NEVADA TEST AND TRAINING RANGE (NTTR)

Land Withdrawal Application Packages/
Case File and Legislative EIS

NOISE ANALYSES FOR THE NEVADA TEST AND TRAINING RANGE (NTTR) LAND WITHDRAWAL LEGISLATIVE ENVIRONMENTAL IMPACT STATEMENT (LEIS)

AIRCRAFT AND LARGE CALIBER WEAPONS NOISE

FINAL
March 13, 2017

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1.0 Introduction

This report documents the analysis of aircraft and large caliber weapons noise in support of the Nevada Test and Training Range (NTTR) Land Withdrawal Legislative Environmental Impact Statement (LEIS). Large caliber weapons are generally defined as 20 millimeter (mm) or above, including, but not limited to, guns, artillery, mortars, demolitions, bombs, etc. The results of this analysis will help inform decision makers in the United States Air Force (USAF) and the Department of Interior (DOI) on the potential environmental impacts of several alternatives including continued use of the NTTR for military training.

1.1 Background

Located in southeastern Nevada, NTTR land base consists of approximately 2.9 million acres of federal land that has been withdrawn from public use and reserved for military use, most recently by the Military Lands Withdrawal Act of 1999 (MLWA). The current withdrawal will expire on November 6, 2021 unless Congress enacts legislation to extend it. In accordance with the MLWA, USAF in coordination with the Department of Defense (DoD) has notified Congress of a continuing military need for the NTTR withdrawal.

The National Environmental Policy Act of 1969 (NEPA) requires federal agencies to include an Environmental Impact Statement (EIS) with proposals for legislation that may significantly affect the quality of the human environment. Further, applicable procedures set forth in Bureau of Land Management (BLM) regulations codify DOI's authority to process federal land withdrawal applications. In accordance with relevant laws and regulations, USAF and DoD plan to submit, through DOI, an LEIS for the proposal to extend the NTTR land withdrawal and potentially expand the withdrawal areas.

1.2 Scope

The scope of this analysis includes subsonic and supersonic aircraft noise, and detonations of large caliber weapons' ordnance during air-to-ground and ground-to-ground operations during training within NTTR. The Special Use Airspace (SUA) of interest include Restricted Areas, Military Operations Areas (MOA) and associated Air Traffic Control Assigned Airspace (ATCAAs) (henceforth denoted MOAs/ATCAAs), Military Training Routes (MTR) and Creech Air Force Base (AFB). The noise analysis is completed for a Baseline Condition defined as Calendar Year (CY) 2015 operations, and Alternatives 2 (Extend Existing Land Withdrawal and Provide Ready Access in the North and South Ranges) and 3 (Expand Withdrawal of Public Lands for the NTTR). A complete description of the proposed alternatives is contained in Chapters 1 and 2 of the LEIS. For the purposes of this analysis, a 30% increase in operations is modeled for Alternatives 2 and 3 (including all sub-alternatives associated with Alternative 3).

1.3 Document Content

The remainder of this document is organized in five sections:

- Section 2 – Methodology: data, metrics and models used to conduct the analysis;
- Section 3 – Airspace, Airfield and Ranges: modeled SUAs (Restricted Area, MOA/ATCAA and MTR), Creech AFB and training ranges;
- Section 4 – CY 2015 Baseline Conditions: Aircraft types, operations, flight profiles, assumptions,, and large caliber weapons type, expenditure and firing and target locations;
- Section 5 – Alternative 2 and 3 Conditions: Modeling assumptions for relevant alternative uses of NTTR in the future;
- Section 6 –Noise Exposure: Noise levels on the ground associated with the Baseline and Alternative 2 and 3 Conditions.

2.0 Methodology

Air Force Instruction (AFI) 32-7070 (USAF, 2016a) provides the overall framework for computing noise levels associated with aircraft operations within SUAs and in the vicinity of military airfields. In a similar way, US Army Regulation 200-1 (AR 200-1) (US Army, 2007) provides the overall framework for modeling noise levels associated with large caliber weapons noise on air-to-ground and ground-to-ground training ranges. The framework illustrated in Figure 2-1 addresses, among other things, the collection of operational data, modeling tools, and noise exposure metrics. The following sections provide additional details on each step of the methodology.

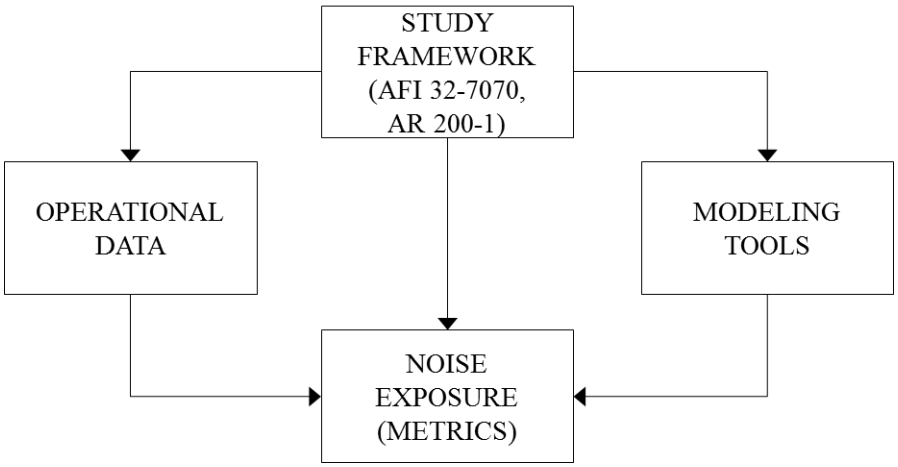

Figure 2-1. Methodology

2.1 Operational Data

Operational data is generally collected from resident operational staff familiar with day-to-day operations within the SUAs, at the airfields and with the ground-to-ground and air-to-ground training ranges comprised within the study area. The installation assumes a critical role in collecting and supplying the required data for use during the environmental planning process. Specifically for subsonic operations within the SUAs, the data includes sortie/operations details such as aircraft type(s), local time of the sortie, average power settings and speeds, duration, and altitude profiles. For supersonic operations within the SUAs, the data includes airspace designated for supersonic flight, aircraft types, percent of the sorties involving supersonic flight, and percent of time spent in supersonic flight. For large caliber weapons noise from ground-to-ground and air-to-ground training ranges, the data includes weapons types, quantities, local time of expenditure, firing and target locations and, when required, the net explosive weight. Given the variability of the large caliber weapon operations and following multiple interviews of range

planning personnel, certain assumptions are made about the utilization of firing and target locations over the course of the year.

2.2 Modeling Tools and Noise Exposure Metrics

DoD developed several tools to help compute subsonic and supersonic aircraft noise underneath SUAs and in the vicinity of military airfields.

2.2.1 Subsonic Aircraft Noise

The *MOA and Range NOISEMAP (MR_NMAP)* suite of computer programs is used for computing subsonic aircraft noise underneath SUAs. The suite of computer programs includes MR_OPS (Version 1), OMEGA10R, MRNMAP (Version 2.2), NMPlot, and NOISEFILE Version 6.4 as follows:

- MR_OPS – This program allows for entry of airspace information, distribution of sorties, flight profiles (average power settings, altitude distributions, and speeds), and numbers of sorties. "Distribution of sorties" refers to the modeling of airspace utilization via three broad representations: uniformly distributed sorties for modeling of MOAs and Restricted Areas, normally distributed operations for modeling of MTRs, and defined tracks for modeling race tracks, air refueling tracks, and other routes within MOAs or Restricted Areas.
- OMEGA10R – This program extrapolates/interpolates the reference single event Sound Exposure Level (SEL) for each model of aircraft from the NOISEFILE Version 6.4 database, taking into consideration the specified speeds, engine power settings, and environmental conditions appropriate to each flight operation, and generates tables of SEL versus altitude.
- MR_NMAP – The core MR_NMAP program incorporates the number of sorties between 0700–2200 and between 2200–0700, specified horizontal distributions, volume of the airspace, and profiles of the aircraft to calculate the Onset Rate Adjusted Day Night Average Sound Level (Ldnmr) as follows: (a) Ldnmr at points of a regularly spaced grid, (b) Ldnmr for an entire piece of airspace, or (c) maximum Ldnmr under the centerline of MTRs or similar routes.
- NMPLOT – From calculations of Ldnmr at many points on the ground, the NMPLOT program draws contours of equal Ldnmr values for overlay onto land-use maps. Ldnmr values are measured in A-weighted decibels denoted dBA or simply dB.

The *NOISEMAP* suite of computer programs was used for computing subsonic aircraft noise in the vicinity of Creech AFB. The NOISEMAP suite of computer programs includes BaseOps, OMEGA10, OMEGA11, NOISEMAP and NMPlot. The suite also includes the NOISEFILE databases. The different modules are described in the following sections.

- BASEOPS – The BaseOps program allows entry of runway coordinates, airfield information, flight tracks, flight profiles (engine thrust settings, altitudes, speeds, and pitch, yaw, roll and

nacelle angles for tilt rotors and helicopters), numbers of daily flight operations, and pre-flight and engine ground run-up spots and operations.

- OMEGA10 – For fixed-wing and helicopters modeled using NOISEMAP, the OMEGA10 program calculates SEL versus distance for each model of aircraft from the NOISEFILE database, taking into consideration the specified speeds, engine thrust settings, and environmental conditions appropriate to each type of flight operation. The NOISEFILE database contains one-third octave band sound data for pre-flight run-up and flight operations by most military aircraft and some civil aircraft. The OMEGA10 output is used by NOISEMAP in subsequent calculations.
- OMEGA11 - The OMEGA11 program calculates maximum A-weighted sound levels from the NOISEFILE database for each model of aircraft taking into consideration the engine thrust settings and environmental conditions appropriate to ground engine maintenance run-up operations. Similar to the OMEGA10 output, the OMEGA11 output is also used by NOISEMAP in subsequent calculations.
- NOISEMAP uses the OMEGA10 and OMEGA11 outputs, incorporates the number of operations between 0700-2200 and 2200-0700 hours, flight paths, and profiles of the aircraft to calculate the Day-Night Average Sound Level (DNL) at a series of points on the ground around the facility. This process results in a "grid" file containing noise levels at different points of a user specified rectangular area. NOISEMAP Version 7 has been expanded to include atmospheric sound propagation effects over varying terrain, including hills and mountainous regions, as well as regions of varying acoustical impedance—for example, water around coastal regions.

2.2.3 Supersonic Aircraft Noise

The BOOMAP model was used to model supersonic noise. The tool is based on long-term sonic boom measurements of Air Combat Maneuvers (ACM) in White Sands Proving Grounds, New Mexico (Plotkin et al. 1989); the eastern portion of the Goldwater Range, Arizona (Plotkin et al. 1992); the Elgin MOA at Nellis AFB, Nevada (Frampton et al. 1993); and the western portion of the Goldwater Range (Page et al. 1994). Analyses of these observations were developed into the empirical BOOMAP model (Plotkin et al. 1992). BOOMAP, therefore, accounts for the statistical variations in ACM maneuvers when computing C-weighted DNL (CDNL) levels and the number of sonic booms per month on the ground underneath an SUA. CDNL values are measured in C-weighted decibels and are denoted dBC.

2.2.4 Large Caliber Weapons Noise

Noise from detonation of large caliber weapons (20mm or greater) is computed using DoD's Blast Noise (BNOISE) program. BNOISE is a collection of computer programs which together can produce CDNL contours for impulsive sources such as guns, artillery, mortars, demolitions, bombs, etc. BNOISE Version 2 is used in this analysis and the required data include:

- Firing and target areas (location, point or area distribution, and elevation),
- Activity data (activity name, site weather, and detailed activity information such as firing location, firing noise source, target location, target noise source, trajectory information, and number of shots fired between 0700-2200 local time and 2200-0700 local time,
- Metrics (noise metrics and assessment period),
- Grid area (rectangular grid area defined by a length, a width and a spacing),

Similar to MRNMAP, the BNOISE computer generates a grid file which is a collection of noise levels at equally spaced points on a grid. The NMPLOT program uses the "grid" file to draw contours of equal CDNL for overlay onto base maps.

3.0 Airspace, Airfield and Ranges

The reported facilities of interest (Figure 3-1) include SUAs (Restricted Areas, MOAs/ATCAAs, and MTRs), one airfield (Creech AFB), and training ranges within NTTR.

Table 3-1 further defines Restricted Areas, corresponding subareas (if any), floors in feet Above Ground Level (AGL), ceiling in feet Above Mean Sea Level (MSL), subarea areas in mile-squared (mile^2) and as a percentage (%). For example, R4806 has 21 subareas and the first subarea R61A extends from "Surface" to "Unlimited" over 155.30 mile^2 or 8.04% of R4806.

Table 3-1. Reported Restricted Areas and Subareas

Restricted Area	Subarea					
	Name	ID	Floor (feet AGL)	Ceiling (feet MSL)	mile^2	%
R4806	R61A	6W_61A	Surface	Unlimited	155.30	8.04%
	R61B	6W_61B	Surface	Unlimited	143.90	7.45%
	R62A	6W_62A	Surface	Unlimited	143.10	7.41%
	R62B	6W_62B	Surface	Unlimited	119.00	6.16%
	R63A	6W_63A	Surface	Unlimited	8.40	0.43%
	R63B	6W_63B	Surface	Unlimited	186.90	9.67%
	R63BHI	6W_63BH	Surface	Unlimited	46.60	2.41%
	R63C	6W_63C	Surface	Unlimited	12.60	0.65%
	R64A	6W_64A	Surface	Unlimited	95.10	4.92%
	R64B	6W_64B	Surface	Unlimited	85.10	4.40%
	R64C	6W_64C	Surface	Unlimited	77.30	4.00%
	R64D	6W_64D	Surface	Unlimited	10.90	0.56%
	R64E	6W_64E	Surface	Unlimited	6.10	0.32%
	R64F	6W_64F	Surface	Unlimited	6.30	0.33%
	R65A	6W_65A	Surface	Unlimited	139.70	7.23%
	R65B	6W_65B	Surface	Unlimited	124.30	6.43%
	R65C	6W_65C	Surface	Unlimited	135.40	7.01%
	R65D	6W_65D	Surface	Unlimited	50.30	2.60%
	Alamo A	6E_ALA	100	Unlimited	187.20	9.69%
	Alamo B	6E_ALB	100	Unlimited	105.00	5.44%
	Alamo C	6E_ALC	100	Unlimited	93.40	4.83%
R4807	R71N	7A_71N	Surface	Unlimited	166.90	7.52%
	R71S	7A_71S	Surface	Unlimited	144.40	6.50%
	R74A	7A_74A	Surface	Unlimited	190.20	8.57%
	R74B	7A_74B	Surface	Unlimited	160.80	7.24%
	R74C	7A_74C	Surface	Unlimited	195.60	8.81%
	R75E	7A_75E	Surface	Unlimited	127.80	5.76%
	R75W	7A_75W	Surface	Unlimited	160.60	7.23%
	R76	7A_76	Surface	Unlimited	300.00	13.51%
	ECE	7A_ECE	Surface	Unlimited	282.20	12.71%
	ECS	7A_ECS	Surface	Unlimited	414.60	18.68%
	TPECR	7A_TPE	Surface	Unlimited	76.90	3.46%
R4808	B	8_B	Surface	Unlimited	279.00	25.03%
	C	8_C	Surface	Unlimited	316.10	28.35%
	D	8_D	Surface	Unlimited	219.90	19.73%
	E	8_E	Surface	Unlimited	299.80	26.89%

Restricted Area	Subarea					
	Name	ID	Floor (feet AGL)	Ceiling (feet MSL)	mile^2	%
R4809	09A	9_09A	Surface	Unlimited	327.50	64.23%
	ECW	9_ECW	Surface	Unlimited	182.40	35.77%

Table 3-2 defines MOAs/ATCAAs and corresponding subareas (if any), floors in feet AGL, ceiling in feet MSL, and subarea areas in mile^2 and as % of the MOA. For example, Caliente and associated ATCAAs have 3 subareas and the first subarea CAL_A extends from 100 feet AGL to "Unlimited" over 717.70 mile^2 or 25.02% of the MOA.

Table 3-2. Reported MOAs/ATCAAs and Subareas

MOAs	Subarea					
	Name	ID	Floor (feet AGL)	Ceiling (feet MSL)	mile^2	%
Caliente	A	CAL_A	100	Unlimited	717.70	25.02%
	B	CAL_B	100	Unlimited	630.20	21.97%
	C	CAL_C	100	Unlimited	1520.50	53.01%
Coyote	A	COY_A	100	Unlimited	221.70	11.66%
	B	COY_B	100	Unlimited	817.00	42.96%
	C	COY_C	100	Unlimited	641.20	33.71%
	D	COY_D	100	Unlimited	222.00	11.67%
Elgin	Elgin	ELG	100	Unlimited	1447.30	100%
Reveille	N	REV_N	100	Unlimited	1637.50	73.20%
	S	REV_S	100	Unlimited	599.50	26.80%
Sally Corridor	Sally	SAL	100	Unlimited	723.90	100%

Tables 3-3 through 3-5 define MTRs in terms of Visual Routes (VRs), Instrument Routes (IRs), and Remotely Piloted Aircraft (RPA) corridors. Table 3-3 shows VR names, turn segments (defined by entry and exit points), width left and right (in feet), and segment entry floor and ceiling in feet AGL. For example, VR1253 has 7 turn segments A through L, each segment is 3 nautical miles (NM) wide either side of the centerline or 18228 feet, with entry floors of 200 feet AGL from A – L (except J – K with a floor of 1500 feet AGL) and ceilings of 1,500 feet AGL.

Table 3-3. Reported VRs

VRs	**Entry Point**	**Exit Point**	**Left** (feet)	**Right** (feet)	**Entry Floor** (feet AGL)	**Entry Ceiling** (feet AGL)
VR1253	A	B	18228	18228	200	1500
	H	I	18228	18228	200	1500
	I	J	18228	18228	200	1500
	J	K	18228	18228	1500	1500
	K	L	18228	18228	200	1500
VR1259	A	B	30380	30380	200	1500
	B	C	30380	30380	200	1500
	C	D	30380	30380	200	1500
VR1260	A	B	12152	12152	200	1500
	B	C	12152	12152	200	1500
VR209	A	B	12152	12152	200	1500
	B	C	12152	12152	200	1500
	C	D	12152	12152	200	1500
VR222	F	G	30380	30380	100	1500
	E2	E2X	30380	30380	100	1500
	E3	E3X	30380	30380	100	1500

Table 3-4 shows IR names, turn segments, width left and right, and segment entry floor and ceiling. For example, IR200 has 12 turn segment V through AG, each segment is 4 nautical miles (NM) wide either side of the centerline or 24304 feet (except AF-AG), with entry floors of 500 feet AGL and ceilings varying from 11000 feet MSL to 12000 feet MSL.

Table 3-4. Reported IRs

IRs	Entry Point	Exit Point	Left (feet)	Right (feet)	Entry Floor (feet AGL)	Entry Ceiling (feet MSL)
IR200	V	W	24304	24304	500	11000
	X	Y	24304	24304	500	11000
	Y	Z	24304	24304	500	11000
	Z	AA	24304	24304	500	11000
	AA	AB	24304	24304	500	11500
	AB	AC	24304	24304	500	11500
	AC	AD	24304	24304	500	11500
	AD	AE	24304	24304	500	12000
	AE	AF	24304	24304	500	11500
	AF	AG	24304	24304	500	12000
IR234	A	B	42532	42532	SFC	10500
IR235	E	F	42532	42532	SFC	10500
IR237	D	E	24304	24304	500	12000
IR238	A	B	24304	24304	500	12000
IR282	G	H	30380	30380	100	10400
IR286	I	J	30380	30380	SFC	9500
	J	K	30380	30380	SFC	9400
	K	L	30380	30380	SFC	9400
	L	M	30380	30380	SFC	9400
	I2	IX	30380	30380	SFC	9000
	J1	JX	30380	30380	SFC	9000
IR425	G	H	24304	42532	500	12000
	H	I	24304	24304	500	11500
	I	J	24304	24304	500	12000
	J	K	24304	24304	500	11500
	K	L	24304	24304	500	11500
	L	M	24304	24304	500	11500
	M	N	24304	24304	500	11000
	N	O	24304	24304	500	11000
	O	P	24304	24304	500	11000
	Q	R	24304	24304	500	11000

Table 3-5 shows data for RPA corridors. For example, RPA_C1 has a width of 0.5 NM either side of centerline or 3038 feet, with a floor of 10000 feet and a ceiling of 12000 feet.

Table 3-5. Reported RPA Corridors

RPA Corridors	Description	Centerline Point ID	Left (feet)	Right (feet)	Floor (feet MSL)	Ceiling (feet MSL)
RPA_C1	Predator Corridor Option 1	1	3038	3038	10000	12000
	Predator Corridor Option 1	2	3038	3038	10000	12000
	Predator Corridor Option 1	3	3038	3038	10000	12000
	Predator Corridor Option 1	4	3038	3038	10000	12000
	Predator Corridor Option 1	5	3038	3038	10000	12000
RPA_C2	Predator Corridor Option 2	1	3038	3038	10000	18000
	Predator Corridor Option 2	2	3038	3038	10000	18000
	Predator Corridor Option 2	3	3038	3038	10000	18000
	Predator Corridor Option 2	4	3038	3038	10000	18000
RPA_C3	Predator Corridor Option 3	1	3038	3038	9000	12000
	Predator Corridor Option 3	2	3038	3038	9000	12000
	Predator Corridor Option 3	3	3038	3038	9000	12000
	Predator Corridor Option 3	4	3038	3038	9000	12000
RPA_C4	Predator Corridor Option 4	1	3038	3038	11000	12000
	Predator Corridor Option 4	2	3038	3038	11000	12000
	Predator Corridor Option 4	3	3038	3038	11000	12000
	Predator Corridor Option 4	4	3038	3038	11000	12000
	Predator Corridor Option 4	5	3038	3038	11000	12000
	Predator Corridor Option 4	6	3038	3038	11000	12000
RPA_C5	Predator Corridor Option 5	1	3038	3038	10000	12000
	Predator Corridor Option 5	2	3038	3038	10000	12000
RPA_C6	Predator Corridor Option 6	1	3038	3038	10000	12000
	Predator Corridor Option 6	2	3038	3038	10000	12000
	Predator Corridor Option 6	3	3038	3038	10000	12000
	Predator Corridor Option 6	4	3038	3038	10000	12000
RPA_RP	Reaper Corridor	1	3038	3038	9000	10000
	Reaper Corridor	2	3038	3038	9000	10000
	Reaper Corridor	3	3038	3038	9000	10000
	Reaper Corridor	4	3038	3038	9000	10000
	Reaper Corridor	5	3038	3038	9000	10000
	Reaper Corridor	6	3038	3038	9000	10000
RPA_TN	Stereo TAN	1	3038	3038	UNK	UNK
	Stereo TAN	2	3038	3038	UNK	UNK
	Stereo TAN	3	3038	3038	UNK	UNK
	Stereo TAN	4	3038	3038	UNK	UNK
	Stereo TAN	5	3038	3038	UNK	UNK
	Stereo TAN	6	3038	3038	UNK	UNK
RPA_GN	Stereo GREEN	1	3038	3038	11000	UNK
	Stereo GREEN	2	3038	3038	11000	UNK
	Stereo GREEN	3	3038	3038	11000	UNK
	Stereo GREEN	4	3038	3038	11000	UNK
	Stereo GREEN	5	3038	3038	11000	UNK
RPA_BL	Stereo BLUE	1	3038	3038	11000	UNK
	Stereo BLUE	2	3038	3038	11000	UNK
	Stereo BLUE	3	3038	3038	11000	UNK

RPA Corridors	Description	Centerline Point ID	Left (feet)	Right (feet)	Floor (feet MSL)	Ceiling (feet MSL)
	Stereo BLUE	4	3038	3038	11000	UNK
	Stereo BLUE	5	3038	3038	11000	UNK

Creech AFB is located in Clark County, Nevada, adjacent to the town of Indian Springs and within NTTR (Figure 3-1). The base, a sub-installation of Nellis AFB located in northeast Las Vegas, consists of a runway complex with two intersecting runways (08/26 and 13/31). Runway 08/26 is 9,002 feet long by 150 feet wide and the intersecting paved runway (13/31) is 5,002 feet long by 100 feet wide. The airfield lies within the west side of R-4806 at an elevation of 3,133 feet above MSL.

