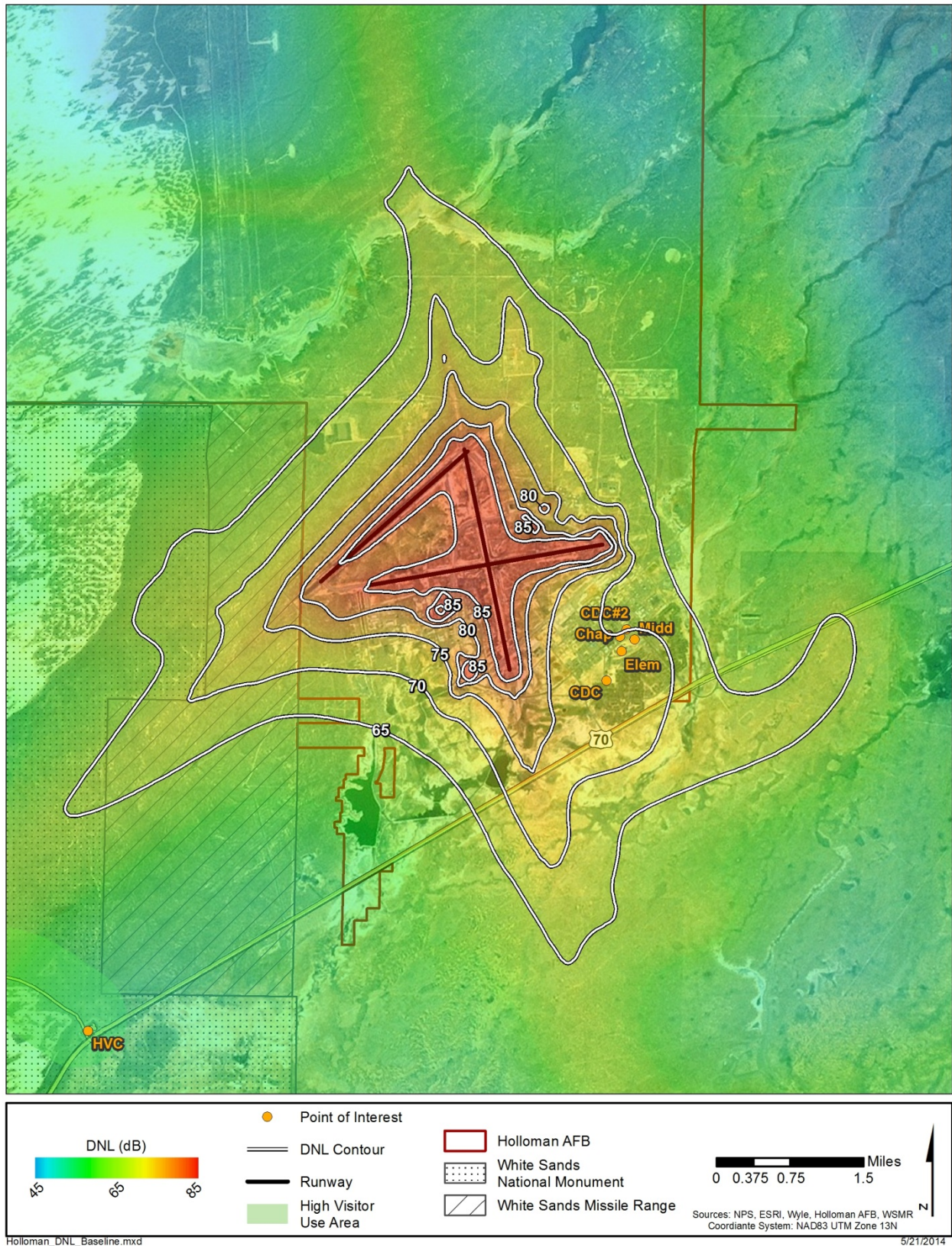


Figure 3-2. Aircraft DNL Contours and Gradient from Operations for the Baseline Scenario

Table 3-2. DNL at POI for Baseline Scenario

Point of Interest			
Grouping	ID	Description	DNL (dB)
WSNM	01_HVC	Visitor Center	54
	02_HUIA1	High Visitor Use Area 1	55
	03_HUIA2	High Visitor Use Area 2	< 45
	04_HUIA3	High Visitor Use Area 3	< 45
	05_HUIA4	High Visitor Use Area 4	52
	06_Trail East	TrailEast	< 45
	07_Trail West	TrailWest	< 45
Holloman AFB	CDC	Child Development Center	72
	CDC#2	Child Development Center #2	70
	Chap	Chapel	70
	Elem	Elementary School	71
	Midd	Middle School	71

WWSA POI (shown in figures introduced later) consist of the Visitor Center (HVC), four points representing High Visitor Use areas (HUIA1 thru 4) and the innermost extents of two trails (TrailEast and TrailWest). WWSA POI have exposure much less than 65 dB DNL.

Supplementing DNL, NA and TA metrics were also computed for the WWSA. NA was computed for 35 dB L_{max} and 65 dB thresholds (NA35ALM, NA65ALM) and TA was computed for the same threshold (TA35ALM, TA65ALM). 35 dB L_{max} corresponds approximately to the natural ambient noise level with man-made noise. 65 dB L_{max} corresponds to speech interference for normal conversation in close proximity.

Figure 3-3 show the flight tracks associated with the Holloman AFB which traverse the WWSA – three departure tracks and seven arrival tracks (only 3 unique paths) traverse nearly the entire width of the WWSA. Other overhead break/pitch-out and closed pattern flight tracks populate an eastern portion of the WWSA.

Figures 3-4 through 3-7 show the NA and TA contours for the two selected L_{max} thresholds for the Baseline scenario. The NA35ALM contours shown in Figure 3-4, decrease primarily as a function of distance from Hollomna. At the low threshold level of 35 dB L_{max} , the NA contours throughout much of WWSA are driven by aircraft operations on the most utilized flight tracks, rather than just those that traverse the national monument area. The NA65ALM contours from 50 events and up, shown in Figure 3-5, result primarily from Tornado and F-16C departures going in all directions from Runways 25 and 22. The shape of the 1 event contour for NA65ALM, results from operations on the WWSA traversing flight tracks shown in Figure 3-3.

The TA35ALM contours, shown in Figure 3-6, simply decrease as a function of distance from HMN much like the NA35ALM contours. The 0.5 hour contour extends approximately 16 statute miles west from the easternmost boundary of WWSA. The TA65ALM contours, shown in Figure 3-7, are also primarily driven by Tornado and F-16C departures from Runways 25 and 22. The 0.5 hour TA65ALM contour extends approximately 4.5 statute miles west from the eastern most boundary of WWSA.

Table 3-3 lists the NA and TA values for the Holloman and WWSA POI. Excluding WWSA's TrailWest, WWSA POI NA ranges from 193 to 217 events for the 35 dB threshold and from 12 to 44 events for the 65 dB threshold, per average flying day. TrailWest NA35ALM is 3 events. TrailWest NA65ALM is less than 0.5 event. Holloman POI NA ranges from 246 to 251 for the 35 dB threshold and is 190 at all POI for the 65 dB threshold, per average flying day.