NTTR also comprises air-to-ground and ground-to-ground ranges primarily located within R4806 and R4807, specifically on the ground under subareas R61, R62, R63, R64, R65, R66, R71, R74, R75, R76, and R77. Figure 3-1 shows clustered within the subareas the centroids of active firing and target area complexes. Each centroid represents several firing and target points. NTTR provides training opportunities for Close Air Support (CAS) missions, laser system operations, air-to-ground bombing, and rocket and strafing operations. A variety of live and inert conventional ordnance are authorized in specific areas of NTTR, including MK 20 (Rockeye), cluster bomb units (CBUs) and up to 2000-pound general purpose (GP) bombs.

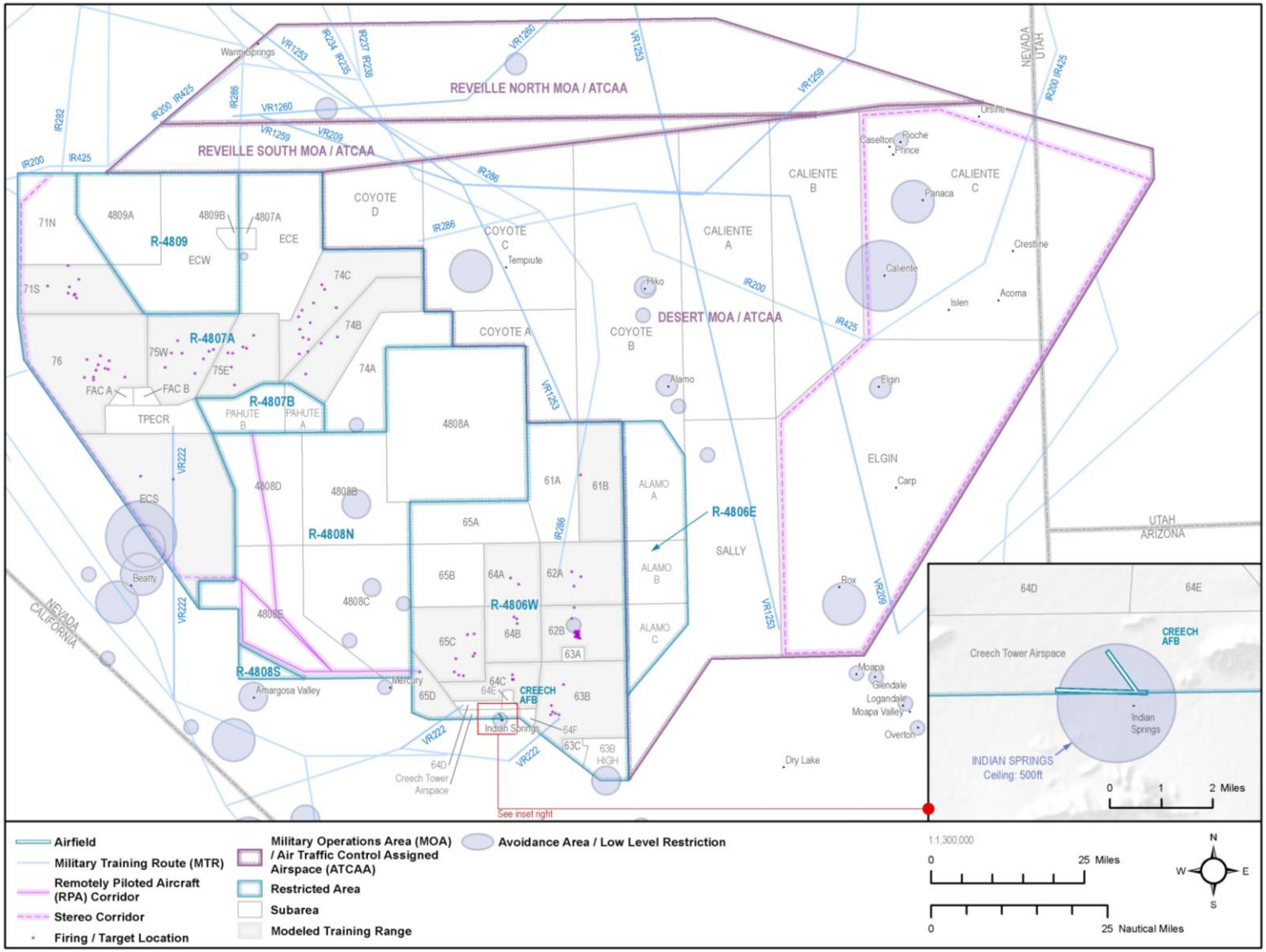

Figure 3-1. NTTR Special Use Airspace of Interest

4.0 CY 2015 Baseline Conditions

4.1 Subsonic Flight Operations

The operational data used to model subsonic noise from aircraft operations within the SUAs was collected from airspace managers (aircraft operations) and aircraft operators (aircraft flight profiles).

4.1.1 Aircraft Operations

Aircraft noise analysis documents typically include results from analyzing aircraft flight operations (1) in and around military airfields and (2) from operations on low altitude MTRs, MOAs/ATCAAs and Restricted Areas. Noise from aircraft operating in and around Nellis AFB is covered in two previously completed environmental documents: the Nellis AFB Air Installation Compatible Use Zones (AICUZ) study (USAF, 2016b) and the F-35 Beddown EIS (USAF, 2011). In those two documents a SORTIE is defined as one aircraft's departure from a base of operations (e.g., Nellis AFB), and one arrival and full stop landing back at Nellis AFB. The noise analysis associated with the NTTR LEIS is limited to addressing aircraft operations which occur INSIDE of the NTTR boundary. In this case, an aircraft OPERATION includes one aircraft's flight time in one or more airspace units, e.g., R4806 or Elgin.

Table 4-1 presents aircraft operations collected for CY 2015 for R-4806, R-4807, R-4808 and R-4809. For each SUA within NTTR, the following information was collected: aircraft type as scheduled, and number of operations split by 0700-2200 local time and 2200-0700 local time (Schirg et al., 2016). For example, in CY2015, 707s from all flying units flew 110 operations in R4806 (with 35 between 2200-0700 local time), 113 in R4807 (with 35 between 2200-0700 local time), 105 in R4808 (with 22 between 2200-0700 local time), and 113 in R4809 (with 35 between 2200-0700 local time). Overall, the total number of operations is 23,109 in R4806 (of which 6,223 or 27% occurred between 2200-0700 local time), 34,449 in R4807 (of which 5,951 or 17% between 2200-0700 local time), 34,485 in R4809 (of which 6,553 or 19% between 2200-0700 local time) and 24,898 in R4809 (of which 4,776 or 19% between 2200-0700 local time).

Table 4-1. CY2015 Aircraft Operations for Restricted Areas

Aircraft Type	R4806			R4807			R4808			R4809		
	0700-2200	2200-0700	Total	0700-2200	2200-0700	Total	0700-2200	2200-0700	Total	0700-2200	2200-0700	Total
707	75	35	110	78	35	113	83	22	105	78	35	113
A-10	1556	63	1619	427	53	480	60	29	89	391	53	444
A-4	6	0	6	95	12	107	6	6	12	28	0	28
A-4K	21	12	33	0	0	0	0	0	0	67	12	79
AC-130	18	12	30	8	5	13	14	0	14	8	5	13
AH1	42	0	42	0	0	0	0	0	0	0	0	0
AH64	56	0	56	0	0	0	0	0	0	0	0	0
AP-3	0	0	0	5	5	10	10	0	10	0	0	0
AS-350	78	0	78	107	7	114	98	0	98	43	5	48
AT-38	40	0	40	65	0	65	18	0	18	65	0	65
AV-8	12	0	12	12	0	12	2	0	2	12	0	12
B-1	96	57	153	255	65	320	124	28	152	242	63	305
B-2	128	113	241	126	121	247	127	65	192	126	121	247
B-200	0	0	0	0	0	0	2	0	2	0	0	0
B-412	0	0	0	0	0	0	1761	18	1779	0	0	0
B-52	109	50	159	162	50	212	491	184	675	162	50	212
B-707	19	9	28	19	9	28	12	24	36	19	9	28
B737	0	0	0	0	0	0	0	0	0	2	0	2
BAE HAWK	12	0	12	8	0	8	145	0	145	8	0	8
BELL-206	2	0	2	7	0	7	4	0	4	6	0	6
C-12	5	3	8	5	3	8	54	13	67	9	3	12
C-130	130	41	171	149	44	193	259	107	366	150	44	194
C-146	2	0	2	1	0	1	30	12	42	98	13	111
C-17	73	14	87	87	13	100	56	0	56	0	0	0
C-208	1	1	2	1	1	2	2	0	2	0	0	0
CESSNA	4	0	4	0	0	0	0	0	0	0	0	0
CH-47	38	20	58	45	18	63	728	314	1042	38	18	56
CH53E	20	4	24	0	0	0	0	0	0	0	0	0
CV-22	22	36	58	6	12	18	27	4	31	6	12	18
DHC-6	16	2	18	2	1	3	24	48	72	0	0	0
E-3	0	0	0	109	59	168	2779	234	3013	0	0	0
E3A	9	7	16	0	0	0	0	0	0	11	7	18
E3B	74	45	119	0	0	0	0	0	0	90	45	135
E3D	8	7	15	0	0	0	0	0	0	8	7	15
E-6	1	0	1	1	0	1	4	0	4	1	0	1
E-7A	3	0	3	3	0	3	0	0	0	0	0	0
E-8	48	44	92	62	44	106	664	302	966	62	44	106
EA-18	268	157	425	2018	1005	3023	1473	13	1486	348	170	518

Aircraft Type	R4806			R4807			R4808			R4809		
	0700-2200	2200-0700	Total	0700-2200	2200-0700	Total	0700-2200	2200-0700	Total	0700-2200	2200-0700	Total
EA-6	100	46	146	100	46	146	7	0	7	100	46	146
EC-130	34	26	60	296	104	400	1136	962	2098	76	26	102
EF-18	0	0	0	4	0	4	10	10	20	4	0	4
EF-2000	4	0	4	68	0	68	2	0	2	24	0	24
EP-3	19	19	38	44	37	81	1861	40	1901	23	19	42
F/A-18	60	14	74	611	244	855	0	0	0	211	34	245
F-15	0	0	0	8044	852	8896	698	177	875	0	0	0
F15C	741	348	1089	0	0	0	0	0	0	1805	365	2170
F15D	134	44	178	0	0	0	0	0	0	84	40	124
F15E	1024	376	1400	0	0	0	0	0	0	2340	400	2740
F15I	72	40	112	0	0	0	0	0	0	77	36	113
F-16	1691	201	1892	8292	1841	10133	3334	984	4318	747	187	934
F16AM	145	69	214	0	0	0	0	0	0	145	69	214
F16C	1663	646	2309	0	0	0	0	0	0	5022	619	5641
F16CJ	430	214	644	0	0	0	0	0	0	587	104	691
F16CM	1680	766	2446	0	0	0	0	0	0	1692	762	2454
F-18	0	0	0	0	0	0	187	46	233	0	0	0
F-22	681	355	1036	2306	359	2665	205	46	251	1532	359	1891
F-35	148	20	168	2935	30	2965	926	176	1102	1579	26	1605
F-5	20	0	20	51	0	51	569	19	588	97	0	97
FA-18	164	122	286	0	0	0	686	306	992	180	122	302
FA18C	4	0	4	0	0	0	0	0	0	24	0	24
FA18D	148	72	220	0	0	0	0	0	0	148	72	220
FA18E	5	0	5	0	0	0	0	0	0	16	0	16
FA18F	4	0	4	0	0	0	0	0	0	22	0	22
FEO	7	3	10	101	3	104	335	263	598	67	3	70
FGR-4	50	20	70	50	20	70	0	0	0	0	0	0
GR-4	165	77	242	165	77	242	1668	738	2406	165	77	242
H-60	157	14	171	24	12	36	246	239	485	16	8	24
HC-130	39	42	81	38	41	79	142	62	204	38	41	79
HH-60	812	164	976	399	77	476	615	73	688	193	73	266
KC-10	10	1	11	16	1	17	555	25	580	13	0	13
KC-130	11	1	12	12	0	12	1	0	1	12	0	12
KC-135	367	194	561	408	196	604	1256	107	1363	400	195	595
L-39	12	0	12	8	0	8	2	0	2	0	0	0
LEAR	6	0	6	4	0	4	464	0	464	8	0	8
M-2000	76	36	112	76	36	112	84	0	84	76	36	112
MANPADS	0	0	0	10	14	24	0	0	0	10	14	24
MC12	1	0	1	0	0	0	0	0	0	0	0	0
MC-130	26	18	44	20	17	37	11	13	24	20	17	37

Aircraft Type	R4806			R4807			R4808			R4809		
	0700-2200	2200-0700	Total	0700-2200	2200-0700	Total	0700-2200	2200-0700	Total	0700-2200	2200-0700	Total
MH-47	6	12	18	6	12	18	2	0	2	6	12	18
MH53	2	0	2	0	0	0	0	0	0	0	0	0
MH-60	61	21	82	33	21	54	34	18	52	33	21	54
MQ-1	1921	1052	2973	56	53	109	641	296	937	35	26	61
MQ-9	723	142	865	137	73	210	66	71	137	101	45	146
MV22	4	4	8	0	0	0	0	0	0	0	0	0
P-3	31	29	60	29	29	58	118	32	150	29	29	58
P-8	9	9	18	5	5	10	0	0	0	0	0	0
Sentinel R-1	33	13	46	33	13	46	1384	18	1402	33	13	46
RC-135	47	40	87	73	40	113	911	38	949	73	40	113
RPA	3	3	6	3	3	6	72	36	108	0	0	0
RQ-170	171	121	292	33	32	65	28	16	44	33	32	65
RQ-4	67	62	129	85	60	145	397	292	689	83	60	143
SR-22	1	1	2	1	1	2	2	0	2	0	0	0
T-39	2	0	2	0	0	0	4	0	4	0	0	0
U-2	30	25	55	44	30	74	186	26	212	52	24	76
U-28	26	9	35	13	8	21	3	1	4	13	8	21
UAV	2	0	2	0	0	0	0	0	0	0	0	0
UH1	45	0	45	0	0	0	0	0	0	0	0	0
UH-60	0	0	0	2	2	4	1	0	1	0	0	0
UH-72	0	0	0	0	0	0	2	0	2	0	0	0
UNKNOWN	0	0	0	0	0	0	24	0	24	0	0	0
Total	**16,886**	**6,223**	**23,109**	**28,498**	**5,951**	**34,449**	**27,932**	**6,553**	**34,485**	**20,122**	**4,776**	**24,898**

Source: Schirg et al., 2016

Table 4-2 summarizes operations by aircraft type and time period for Caliente, Coyote, Elgin, Reveille and Sally MOAs/ATCAAs (Schirg et al., 2016). For example, in CY2015, 707s from all flying units flew 112 operations in Caliente MOA/ATCAA (with 35 between 2200-0700 local time), 113 in Coyote MOA/ATCAA (with 35 between 2200-0700 local time), 112 in Elgin MOA/ATCAA (with 35 between 2200-0700 local time), and 113 in Reveille MOA/ATCAA (with 35 between 2200-0700 local time). Overall, the total number of operations are 46,396 in Caliente MOA/ATCAA (of which 5,392 or 12% between 2200-0700 local time), 24,316 in Coyote MOA/ATCAA (of which 4,594 or 19% between 2200-0700 local time), 26,901 in Elgin MOA/ATCAA (of which 5,113 or 19% between 2200-0700 local time), 25,531 in Reveille MOA/ATCAA (of which 4,970 occurred or 20% between 2200-0700 local time), and 96,604 in Sally MOA/ATCAA (of which 19,321 or 20% between 2200-0700 local time).

Table 4-2. CY2015 Aircraft Operations for MOAs/ATCAAs

Aircraft Type	CALIENTE			COYOTE			ELGIN			REVEILLE			SALLY		
	0700-2200	2200-0700	Total	0700-2200	2200-0700	Total	0700-2200	2200-0700	Total	0700-2200	2200-0700	Total	0700-2200	2200-0700	Total
707	77	35	112	78	35	113	77	35	112	78	35	113	0	0	0
A-10	386	57	443	240	53	293	270	57	327	232	53	285	4294	1074	5368
A-4	87	12	99	28	0	28	79	4	83	87	4	91	0	0	0
A-4K	0	0	0	67	12	79	0	0	0	0	0	0	0	0	0
AC-130	12	8	20	9	6	15	14	14	28	8	5	13	0	0	0
AH1	12	0	12	0	0	0	12	2	14	0	0	0	0	0	0
AH64	2	0	2	0	0	0	7	0	7	0	0	0	4294	1074	5368
AS-350	13	0	13	30	1	31	5	5	10	16	4	20	0	0	0
AT-38	70	0	70	65	0	65	11	0	11	65	0	65	0	0	0
AV-8	12	0	12	12	0	12	40	0	40	12	0	12	0	0	0
B-1	235	59	294	247	65	312	209	59	268	242	63	305	4293	1073	5366
B-2	121	113	234	118	113	231	124	113	237	126	121	247	4294	1074	5368
B-52	140	50	190	164	50	214	138	50	188	162	50	212	4293	1073	5366
B-707	19	9	28	19	9	28	19	9	28	19	9	28	0	0	0
B-727	1	0	1	1	0	1	1	0	1	0	0	0	0	0	0
BAE HAWK	8	0	8	8	0	8	8	0	8	8	0	8	0	0	0
C-12	5	3	8	5	3	8	5	3	8	7	3	10	4294	1073	5367
C-130	153	45	198	151	45	196	152	45	197	148	44	192	4294	1074	5368
C-135	0	0	0	0	0	0	0	0	0	0	0	0	4293	1073	5366
C-146	2	0	2	1	0	1	2	0	2	1	0	1	0	0	0
C-17	86	14	100	86	14	100	86	14	100	87	14	101	4293	1073	5366
C-310	3	0	3	3	0	3	3	0	3	3	0	3	0	0	0
C-441	6	6	12	14	12	26	6	6	12	8	6	14	0	0	0
CESSNA	2	0	2	2	0	2	2	0	2	2	0	2	0	0	0
CH-47	38	20	58	45	20	65	38	20	58	45	20	65	0	0	0
CH53E	0	0	0	0	0	0	0	0	0	0	0	0	4293	1073	5366
CT-210	1	0	1	1	0	1	1	0	1	1	0	1	0	0	0
CV-22	10	14	24	8	14	22	10	14	24	6	12	18	4294	1074	5368
E-3	111	59	170	0	0	0	110	59	169	109	59	168	0	0	0
E3A	0	0	0	11	7	18	0	0	0	0	0	0	0	0	0
E3B	0	0	0	90	45	135	0	0	0	0	0	0	0	0	0
E3D	0	0	0	8	7	15	0	0	0	0	0	0	0	0	0
E-6	1	0	1	1	0	1	1	0	1	1	0	1	0	0	0
E-8	63	44	107	62	44	106	63	44	107	62	44	106	0	0	0
EA-18	348	172	520	348	172	520	345	172	517	348	172	520	0	0	0
EA-6	100	46	146	100	46	146	100	46	146	100	46	146	0	0	0
EC-130	91	29	120	77	28	105	92	29	121	74	26	100	0	0	0

NTTR Noise Analysis, March 2017

Aircraft Type	CALIENTE			COYOTE			ELGIN			REVEILLE			SALLY		
	0700-2200	2200-0700	Total	0700-2200	2200-0700	Total	0700-2200	2200-0700	Total	0700-2200	2200-0700	Total	0700-2200	2200-0700	Total
EF-18	8	0	8	4	0	4	8	0	8	4	0	4	0	0	0
EF-2000	52	0	52	24	0	24	20	0	20	24	0	24	0	0	0
EP-3	23	19	42	23	19	42	23	19	42	23	19	42	0	0	0
F/A-18	0	0	0	211	34	245	0	0	0	0	0	0	0	0	0
F-15	11309	925	12234	0	0	0	5162	843	6005	4679	859	5538	4294	1074	5368
F15C	0	0	0	1850	365	2215	0	0	0	0	0	0	0	0	0
F15D	0	0	0	84	44	128	0	0	0	0	0	0	0	0	0
F15E	0	0	0	2606	400	3006	0	0	0	0	0	0	0	0	0
F15I	0	0	0	77	40	117	0	0	0	0	0	0	0	0	0
F-16	16925	2099	19024	757	200	957	8734	1961	10695	8430	1906	10336	4293	1073	5366
F16AM	0	0	0	145	69	214	0	0	0	0	0	0	0	0	0
F16C	0	0	0	5009	632	5641	0	0	0	0	0	0	0	0	0
F16CJ	0	0	0	581	214	795	0	0	0	0	0	0	0	0	0
F16CM	0	0	0	1692	766	2458	0	0	0	0	0	0	0	0	0
F-18	279	34	313	0	0	0	205	38	243	216	34	250	4294	1074	5368
F-22	4148	461	4609	1558	363	1921	1898	381	2279	1596	375	1971	4293	1073	5366
F-35	3831	60	3891	1632	26	1658	1405	12	1417	1632	26	1658	4294	1074	5368
F-5	97	0	97	51	0	51	39	0	39	51	0	51	0	0	0
FA-18	430	194	624	180	122	302	391	194	585	390	194	584	0	0	0
FA18C	0	0	0	21	0	21	0	0	0	0	0	0	0	0	0
FA18D	0	0	0	148	72	220	0	0	0	0	0	0	0	0	0
FA18E	0	0	0	12	0	12	0	0	0	0	0	0	0	0	0
FA18F	0	0	0	22	0	22	0	0	0	0	0	0	0	0	0
FEO	111	3	114	67	3	70	59	3	62	67	3	70	0	0	0
FGR-4	0	0	0	215	97	312	0	0	0	0	0	0	0	0	0
GR-4	215	97	312	0	0	0	215	97	312	165	77	242	0	0	0
H-60	33	8	41	16	8	24	54	8	62	19	8	27	4293	1073	5366
HC-130	38	42	80	38	42	80	39	42	81	38	42	80	0	0	0
HH-60	254	85	339	177	79	256	468	135	603	162	75	237	0	0	0
KC-10	13	0	13	13	0	13	12	1	13	13	0	13	0	0	0
KC-130	12	0	12	12	0	12	13	1	14	12	0	12	0	0	0
KC-135	399	197	596	398	198	596	395	193	588	400	198	598	0	0	0
L-39	8	0	8	8	0	8	8	0	8	8	0	8	0	0	0
LEAR	4	0	4	4	0	4	4	0	4	4	0	4	0	0	0
M-2000	76	36	112	76	36	112	76	36	112	76	36	112	0	0	0
MC12	1	0	1	0	0	0	1	0	1	0	0	0	0	0	0
MC-130	30	20	50	21	18	39	25	20	45	20	17	37	0	0	0
MH-47	6	12	18	39	33	72	6	12	18	6	12	18	0	0	0
MH53	0	0	0	0	0	0	2	0	2	0	0	0	0	0	0
MH-60	35	21	56	0	0	0	35	21	56	33	21	54	0	0	0

Aircraft Type	CALIENTE			COYOTE			ELGIN			REVEILLE			SALLY		
	0700-2200	2200-0700	Total	0700-2200	2200-0700	Total	0700-2200	2200-0700	Total	0700-2200	2200-0700	Total	0700-2200	2200-0700	Total
MQ-1	35	26	61	36	27	63	35	26	61	35	26	61	0	0	0
MQ-9	94	48	142	141	46	187	96	48	144	97	45	142	0	0	0
MV22	0	0	0	0	0	0	4	4	8	0	0	0	0	0	0
P-3	29	29	58	29	29	58	37	37	74	29	29	58	0	0	0
Sentinel R-1	33	13	46	33	13	46	33	13	46	33	13	46	0	0	0
RC-135	82	40	122	73	40	113	82	40	122	73	40	113	0	0	0
RQ-170	29	30	59	29	30	59	29	30	59	29	30	59	0	0	0
RQ-4	86	62	148	86	62	148	86	62	148	86	62	148	0	0	0
U-2	41	25	66	44	31	75	41	25	66	41	25	66	0	0	0
U-28	18	11	29	15	10	25	18	11	29	13	8	21	0	0	0
UH1	5	0	5	0	0	0	11	0	11	0	0	0	4293	1072	5365
Total	**41,004**	**5,392**	**46,396**	**20,356**	**4,969**	**25,325**	**21,799**	**5,113**	**26,912**	**20,561**	**4,970**	**25,531**	**77,283**	**19,321**	**96,604**

Source: Schirg et al., 2016

Table 4-3 summarizes operations by aircraft type and time period for VR209 and VR222 (Campos et al., 2016). For example, in CY2015, an A-10 flew 1 sortie on VR209 and 2 sorties on VR222. Overall, the total number of sorties are 54 on VR209 (of which 9 or 20% between 2200-0700 local time) and 3 on VR222 with none between 2200-0700 local time. There were zero operations conducted on all other MTRs within NTTR boundaries as provided by the responsible scheduling organization for each MTR.

Table 4-3. CY2015 Aircraft Operations for MTRs

Aircraft Type	VR209			VR222		
	0700-2200	2200-0700	Total	0700-2200	2200-0700	Total
A-10	1	0	1	2	0	2
C-130	3	3	6	0	0	0
EA-18G	1	0	1	0	0	0
FA-18	5	1	6	0	0	0
F-15	14	0	14	0	0	0
F-16	12	3	15	0	0	0
MV-22	9	2	11	1	0	1
Total	**45**	**9**	**54**	**3**	**0**	**3**

Table 4-4 summarizes flight operations by aircraft type and time of day for Creech AFB. USAF personnel provided total operations categorized by Military, General Aviation, Air Carrier/Taxi, RPA and HELO, their respective allocations between 0700-2200 local and 2200-0700 local, and the allocation by aircraft types for the RPAs (Anderson et al., 2016). The data shows a total number of operations of 44,220 at Creech AFB, the majority (41,313) of which is RPA operations. Further, RPA operations are divided among the MQ-1, MQ-9 and RQ-170 at 20%, 70% and 10%, respectively. For the purposes of this analysis, the MQ-1 and MQ-9 are modeled as a propeller aircraft and the RQ-170 as the A-10 (USAF, 2016c). The remaining operations are allocated to individual aircraft and operation types based on the noise modeling inputs for the Creech AICUZ (USAF, 2007). For example Military operations are allocated to the A-10A, F-15A, F-16A, T-38A and F-16C, Air Carrier/Taxi operations to the C-12, etc. No effort was made to update other modeling parameters such as aircraft types, flight tracks, flight profiles, etc. To obtain daily operations for entry into NOISEMAP, annual operations for the RPAs are divided by 260 days and annual operations for all other aircraft by 365 days.

Table 4-4. CY2015 Aircraft Operations for Creech AFB

Aircraft		Arrival		Departure		Closed Pattern		Total		
Unit	Type	0700-2200	2200-0700	0700-2200	2200-0700	0700-2200	2200-0700	0700-2200	2200-0700	Total
Military	A-10A	18.2	2.4	18.2	2.4	0.0	0.0	36.5	4.8	41.3
	F-15A*	39.1	5.1	39.1	5.1	0.0	0.0	78.2	10.3	88.4
	F-16A	56.5	7.4	56.5	7.4	0.0	0.0	112.9	14.8	127.8
	T-38A	13.9	1.8	13.9	1.8	0.0	0.0	27.8	3.6	31.4
	F-16C	1045.0	137.1	1045.0	137.1	0.0	0.0	2089.9	274.2	2364.1
	Subtotal	1172.7	153.8	1172.7	153.8	0.0	0.0	2345.3	307.7	2653.0
General	C-12	70.0	12.0	70.0	12.0	0.0	0.0	140.0	24.0	164.0
Aviation	Subtotal	70.0	12.0	70.0	12.0	0.0	0.0	140.0	24.0	164.0
Air	C-130A&D*	3.8	0.7	3.8	0.7	0.0	0.0	7.7	1.3	9.0
Carrier	C-135A*	3.8	0.7	3.8	0.7	0.0	0.0	7.7	1.3	9.0
/Taxi	Subtotal	7.7	1.3	7.7	1.3	0.0	0.0	15.3	2.7	18.0
RPA	MQ-1	1462.0	165.8	1462.0	165.8	5007.0	0.0	7931.0	331.6	8262.6
	MQ-9	5117.1	580.2	5117.1	580.2	17524.5	0.0	27758.7	1160.4	28919.1
	RQ-170	731.0	82.9	731.0	82.9	2503.5	0.0	3965.5	165.8	4131.3
	Subtotal	7310.1	828.9	7310.1	828.9	25035.0	0.0	39655.2	1657.8	41313.0
HELO	UH60A	32.4	3.6	32.4	3.6	0.0	0.0	64.8	7.2	72.0
	Subtotal	32.4	3.6	32.4	3.6	0.0	0.0	64.8	7.2	72.0
Total		8592.9	999.6	8592.9	999.6	25035.0	0.0	42220.7	1999.3	44220.0

* Representative aircraft types modeled in Creech AICUZ document; these specific model-design-series may not be in operation

4.1.2 Aircraft Flight Profiles

Flight profile information was provided for typical aircraft types to include average speed in Knots Indicated Airspeed (KIAS), average power setting, percent of time in various altitude bands, and average sortie duration in minutes (Haggerty et al., 2016).

Tables 4-5 through 4-14 summarize the data in terms of the "reported" aircraft parameters (aircraft type, average power setting and average airspeed), "modeled" aircraft parameters (aircraft type, average power setting and average airspeed), altitude profile (percent of time in various altitude bands), and typical sortie duration for the aircraft of interest. The "modeled" parameters are, in most cases, as close as possible to a reference condition in the MR_NMAP noise database. For example, Table 4-5 shows for R4806, the "reported" aircraft parameters for the A-10 as power setting 94%, airspeed 300 KIAS, the "modeled" aircraft parameters as power setting 5333 NF [Fan Speed], airspeed 325 KIAS, altitude profile (the aircraft flies between 100 feet AGL and 250 feet AGL 2% of the time, 250 feet AGL and 1,000 feet AGL 11% of the time, 1,000 feet AGL and 10,000 feet AGL 45% of the time, 10,000 feet AGL and 18,000 feet AGL 22% of the time, and 18,000 feet AGL and 30,000 feet AGL 20% of the time). The typical sortie duration is 120 minutes (min), which could be spent among various SUAs.

The following terms defined here and in the acronym section are used in Tables 4-5 through 4-14:

Power Settings: EPR – Engine Pressure Ratio, N1 – Fan Speed, RPM – Revolutions Per Minute, ESHP – Estimated Shaft Horsepower, LBS/HR – Pounds of Fuel per Engine per Hour, NC – Compressor Speed, NF – Fan Speed, Q-BPA – Torque, NR – Compressor Speed, N2 – Compressor Speed, C TIT – Turbine Inlet Temperature in Celsius, ETR – Engine Thrust Request, LFO LITE – Level Flight Operations, Light Weight, PLA – Power Level Angle.

Table 4-5. CY2015 Aircraft Flight Profiles for R4806

Reported Aircraft			Reference Aircraft (Modeled)			Percent in Altitude Band (feet AGL)						Duration (min)
Aircraft Type	Airspeed (Knots)	Power Setting	Type	Airspeed (Knots)	Power Setting	150-250	250-1000	1000-10000	10000-18000	18000-30000	30000-50000	
A-10	300	94.00%	A-10A	325	5333 NF	2	11	45	22	20	0	120
A350	110	90.00%	SA350D	116	116 KNOTS	80	20	0	0	0	0	150
A-4	450	95.00%	A-4C	300	83 % NC	2	6	18	30	35	9	60
AC-130	250	92.00%	C-130H&N&P	250	850 C TIT	3	10	27	50	10	0	150
AH-64	110	90.00%	AH64	100	100 KNOTS	80	20	0	0	0	0	150
ASTAR	110	90.00%	SA350D	116	116 KNOTS	80	20	0	0	0	0	150
AT-38	450	95.00%	T-38A	301	90 % RPM	2	6	18	30	35	9	45
AV-8	400	95.00%	AV-8B	400	95 % RPM	2	11	45	22	20	0	150
B-1B	450	95.00%	B-1B	450	101 % RPM	0	0	50	15	35	0	120
B-2	350	92.00%	B-2A	350	70 PLA	0	0	0	0	0	100	180
B-52H	300	94.00%	B-52H	350	4500 LBS/HR	0	0	0	0	25	75	180
B707	250	92.00%	KC-135R	240	80.3 % NC	0	0	0	0	25	75	150
BAE HAWK	110	90.00%	UH-1N	80	100 % RPM	80	20	0	0	0	0	150
BELL206B	110	90.00%	UH-1N	80	100 % RPM	80	20	0	0	0	0	150
C-12	250	92.00%	HS748	250	72 % RPM	0	0	0	50	50	0	150
C-130J	250	92.00%	C-130H&N&P	250	850 C TIT	1	6	18	35	30	10	150
C-146	250	92.00%	HS748	250	72 % RPM	4	9	27	50	10	0	150
C-17	250	92.00%	C-17	250	1.25 EPR	0	3	13	28	28	28	150
CESSNA	110	90.00%	JPATS	160	100 % N1	0	0	90	10	0	0	150
CH-47	110	90.00%	CH-47D	120	120 KNOTS	80	20	0	0	0	0	150
CH-53E	110	90.00%	CH-53E	120	68 %Q-BPA	80	20	0	0	0	0	150
CV-22	250	90.00%	CV22	250	70% RPM	7	19	54	20	0	0	150
EA-18G	450	95.00%	F-18EF	360	83 % N2	0	0	0	0	80	20	60
EA-6B	350	95.00%	A-6A	350	95 % RPM	0	0	0	0	100	0	150
F/A-18C	450	95.00%	F-18	450	92 % NC	0	12	62	13	13	0	90
F/A-18D	450	95.00%	F-18	450	92 % NC	0	12	62	13	13	0	90
F/A-18E	450	95.00%	F-18EF	360	83 % N2	0	12	62	13	13	0	90
F/A-18F	450	95.00%	F-18EF	360	83 % N2	0	12	62	13	13	0	90
F-15C	450	95.00%	F-15A	450	77 % NC	0	0	0	0	25	75	90
F-15D	450	95.00%	F-15A	450	77 % NC	0	0	0	0	25	75	90
F-15E	450	95.00%	F-15A	450	77 % NC	2	6	18	30	35	9	90
F-15I	450	95.00%	F-15A	450	77 % NC	2	6	18	30	35	9	90
F-16	450	95.00%	F-16(G100)	465	94 % NC	0	12	62	13	13	0	90
F-16C	450	95.00%	F-16(G100)	465	94 % NC	0	12	62	13	13	0	90
F-18	450	95.00%	F-18EF	360	83 % N2	0	12	62	13	13	0	90
F-22A	450	95.00%	F-18EF	360	83 % N2	0	0	0	0	20	80	90
F-35A	450	95.00%	F-35	475	95 % ETR	0	6	68	13	13	0	90

Reported Aircraft			Reference Aircraft (Modeled)			Percent in Altitude Band (feet AGL)						Duration (min)
Aircraft Type	Airspeed (Knots)	Power Setting	Type	Airspeed (Knots)	Power Setting	150-250	250-1000	1000-10000	10000-18000	18000-30000	30000-50000	
F-35B	450	95.00%	F-35	475	95 % ETR	0	6	68	13	13	0	90
F-5N	450	95.00%	F-5E	450	86 % RPM	2	6	18	30	35	9	60
FGR-4	450	95.00%	TORNADO	420	89 % RPM	2	6	18	30	35	9	60
GR-4	450	95.00%	TORNADO	420	89 % RPM	2	6	18	30	35	9	60
H-60	110	90.00%	UH60A	100	100 KNOTS	80	20	0	0	0	0	150
HC-130	250	92.00%	C-130H&N&P	250	850 C TIT	4	12	36	25	18	5	150
HH-60	100	90.00%	UH60A	100	100 KNOTS	80	20	0	0	0	0	150
KC-10	250	92.00%	KC-135R	240	80.3 % NC	0	0	0	0	75	25	150
KC-130	250	92.00%	C-130H&N&P	250	850 C TIT	5	18	47	20	10	0	150
KC-135	250	92.00%	KC-135R	240	80.3 % NC	0	0	0	0	75	25	150
M2000	450	95.00%	F-16(G100)	465	94 % NC	2	6	18	30	35	9	90
MC-12	250	92.00%	HS748	250	72 % RPM	0	0	0	50	50	0	150
MC-130	250	92.00%	C-130H&N&P	250	850 C TIT	1	6	18	35	30	10	150
MH-47	110	90.00%	CH-47D	120	120 KNOTS	80	20	0	0	0	0	150
MH-60	110	90.00%	UH60A	100	100 KNOTS	80	20	0	0	0	0	150
MQ-1	200	90.00%	HS748	250	72 % RPM	0	0	0	90	10	0	360
MQ-9	200	90.00%	HS748	250	72 % RPM	0	0	0	75	25	0	360
MV-22	250	90.00%	CV22	250	70% RPM	7	19	54	20	0	0	150
RQ-170	200	90.00%	A-10A	325	5333 NF	0	0	0	0	0	100	360
RQ-4	400	95.00%	A-10A	325	5333 NF	0	0	0	0	0	100	90
T-39	250	92.00%	T-39A	250	89 % RPM	2	6	18	30	35	9	150
U-2	360	75.00%	A-10A	325	5333 NF	0	0	0	0	0	100	180
U-28A	240	85.00%	JPATS	160	100 % N1	0	0	0	50	50	0	150
UH-1	110	90.00%	UH-1N	80	100 % RPM	80	20	0	0	0	0	150

Source: Haggerty et al., 2016

Table 4-6. CY2015 Aircraft Flight Profiles for R4807

Reported Aircraft			Reference Aircraft (Modeled)			Percent in Altitude Band (feet AGL)						Duration (min)
Aircraft Type	Airspeed (Knots)	Power Setting	Type	Airspeed (Knots)	Power Setting	150-250	250-1000	1000-10000	10000-18000	18000-30000	30000-50000	
A-10	300	94.00%	A-10A	325	5333 NF	2	11	45	22	20	0	120
A350	110	90.00%	SA350D	116	116 KNOTS	80	20	0	0	0	0	150
A-4	450	95.00%	A-4C	300	83 % NC	2	6	18	30	35	9	60
AC-130	250	92.00%	C-130H&N&P	250	850 C TIT	3	10	27	50	10	0	150
AH-64	110	90.00%	AH64	100	100 KNOTS	80	20	0	0	0	0	150
ASTAR	110	90.00%	SA350D	116	116 KNOTS	80	20	0	0	0	0	150
AT-38	450	95.00%	T-38A	301	90 % RPM	2	6	18	30	35	9	45
AV-8	400	95.00%	AV-8B	400	95 % RPM	2	11	45	22	20	0	150
B-1B	450	95.00%	B-1B	450	101 % RPM	0	0	50	15	35	0	120
B-2	350	92.00%	B-2A	350	70 PLA	0	0	0	0	0	100	180
B-52H	300	94.00%	B-52H	350	4500 LBS/HR	0	0	0	0	25	75	180
B707	250	92.00%	KC-135R	240	80.3 % NC	0	0	0	0	25	75	150
BAE HAWK	110	90.00%	UH-1N	80	100 % RPM	80	20	0	0	0	0	150
BELL206B	110	90.00%	UH-1N	80	100 % RPM	80	20	0	0	0	0	150
C-12	250	92.00%	HS748	250	72 % RPM	0	0	0	50	50	0	150
C-130J	250	92.00%	C-130H&N&P	250	850 C TIT	1	6	18	35	30	10	150
C-146	250	92.00%	HS748	250	72 % RPM	4	9	27	50	10	0	150
C-17	250	92.00%	C-17	250	1.25 EPR	0	3	13	28	28	28	150
CESSNA	110	90.00%	JPATS	160	100 % N1	0	0	90	10	0	0	150
CH-47	110	90.00%	CH-47D	120	120 KNOTS	80	20	0	0	0	0	150
CH-53E	110	90.00%	CH-53E	120	68 %Q-BPA	80	20	0	0	0	0	150
CV-22	250	90.00%	CV22	250	70% RPM	7	19	54	20	0	0	150
EA-18G	450	95.00%	F-18EF	360	83 % N2	0	0	0	0	80	20	60
EA-6B	350	95.00%	A-6A	350	95 % RPM	0	0	0	0	100	0	150
F/A-18C	450	95.00%	F-18	450	92 % NC	0	12	62	13	13	0	90
F/A-18D	450	95.00%	F-18	450	92 % NC	0	12	62	13	13	0	90
F/A-18E	450	95.00%	F-18EF	360	83 % N2	0	12	62	13	13	0	90
F/A-18F	450	95.00%	F-18EF	360	83 % N2	0	12	62	13	13	0	90
F-15C	450	95.00%	F-15A	450	77 % NC	0	0	0	0	25	75	90
F-15D	450	95.00%	F-15A	450	77 % NC	0	0	0	0	25	75	90
F-15E	450	95.00%	F-15A	450	77 % NC	2	6	18	30	35	9	90
F-15I	450	95.00%	F-15A	450	77 % NC	2	6	18	30	35	9	90
F-16	450	95.00%	F-16(G100)	465	94 % NC	0	12	62	13	13	0	90
F-16C	450	95.00%	F-16(G100)	465	94 % NC	0	12	62	13	13	0	90
F-18	450	95.00%	F-18EF	360	83 % N2	0	12	62	13	13	0	90
F-22A	450	95.00%	F-18EF	360	83 % N2	0	0	0	0	20	80	90
F-35A	450	95.00%	F-35	475	95 % ETR	0	6	68	13	13	0	90

Reported Aircraft			Reference Aircraft (Modeled)			Percent in Altitude Band (feet AGL)						Duration (min)
Aircraft Type	Airspeed (Knots)	Power Setting	Type	Airspeed (Knots)	Power Setting	150-250	250-1000	1000-10000	10000-18000	18000-30000	30000-50000	
F-35B	450	95.00%	F-35	475	95 % ETR	0	6	68	13	13	0	90
F-5N	450	95.00%	F-5E	450	86 % RPM	2	6	18	30	35	9	60
FGR-4	450	95.00%	TORNADO	420	89 % RPM	2	6	18	30	35	9	60
GR-4	450	95.00%	TORNADO	420	89 % RPM	2	6	18	30	35	9	60
H-60	110	90.00%	UH60A	100	100 KNOTS	80	20	0	0	0	0	150
HC-130	250	92.00%	C-130H&N&P	250	850 C TIT	4	12	36	25	18	5	150
HH-60	100	90.00%	UH60A	100	100 KNOTS	80	20	0	0	0	0	150
M2000	450	95.00%	F-16(G100)	465	94 % NC	2	6	18	30	35	9	90
MC-12	250	92.00%	HS748	250	72 % RPM	0	0	0	50	50	0	150
MC-130	250	92.00%	C-130H&N&P	250	850 C TIT	1	6	18	35	30	10	150
MH-47	110	90.00%	CH-47D	120	120 KNOTS	80	20	0	0	0	0	150
MH-60	110	90.00%	UH60A	100	100 KNOTS	80	20	0	0	0	0	150
MQ-1	200	90.00%	HS748	250	72 % RPM	0	0	0	90	10	0	360
MQ-9	200	90.00%	HS748	250	72 % RPM	0	0	0	75	25	0	360
MV-22	250	90.00%	CV22	250	70% RPM	7	19	54	20	0	0	150
RQ-170	200	90.00%	A-10A	325	5333 NF	0	0	0	0	0	100	360
RQ-4	400	95.00%	A-10A	325	5333 NF	0	0	0	0	0	100	90
T-39	250	92.00%	T-39A	250	89 % RPM	2	6	18	30	35	9	150
U-2	360	75.00%	A-10A	325	5333 NF	0	0	0	0	0	100	180
U-28A	240	85.00%	JPATS	160	100 % N1	0	0	0	50	50	0	150
UH-1	110	90.00%	UH-1N	80	100 % RPM	80	20	0	0	0	0	150

Source: Haggerty et al., 2016

Table 4-7. CY2015 Aircraft Flight Profiles for R4808

Reported Aircraft			Reference Aircraft (Modeled)			Percent in Altitude Band (feet AGL)						Duration (min)
Aircraft Type	Airspeed (Knots)	Power Setting	Type	Airspeed (Knots)	Power Setting	150-250	250-1000	1000-10000	10000-18000	18000-30000	30000-50000	
A-10	300	94.00%	A-10A	325	5333 NF	0	0	0	0	50	50	120
AC-130	250	92.00%	C-130H&N&P	250	850 C TIT	0	0	0	0	100	0	150
AT-38	450	95.00%	T-38A	301	90 % RPM	0	0	0	0	100	0	45
AV-8	400	95.00%	AV-8B	400	95 % RPM	0	0	0	0	100	0	150
B-1B	450	95.00%	B-1B	450	101 % RPM	0	0	0	0	100	0	120
B-2	350	92.00%	B-2A	350	70 PLA	0	0	0	0	50	50	180
B-52H	300	94.00%	B-52H	350	4500 LBS/HR	0	0	0	0	50	50	180
C-130J	250	92.00%	C-130H&N&P	250	850 C TIT	0	0	0	0	100	0	150
C-17	250	92.00%	C-17	250	1.25 EPR	0	0	0	0	50	50	150
EA-18G	450	95.00%	F-18EF	360	83 % N2	0	0	0	0	50	50	60
EA-6B	350	95.00%	A-6A	350	95 % RPM	0	0	0	0	100	0	150
F/A-18C	450	95.00%	F-18	450	92 % NC	0	0	0	0	50	50	90
F/A-18D	450	95.00%	F-18	450	92 % NC	0	0	0	0	50	50	90
F/A-18E	450	95.00%	F-18EF	360	83 % N2	0	0	0	0	50	50	90
F-15C	450	95.00%	F-15A	450	77 % NC	0	0	0	0	50	50	90
F-15D	450	95.00%	F-15A	450	77 % NC	0	0	0	0	50	50	90
F-15E	450	95.00%	F-15A	450	77 % NC	0	0	0	0	50	50	90
F-16	450	95.00%	F-16(G100)	465	94 % NC	0	0	0	0	50	50	90
F-16C	450	95.00%	F-16(G100)	465	94 % NC	0	0	0	0	50	50	90
F-18	450	95.00%	F-18EF	360	83 % N2	0	0	0	0	50	50	90
F-22A	450	95.00%	F-18EF	360	83 % N2	0	0	0	0	50	50	90
F-35A	450	95.00%	F-35	475	95 % ETR	0	0	0	0	50	50	90
F-35B	450	95.00%	F-35	475	95 % ETR	0	0	0	0	50	50	90
F-5N	450	95.00%	F-5E	450	86 % RPM	0	0	0	0	50	50	60
HC-130	250	92.00%	C-130H&N&P	250	850 C TIT	0	0	0	0	100	0	150
MC-130	250	92.00%	C-130H&N&P	250	850 C TIT	0	0	0	0	100	0	150
MQ-1	200	90.00%	HS748	250	72 % RPM	0	0	0	0	100	0	360
MQ-9	200	90.00%	HS748	250	72 % RPM	0	0	0	0	100	0	360
RQ-170	200	90.00%	A-10A	325	5333 NF	0	0	0	0	0	100	360
RQ-4	400	95.00%	A-10A	325	5333 NF	0	0	0	0	0	100	90
T-39	250	92.00%	T-39A	250	89 % RPM	0	0	0	0	50	50	150
U-2	360	75.00%	A-10A	325	5333 NF	0	0	0	0	0	100	180
U-28A	240	85.00%	JPATS	160	100 % N1	0	0	0	0	100	0	150

Source: Haggerty et al., 2016

Table 4-8. CY2015 Aircraft Flight Profiles for R4809

Reported Aircraft			Reference Aircraft (Modeled)			Percent in Altitude Band (feet AGL)						Duration (min)
Aircraft Type	Airspeed (Knots)	Power Setting	Type	Airspeed (Knots)	Power Setting	150-250	250-1000	1000-10000	10000-18000	18000-30000	30000-50000	
A-10	300	94.00%	A-10A	325	5333 NF	2	11	45	22	20	0	120
A350	110	90.00%	SA350D	116	116 KNOTS	80	20	0	0	0	0	150
A-4	450	95.00%	A-4C	300	83 % NC	2	6	18	30	35	9	60
AC-130	250	92.00%	C-130H&N&P	250	850 C TIT	3	10	27	50	10	0	150
AH-64	110	90.00%	AH64	100	100 KNOTS	80	20	0	0	0	0	150
ASTAR	110	90.00%	SA350D	116	116 KNOTS	80	20	0	0	0	0	150
AT-38	450	95.00%	T-38A	301	90 % RPM	2	6	18	30	35	9	45
AV-8	400	95.00%	AV-8B	400	95 % RPM	2	11	45	22	20	0	150
B-1B	450	95.00%	B-1B	450	101 % RPM	0	0	50	15	35	0	120
B-2	350	92.00%	B-2A	350	70 PLA	0	0	0	0	0	100	180
B-52H	300	94.00%	B-52H	350	4500 LBS/HR	0	0	0	0	25	75	180
B707	250	92.00%	KC-135R	240	80.3 % NC	0	0	0	0	25	75	150
BAE HAWK	110	90.00%	UH-1N	80	100 % RPM	80	20	0	0	0	0	150
BELL206B	110	90.00%	UH-1N	80	100 % RPM	80	20	0	0	0	0	150
C-12	250	92.00%	HS748	250	72 % RPM	0	0	0	50	50	0	150
C-130J	250	92.00%	C-130H&N&P	250	850 C TIT	1	6	18	35	30	10	150
C-146	250	92.00%	HS748	250	72 % RPM	4	9	27	50	10	0	150
C-17	250	92.00%	C-17	250	1.25 EPR	0	3	13	28	28	28	150
CESSNA	110	90.00%	JPATS	160	100 % N1	0	0	90	10	0	0	150
CH-47	110	90.00%	CH-47D	120	120 KNOTS	80	20	0	0	0	0	150
CH-53E	110	90.00%	CH-53E	120	68 %Q-BPA	80	20	0	0	0	0	150
CV-22	250	90.00%	CV22	250	70% RPM	7	19	54	20	0	0	150
EA-18G	450	95.00%	F-18EF	360	83 % N2	0	0	0	0	80	20	60
EA-6B	350	95.00%	A-6A	350	95 % RPM	0	0	0	0	100	0	150
F/A-18C	450	95.00%	F-18	450	92 % NC	0	12	62	13	13	0	90
F/A-18D	450	95.00%	F-18	450	92 % NC	0	12	62	13	13	0	90
F/A-18E	450	95.00%	F-18EF	360	83 % N2	0	12	62	13	13	0	90
F/A-18F	450	95.00%	F-18EF	360	83 % N2	0	12	62	13	13	0	90
F-15C	450	95.00%	F-15A	450	77 % NC	0	0	0	0	25	75	90
F-15D	450	95.00%	F-15A	450	77 % NC	0	0	0	0	25	75	90
F-15E	450	95.00%	F-15A	450	77 % NC	2	6	18	30	35	9	90
F-15I	450	95.00%	F-15A	450	77 % NC	2	6	18	30	35	9	90
F-16	450	95.00%	F-16(G100)	465	94 % NC	0	12	62	13	13	0	90
F-16C	450	95.00%	F-16(G100)	465	94 % NC	0	12	62	13	13	0	90
F-18	450	95.00%	F-18EF	360	83 % N2	0	12	62	13	13	0	90

Reported Aircraft			Reference Aircraft (Modeled)			Percent in Altitude Band (feet AGL)						Duration (min)
Aircraft Type	Airspeed (Knots)	Power Setting	Type	Airspeed (Knots)	Power Setting	150-250	250-1000	1000-10000	10000-18000	18000-30000	30000-50000	
F-22A	450	95.00%	F-18EF	360	83 % N2	0	0	0	0	20	80	90
F-35A	450	95.00%	F-35	475	95 % ETR	0	6	68	13	13	0	90
F-35B	450	95.00%	F-35	475	95 % ETR	0	6	68	13	13	0	90
F-5N	450	95.00%	F-5E	450	86 % RPM	2	6	18	30	35	9	60
FGR-4	450	95.00%	TORNADO	420	89 % RPM	2	6	18	30	35	9	60
GR-4	450	95.00%	TORNADO	420	89 % RPM	2	6	18	30	35	9	60
H-60	110	90.00%	UH60A	100	100 KNOTS	80	20	0	0	0	0	150
HC-130	250	92.00%	C-130H&N&P	250	850 C TIT	4	12	36	25	18	5	150
HH-60	100	90.00%	UH60A	100	100 KNOTS	80	20	0	0	0	0	150
M2000	450	95.00%	F-16(G100)	465	94 % NC	2	6	18	30	35	9	90
MC-12	250	92.00%	HS748	250	72 % RPM	0	0	0	50	50	0	150
MC-130	250	92.00%	C-130H&N&P	250	850 C TIT	1	6	18	35	30	10	150
MH-47	110	90.00%	CH-47D	120	120 KNOTS	80	20	0	0	0	0	150
MH-60	110	90.00%	UH60A	100	100 KNOTS	80	20	0	0	0	0	150
MQ-1	200	90.00%	HS748	250	72 % RPM	0	0	0	90	10	0	360
MQ-9	200	90.00%	HS748	250	72 % RPM	0	0	0	75	25	0	360
MV-22	250	90.00%	CV22	250	70% RPM	7	19	54	20	0	0	150
RQ-170	200	90.00%	A-10A	325	5333 NF	0	0	0	0	0	100	360
RQ-4	400	95.00%	A-10A	325	5333 NF	0	0	0	0	0	100	90
T-39	250	92.00%	T-39A	250	89 % RPM	2	6	18	30	35	9	150
U-2	360	75.00%	A-10A	325	5333 NF	0	0	0	0	0	100	180
U-28A	240	85.00%	JPATS	160	100 % N1	0	0	0	50	50	0	150
UH-1	110	90.00%	UH-1N	80	100 % RPM	80	20	0	0	0	0	150

Source: Haggerty et al., 2016

Table 4-9. CY2015 Aircraft Flight Profiles for Caliente MOA

Reported Aircraft			Reference Aircraft (Modeled)			Percent in Altitude Band (feet AGL)						Duration (min)
Aircraft Type	Airspeed (Knots)	Power Setting	Type	Airspeed (Knots)	Power Setting	150-250	250-1000	1000-10000	10000-18000	18000-30000	30000-50000	
A-10	250	85.00%	A-10A	325	5333 NF	2	11	45	22	20	0	120
A350	110	90.00%	SA350D	116	116 KNOTS	80	20	0	0	0	0	150
AC-130	250	90.00%	C-130H&N&P	250	850 C TIT	7	19	54	10	10	0	150
AH-64	110	90.00%	AH64	100	100 KNOTS	80	20	0	0	0	0	150
AP-3	250	90.00%	P-3A	180	2000 ESHP	0	0	0	0	50	50	150
ASTAR	110	90.00%	SA350D	116	116 KNOTS	80	20	0	0	0	0	150
AT-38	350	85.00%	T-38A	301	90 % RPM	2	6	18	30	35	9	60
AV-8	350	85.00%	AV-8B	400	95 % RPM	2	11	45	22	20	0	150
B-1B	350	85.00%	B-1B	450	101 % RPM	0	0	50	15	35	0	120
B-2	350	85.00%	B-2A	350	70 PLA	0	0	0	0	0	100	180
B-52H	350	85.00%	B-52H	350	4500 LBS/HR	0	0	0	0	25	75	180
B707	250	90.00%	KC-135R	240	80.3 % NC	0	0	0	0	25	75	150
BAE HAWK	110	90.00%	UH-1N	80	100 % RPM	80	20	0	0	0	0	150
BELL206B	110	90.00%	UH-1N	80	100 % RPM	80	20	0	0	0	0	150
C-12	250	90.00%	HS748	250	72 % RPM	0	0	0	50	50	0	150
C-130J	250	90.00%	C-130H&N&P	250	850 C TIT	7	19	54	10	10	0	150
C-146	110	90.00%	HS748	250	72 % RPM	4	9	27	50	10	0	150
C-17	250	90.00%	C-17	250	1.25 EPR	0	0	45	10	20	25	150
CESSNA	110	90.00%	JPATS	160	100 % N1	0	0	90	0	10	0	150
CH-47	110	90.00%	CH-47D	120	120 KNOTS	80	20	0	0	0	0	150
CH-53E	110	90.00%	CH-53E	120	68 %Q-BPA	80	20	0	0	0	0	150
CV-22	110	90.00%	CV22	250	70% RPM	7	19	54	20	0	0	150
E-3B	250	90.00%	KC-135R	240	80.3 % NC	0	0	0	0	50	50	150
E-3D	250	90.00%	KC-135R	240	80.3 % NC	0	0	0	0	50	50	150
E-7A	250	90.00%	T-43A	250	1.21 EPR	0	0	0	0	50	50	150
E-8C	250	90.00%	KC-135R	240	80.3 % NC	0	0	0	0	50	50	150
EA-18G	350	85.00%	F-18EF	360	83 % N2	0	0	0	0	80	20	60
EA-6B	300	85.00%	A-6A	350	95 % RPM	0	0	0	0	100	0	150
EC-130	250	90.00%	C-130H&N&P	250	850 C TIT	0	0	0	20	80	0	150
EP-3	250	90.00%	P-3A	180	2000 ESHP	0	0	0	0	50	50	150
F/A-18C	350	85.00%	F-18	450	92 % NC	0	12	62	13	13	0	90
F/A-18D	350	85.00%	F-18	450	92 % NC	0	12	62	13	13	0	90
F/A-18E	350	85.00%	F-18EF	360	83 % N2	0	12	62	13	13	0	90
F/A-18F	350	85.00%	F-18EF	360	83 % N2	0	12	62	13	13	0	90
F-15C	350	85.00%	F-15A	450	77 % NC	0	0	0	0	25	75	90
F-15D	350	85.00%	F-15A	450	77 % NC	0	0	0	0	25	75	90
F-15E	350	85.00%	F-15A	450	77 % NC	2	6	18	30	35	9	90

Reported Aircraft			Reference Aircraft (Modeled)			Percent in Altitude Band (feet AGL)						Duration (min)
Aircraft Type	Airspeed (Knots)	Power Setting	Type	Airspeed (Knots)	Power Setting	150-250	250-1000	1000-10000	10000-18000	18000-30000	30000-50000	
F-15I	350	85.00%	F-15A	450	77 % NC	2	6	18	30	35	9	90
F-16	350	85.00%	F-16(G100)	465	94 % NC	0	12	62	13	13	0	90
F-16C	350	85.00%	F-16(G100)	465	94 % NC	0	12	62	13	13	0	90
F-18	350	85.00%	F-18EF	360	83 % N2	0	12	62	13	13	0	90
F-22A	350	85.00%	F-18EF	360	83 % N2	0	0	0	0	20	80	90
F-35A	350	85.00%	F-35	475	75 % ETR	0	6	68	13	13	0	90
F-35B	350	85.00%	F-35	475	75 % ETR	0	6	68	13	13	0	90
F-5N	350	85.00%	F-5E	450	86 % RPM	2	6	18	30	35	9	60
FGR-4	350	85.00%	TORNADO	420	89 % RPM	2	6	18	30	35	9	60
GR-4	350	85.00%	TORNADO	420	89 % RPM	2	6	18	30	35	9	60
H-60	110	90.00%	UH60A	100	100 KNOTS	80	20	0	0	0	0	150
HC-130	250	90.00%	C-130H&N&P	250	850 C TIT	7	19	54	10	10	0	150
HH-60	110	90.00%	UH60A	100	100 KNOTS	80	20	0	0	0	0	150
KC-10	250	90.00%	KC-135R	240	80.3 % NC	0	0	0	0	80	20	150
KC-130	250	90.00%	C-130H&N&P	250	850 C TIT	7	19	54	10	10	0	150
KC-135	250	90.00%	KC-135R	240	80.3 % NC	0	0	0	0	80	20	150
M2000	350	85.00%	F-16(G100)	465	94 % NC	2	6	18	30	35	9	60
MC-12	250	90.00%	HS748	250	72 % RPM	0	0	0	50	50	0	150
MC-130	250	90.00%	C-130H&N&P	250	850 C TIT	7	19	54	10	10	0	150
MH-47	110	90.00%	CH-47D	120	120 KNOTS	80	20	0	0	0	0	150
MH-60	110	90.00%	UH60A	100	100 KNOTS	80	20	0	0	0	0	150
MQ-1	200	90.00%	HS748	250	72 % RPM	0	0	0	90	10	0	360
MQ-9	200	90.00%	HS748	250	72 % RPM	0	0	0	75	25	0	360
MV-22	110	90.00%	CV22	250	70% RPM	7	19	54	20	0	0	150
P-3	250	90.00%	P-3A	180	2000 ESHP	0	0	0	0	50	50	150
P-8	250	90.00%	T-43A	250	1.21 EPR	0	0	0	0	50	50	150
R-1	250	90.00%	T-39A	250	89 % RPM	0	0	0	0	25	75	150
RC-135	250	90.00%	KC-135R	240	80.3 % NC	0	0	0	0	50	50	150
RQ-170	200	90.00%	A-10A	325	5333 NF	0	0	0	0	0	100	360
RQ-4	400	95.00%	A-10A	325	5333 NF	0	0	0	0	0	100	90
T-39	350	85.00%	T-39A	250	89 % RPM	2	6	18	30	35	9	150
U-2	360	75.00%	A-10A	325	5333 NF	0	0	0	0	0	100	180
U-28A	240	85.00%	JPATS	160	100 % N1	0	0	0	50	50	0	150
UH-1	110	90.00%	UH-1N	80	100 % RPM	80	20	0	0	0	0	150

Source: Haggerty et al., 2016

Table 4-10. CY2015 Aircraft Flight Profiles for Coyote MOA

Reported Aircraft			Reference Aircraft (Modeled)			Percent in Altitude Band (feet AGL)						Duration (min)
Aircraft Type	Airspeed (Knots)	Power Setting	Type	Airspeed (Knots)	Power Setting	150-250	250-1000	1000-10000	10000-18000	18000-30000	30000-50000	
A-10	300	94.00%	A-10A	325	5333 NF	2	11	45	22	20	0	120
A350	110	90.00%	SA350D	116	116 KNOTS	80	20	0	0	0	0	150
A-4	450	95.00%	A-4C	300	83 % NC	2	6	18	30	35	9	60
AC-130	250	92.00%	C-130H&N&P	250	850 C TIT	3	10	27	50	10	0	150
AH-64	110	90.00%	AH64	100	100 KNOTS	80	20	0	0	0	0	150
ASTAR	110	90.00%	SA350D	116	116 KNOTS	80	20	0	0	0	0	150
AT-38	450	95.00%	T-38A	301	90 % RPM	2	6	18	30	35	9	45
AV-8	400	95.00%	AV-8B	400	95 % RPM	2	11	45	22	20	0	150
B-1B	450	95.00%	B-1B	450	101 % RPM	0	0	50	15	35	0	120
B-2	350	92.00%	B-2A	350	70 PLA	0	0	0	0	0	100	180
B-52H	300	94.00%	B-52H	350	4500 LBS/HR	0	0	0	0	25	75	180
B707	250	92.00%	KC-135R	240	80.3 % NC	0	0	0	0	25	75	150
BAE HAWK	110	90.00%	UH-1N	80	100 % RPM	80	20	0	0	0	0	150
BELL206B	110	90.00%	UH-1N	80	100 % RPM	80	20	0	0	0	0	150
C-12	250	92.00%	HS748	250	72 % RPM	0	0	0	50	50	0	150
C-130J	250	92.00%	C-130H&N&P	250	850 C TIT	1	6	18	35	30	10	150
C-146	250	92.00%	HS748	250	72 % RPM	4	9	27	50	10	0	150
C-17	250	92.00%	C-17	250	1.25 EPR	0	3	13	28	28	28	150
CESSNA	110	90.00%	JPATS	160	100 % N1	0	0	90	10	0	0	150
CH-47	110	90.00%	CH-47D	120	120 KNOTS	80	20	0	0	0	0	150
CH-53E	110	90.00%	CH-53E	120	68 %Q-BPA	80	20	0	0	0	0	150
CV-22	250	90.00%	CV22	250	70% RPM	7	19	54	20	0	0	150
EA-18G	450	95.00%	F-18EF	360	83 % N2	0	0	0	0	80	20	60
EA-6B	350	95.00%	A-6A	350	95 % RPM	0	0	0	0	100	0	150
F/A-18C	450	95.00%	F-18	450	92 % NC	0	12	62	13	13	0	90
F/A-18D	450	95.00%	F-18	450	92 % NC	0	12	62	13	13	0	90
F/A-18E	450	95.00%	F-18EF	360	83 % N2	0	12	62	13	13	0	90
F/A-18F	450	95.00%	F-18EF	360	83 % N2	0	12	62	13	13	0	90
F-15C	450	95.00%	F-15A	450	77 % NC	0	0	0	0	25	75	90
F-15D	450	95.00%	F-15A	450	77 % NC	0	0	0	0	25	75	90
F-15E	450	95.00%	F-15A	450	77 % NC	2	6	18	30	35	9	90
F-15I	450	95.00%	F-15A	450	77 % NC	2	6	18	30	35	9	90
F-16	450	95.00%	F-16(G100)	465	94 % NC	0	12	62	13	13	0	90
F-16C	450	95.00%	F-16(G100)	465	94 % NC	0	12	62	13	13	0	90
F-18	450	95.00%	F-18EF	360	83 % N2	0	12	62	13	13	0	90

Reported Aircraft			Reference Aircraft (Modeled)			Percent in Altitude Band (feet AGL)						Duration (min)
Aircraft Type	Airspeed (Knots)	Power Setting	Type	Airspeed (Knots)	Power Setting	150-250	250-1000	1000-10000	10000-18000	18000-30000	30000-50000	
F-22A	450	95.00%	F-18EF	360	83 % N2	0	0	0	0	20	80	90
F-35A	450	95.00%	F-35	475	95 % ETR	0	6	68	13	13	0	90
F-35B	450	95.00%	F-35	475	95 % ETR	0	6	68	13	13	0	90
F-5N	450	95.00%	F-5E	450	86 % RPM	2	6	18	30	35	9	60
FGR-4	450	95.00%	TORNADO	420	89 % RPM	2	6	18	30	35	9	60
GR-4	450	95.00%	TORNADO	420	89 % RPM	2	6	18	30	35	9	60
H-60	110	90.00%	UH60A	100	100 KNOTS	80	20	0	0	0	0	150
HC-130	250	92.00%	C-130H&N&P	250	850 C TIT	4	12	36	25	18	5	150
HH-60	100	90.00%	UH60A	100	100 KNOTS	80	20	0	0	0	0	150
KC-10	250	92.00%	KC-135R	240	80.3 % NC	0	0	0	0	30	70	150
KC-130	250	92.00%	C-130H&N&P	250	850 C TIT	0	0	0	0	30	70	150
KC-135	250	92.00%	KC-135R	240	80.3 % NC	0	0	0	0	30	70	150
M2000	450	95.00%	F-16(G100)	465	94 % NC	2	6	18	30	35	9	90
MC-12	250	92.00%	HS748	250	72 % RPM	0	0	0	50	50	0	150
MC-130	250	92.00%	C-130H&N&P	250	850 C TIT	1	6	18	35	30	10	150
MH-47	110	90.00%	CH-47D	120	120 KNOTS	80	20	0	0	0	0	150
MH-60	110	90.00%	UH60A	100	100 KNOTS	80	20	0	0	0	0	150
MQ-1	200	90.00%	HS748	250	72 % RPM	0	0	0	90	10	0	360
MQ-9	200	90.00%	HS748	250	72 % RPM	0	0	0	75	25	0	360
MV-22	250	90.00%	CV22	250	70% RPM	7	19	54	20	0	0	150
RQ-170	200	90.00%	A-10A	325	5333 NF	0	0	0	0	0	100	360
RQ-4	400	95.00%	A-10A	325	5333 NF	0	0	0	0	0	100	90
T-39	250	92.00%	T-39A	250	89 % RPM	2	6	18	30	35	9	150
U-2	360	75.00%	A-10A	325	5333 NF	0	0	0	0	0	100	180
U-28A	240	85.00%	JPATS	160	100 % N1	0	0	0	50	50	0	150
UH-1	110	90.00%	UH-1N	80	100 % RPM	80	20	0	0	0	0	150

Source: Haggerty et al., 2016

Table 4-11. CY2015 Aircraft Flight Profiles for Elgin MOA

Reported Aircraft			Reference Aircraft (Modeled)			Percent in Altitude Band (feet AGL)						Duration (min)
Aircraft Type	Airspeed (Knots)	Power Setting	Type	Airspeed (Knots)	Power Setting	150-250	250-1000	1000-10000	10000-18000	18000-30000	30000-50000	
A-10	250	85.00%	A-10A	325	5333 NF	2	11	45	22	20	0	120
A350	110	90.00%	SA350D	116	116 KNOTS	80	20	0	0	0	0	150
AC-130	250	90.00%	C-130H&N&P	250	850 C TIT	7	19	54	10	10	0	150
AH-64	110	90.00%	AH64	100	100 KNOTS	80	20	0	0	0	0	150
AP-3	250	90.00%	P-3A	180	2000 ESHP	0	0	0	0	50	50	150
ASTAR	110	90.00%	SA350D	116	116 KNOTS	80	20	0	0	0	0	150
AT-38	350	85.00%	T-38A	301	90 % RPM	2	6	18	30	35	9	60
AV-8	350	85.00%	AV-8B	400	95 % RPM	2	11	45	22	20	0	150
B-1B	350	85.00%	B-1B	450	101 % RPM	0	0	50	15	35	0	120
B-2	350	85.00%	B-2A	350	70 PLA	0	0	0	0	0	100	180
B-52H	350	85.00%	B-52H	350	4500 LBS/HR	0	0	0	0	25	75	180
B707	250	90.00%	KC-135R	240	80.3 % NC	0	0	0	0	25	75	150
BAE HAWK	110	90.00%	UH-1N	80	100 % RPM	80	20	0	0	0	0	150
BELL206B	110	90.00%	UH-1N	80	100 % RPM	80	20	0	0	0	0	150
C-12	250	90.00%	HS748	250	72 % RPM	0	0	0	50	50	0	150
C-130J	250	90.00%	C-130H&N&P	250	850 C TIT	7	19	54	10	10	0	150
C-146	110	90.00%	HS748	250	72 % RPM	4	9	27	50	10	0	150
C-17	250	90.00%	C-17	250	1.25 EPR	0	0	45	10	20	25	150
CESSNA	110	90.00%	JPATS	160	100 % N1	0	0	90	10	0	0	150
CH-47	110	90.00%	CH-47D	120	120 KNOTS	80	20	0	0	0	0	150
CH-53E	110	90.00%	CH-53E	120	68 %Q-BPA	80	20	0	0	0	0	150
CV-22	110	90.00%	CV22	250	70% RPM	7	19	54	20	0	0	150
E-3B	250	90.00%	KC-135R	240	80.3 % NC	0	0	0	0	50	50	150
E-3D	250	90.00%	KC-135R	240	80.3 % NC	0	0	0	0	50	50	150
E-7A	250	90.00%	T-43A	250	1.21 EPR	0	0	0	0	50	50	150
E-8C	250	90.00%	KC-135R	240	80.3 % NC	0	0	0	0	50	50	150
EA-18G	350	85.00%	F-18EF	360	83 % N2	0	0	0	0	80	20	60
EA-6B	300	85.00%	A-6A	350	95 % RPM	0	0	0	0	100	0	150
EC-130	250	90.00%	C-130H&N&P	250	850 C TIT	0	0	0	20	80	0	150
EP-3	250	90.00%	P-3A	180	2000 ESHP	0	0	0	0	50	50	150
F/A-18C	350	85.00%	F-18	450	92 % NC	0	12	62	13	13	0	90
F/A-18D	350	85.00%	F-18	450	92 % NC	0	12	62	13	13	0	90
F/A-18E	350	85.00%	F-18EF	360	83 % N2	0	12	62	13	13	0	90
F/A-18F	350	85.00%	F-18EF	360	83 % N2	0	12	62	13	13	0	90
F-15C	350	85.00%	F-15A	450	77 % NC	0	0	0	0	25	75	90
F-15D	350	85.00%	F-15A	450	77 % NC	0	0	0	0	25	75	90
F-15E	350	85.00%	F-15A	450	77 % NC	2	6	18	30	35	9	90

Reported Aircraft			Reference Aircraft (Modeled)			Percent in Altitude Band (feet AGL)						Duration (min)
Aircraft Type	Airspeed (Knots)	Power Setting	Type	Airspeed (Knots)	Power Setting	150-250	250-1000	1000-10000	10000-18000	18000-30000	30000-50000	
F-15I	350	85.00%	F-15A	450	77 % NC	2	6	18	30	35	9	90
F-16	350	85.00%	F-16(G100)	465	94 % NC	0	12	62	13	13	0	90
F-16C	350	85.00%	F-16(G100)	465	94 % NC	0	12	62	13	13	0	90
F-18	350	85.00%	F-18EF	360	83 % N2	0	12	62	13	13	0	90
F-22A	350	85.00%	F-18EF	360	83 % N2	0	0	0	0	20	80	90
F-35A	350	85.00%	F-35	475	75 % ETR	0	6	68	13	13	0	90
F-35B	350	85.00%	F-35	475	75 % ETR	0	6	68	13	13	0	90
F-5N	350	85.00%	F-5E	450	86 % RPM	2	6	18	30	35	9	60
FGR-4	350	85.00%	TORNADO	420	89 % RPM	2	6	18	30	35	9	60
GR-4	350	85.00%	TORNADO	420	89 % RPM	2	6	18	30	35	9	60
H-60	110	90.00%	UH60A	100	100 KNOTS	80	20	0	0	0	0	150
HC-130	250	90.00%	C-130H&N&P	250	850 C TIT	7	19	54	10	10	0	150
HH-60	110	90.00%	UH60A	100	100 KNOTS	80	20	0	0	0	0	150
KC-10	250	90.00%	KC-135R	240	80.3 % NC	0	0	0	0	80	20	150
KC-130	250	90.00%	C-130H&N&P	250	850 C TIT	7	19	54	10	10	0	150
KC-135	250	90.00%	KC-135R	240	80.3 % NC	0	0	0	0	80	20	150
M2000	350	85.00%	F-16(G100)	465	94 % NC	2	6	18	30	35	9	60
MC-12	250	90.00%	HS748	250	72 % RPM	0	0	0	50	50	0	150
MC-130	250	90.00%	C-130H&N&P	250	850 C TIT	7	19	54	10	10	0	150
MH-47	110	90.00%	CH-47D	120	120 KNOTS	80	20	0	0	0	0	150
MH-60	110	90.00%	UH60A	100	100 KNOTS	80	20	0	0	0	0	150
MQ-1	200	90.00%	HS748	250	72 % RPM	0	0	0	90	10	0	360
MQ-9	200	90.00%	HS748	250	72 % RPM	0	0	0	75	25	0	360
MV-22	110	90.00%	CV22	250	70% RPM	7	19	54	20	0	0	150
P-3	250	90.00%	P-3A	180	2000 ESHP	0	0	0	0	50	50	150
P-8	250	90.00%	T-43A	250	1.21 EPR	0	0	0	0	50	50	150
R-1	250	90.00%	T-39A	250	89 % RPM	0	0	0	0	25	75	150
RC-135	250	90.00%	KC-135R	240	80.3 % NC	0	0	0	0	50	50	150
RQ-170	200	90.00%	A-10A	325	5333 NF	0	0	0	0	0	100	360
RQ-4	400	95.00%	A-10A	325	5333 NF	0	0	0	0	0	100	90
T-39	350	85.00%	T-39A	250	89 % RPM	2	6	18	30	35	9	150
U-2	360	75.00%	A-10A	325	5333 NF	0	0	0	0	0	100	180
U-28A	240	85.00%	JPATS	160	100 % N1	0	0	0	50	50	0	150
UH-1	110	90.00%	UH-1N	80	100 % RPM	80	20	0	0	0	0	150

Source: Haggerty et al., 2016

Table 4-12. CY2015 Aircraft Flight Profiles for Reveille MOA

Reported Aircraft			Reference Aircraft (Modeled)			Percent in Altitude Band (feet AGL)						Duration (min)
Aircraft Type	Airspeed (Knots)	Power Setting	Type	Airspeed (Knots)	Power Setting	150-250	250-1000	1000-10000	10000-18000	18000-30000	30000-50000	
A-10	300	94.00%	A-10A	325	5333 NF	2	11	45	22	20	0	120
A-4	450	95.00%	A-4C	300	83 % NC	2	6	18	30	35	9	60
AC-130	250	92.00%	C-130H&N&P	250	850 C TIT	3	10	27	50	10	0	150
AT-38	450	95.00%	T-38A	301	90 % RPM	2	6	18	30	35	9	45
AV-8	400	95.00%	AV-8B	400	95 % RPM	2	11	45	22	20	0	150
B-1B	450	95.00%	B-1B	450	101 % RPM	0	0	50	15	35	0	120
B-2	350	92.00%	B-2A	350	70 PLA	0	0	0	0	0	100	180
B-52H	300	94.00%	B-52H	350	4500 LBS/HR	0	0	0	0	25	75	180
B707	250	92.00%	KC-135R	240	80.3 % NC	0	0	0	0	25	75	150
C-12	250	92.00%	HS748	250	72 % RPM	0	0	0	50	50	0	150
C-130J	250	92.00%	C-130H&N&P	250	850 C TIT	1	6	18	35	30	10	150
C-146	250	92.00%	HS748	250	72 % RPM	4	9	27	50	10	0	150
C-17	250	92.00%	C-17	250	1.25 EPR	0	3	13	28	28	28	150
CESSNA	110	90.00%	JPATS	160	100 % N1	0	0	90	10	0	0	150
CV-22	250	90.00%	CV22	250	70% RPM	7	19	54	20	0	0	150
EA-18G	450	95.00%	F-18EF	360	83 % N2	0	0	0	0	80	20	60
EA-6B	350	95.00%	A-6A	350	95 % RPM	0	0	0	0	100	0	150
F/A-18C	450	95.00%	F-18	450	92 % NC	0	12	62	13	13	0	90
F/A-18D	450	95.00%	F-18	450	92 % NC	0	12	62	13	13	0	90
F/A-18E	450	95.00%	F-18EF	360	83 % N2	0	12	62	13	13	0	90
F/A-18F	450	95.00%	F-18EF	360	83 % N2	0	12	62	13	13	0	90
F-15C	450	95.00%	F-15A	450	77 % NC	0	0	0	0	25	75	90
F-15D	450	95.00%	F-15A	450	77 % NC	0	0	0	0	25	75	90
F-15E	450	95.00%	F-15A	450	77 % NC	2	6	18	30	35	9	90
F-15I	450	95.00%	F-15A	450	77 % NC	2	6	18	30	35	9	90
F-16	450	95.00%	F-16(G100)	465	94 % NC	0	12	62	13	13	0	90
F-16C	450	95.00%	F-16(G100)	465	94 % NC	0	12	62	13	13	0	90
F-18	450	95.00%	F-18EF	360	83 % N2	0	12	62	13	13	0	90
F-22A	450	95.00%	F-18EF	360	83 % N2	0	0	0	0	20	80	90
F-35A	450	95.00%	F-35	475	95 % ETR	0	6	68	13	13	0	90
F-35B	450	95.00%	F-35	475	95 % ETR	0	6	68	13	13	0	90
F-5N	450	95.00%	F-5E	450	86 % RPM	2	6	18	30	35	9	60
FGR-4	450	95.00%	TORNADO	420	89 % RPM	2	6	18	30	35	9	60
GR-4	450	95.00%	TORNADO	420	89 % RPM	2	6	18	30	35	9	60
HC-130	250	92.00%	C-130H&N&P	250	850 C TIT	4	12	36	25	18	5	150
M2000	450	95.00%	F-16(G100)	465	94 % NC	2	6	18	30	35	9	90
MC-12	250	92.00%	HS748	250	72 % RPM	0	0	0	50	50	0	150

Reported Aircraft			Reference Aircraft (Modeled)			Percent in Altitude Band (feet AGL)						Duration (min)
Aircraft Type	Airspeed (Knots)	Power Setting	Type	Airspeed (Knots)	Power Setting	150-250	250-1000	1000-10000	10000-18000	18000-30000	30000-50000	
MC-130	250	92.00%	C-130H&N&P	250	850 C TIT	1	6	18	35	30	10	150
MQ-1	200	90.00%	HS748	250	72 % RPM	0	0	0	90	10	0	360
MQ-9	200	90.00%	HS748	250	72 % RPM	0	0	0	75	25	0	360
MV-22	250	90.00%	CV22	250	70% RPM	7	19	54	20	0	0	150
RQ-170	200	90.00%	A-10A	325	5333 NF	0	0	0	0	0	100	360
RQ-4	400	95.00%	A-10A	325	5333 NF	0	0	0	0	0	100	90
T-39	250	92.00%	T-39A	250	89 % RPM	2	6	18	30	35	9	150
U-2	360	75.00%	A-10A	325	5333 NF	0	0	0	0	0	100	180
U-28A	240	85.00%	JPATS	160	100 % N1	0	0	0	50	50	0	150

Source: Haggerty et al., 2016

Table 4-13. CY2015 Aircraft Flight Profiles for Sally MOA

Reported Aircraft			Reference Aircraft (Modeled)			Percent in Altitude Band (feet AGL)						Duration (min)
Aircraft Type	Airspeed (Knots)	Power Setting	Type	Airspeed (Knots)	Power Setting	150-250	250-1000	1000-10000	10000-18000	18000-30000	30000-50000	
A-10	250	75.00%	A-10A	250	5333 NF	0	0	0	50	50	0	20
AH-64	110	90.00%	AH64	110	100 KNOTS	80	20	0	0	0	0	40
B-1	350	75.00%	B-1B	350	101 % RPM	0	0	0	50	50	0	15
B-2	350	75.00%	B-2A	350	70 PLA	0	0	0	0	0	100	15
B-52	350	75.00%	B-52H	350	4500 LBS/HR	0	0	0	0	25	75	15
C-12	250	85.00%	HS748	250	72 % RPM	0	0	0	50	50	0	20
C-130	250	85.00%	C-130H&N&P	250	850 C TIT	7	19	54	10	10	0	20
C-135	250	85.00%	KC-135R	250	80.3 % NC	0	0	0	0	80	20	20
C-17	250	90.00%	C-17	250	1.25 EPR	0	0	45	10	20	25	20
CH-53	110	90.00%	CH-53E	110	68 %Q-BPA	80	20	0	0	0	0	40
CV-22	250	90.00%	CV22	250	70% RPM	7	19	54	20	0	0	20
F-15	350	75.00%	F-15A	350	77 % NC	0	0	0	0	25	75	15
F-16	350	75.00%	F-16(G100)	350	94 % NC	0	0	0	50	50	0	15
F-18	350	75.00%	F-18EF	350	83 % N2	0	0	0	50	50	0	15
F-22	350	75.00%	F-18EF	350	83 % N2	0	0	0	0	20	80	15
F-35	350	75.00%	F-35	350	75 % ETR	0	0	0	50	50	0	15
H-60	110	90.00%	UH60A	110	100 KNOTS	80	20	0	0	0	0	40
UH-1	110	90.00%	UH-1N	110	100 % RPM	80	20	0	0	0	0	40

Note: Sortie duration (min) based on time to ingress and egress through Sally MOA for a total distance of approximately 70 NM

Source: Haggerty et al., 2016; Morrison et al., 2016

Table 4-14. CY2015 Aircraft Flight Profiles for MTRs

MTR	Reported Aircraft			Reference Aircraft (Modeled)			Percent in Altitude Band (feet AGL)	
	Aircraft Type	Power Setting	Airspeed (Knots)	Type	Airspeed (Knots)	Power Setting	100-1500	200-1500
VR209	A-10	5333 %NF	300	A-10A	325	5333 NF		100
VR209	C-130	850 %C TIT	220	C-130H&N&P	250	850 C TIT		100
VR209	EA-18G	84.5 % N2	400	F-18EF	360	83 % N2		100
VR209	F-15	77 % NC	450	F-15A	450	77 % NC		100
VR209	F-16	94 % NC	465	F-16(G100)	465	94 % NC		100
VR209	FA-18	84.5 % N2	401	F-18EF	360	83 % N2		100
VR209	MV-22	84% NR	240	CV22	250	70% RPM		100
VR222	A-10	5333 %NF	300	A-10A	325	5333 NF	100	
VR222	MV-22	84% NR	240	CV22	250	70% RPM	100	

Source: Campos et al., 2016

For Creech AFB, flight tracks, flight profiles (altitudes, power setting and airspeeds along flight tracks), and run-up operations are based on existing noise modeling inputs for the Creech AFB AICUZ (USAF, 2007).

4.1.3 Other Modeling Assumptions

Other modeling assumptions include:

- **Weather**: Another important factor in the propagation of noise from aircraft overflights is weather condition. The weather values for entry into MR_NMAP were based on the standard reference values for temperature of 59 degree Fahrenheit and relative humidity of 70 percent.
- **Number of flying days in the busiest month of CY2015**: For the purpose of the noise analysis, 28 days was modeled for all SUAs.
- **Mapping of aircraft from the "reported" aircraft in the sortie data (Schirg et al., 2016) to the "reported" aircraft in mission data (Haggerty et al., 2016)**: In the two sets of data, there was not always a direct one-to-one relationship between the aircraft types in the sortie data (aircraft type – sortie) and those in the flight profile data (aircraft type – mission). As a result, a mapping was developed to apply flight profiles to each aircraft sortie. Table 4-15 summarizes the mapping. In some cases, there is an "EXACT" match from aircraft type (sortie) to aircraft type (mission). In other cases, there is a "CLOSE/SAME" match from aircraft type (sortie) to aircraft type (mission) owing mostly to spelling or nomenclature differences. In the remaining cases, there is no match from aircraft type (sortie) to aircraft type (mission) and the aircraft type (sortie) is "MODELED AS" an aircraft type (mission).

Table 4-15. Mapping of Aircraft Types (Sortie) to Aircraft Types (Mission)

Aircraft Type (Sortie)	Aircraft Type (Mission)	Match Type
A-10	A-10	EXACT
A-4	A-4	EXACT
AC-130	AC-130	EXACT
AH-64	AH-64	EXACT
AP-3	AP-3	EXACT
ASTAR	ASTAR	EXACT
AT-38	AT-38	EXACT
AV-8	AV-8	EXACT
B-2	B-2	EXACT
B707	B707	EXACT
BAE Hawk	BAE HAWK	EXACT
BELL206B	BELL206B	EXACT
C-12	C-12	EXACT
C-146	C-146	EXACT
C-17	C-17	EXACT
CESSNA	CESSNA	EXACT

Aircraft Type (Sortie)	Aircraft Type (Mission)	Match Type
CH-47	CH-47	EXACT
CV-22	CV-22	EXACT
E-7	E-7A	EXACT
E-7A	E-7A	EXACT
EC-130	EC-130	EXACT
EP-3	EP-3	EXACT
F-16	F-16	EXACT
F-18	F-18	EXACT
F-5N	F-5N	EXACT
FGR-4	FGR-4	EXACT
GR-4	GR-4	EXACT
H-60	H-60	EXACT
HC-130	HC-130	EXACT
HH-60	HH-60	EXACT
KC-10	KC-10	EXACT
KC-130	KC-130	EXACT
KC-135	KC-135	EXACT
M2000	M2000	EXACT
MC-12	MC-12	EXACT
MC-130	MC-130	EXACT
MH-47	MH-47	EXACT
MH-60	MH-60	EXACT
MQ-1	MQ-1	EXACT
MQ-9	MQ-9	EXACT
MV-22	MV-22	EXACT
P-3	P-3	EXACT
P-8	P-8	EXACT
R-1	R-1	EXACT
RC-135	RC-135	EXACT
RQ-170	RQ-170	EXACT
RQ-4	RQ-4	EXACT
T-39	T-39	EXACT
U-2	U-2	EXACT
UH-1	UH-1	EXACT
707	B707	CLOSE/SAME
A10	A-10	CLOSE/SAME
A4	A-4	CLOSE/SAME
A4K	A-4	CLOSE/SAME
A-4K	A-4	CLOSE/SAME
AC130	AC-130	CLOSE/SAME
AH64	AH-64	CLOSE/SAME
AS350	A350	CLOSE/SAME
AS-350	ASTAR	CLOSE/SAME
AT38	AT-38	CLOSE/SAME
AV8B	AV-8	CLOSE/SAME
B-1	B-1B	CLOSE/SAME
B1B	B-1B	CLOSE/SAME
B2	B-2	CLOSE/SAME
B-52	B-52H	CLOSE/SAME
B52H	B-52H	CLOSE/SAME
B-707	B707	CLOSE/SAME
BEKK206B	BELL206B	CLOSE/SAME
BELL-206	BELL206B	CLOSE/SAME
C12	C-12	CLOSE/SAME
C130	C-130J	CLOSE/SAME
C-130	C-130J	CLOSE/SAME
C146	C-146	CLOSE/SAME

Aircraft Type (Sortie)	Aircraft Type (Mission)	Match Type
C146A	C-146	CLOSE/SAME
C17	C-17	CLOSE/SAME
CH47	CH-47	CLOSE/SAME
CH53E	CH-53E	CLOSE/SAME
CV22	CV-22	CLOSE/SAME
E-3	E-3D	CLOSE/SAME
E3A	E-3B	CLOSE/SAME
E3B	E-3B	CLOSE/SAME
E3D	E-3D	CLOSE/SAME
E8	E-8C	CLOSE/SAME
E-8	E-8C	CLOSE/SAME
E8C	E-8C	CLOSE/SAME
EA18	EA-18G	CLOSE/SAME
EA-18	EA-18G	CLOSE/SAME
EA18G	EA-18G	CLOSE/SAME
EA-6	EA-6B	CLOSE/SAME
EA6B	EA-6B	CLOSE/SAME
EC130	EC-130	CLOSE/SAME
EC130H	EC-130	CLOSE/SAME
EF18	F/A-18E	CLOSE/SAME
EF-18	F/A-18E	CLOSE/SAME
EP3	EP-3	CLOSE/SAME
EP3E	EP-3	CLOSE/SAME
F/A18	F/A-18C	CLOSE/SAME
F/A-18	F/A-18C	CLOSE/SAME
F-15	F-15C	CLOSE/SAME
F15C	F-15C	CLOSE/SAME
F15D	F-15D	CLOSE/SAME
F15E	F-15E	CLOSE/SAME
F15I	F-15I	CLOSE/SAME
F16	F-16	CLOSE/SAME
F16AM	F-16	CLOSE/SAME
F16C	F-16C	CLOSE/SAME
F16CJ	F-16C	CLOSE/SAME
F16CM	F-16C	CLOSE/SAME
F22	F-22A	CLOSE/SAME
F-22	F-22A	CLOSE/SAME
F22A	F-22A	CLOSE/SAME
F-35	F-35A	CLOSE/SAME
F35A	F-35A	CLOSE/SAME
F35B	F-35B	CLOSE/SAME
F5	F-5N	CLOSE/SAME
F-5	F-5N	CLOSE/SAME
FA18	F/A-18	CLOSE/SAME
FA-18	F/A-18	CLOSE/SAME
FA18C	F/A-18C	CLOSE/SAME
FA18D	F/A-18D	CLOSE/SAME
FA18E	F/A-18E	CLOSE/SAME
FA18F	F/A-18F	CLOSE/SAME
GR4	GR-4	CLOSE/SAME
H60	HH-60	CLOSE/SAME
HC130	HC-130	CLOSE/SAME
HH60	HH-60	CLOSE/SAME
KC10	KC-10	CLOSE/SAME
KC130	KC-130	CLOSE/SAME
KC135	KC-135	CLOSE/SAME
KC135R	KC-135	CLOSE/SAME

Aircraft Type (Sortie)	Aircraft Type (Mission)	Match Type
M-2000	M2000	CLOSE/SAME
MC12	MC-12	CLOSE/SAME
MC130	MC-130	CLOSE/SAME
MH47	MH-47	CLOSE/SAME
MH53	CH-53E	CLOSE/SAME
MH-53	CH-53E	CLOSE/SAME
MH60	MH-60	CLOSE/SAME
MQ1	MQ-1	CLOSE/SAME
MQ9	MQ-9	CLOSE/SAME
MQ9U	MQ-9	CLOSE/SAME
MV22	MV-22	CLOSE/SAME
P3	P-3	CLOSE/SAME
R1	R-1	CLOSE/SAME
RC135V/W	RC-135	CLOSE/SAME
RQ170	RQ-170	CLOSE/SAME
RQ4	RQ-4	CLOSE/SAME
Sentinal R1	R-1	CLOSE/SAME
SentinalR1	R-1	CLOSE/SAME
Sentinel R-1	R-1	CLOSE/SAME
SentinelR-1	R-1	CLOSE/SAME
T39	T-39	CLOSE/SAME
U2	U-2	CLOSE/SAME
U-28	U-28A	CLOSE/SAME
U28A	U-28A	CLOSE/SAME
UH1	UH-1	CLOSE/SAME
UH-60	HH-60	CLOSE/SAME
88TES	HH-60	MODELED AS
AH1	UH-1	MODELED AS
AH-1	UH-1	MODELED AS
B-200	C-146	MODELED AS
B-412	UH-1	MODELED AS
B727	E-7A	MODELED AS
B-727	E-7A	MODELED AS
B737	E-7A	MODELED AS
BAE	E-7A	MODELED AS
C208	CESSNA	MODELED AS
C-208	CESSNA	MODELED AS
C310	C-12	MODELED AS
C-310	C-12	MODELED AS
C441	C-12	MODELED AS
C-441	C-12	MODELED AS
CT210	C-12	MODELED AS
CT-210	C-12	MODELED AS
DHC6	C-146	MODELED AS
DHC-6	C-146	MODELED AS
E6	E-3B	MODELED AS
E-6	E-3B	MODELED AS
EF2000	F-16	MODELED AS
EF-2000	F-16	MODELED AS
FEO	E-7A	MODELED AS
L39	F-16	MODELED AS
L-39	F-16	MODELED AS
LEAR	R-1	MODELED AS
RPA	MQ-9	MODELED AS
SR-22	CESSNA	MODELED AS
UAV	MQ-1	MODELED AS
UH-72	UH-1	MODELED AS

Aircraft Type (Sortie)	Aircraft Type (Mission)	Match Type
UNKNOWN	U-2	MODELED AS

- **Sortie and operations by airspace units**: Where the aircraft type, unit, and a number of operations defined by 0700-2200 and 2200-0700 appear in one or more airspace units, those operations are modeled as having been conducted during the same sortie and the "sortie duration" is used to determine how much time was spent in each airspace unit based on square area of the airspace unit. For example, the 707 aircraft associated with the RED FLAG unit (modeled as a KC-135 with an average sortie duration 150 minutes) conducted 73 operations in R-4806, 75 in R-4807, 73 in R-4808, 75 in R-4809, 75 in Reveille, 75 in Caliente, 75 in Coyote and 75 in Elgin between 0700-2200 local. Table 4-16 illustrates the modeling approach as follows:
    - Sortie #1 of the RED FLAG 707 would fly in each piece of airspace for 1 operation each in R-4806, R-4807, R-4808, R-4809, Reveille, Caliente, Coyote and Elgin. The durations are 17.6, 20.3, 10.2, 4.7, 20.4, 17.4, 26.2 and 13.2 minutes in R-4806, R-4807, R-4808, R-4809, Reveille, Caliente, Coyote and Elgin, respectively. That amounts to 130 minutes, which added to 20 minutes of ingress/egress time amounts to 150 minutes for the sortie. The same is true of Sortie #2 through Sortie #73 for a total of 73 operations in each piece of airspace.
    - Sortie #74 of the RED FLAG 707 would fly 1 operation each in R-4807, R-4809, Reveille, Caliente, Coyote and Elgin. The durations are 25.8, 5.9, 26.0, 22.1, 33.3 and 16.8 minutes in R-4807, R-4809, Reveille, Caliente, Coyote and Elgin, respectively. That amounts to 130 minutes, which added to 20 minutes of ingress/egress time amounts to 150 minutes for the sortie.
    - In summary, the RED FLAG 707 aircraft would conduct 73 operations in R-4806, 75 in R-4807, 73 in R-4808, 75 in R-4809, 75 in Reveille, 75 in Caliente, 75 in Coyote and 75 in Elgin between 0700-2200 local, as reported, with each sortie lasting 150 minutes. The same rationale was used for all reported operations.

Table 4-16. Modeling of Sorties and Operations

SUA Area (mile^2)	**R-4806** 1931.9	**R-4807** 2220.0	**R-4808** 1114.8	**R-4809** 509.9	**REV** 2237.0	**COY** 1901.9	**CAL** 2868.4	**ELG** 1447.0	
Sortie #1 Duration (min)	x 17.6	x 20.3	x 10.2	x 4.7	x 20.4	x 17.4	x 26.2	x 13.2	 130.0
Sortie #3 Duration (min)	x 17.6	x 20.3	x 10.2	x 4.7	x 20.4	x 17.4	x 26.2	x 13.2	 130.0
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.									
Sortie #73 Duration (min)	x 17.6	x 20.3	x 10.2	x 4.7	x 20.4	x 17.4	x 26.2	x 13.2	 130.0
Sortie #74 Duration (min)		x 25.8		x 5.9	x 26.0	x 22.1	x 33.3	x 16.8	 130
Sortie #75 Duration (min)		x 25.8		x 5.9	x 26.0	x 22.1	x 33.3	x 16.8	 130
Total Operations	73	75	73	75	75	75	75	75	

Note: In addition to ingress/egress of 20 min, total sortie duration for the 707 is 150 min

4.2 Supersonic Flight Operations

Supersonic flight within NTTR is limited to designated and approved airspace in both Restricted Areas and MOAs/ATCAAs. In general, these flights avoid populated areas within the SUAs to minimize exposure. The following areas are designated and approved for supersonic flight:

- R4806 at 5,000 feet AGL and up (except where prohibited – Creech AFB, 64D and 64E)
- R4807 at 5,000 feet AGL and up
- R4808 (as scheduled through NTTR)
- R4809 at 5,000 feet AGL and up
- Caliente A and B at 5,000 feet AGL and up, and Caliente C at 30,000 feet and up
- Coyote 5,000 feet AGL and up
- Elgin 5,000 feet AGL and up (except southern one-third from 30,000 feet MSL and up)
- Reveille 5,000 feet AGL and up
- Sally 5,000 feet AGL and up (except southern one-third from 30,000 feet MSL and up)

The aircraft of interest are F-15s (U.S. and Foreign Partners), F-16s (U.S. and Foreign Partners), F-18s (U.S. and Foreign Partners), F-35s (U.S. and Foreign Partners) and the Eurofighter (Foreign Partner) with approximately 50% of their operations involving supersonic flight. Typical range time for these aircraft is 60 minutes, of which 5 minutes (8%) is spent in supersonic flight. The F-22 is the other aircraft of interest. However, in 60 minutes of range time, 12 minutes (20%) is spent in supersonic flight. The above estimates are relative to the operations discussed in Section 4.1 for the designated and approved airspace.

4.3 Large Caliber Weapons Expenditure

The operational data used to model noise from large caliber noise weapons on training ranges was collected from airspace managers. High explosive blast and large caliber weapons firings (artillery, rockets, bombs, demolition charges, missiles) tend to dominate the noise environment associated with large ranges such as NTTR. As a result, only live ordnance from large caliber weapons is addressed in this analysis. NTTR personnel provided the annual ordnance expenditure for air-to-ground and ground-to-ground activities for CY2015 (Shirg et al, 2016). The report contains a listing of ordnance type, quantity fired, area/facility where firing took place, impact area and classification of event between 0700-2200 local time and 2200-0700 local time. Table 4-17 summarizes the ordnance expenditure for NTTR by ordnance type; whether it was modeled or not; if not modeled, why; if modeled, the modeled ordnance type; quantity expended between 0700-2200 local time; and quantity expended between 2200-0700 local time. For example, on the first row, the .50 CAL AP/TRACER (4/1) is not modeled because it is fired from a small arm; the reported quantities are 6,859 shots between 0700-2200 local time and 1,547 shots between 2200-0700 local time for a total of 8,406 in CY2015. On the 45th row, the 2.75" TP is modeled for a 2.75-IN ROCKET with an inert projectile; the reported quantities are 297 shots between 0700-2200 local time and 1 shot between 2200-0700 local time for a total of 298 in CY2015.

Table 4-17. CY2015 Ordnance Expenditure for NTTR

ORDNANCE	MODELED (YES/NO)	IF NOT MODELED, RATIONALE IF MODELED, MODELED AS	LIVE/ INERT	QUANTITY		
				0700-2200	2200-0700	Total
.50 CAL AP/TRACER (4/1)	NO	SMALL ARMS	N/A	6858.7	1547.3	8406.0
.50 CAL API	NO	SMALL ARMS	N/A	31107.0	4693.0	35800.0
.50CAL 4/1 API/APIT (A576)	NO	SMALL ARMS	N/A	24953.4	3751.6	28705.0
.50Cal A557 Tracer	NO	SMALL ARMS	N/A	5331.0	719.0	6050.0
.50CAL AP/API/DIM Tracer(AA50)	NO	SMALL ARMS	N/A	49977.4	2035.6	52013.0
.50CAL BALL LINKED (A555)	NO	SMALL ARMS	N/A	2927.8	372.2	3300.0
.50CAL BALL/TRACER (A557)	NO	SMALL ARMS	N/A	272852.4	39376.6	312229.0
5.56MM M193 Ball HH	NO	SMALL ARMS	N/A	4.0	0.0	4.0
5.56MM M196 Tracer HH	NO	SMALL ARMS	N/A	4.0	0.0	4.0
7.62MM 4/1 M80 (A165)	NO	SMALL ARMS	N/A	11423.8	1776.2	13200.0
7.62MM 9/1 DIM TRACER	NO	SMALL ARMS	N/A	108623.0	8260.0	116883.0
7.62MM 9/1 M80(A168)	NO	SMALL ARMS	N/A	428089.3	61397.7	489487.0
7.62MM BALL LINKED (A164)	NO	SMALL ARMS	N/A	57818.2	2381.8	60200.0
7.62MM Ball M80	NO	SMALL ARMS	N/A	63295.7	4804.3	68100.0
7.62MM BLANK (A111)	NO	SMALL ARMS	N/A	2400.0	0.0	2400.0
7.62MM M276 Dim Tracer HH	NO	SMALL ARMS	N/A	3000.0	0.0	3000.0
7.62MM M80 Ball HH	NO	SMALL ARMS	N/A	6000.0	0.0	6000.0
7.62MM M82 Blank HH	NO	SMALL ARMS	N/A	8.0	0.0	8.0
AN/ALE50 CMDDS	NO	COUNTERMEASURE DISPENSER	N/A	9.5	2.5	12.0
CHAFF(RR129)	NO	CHAFF	N/A	1.3	2.7	4.0
CHAFF(RR188)	NO	CHAFF	N/A	2.0	0.0	2.0
GBU10I PWII	NO	MK84 - INERT	INERT	37.4	5.6	43.0
GBU12FI PWII	NO	MK82 - INERT	INERT	89.6	5.4	95.0
GBU12I PWII (ZL5CB)	NO	MK82 - INERT	INERT	715.6	66.4	782.0
GBU12I PWII (ZL5CD)	NO	MK82 - INERT	INERT	5.5	2.5	8.0
GBU16I PWII (USN)	NO	MK83 - INERT	INERT	10.0	0.0	10.0
GBU24I	NO	MK84 - INERT	INERT	215.6	11.4	227.0
GBU28I	NO	BLU113 - INERT	INERT	1.4	0.6	2.0
GBU31I	NO	MK84 - INERT	INERT	114.7	17.3	132.0
GBU32I	NO	MK83 - INERT	INERT	43.6	10.4	54.0
GBU38I	NO	MK82 - INERT	INERT	201.9	39.1	241.0
GBU39I	NO	MK81 - INERT	INERT	2.7	1.3	4.0
GBU49I EPWII	NO	MK82 - INERT	INERT	3.0	0.0	3.0
GBU54I	NO	MK82 - INERT	INERT	8.7	2.3	11.0
LUU19L	NO	FLARES	INERT	910.5	11.5	922.0
LUU2L	NO	FLARES	INERT	1.0	0.0	1.0
M206 Flare (F061A)	NO	FLARES	N/A	2.0	0.0	2.0
MJU32 A/B IR Decoy	NO	DECOY	N/A	1.3	2.7	4.0

ORDNANCE	MODELED (YES/NO)	IF NOT MODELED, RATIONALE IF MODELED, MODELED AS	LIVE/ INERT	QUANTITY		
				0700-2200	2200-0700	Total
MK-87	NO	LINE THROWING RIFLE ADAPTER KIT	N/A	23.4	10.6	34.0
120MM Mor Cart (HE)	YES	120-MM MORTAR	LIVE	12.0	0.0	12.0
155MM (ILLUM)	YES	155-MM HOWITZER M109	INERT	18.0	0.0	18.0
155MM (SMOKE)	YES	155-MM HOWITZER M109	INERT	5.0	0.0	5.0
2.75" TP	YES	2.75-IN ROCKET	INERT	297.4	0.6	298.0
2.75"L HE RKT	YES	2.75-IN ROCKET	LIVE	159.7	3.3	163.0
2.75"L ILLUM	YES	2.75-IN ROCKET	INERT	42.7	0.3	43.0
2.75"L IR ILLUM	YES	2.75-IN ROCKET	INERT	142.1	0.9	143.0
2.75"L SIG PRAC	YES	2.75-IN ROCKET	INERT	13.0	1.0	14.0
2.75"L WP RKT	YES	2.75-IN ROCKET	INERT	2156.7	14.3	2171.0
20MM API M53	YES	20-MM GUN	LIVE	1000.0	0.0	1000.0
20MM TP PGU27	YES	20-MM GUN	INERT	144429.1	1375.9	145805.0
20MMFB	YES	20-MM GUN	LIVE	500.0	0.0	500.0
30MM HEI PGU13/B	YES	25-MM GUN	LIVE	15461.0	0.0	15461.0
30MM HEI/API (CM)	YES	25-MM GUN	LIVE	15285.6	26.4	15312.0
30MM TP PGU15	YES	25-MM GUN	INERT	212611.8	2346.2	214958.0
30MMFB HEI	YES	25-MM GUN	LIVE	1900.0	0.0	1900.0
40MM HEI PGU9/PGU37	YES	40-MM GUN	LIVE	5.4	3.6	9.0
AGM114L(K) (P-A) HELLFIRE	YES	HELLFIRE MISSILE	LIVE	23.7	1.3	25.0
AGM114L(K2) (P-ZA) HLFIRE	YES	HELLFIRE MISSILE	LIVE	7.5	3.5	11.0
AGM114L(M) (N-6)	YES	HELLFIRE MISSILE	LIVE	23.6	9.4	33.0
AGM114L(P) (M)	YES	HELLFIRE MISSILE	LIVE	9.7	2.3	12.0
AGM65BL	YES	COMPOSITION B - 86 LBS	LIVE	27.0	0.0	27.0
AGM65DL	YES	COMPOSITION B - 86 LBS	LIVE	72.8	0.2	73.0
AGM65GL	YES	COMPOSITION B - 86 LBS	LIVE	17.8	0.2	18.0
AGM65HL	YES	COMPOSITION B - 86 LBS	LIVE	4.0	0.0	4.0
AGM65KL	YES	COMPOSITION B - 86 LBS	LIVE	2.0	0.0	2.0
AGM65L	YES	COMPOSITION B - 86 LBS	LIVE	25.0	0.0	25.0
BDU33I W/LUG	YES	BDU33	INERT	2911.1	15.9	2927.0
BDU33I W/O LUG	YES	BDU33	INERT	235.3	1.7	237.0
BDU50I HD	YES	BDU33	INERT	111.7	1.3	113.0
BDU50I LD CF	YES	BDU33	INERT	321.4	12.6	334.0
BDU56I HD	YES	BDU33	INERT	31.7	12.3	44.0
BDU56I LD CF	YES	BDU33	INERT	136.6	4.4	141.0
BDU59B/BI LGTR	YES	BDU33	INERT	4.0	0.0	4.0
CBU103L	YES	CYCLOTOL (70 RDX/130 TNT) - 202 x .63 LBS	LIVE	326.9	7.1	334.0
CBU105L	YES	MINOL II (70 HMX/30 TNT) - 10 x 2 LBS	LIVE	4.0	0.0	4.0
CBU87L	YES	CYCLOTOL (70 RDX/130 TNT) - 202 x .63 LBS	LIVE	67.6	0.4	68.0
FIM-92 STINGER	YES	TNT - 0.87 LBS	LIVE	3.8	5.3	9.0
FMG-148A Javelin	YES	DRAGON MISSILE	LIVE	40.0	0.0	40.0
GBU10L PWII	YES	MK84	LIVE	46.7	0.3	47.0

ORDNANCE	MODELED (YES/NO)	IF NOT MODELED, RATIONALE IF MODELED, MODELED AS	LIVE/ INERT	QUANTITY		
				0700-2200	2200-0700	Total
GBU12FL PWII	YES	MK82	LIVE	103.4	3.6	107.0
GBU12L PWII	YES	MK82	LIVE	855.8	35.2	891.0
GBU31L	YES	MK84	LIVE	68.3	7.7	76.0
GBU32L	YES	MK83	LIVE	2.7	1.3	4.0
GBU38L	YES	MK82	LIVE	161.5	2.5	164.0
GBU39L	YES	MK81	LIVE	20.0	0.0	20.0
HIMARS (RRPR)	YES	MLRS	LIVE	14.0	0.0	14.0
LAW Rocket 66MM (HEAT)	YES	LAW MISSILE M72	LIVE	3.0	0.0	3.0
M117L (LD)	YES	TRITONAL - 403 LBS	LIVE	54.0	0.0	54.0
MK82L HD	YES	MK82	LIVE	112.0	2.0	114.0
MK82L LD	YES	MK82	LIVE	971.3	66.7	1038.0
MK82L LD CF	YES	MK82	LIVE	61.0	0.0	61.0
MK82L Retarder (AIR) HD/LD	YES	MK82	LIVE	20.9	0.1	21.0
MK83L HD	YES	MK83	LIVE	4.0	0.0	4.0
MK84L HD	YES	MK84	LIVE	20.9	0.1	21.0
MK84L LD	YES	MK84	LIVE	52.9	11.1	64.0
YES - LIVE	YES	MK82	LIVE	1.9	0.1	2.0
TOTAL				1478095.7	135288.3	1613384.0

Source: Schirg et al., 2016

For the modeling purposes, BNOISE requires input of the firing and target locations for each of the ordnance analyzed. NTTR personnel provided the location of the centroids of the firing and target complexes illustrated in Figure 3-1, Section 3. Table 4-18 presents modeled ordnance expenditure by firing and target locations and by time periods of 0700-2200 local time and 2200-0700 local time. For example, in CY2015, the 2.75" TP rocket was fired from aircraft to 18 general target complexes. The three most used complexes are 6101, 6102 and 6213. The "Easting" and "Northing" coordinates of the target complex centroids are provided in Universal Transverse Mercator (UTM) Zone 11, in addition to the quantity of shots fired for each target location. All ordnance with a firing location designated as "Air-to-Ground" are modeled as being fired from an aircraft at a height of 500 feet AGL above the target complex. In addition, for target complexes where the location is not reported (e.g., 64 TBD TGT), a random target is modeled from the same range, in this case R64.

Table 4-18. CY2015 Ordnance Expenditure by Firing and Target Locations

Ordnance	Firing Location			Target Location			0700-2200	2200-0700	Total
	Name	Easting (11)	Northing (11)	Name	Easting (11)	Northing (11)			
2.75" TP	Air-to-Ground	N/A	N/A	6101	639737	4113734	47.00	0.00	47.00
2.75" TP	Air-to-Ground	N/A	N/A	6202	639759	4086935	34.95	0.05	35.00
2.75" TP	Air-to-Ground	N/A	N/A	6204	638017	4084486	24.90	0.10	25.00
2.75" TP	Air-to-Ground	N/A	N/A	6209	637367	4075940	18.00	0.00	18.00
2.75" TP	Air-to-Ground	N/A	N/A	6211	638813	4072489	18.00	0.00	18.00
2.75" TP	Air-to-Ground	N/A	N/A	6212	639316	4072518	19.00	0.00	19.00
2.75" TP	Air-to-Ground	N/A	N/A	6213	639148	4072475	25.97	0.03	26.00
2.75" TP	Air-to-Ground	N/A	N/A	6302	632380	4051396	7.94	0.06	8.00
2.75" TP	Air-to-Ground	N/A	N/A	6305	634047	4050652	7.94	0.06	8.00
2.75" TP	Air-to-Ground	N/A	N/A	64 TBD TGT	623455	4085010	11.92	0.08	12.00
2.75" TP	Air-to-Ground	N/A	N/A	6410	623455	4085010	12.00	0.00	12.00
2.75" TP	Air-to-Ground	N/A	N/A	6412	621338	4086641	12.00	0.00	12.00
2.75" TP	Air-to-Ground	N/A	N/A	6414	622985	4075870	18.95	0.05	19.00
2.75" TP	Air-to-Ground	N/A	N/A	6417	623017	4074616	18.95	0.05	19.00
2.75" TP	Air-to-Ground	N/A	N/A	6504	611486	4066044	4.97	0.03	5.00
2.75" TP	Air-to-Ground	N/A	N/A	6506	606903	4065322	4.97	0.03	5.00
2.75" TP	Air-to-Ground	N/A	N/A	6507	610008	4071727	4.97	0.03	5.00
2.75" TP	Air-to-Ground	N/A	N/A	6508	611697	4071897	4.97	0.03	5.00
2.75"L HE RKT	Air-to-Ground	N/A	N/A	6202	639759	4086935	13.31	2.69	16.00
2.75"L HE RKT	Air-to-Ground	N/A	N/A	6410	623455	4085010	55.81	0.19	56.00
2.75"L HE RKT	Air-to-Ground	N/A	N/A	6412	621338	4086641	5.96	0.04	6.00
2.75"L HE RKT	Air-to-Ground	N/A	N/A	6413	622215	4076342	15.89	0.11	16.00
2.75"L HE RKT	Air-to-Ground	N/A	N/A	6414	622985	4075870	14.94	0.06	15.00
2.75"L HE RKT	Air-to-Ground	N/A	N/A	6417	623017	4074616	15.89	0.11	16.00
2.75"L HE RKT	Air-to-Ground	N/A	N/A	6507	610008	4071727	6.95	0.05	7.00
2.75"L HE RKT	Air-to-Ground	N/A	N/A	7430	568678	4153688	7.00	0.00	7.00
2.75"L HE RKT	Air-to-Ground	N/A	N/A	7436	571711	4163643	10.00	0.00	10.00
2.75"L HE RKT	Air-to-Ground	N/A	N/A	76 TBD TGT	509917	4144038	14.00	0.00	14.00
2.75"L ILLUM	Air-to-Ground	N/A	N/A	62 TBD TGT	638017	4084486	2.00	0.00	2.00
2.75"L ILLUM	Air-to-Ground	N/A	N/A	6202	639759	4086935	35.75	0.25	36.00
2.75"L ILLUM	Air-to-Ground	N/A	N/A	6502	608910	4060927	4.97	0.03	5.00
2.75"L IR ILLUM	Air-to-Ground	N/A	N/A	62 TBD TGT	638017	4084486	3.99	0.01	4.00
2.75"L IR ILLUM	Air-to-Ground	N/A	N/A	6202	639759	4086935	7.94	0.06	8.00
2.75"L IR ILLUM	Air-to-Ground	N/A	N/A	6302	632380	4051396	19.90	0.10	20.00
2.75"L IR ILLUM	Air-to-Ground	N/A	N/A	6305	634047	4050652	6.00	0.00	6.00
2.75"L IR ILLUM	Air-to-Ground	N/A	N/A	64 TBD TGT	623455	4085010	42.70	0.30	43.00
2.75"L IR ILLUM	Air-to-Ground	N/A	N/A	6412	621338	4086641	34.76	0.24	35.00
2.75"L IR ILLUM	Air-to-Ground	N/A	N/A	6413	622215	4076342	13.90	0.10	14.00
2.75"L IR ILLUM	Air-to-Ground	N/A	N/A	6414	622985	4075870	6.95	0.05	7.00
2.75"L IR ILLUM	Air-to-Ground	N/A	N/A	65 TBD TGT	606563	4061868	5.96	0.04	6.00

Ordnance	Firing Location			Target Location			0700-2200	2200-0700	Total
	Name	Easting (11)	Northing (11)	Name	Easting (11)	Northing (11)			
2.75"L SIG PRAC	Air-to-Ground	N/A	N/A	6410	623455	4085010	6.00	0.00	6.00
2.75"L SIG PRAC	Air-to-Ground	N/A	N/A	6414	622985	4075870	5.99	1.01	7.00
2.75"L SIG PRAC	Air-to-Ground	N/A	N/A	6417	623017	4074616	1.00	0.00	1.00
2.75"L WP RKT	Air-to-Ground	N/A	N/A	62 TBD TGT	638017	4084486	146.95	1.05	148.00
2.75"L WP RKT	Air-to-Ground	N/A	N/A	6202	639759	4086935	210.29	1.71	212.00
2.75"L WP RKT	Air-to-Ground	N/A	N/A	6204	638017	4084486	393.58	2.42	396.00
2.75"L WP RKT	Air-to-Ground	N/A	N/A	6209	637367	4075940	48.00	0.00	48.00
2.75"L WP RKT	Air-to-Ground	N/A	N/A	6212	639316	4072518	55.95	0.05	56.00
2.75"L WP RKT	Air-to-Ground	N/A	N/A	6291	639593	4070673	6.95	0.05	7.00
2.75"L WP RKT	Air-to-Ground	N/A	N/A	6302	632380	4051396	117.18	0.82	118.00
2.75"L WP RKT	Air-to-Ground	N/A	N/A	64 TBD TGT	623455	4085010	290.71	2.29	293.00
2.75"L WP RKT	Air-to-Ground	N/A	N/A	6404	622089	4059874	5.96	0.04	6.00
2.75"L WP RKT	Air-to-Ground	N/A	N/A	6410	623455	4085010	50.02	0.98	51.00
2.75"L WP RKT	Air-to-Ground	N/A	N/A	6412	621338	4086641	52.64	0.36	53.00
2.75"L WP RKT	Air-to-Ground	N/A	N/A	6413	622215	4076342	8.94	0.06	9.00
2.75"L WP RKT	Air-to-Ground	N/A	N/A	6414	622985	4075870	87.45	0.55	88.00
2.75"L WP RKT	Air-to-Ground	N/A	N/A	6417	623017	4074616	47.50	0.50	48.00
2.75"L WP RKT	Air-to-Ground	N/A	N/A	65 TBD TGT	606563	4061868	101.16	0.84	102.00
2.75"L WP RKT	Air-to-Ground	N/A	N/A	6501	607676	4061027	2.00	0.00	2.00
2.75"L WP RKT	Air-to-Ground	N/A	N/A	6502	608910	4060927	45.00	0.00	45.00
2.75"L WP RKT	Air-to-Ground	N/A	N/A	6504	611486	4066044	47.58	0.42	48.00
2.75"L WP RKT	Air-to-Ground	N/A	N/A	6506	606903	4065322	123.86	1.14	125.00
2.75"L WP RKT	Air-to-Ground	N/A	N/A	6507	610008	4071727	54.62	0.38	55.00
2.75"L WP RKT	Air-to-Ground	N/A	N/A	6508	611697	4071897	51.67	0.33	52.00
2.75"L WP RKT	Air-to-Ground	N/A	N/A	6511	606563	4061868	80.74	0.26	81.00
2.75"L WP RKT	Air-to-Ground	N/A	N/A	71 TBD TGT	506560	4160956	28.00	0.00	28.00
2.75"L WP RKT	Air-to-Ground	N/A	N/A	7411	565723	4145469	24.00	0.00	24.00
2.75"L WP RKT	Air-to-Ground	N/A	N/A	7433	575822	4149974	28.00	0.00	28.00
2.75"L WP RKT	Air-to-Ground	N/A	N/A	7506	543183	4146667	6.00	0.00	6.00
2.75"L WP RKT	Air-to-Ground	N/A	N/A	7519	532188	4145772	14.00	0.00	14.00
2.75"L WP RKT	Air-to-Ground	N/A	N/A	76 TBD TGT	509917	4144038	14.00	0.00	14.00
2.75"L WP RKT	Air-to-Ground	N/A	N/A	7605	513529	4144999	14.00	0.00	14.00
20MM API M53	Air-to-Ground	N/A	N/A	6213	639148	4072475	1000.00	0.00	1000.00
20MM TP PGU27	Air-to-Ground	N/A	N/A	6101	639737	4113734	750.00	0.00	750.00
20MM TP PGU27	Air-to-Ground	N/A	N/A	62 TBD TGT	638017	4084486	38.67	0.33	39.00
20MM TP PGU27	Air-to-Ground	N/A	N/A	6202	639759	4086935	1179.15	22.85	1202.00
20MM TP PGU27	Air-to-Ground	N/A	N/A	6204	638017	4084486	2928.01	42.99	2971.00
20MM TP PGU27	Air-to-Ground	N/A	N/A	6209	637367	4075940	34016.81	155.19	34172.00
20MM TP PGU27	Air-to-Ground	N/A	N/A	6211	638813	4072489	450.00	0.00	450.00
20MM TP PGU27	Air-to-Ground	N/A	N/A	6212	639316	4072518	4201.98	13.02	4215.00
20MM TP PGU27	Air-to-Ground	N/A	N/A	6213	639148	4072475	4636.98	13.02	4650.00
20MM TP PGU27	Air-to-Ground	N/A	N/A	6291	639593	4070673	1340.00	0.00	1340.00

Ordnance	Firing Location			Target Location			0700-2200	2200-0700	Total
	Name	Easting (11)	Northing (11)	Name	Easting (11)	Northing (11)			
20MM TP PGU27	Air-to-Ground	N/A	N/A	62A TBD TGT	638017	4084486	5.80	0.20	6.00
20MM TP PGU27	Air-to-Ground	N/A	N/A	64 TBD TGT	623455	4085010	17.51	0.49	18.00
20MM TP PGU27	Air-to-Ground	N/A	N/A	6410	623455	4085010	1571.59	39.41	1611.00
20MM TP PGU27	Air-to-Ground	N/A	N/A	6412	621338	4086641	400.00	0.00	400.00
20MM TP PGU27	Air-to-Ground	N/A	N/A	6413	622215	4076342	1447.34	22.66	1470.00
20MM TP PGU27	Air-to-Ground	N/A	N/A	6414	622985	4075870	1251.48	29.52	1281.00
20MM TP PGU27	Air-to-Ground	N/A	N/A	6417	623017	4074616	4767.88	72.12	4840.00
20MM TP PGU27	Air-to-Ground	N/A	N/A	65 TBD TGT	606563	4061868	9.84	0.16	10.00
20MM TP PGU27	Air-to-Ground	N/A	N/A	6501	607676	4061027	2283.73	16.27	2300.00
20MM TP PGU27	Air-to-Ground	N/A	N/A	6502	608910	4060927	2929.59	55.41	2985.00
20MM TP PGU27	Air-to-Ground	N/A	N/A	6504	611486	4066044	2900.61	40.39	2941.00
20MM TP PGU27	Air-to-Ground	N/A	N/A	6506	606903	4065322	3513.19	77.81	3591.00
20MM TP PGU27	Air-to-Ground	N/A	N/A	6507	610008	4071727	531.33	13.67	545.00
20MM TP PGU27	Air-to-Ground	N/A	N/A	6508	611697	4071897	500.00	0.00	500.00
20MM TP PGU27	Air-to-Ground	N/A	N/A	6511	606563	4061868	1988.41	61.59	2050.00
20MM TP PGU27	Air-to-Ground	N/A	N/A	71 TBD TGT	506560	4160956	24.97	0.03	25.00
20MM TP PGU27	Air-to-Ground	N/A	N/A	7109	505024	4161471	1988.69	11.31	2000.00
20MM TP PGU27	Air-to-Ground	N/A	N/A	7113	506822	4161226	795.48	4.52	800.00
20MM TP PGU27	Air-to-Ground	N/A	N/A	74 TBD TGT	568061	4146054	1727.67	10.33	1738.00
20MM TP PGU27	Air-to-Ground	N/A	N/A	7401	568223	4149323	11323.45	81.55	11405.00
20MM TP PGU27	Air-to-Ground	N/A	N/A	7408	566703	4149767	795.48	4.52	800.00
20MM TP PGU27	Air-to-Ground	N/A	N/A	7421	572418	4162404	2669.60	10.40	2680.00
20MM TP PGU27	Air-to-Ground	N/A	N/A	7430	568678	4153688	0.74	0.26	1.00
20MM TP PGU27	Air-to-Ground	N/A	N/A	7432	571565	4148304	995.34	5.66	1001.00
20MM TP PGU27	Air-to-Ground	N/A	N/A	7433	575822	4149974	3759.37	21.63	3781.00
20MM TP PGU27	Air-to-Ground	N/A	N/A	7442	575477	4157672	2406.32	13.68	2420.00
20MM TP PGU27	Air-to-Ground	N/A	N/A	75 TBD TGT	547932	4142019	1533.28	8.72	1542.00
20MM TP PGU27	Air-to-Ground	N/A	N/A	7503	538344	4140367	3397.74	2.26	3400.00
20MM TP PGU27	Air-to-Ground	N/A	N/A	7504	550985	4147329	597.60	3.40	601.00
20MM TP PGU27	Air-to-Ground	N/A	N/A	7506	543183	4146667	208.81	1.19	210.00
20MM TP PGU27	Air-to-Ground	N/A	N/A	7508	542061	4146173	497.17	2.83	500.00
20MM TP PGU27	Air-to-Ground	N/A	N/A	7515	540542	4144155	1332.42	7.58	1340.00
20MM TP PGU27	Air-to-Ground	N/A	N/A	7519	532188	4145772	997.17	2.83	1000.00
20MM TP PGU27	Air-to-Ground	N/A	N/A	7520	534972	4145666	3042.70	17.30	3060.00
20MM TP PGU27	Air-to-Ground	N/A	N/A	7532	547932	4142019	3201.80	18.20	3220.00
20MM TP PGU27	Air-to-Ground	N/A	N/A	7534	548262	4145649	5856.70	33.30	5890.00
20MM TP PGU27	Air-to-Ground	N/A	N/A	7543	551847	4146967	8705.50	49.50	8755.00
20MM TP PGU27	Air-to-Ground	N/A	N/A	7547	530496	4141962	407.68	2.32	410.00
20MM TP PGU27	Air-to-Ground	N/A	N/A	76 TBD TGT	509917	4144038	2007.18	10.82	2018.00
20MM TP PGU27	Air-to-Ground	N/A	N/A	7603	512952	4142637	2677.13	322.87	3000.00
20MM TP PGU27	Air-to-Ground	N/A	N/A	7605	513529	4144999	1899.76	10.24	1910.00
20MM TP PGU27	Air-to-Ground	N/A	N/A	7611	512308	4141196	1094.10	5.90	1100.00
20MM TP PGU27	Air-to-Ground	N/A	N/A	7620	511692	4138635	1413.56	6.44	1420.00

Ordnance	Firing Location			Target Location			0700-2200	2200-0700	Total
	Name	Easting (11)	Northing (11)	Name	Easting (11)	Northing (11)			
20MM TP PGU27	Air-to-Ground	N/A	N/A	7621	515832	4143666	795.71	4.29	800.00
20MM TP PGU27	Air-to-Ground	N/A	N/A	7629	509917	4144038	1831.13	9.87	1841.00
20MM TP PGU27	Air-to-Ground	N/A	N/A	7630	514747	4141736	2784.99	15.01	2800.00
20MMFB	Air-to-Ground	N/A	N/A	6302	632380	4051396	500.00	0.00	500.00
30MM HEI PGU13/B	Air-to-Ground	N/A	N/A	6202	639759	4086935	10.00	0.00	10.00
30MM HEI PGU13/B	Air-to-Ground	N/A	N/A	6204	638017	4084486	4300.00	0.00	4300.00
30MM HEI PGU13/B	Air-to-Ground	N/A	N/A	6209	637367	4075940	1600.00	0.00	1600.00
30MM HEI PGU13/B	Air-to-Ground	N/A	N/A	6212	639316	4072518	600.00	0.00	600.00
30MM HEI PGU13/B	Air-to-Ground	N/A	N/A	6213	639148	4072475	4800.00	0.00	4800.00
30MM HEI PGU13/B	Air-to-Ground	N/A	N/A	6413	622215	4076342	2300.00	0.00	2300.00
30MM HEI PGU13/B	Air-to-Ground	N/A	N/A	6414	622985	4075870	1150.00	0.00	1150.00
30MM HEI PGU13/B	Air-to-Ground	N/A	N/A	6504	611486	4066044	1.00	0.00	1.00
30MM HEI PGU13/B	Air-to-Ground	N/A	N/A	6506	606903	4065322	700.00	0.00	700.00
30MM HEI/API (CM)	Air-to-Ground	N/A	N/A	6310	635271	4058538	15285.57	26.43	15312.00
30MM TP PGU15	Air-to-Ground	N/A	N/A	62 TBD TGT	638017	4084486	1780.02	771.98	2552.00
30MM TP PGU15	Air-to-Ground	N/A	N/A	6201	637409	4088318	400.00	0.00	400.00
30MM TP PGU15	Air-to-Ground	N/A	N/A	6202	639759	4086935	19068.65	326.35	19395.00
30MM TP PGU15	Air-to-Ground	N/A	N/A	6204	638017	4084486	14916.17	283.83	15200.00
30MM TP PGU15	Air-to-Ground	N/A	N/A	6208	638076	4078831	2200.00	0.00	2200.00
30MM TP PGU15	Air-to-Ground	N/A	N/A	6209	637367	4075940	19699.60	105.40	19805.00
30MM TP PGU15	Air-to-Ground	N/A	N/A	6211	638813	4072489	2024.45	5.55	2030.00
30MM TP PGU15	Air-to-Ground	N/A	N/A	6212	639316	4072518	14679.16	55.84	14735.00
30MM TP PGU15	Air-to-Ground	N/A	N/A	6213	639148	4072475	9457.69	42.31	9500.00
30MM TP PGU15	Air-to-Ground	N/A	N/A	6291	639593	4070673	6405.64	46.36	6452.00
30MM TP PGU15	Air-to-Ground	N/A	N/A	63 TBD TGT	635271	4058538	18.87	0.13	19.00
30MM TP PGU15	Air-to-Ground	N/A	N/A	6302	632380	4051396	11824.41	82.59	11907.00
30MM TP PGU15	Air-to-Ground	N/A	N/A	6305	634047	4050652	3392.89	11.11	3404.00
30MM TP PGU15	Air-to-Ground	N/A	N/A	64 TBD TGT	623455	4085010	180.56	1.44	182.00
30MM TP PGU15	Air-to-Ground	N/A	N/A	6402	621787	4059908	800.00	0.00	800.00
30MM TP PGU15	Air-to-Ground	N/A	N/A	6410	623455	4085010	8100.66	51.34	8152.00
30MM TP PGU15	Air-to-Ground	N/A	N/A	6412	621338	4086641	7574.22	45.78	7620.00
30MM TP PGU15	Air-to-Ground	N/A	N/A	6413	622215	4076342	4072.95	27.05	4100.00
30MM TP PGU15	Air-to-Ground	N/A	N/A	6414	622985	4075870	10822.42	78.58	10901.00
30MM TP PGU15	Air-to-Ground	N/A	N/A	6417	623017	4074616	8730.53	70.47	8801.00
30MM TP PGU15	Air-to-Ground	N/A	N/A	65 TBD TGT	606563	4061868	1013.44	0.56	1014.00
30MM TP PGU15	Air-to-Ground	N/A	N/A	6501	607676	4061027	1070.14	4.86	1075.00
30MM TP PGU15	Air-to-Ground	N/A	N/A	6502	608910	4060927	12659.65	73.35	12733.00
30MM TP PGU15	Air-to-Ground	N/A	N/A	6504	611486	4066044	10626.07	64.93	10691.00
30MM TP PGU15	Air-to-Ground	N/A	N/A	6505	611910	4066783	191.49	8.51	200.00
30MM TP PGU15	Air-to-Ground	N/A	N/A	6506	606903	4065322	11002.95	61.05	11064.00
30MM TP PGU15	Air-to-Ground	N/A	N/A	6507	610008	4071727	4314.09	35.91	4350.00
30MM TP PGU15	Air-to-Ground	N/A	N/A	6508	611697	4071897	5861.06	40.94	5902.00

Ordnance	Firing Location			Target Location			0700-2200	2200-0700	Total
	Name	Easting (11)	Northing (11)	Name	Easting (11)	Northing (11)			
30MM TP PGU15	Air-to-Ground	N/A	N/A	6511	606563	4061868	8750.06	49.94	8800.00
30MM TP PGU15	Air-to-Ground	N/A	N/A	6599	606563	4061868	200.00	0.00	200.00
30MM TP PGU15	Air-to-Ground	N/A	N/A	71 TBD TGT	506560	4160956	9.00	0.00	9.00
30MM TP PGU15	Air-to-Ground	N/A	N/A	7107	507782	4165043	500.00	0.00	500.00
30MM TP PGU15	Air-to-Ground	N/A	N/A	7108	505322	4163106	1100.00	0.00	1100.00
30MM TP PGU15	Air-to-Ground	N/A	N/A	7109	505024	4161471	402.00	0.00	402.00
30MM TP PGU15	Air-to-Ground	N/A	N/A	7114	506560	4160956	500.00	0.00	500.00
30MM TP PGU15	Air-to-Ground	N/A	N/A	74 TBD TGT	568061	4146054	4.00	0.00	4.00
30MM TP PGU15	Air-to-Ground	N/A	N/A	7433	575822	4149974	3.00	0.00	3.00
30MM TP PGU15	Air-to-Ground	N/A	N/A	7506	543183	4146667	600.00	0.00	600.00
30MM TP PGU15	Air-to-Ground	N/A	N/A	7519	532188	4145772	1150.00	0.00	1150.00
30MM TP PGU15	Air-to-Ground	N/A	N/A	7543	551847	4146967	400.00	0.00	400.00
30MM TP PGU15	Air-to-Ground	N/A	N/A	76 TBD TGT	509917	4144038	6.00	0.00	6.00
30MM TP PGU15	Air-to-Ground	N/A	N/A	7603	512952	4142637	800.00	0.00	800.00
30MM TP PGU15	Air-to-Ground	N/A	N/A	7605	513529	4144999	200.00	0.00	200.00
30MM TP PGU15	Air-to-Ground	N/A	N/A	7608	519955	4139374	1000.00	0.00	1000.00
30MM TP PGU15	Air-to-Ground	N/A	N/A	7610	511689	4139413	1000.00	0.00	1000.00
30MM TP PGU15	Air-to-Ground	N/A	N/A	7611	512308	4141196	500.00	0.00	500.00
30MM TP PGU15	Air-to-Ground	N/A	N/A	7621	515832	4143666	700.00	0.00	700.00
30MM TP PGU15	Air-to-Ground	N/A	N/A	7629	509917	4144038	1300.00	0.00	1300.00
30MM TP PGU15	Air-to-Ground	N/A	N/A	7630	514747	4141736	600.00	0.00	600.00
30MMFB HEI	Air-to-Ground	N/A	N/A	6511	606563	4061868	1900.00	0.00	1900.00
40MM HEI PGU9/PGU37	Air-to-Ground	N/A	N/A	6204	638017	4084486	5.40	3.60	9.00
AGM114L(K) (P-A) HELLFIRE	Air-to-Ground	N/A	N/A	62 TBD TGT	638017	4084486	3.73	0.27	4.00
AGM114L(K) (P-A) HELLFIRE	Air-to-Ground	N/A	N/A	6209	637367	4075940	2.80	0.20	3.00
AGM114L(K) (P-A) HELLFIRE	Air-to-Ground	N/A	N/A	64 TBD TGT	623455	4085010	2.80	0.20	3.00
AGM114L(K) (P-A) HELLFIRE	Air-to-Ground	N/A	N/A	6414	622985	4075870	1.87	0.13	2.00
AGM114L(K) (P-A) HELLFIRE	Air-to-Ground	N/A	N/A	65 TBD TGT	606563	4061868	1.87	0.13	2.00
AGM114L(K) (P-A) HELLFIRE	Air-to-Ground	N/A	N/A	6504	611486	4066044	0.93	0.07	1.00
AGM114L(K) (P-A) HELLFIRE	Air-to-Ground	N/A	N/A	6506	606903	4065322	0.93	0.07	1.00
AGM114L(K) (P-A) HELLFIRE	Air-to-Ground	N/A	N/A	6507	610008	4071727	1.87	0.13	2.00
AGM114L(K) (P-A) HELLFIRE	Air-to-Ground	N/A	N/A	6508	611697	4071897	4.87	0.13	5.00
AGM114L(K) (P-A) HELLFIRE	Air-to-Ground	N/A	N/A	7432	571565	4148304	1.00	0.00	1.00
AGM114L(K) (P-A) HELLFIRE	Air-to-Ground	N/A	N/A	7433	575822	4149974	1.00	0.00	1.00
AGM114L(K2) (P-ZA) HLFIRE	Air-to-Ground	N/A	N/A	6202	639759	4086935	0.93	0.07	1.00
AGM114L(K2) (P-ZA) HLFIRE	Air-to-Ground	N/A	N/A	6410	623455	4085010	6.55	3.45	10.00
AGM114L(M) (N-6)	Air-to-Ground	N/A	N/A	64 TBD TGT	623455	4085010	15.72	8.28	24.00
AGM114L(M) (N-6)	Air-to-Ground	N/A	N/A	6410	623455	4085010	3.23	0.77	4.00
AGM114L(M) (N-6)	Air-to-Ground	N/A	N/A	6414	622985	4075870	0.93	0.07	1.00
AGM114L(M) (N-6)	Air-to-Ground	N/A	N/A	6507	610008	4071727	1.87	0.13	2.00
AGM114L(M) (N-6)	Air-to-Ground	N/A	N/A	6508	611697	4071897	1.87	0.13	2.00
AGM114L(P) (M)	Air-to-Ground	N/A	N/A	6204	638017	4084486	3.23	0.77	4.00

Ordnance	Firing Location			Target Location			0700-2200	2200-0700	Total
	Name	Easting (11)	Northing (11)	Name	Easting (11)	Northing (11)			
AGM114L(P) (M)	Air-to-Ground	N/A	N/A	6209	637367	4075940	6.45	1.55	8.00
AGM65BL	Air-to-Ground	N/A	N/A	6202	639759	4086935	6.00	0.00	6.00
AGM65BL	Air-to-Ground	N/A	N/A	6204	638017	4084486	11.99	0.01	12.00
AGM65BL	Air-to-Ground	N/A	N/A	6412	621338	4086641	1.00	0.00	1.00
AGM65BL	Air-to-Ground	N/A	N/A	6414	622985	4075870	1.00	0.00	1.00
AGM65BL	Air-to-Ground	N/A	N/A	6417	623017	4074616	6.00	0.00	6.00
AGM65BL	Air-to-Ground	N/A	N/A	7433	575822	4149974	1.00	0.00	1.00
AGM65DL	Air-to-Ground	N/A	N/A	6202	639759	4086935	15.00	0.00	15.00
AGM65DL	Air-to-Ground	N/A	N/A	6204	638017	4084486	16.92	0.08	17.00
AGM65DL	Air-to-Ground	N/A	N/A	6410	623455	4085010	4.97	0.03	5.00
AGM65DL	Air-to-Ground	N/A	N/A	6412	621338	4086641	2.98	0.02	3.00
AGM65DL	Air-to-Ground	N/A	N/A	6414	622985	4075870	7.94	0.06	8.00
AGM65DL	Air-to-Ground	N/A	N/A	6417	623017	4074616	4.99	0.01	5.00
AGM65DL	Air-to-Ground	N/A	N/A	6504	611486	4066044	10.00	0.00	10.00
AGM65DL	Air-to-Ground	N/A	N/A	6506	606903	4065322	3.98	0.02	4.00
AGM65DL	Air-to-Ground	N/A	N/A	6507	610008	4071727	2.00	0.00	2.00
AGM65DL	Air-to-Ground	N/A	N/A	6508	611697	4071897	0.99	0.01	1.00
AGM65DL	Air-to-Ground	N/A	N/A	7433	575822	4149974	1.00	0.00	1.00
AGM65DL	Air-to-Ground	N/A	N/A	7629	509917	4144038	2.00	0.00	2.00
AGM65GL	Air-to-Ground	N/A	N/A	62 TBD TGT	638017	4084486	1.00	0.00	1.00
AGM65GL	Air-to-Ground	N/A	N/A	6202	639759	4086935	6.90	0.10	7.00
AGM65GL	Air-to-Ground	N/A	N/A	6204	638017	4084486	4.90	0.10	5.00
AGM65GL	Air-to-Ground	N/A	N/A	6410	623455	4085010	1.00	0.00	1.00
AGM65GL	Air-to-Ground	N/A	N/A	6413	622215	4076342	1.99	0.01	2.00
AGM65GL	Air-to-Ground	N/A	N/A	7629	509917	4144038	2.00	0.00	2.00
AGM65HL	Air-to-Ground	N/A	N/A	6202	639759	4086935	4.00	0.00	4.00
AGM65KL	Air-to-Ground	N/A	N/A	6410	623455	4085010	2.00	0.00	2.00
AGM65L	Air-to-Ground	N/A	N/A	62 TBD TGT	638017	4084486	1.00	0.00	1.00
AGM65L	Air-to-Ground	N/A	N/A	6204	638017	4084486	5.00	0.00	5.00
AGM65L	Air-to-Ground	N/A	N/A	6504	611486	4066044	2.00	0.00	2.00
AGM65L	Air-to-Ground	N/A	N/A	6506	606903	4065322	3.00	0.00	3.00
AGM65L	Air-to-Ground	N/A	N/A	7433	575822	4149974	10.00	0.00	10.00
AGM65L	Air-to-Ground	N/A	N/A	7629	509917	4144038	4.00	0.00	4.00
BDU33I W/LUG	Air-to-Ground	N/A	N/A	62 TBD TGT	638017	4084486	51.64	0.36	52.00
BDU33I W/LUG	Air-to-Ground	N/A	N/A	6201	637409	4088318	3.00	0.00	3.00
BDU33I W/LUG	Air-to-Ground	N/A	N/A	6202	639759	4086935	208.38	1.62	210.00
BDU33I W/LUG	Air-to-Ground	N/A	N/A	6204	638017	4084486	116.22	0.78	117.00
BDU33I W/LUG	Air-to-Ground	N/A	N/A	6209	637367	4075940	103.98	0.02	104.00
BDU33I W/LUG	Air-to-Ground	N/A	N/A	6211	638813	4072489	33.00	0.00	33.00
BDU33I W/LUG	Air-to-Ground	N/A	N/A	6212	639316	4072518	141.00	0.00	141.00
BDU33I W/LUG	Air-to-Ground	N/A	N/A	6213	639148	4072475	32.94	0.06	33.00
BDU33I W/LUG	Air-to-Ground	N/A	N/A	6291	639593	4070673	8.98	0.02	9.00

Ordnance	Firing Location			Target Location			0700-2200	2200-0700	Total
	Name	Easting (11)	Northing (11)	Name	Easting (11)	Northing (11)			
BDU33I W/LUG	Air-to-Ground	N/A	N/A	63 TBD TGT	635271	4058538	143.00	1.00	144.00
BDU33I W/LUG	Air-to-Ground	N/A	N/A	6302	632380	4051396	818.71	5.29	824.00
BDU33I W/LUG	Air-to-Ground	N/A	N/A	6305	634047	4050652	249.77	1.23	251.00
BDU33I W/LUG	Air-to-Ground	N/A	N/A	64 TBD TGT	623455	4085010	76.47	0.53	77.00
BDU33I W/LUG	Air-to-Ground	N/A	N/A	6410	623455	4085010	39.84	0.16	40.00
BDU33I W/LUG	Air-to-Ground	N/A	N/A	6412	621338	4086641	39.78	0.22	40.00
BDU33I W/LUG	Air-to-Ground	N/A	N/A	6413	622215	4076342	4.00	0.00	4.00
BDU33I W/LUG	Air-to-Ground	N/A	N/A	6414	622985	4075870	24.89	0.11	25.00
BDU33I W/LUG	Air-to-Ground	N/A	N/A	6417	623017	4074616	61.61	0.39	62.00
BDU33I W/LUG	Air-to-Ground	N/A	N/A	65 TBD TGT	606563	4061868	14.90	0.10	15.00
BDU33I W/LUG	Air-to-Ground	N/A	N/A	6502	608910	4060927	87.68	0.32	88.00
BDU33I W/LUG	Air-to-Ground	N/A	N/A	6504	611486	4066044	75.78	0.22	76.00
BDU33I W/LUG	Air-to-Ground	N/A	N/A	6506	606903	4065322	121.81	0.19	122.00
BDU33I W/LUG	Air-to-Ground	N/A	N/A	6507	610008	4071727	54.62	0.38	55.00
BDU33I W/LUG	Air-to-Ground	N/A	N/A	6508	611697	4071897	31.78	0.22	32.00
BDU33I W/LUG	Air-to-Ground	N/A	N/A	6511	606563	4061868	6.00	0.00	6.00
BDU33I W/LUG	Air-to-Ground	N/A	N/A	71 TBD TGT	506560	4160956	46.75	1.25	48.00
BDU33I W/LUG	Air-to-Ground	N/A	N/A	7109	505024	4161471	24.00	0.00	24.00
BDU33I W/LUG	Air-to-Ground	N/A	N/A	7430	568678	4153688	6.00	0.00	6.00
BDU33I W/LUG	Air-to-Ground	N/A	N/A	7433	575822	4149974	73.65	0.35	74.00
BDU33I W/LUG	Air-to-Ground	N/A	N/A	7436	571711	4163643	12.00	0.00	12.00
BDU33I W/LUG	Air-to-Ground	N/A	N/A	75 TBD TGT	547932	4142019	3.98	0.02	4.00
BDU33I W/LUG	Air-to-Ground	N/A	N/A	7520	534972	4145666	95.46	0.54	96.00
BDU33I W/LUG	Air-to-Ground	N/A	N/A	7543	551847	4146967	87.50	0.50	88.00
BDU33I W/LUG	Air-to-Ground	N/A	N/A	7605	513529	4144999	12.00	0.00	12.00
BDU33I W/O LUG	Air-to-Ground	N/A	N/A	62 TBD TGT	638017	4084486	48.00	0.00	48.00
BDU33I W/O LUG	Air-to-Ground	N/A	N/A	6202	639759	4086935	15.00	0.00	15.00
BDU33I W/O LUG	Air-to-Ground	N/A	N/A	6204	638017	4084486	3.00	0.00	3.00
BDU33I W/O LUG	Air-to-Ground	N/A	N/A	6209	637367	4075940	12.00	0.00	12.00
BDU33I W/O LUG	Air-to-Ground	N/A	N/A	6213	639148	4072475	24.00	0.00	24.00
BDU33I W/O LUG	Air-to-Ground	N/A	N/A	6302	632380	4051396	11.92	0.08	12.00
BDU33I W/O LUG	Air-to-Ground	N/A	N/A	6410	623455	4085010	11.98	0.02	12.00
BDU33I W/O LUG	Air-to-Ground	N/A	N/A	6417	623017	4074616	12.00	0.00	12.00
BDU33I W/O LUG	Air-to-Ground	N/A	N/A	6504	611486	4066044	2.98	0.02	3.00
BDU33I W/O LUG	Air-to-Ground	N/A	N/A	7425	568061	4146054	48.00	0.00	48.00
BDU33I W/O LUG	Air-to-Ground	N/A	N/A	7543	551847	4146967	12.00	0.00	12.00
BDU33I W/O LUG	Air-to-Ground	N/A	N/A	7547	530496	4141962	28.44	1.56	30.00
BDU33I W/O LUG	Air-to-Ground	N/A	N/A	7603	512952	4142637	5.97	0.03	6.00
BDU50I HD	Air-to-Ground	N/A	N/A	6202	639759	4086935	6.00	0.00	6.00
BDU50I HD	Air-to-Ground	N/A	N/A	6204	638017	4084486	4.00	0.00	4.00
BDU50I HD	Air-to-Ground	N/A	N/A	6209	637367	4075940	45.00	0.00	45.00
BDU50I HD	Air-to-Ground	N/A	N/A	6212	639316	4072518	4.00	0.00	4.00

Ordnance	Firing Location			Target Location			0700-2200	2200-0700	Total
	Name	Easting (11)	Northing (11)	Name	Easting (11)	Northing (11)			
BDU50I HD	Air-to-Ground	N/A	N/A	6213	639148	4072475	10.00	0.00	10.00
BDU50I HD	Air-to-Ground	N/A	N/A	6291	639593	4070673	2.00	0.00	2.00
BDU50I HD	Air-to-Ground	N/A	N/A	6504	611486	4066044	4.00	0.00	4.00
BDU50I HD	Air-to-Ground	N/A	N/A	6507	610008	4071727	8.00	0.00	8.00
BDU50I HD	Air-to-Ground	N/A	N/A	6508	611697	4071897	6.00	0.00	6.00
BDU50I HD	Air-to-Ground	N/A	N/A	71 TBD TGT	506560	4160956	6.00	0.00	6.00
BDU50I HD	Air-to-Ground	N/A	N/A	7114	506560	4160956	1.99	0.01	2.00
BDU50I HD	Air-to-Ground	N/A	N/A	7404	567446	4140246	2.00	0.00	2.00
BDU50I HD	Air-to-Ground	N/A	N/A	7430	568678	4153688	2.77	1.23	4.00
BDU50I HD	Air-to-Ground	N/A	N/A	7432	571565	4148304	1.99	0.01	2.00
BDU50I HD	Air-to-Ground	N/A	N/A	7547	530496	4141962	7.95	0.05	8.00
BDU50I LD CF	Air-to-Ground	N/A	N/A	6202	639759	4086935	7.99	0.01	8.00
BDU50I LD CF	Air-to-Ground	N/A	N/A	6204	638017	4084486	1.99	0.01	2.00
BDU50I LD CF	Air-to-Ground	N/A	N/A	6209	637367	4075940	100.00	0.00	100.00
BDU50I LD CF	Air-to-Ground	N/A	N/A	6414	622985	4075870	10.00	0.00	10.00
BDU50I LD CF	Air-to-Ground	N/A	N/A	6417	623017	4074616	29.00	0.00	29.00
BDU50I LD CF	Air-to-Ground	N/A	N/A	6504	611486	4066044	15.97	0.03	16.00
BDU50I LD CF	Air-to-Ground	N/A	N/A	6506	606903	4065322	10.97	0.03	11.00
BDU50I LD CF	Air-to-Ground	N/A	N/A	71 TBD TGT	506560	4160956	3.98	0.02	4.00
BDU50I LD CF	Air-to-Ground	N/A	N/A	74 TBD TGT	568061	4146054	12.00	0.00	12.00
BDU50I LD CF	Air-to-Ground	N/A	N/A	7425	568061	4146054	24.00	0.00	24.00
BDU50I LD CF	Air-to-Ground	N/A	N/A	7504	550985	4147329	27.00	0.00	27.00
BDU50I LD CF	Air-to-Ground	N/A	N/A	7519	532188	4145772	8.00	0.00	8.00
BDU50I LD CF	Air-to-Ground	N/A	N/A	7532	547932	4142019	5.55	2.45	8.00
BDU50I LD CF	Air-to-Ground	N/A	N/A	7543	551847	4146967	11.09	4.91	16.00
BDU50I LD CF	Air-to-Ground	N/A	N/A	7603	512952	4142637	11.09	4.91	16.00
BDU50I LD CF	Air-to-Ground	N/A	N/A	7610	511689	4139413	42.80	0.20	43.00
BDU56I HD	Air-to-Ground	N/A	N/A	7105	507245	4160163	8.32	3.68	12.00
BDU56I HD	Air-to-Ground	N/A	N/A	7436	571711	4163643	4.00	0.00	4.00
BDU56I HD	Air-to-Ground	N/A	N/A	7534	548262	4145649	5.55	2.45	8.00
BDU56I HD	Air-to-Ground	N/A	N/A	7603	512952	4142637	5.55	2.45	8.00
BDU56I HD	Air-to-Ground	N/A	N/A	7621	515832	4143666	8.32	3.68	12.00
BDU56I LD CF	Air-to-Ground	N/A	N/A	6202	639759	4086935	2.00	0.00	2.00
BDU56I LD CF	Air-to-Ground	N/A	N/A	6208	638076	4078831	4.00	0.00	4.00
BDU56I LD CF	Air-to-Ground	N/A	N/A	71 TBD TGT	506560	4160956	1.00	0.00	1.00
BDU56I LD CF	Air-to-Ground	N/A	N/A	74 TBD TGT	568061	4146054	7.97	0.03	8.00
BDU56I LD CF	Air-to-Ground	N/A	N/A	7411	565723	4145469	8.00	0.00	8.00
BDU56I LD CF	Air-to-Ground	N/A	N/A	7436	571711	4163643	2.00	0.00	2.00
BDU56I LD CF	Air-to-Ground	N/A	N/A	7519	532188	4145772	6.71	1.29	8.00
BDU56I LD CF	Air-to-Ground	N/A	N/A	7534	548262	4145649	4.00	0.00	4.00
BDU56I LD CF	Air-to-Ground	N/A	N/A	7547	530496	4141962	37.79	0.21	38.00
BDU56I LD CF	Air-to-Ground	N/A	N/A	7603	512952	4142637	60.38	1.62	62.00

Ordnance	Firing Location			Target Location			0700-2200	2200-0700	Total
	Name	Easting (11)	Northing (11)	Name	Easting (11)	Northing (11)			
BDU56I LD CF	Air-to-Ground	N/A	N/A	7608	519955	4139374	2.77	1.23	4.00
BDU59B/BI LGTR	Air-to-Ground	N/A	N/A	7510	547045	4145747	4.00	0.00	4.00
CBU103L	Air-to-Ground	N/A	N/A	6201	637409	4088318	177.89	1.11	179.00
CBU103L	Air-to-Ground	N/A	N/A	74 TBD TGT	568061	4146054	9.96	0.04	10.00
CBU103L	Air-to-Ground	N/A	N/A	7546	553760	4150387	139.03	5.97	145.00
CBU105L	Air-to-Ground	N/A	N/A	6312	632064	4053067	4.00	0.00	4.00
CBU87L	Air-to-Ground	N/A	N/A	6201	637409	4088318	55.63	0.37	56.00
CBU87L	Air-to-Ground	N/A	N/A	7546	553760	4150387	11.98	0.02	12.00
FIM-92 STINGER	Air-to-Ground	N/A	N/A	71 TBD TGT	506560	4160956	0.83	1.17	2.00
FIM-92 STINGER	Air-to-Ground	N/A	N/A	76 TBD TGT	509917	4144038	2.92	4.08	7.00
FMG-148A Javelin	Air-to-Ground	N/A	N/A	6309	633129	4050944	30.00	0.00	30.00
FMG-148A Javelin	Air-to-Ground	N/A	N/A	6313	631843	4050671	10.00	0.00	10.00
GBU10L PWII	Air-to-Ground	N/A	N/A	6506	606903	4065322	1.00	0.00	1.00
GBU10L PWII	Air-to-Ground	N/A	N/A	7109	505024	4161471	4.97	0.03	5.00
GBU10L PWII	Air-to-Ground	N/A	N/A	7114	506560	4160956	5.97	0.03	6.00
GBU10L PWII	Air-to-Ground	N/A	N/A	7421	572418	4162404	7.95	0.05	8.00
GBU10L PWII	Air-to-Ground	N/A	N/A	7442	575477	4157672	7.95	0.05	8.00
GBU10L PWII	Air-to-Ground	N/A	N/A	7503	538344	4140367	1.99	0.01	2.00
GBU10L PWII	Air-to-Ground	N/A	N/A	7508	542061	4146173	1.99	0.01	2.00
GBU10L PWII	Air-to-Ground	N/A	N/A	7519	532188	4145772	3.98	0.02	4.00
GBU10L PWII	Air-to-Ground	N/A	N/A	7605	513529	4144999	5.97	0.03	6.00
GBU10L PWII	Air-to-Ground	N/A	N/A	7609	515525	4141457	2.98	0.02	3.00
GBU10L PWII	Air-to-Ground	N/A	N/A	7629	509917	4144038	1.99	0.01	2.00
GBU12FL PWII	Air-to-Ground	N/A	N/A	6202	639759	4086935	14.49	0.51	15.00
GBU12FL PWII	Air-to-Ground	N/A	N/A	6204	638017	4084486	16.34	0.66	17.00
GBU12FL PWII	Air-to-Ground	N/A	N/A	6209	637367	4075940	4.00	0.00	4.00
GBU12FL PWII	Air-to-Ground	N/A	N/A	6412	621338	4086641	5.96	0.04	6.00
GBU12FL PWII	Air-to-Ground	N/A	N/A	6414	622985	4075870	6.84	0.16	7.00
GBU12FL PWII	Air-to-Ground	N/A	N/A	6417	623017	4074616	0.97	0.03	1.00
GBU12FL PWII	Air-to-Ground	N/A	N/A	6506	606903	4065322	20.05	0.95	21.00
GBU12FL PWII	Air-to-Ground	N/A	N/A	6507	610008	4071727	5.60	0.40	6.00
GBU12FL PWII	Air-to-Ground	N/A	N/A	6508	611697	4071897	8.91	0.09	9.00
GBU12FL PWII	Air-to-Ground	N/A	N/A	6511	606563	4061868	2.90	0.10	3.00
GBU12FL PWII	Air-to-Ground	N/A	N/A	71 TBD TGT	506560	4160956	2.00	0.00	2.00
GBU12FL PWII	Air-to-Ground	N/A	N/A	7109	505024	4161471	3.98	0.02	4.00
GBU12FL PWII	Air-to-Ground	N/A	N/A	7433	575822	4149974	3.98	0.02	4.00
GBU12FL PWII	Air-to-Ground	N/A	N/A	7504	550985	4147329	1.48	0.52	2.00
GBU12FL PWII	Air-to-Ground	N/A	N/A	76 TBD TGT	509917	4144038	2.00	0.00	2.00
GBU12FL PWII	Air-to-Ground	N/A	N/A	7629	509917	4144038	3.95	0.05	4.00
GBU12L PWII	Air-to-Ground	N/A	N/A	62 TBD TGT	638017	4084486	44.76	3.24	48.00
GBU12L PWII	Air-to-Ground	N/A	N/A	6202	639759	4086935	61.18	1.82	63.00
GBU12L PWII	Air-to-Ground	N/A	N/A	6204	638017	4084486	99.75	6.25	106.00

Ordnance	Firing Location			Target Location			0700-2200	2200-0700	Total
	Name	Easting (11)	Northing (11)	Name	Easting (11)	Northing (11)			
GBU12L PWII	Air-to-Ground	N/A	N/A	6209	637367	4075940	4.00	0.00	4.00
GBU12L PWII	Air-to-Ground	N/A	N/A	6212	639316	4072518	16.00	0.00	16.00
GBU12L PWII	Air-to-Ground	N/A	N/A	64 TBD TGT	623455	4085010	55.38	3.62	59.00
GBU12L PWII	Air-to-Ground	N/A	N/A	6410	623455	4085010	30.87	1.13	32.00
GBU12L PWII	Air-to-Ground	N/A	N/A	6412	621338	4086641	6.95	0.05	7.00
GBU12L PWII	Air-to-Ground	N/A	N/A	6413	622215	4076342	2.90	0.10	3.00
GBU12L PWII	Air-to-Ground	N/A	N/A	6414	622985	4075870	45.91	2.09	48.00
GBU12L PWII	Air-to-Ground	N/A	N/A	6417	623017	4074616	31.47	0.53	32.00
GBU12L PWII	Air-to-Ground	N/A	N/A	65 TBD TGT	606563	4061868	32.92	2.08	35.00
GBU12L PWII	Air-to-Ground	N/A	N/A	6504	611486	4066044	51.16	0.84	52.00
GBU12L PWII	Air-to-Ground	N/A	N/A	6506	606903	4065322	105.60	7.40	113.00
GBU12L PWII	Air-to-Ground	N/A	N/A	6507	610008	4071727	9.17	0.83	10.00
GBU12L PWII	Air-to-Ground	N/A	N/A	6508	611697	4071897	24.60	0.40	25.00
GBU12L PWII	Air-to-Ground	N/A	N/A	6511	606563	4061868	15.45	0.55	16.00
GBU12L PWII	Air-to-Ground	N/A	N/A	7107	507782	4165043	1.99	0.01	2.00
GBU12L PWII	Air-to-Ground	N/A	N/A	7114	506560	4160956	4.00	0.00	4.00
GBU12L PWII	Air-to-Ground	N/A	N/A	74 TBD TGT	568061	4146054	5.97	0.03	6.00
GBU12L PWII	Air-to-Ground	N/A	N/A	7408	566703	4149767	9.95	0.05	10.00
GBU12L PWII	Air-to-Ground	N/A	N/A	7411	565723	4145469	0.98	0.02	1.00
GBU12L PWII	Air-to-Ground	N/A	N/A	7430	568678	4153688	6.97	0.03	7.00
GBU12L PWII	Air-to-Ground	N/A	N/A	7432	571565	4148304	5.97	0.03	6.00
GBU12L PWII	Air-to-Ground	N/A	N/A	7433	575822	4149974	13.92	0.08	14.00
GBU12L PWII	Air-to-Ground	N/A	N/A	7442	575477	4157672	4.95	0.05	5.00
GBU12L PWII	Air-to-Ground	N/A	N/A	75 TBD TGT	547932	4142019	15.91	0.09	16.00
GBU12L PWII	Air-to-Ground	N/A	N/A	7504	550985	4147329	3.00	0.00	3.00
GBU12L PWII	Air-to-Ground	N/A	N/A	7508	542061	4146173	4.99	0.01	5.00
GBU12L PWII	Air-to-Ground	N/A	N/A	7515	540542	4144155	26.29	2.71	29.00
GBU12L PWII	Air-to-Ground	N/A	N/A	7519	532188	4145772	3.39	0.61	4.00
GBU12L PWII	Air-to-Ground	N/A	N/A	7532	547932	4142019	3.98	0.02	4.00
GBU12L PWII	Air-to-Ground	N/A	N/A	7534	548262	4145649	47.73	0.27	48.00
GBU12L PWII	Air-to-Ground	N/A	N/A	76 TBD TGT	509917	4144038	2.98	0.02	3.00
GBU12L PWII	Air-to-Ground	N/A	N/A	7605	513529	4144999	41.81	0.19	42.00
GBU12L PWII	Air-to-Ground	N/A	N/A	7620	511692	4138635	2.99	0.01	3.00
GBU12L PWII	Air-to-Ground	N/A	N/A	7629	509917	4144038	9.95	0.05	10.00
GBU31L	Air-to-Ground	N/A	N/A	6202	639759	4086935	4.00	0.00	4.00
GBU31L	Air-to-Ground	N/A	N/A	6506	606903	4065322	1.00	0.00	1.00
GBU31L	Air-to-Ground	N/A	N/A	7107	507782	4165043	3.98	0.02	4.00
GBU31L	Air-to-Ground	N/A	N/A	7432	571565	4148304	1.00	0.00	1.00
GBU31L	Air-to-Ground	N/A	N/A	7442	575477	4157672	10.00	0.00	10.00
GBU31L	Air-to-Ground	N/A	N/A	7504	550985	4147329	3.00	0.00	3.00
GBU31L	Air-to-Ground	N/A	N/A	7506	543183	4146667	8.80	1.20	10.00
GBU31L	Air-to-Ground	N/A	N/A	7508	542061	4146173	3.99	0.01	4.00
GBU31L	Air-to-Ground	N/A	N/A	7510	547045	4145747	2.00	0.00	2.00

Ordnance	Firing Location			Target Location			0700-2200	2200-0700	Total
	Name	Easting (11)	Northing (11)	Name	Easting (11)	Northing (11)			
GBU31L	Air-to-Ground	N/A	N/A	7515	540542	4144155	1.73	0.27	2.00
GBU31L	Air-to-Ground	N/A	N/A	7532	547932	4142019	9.57	0.43	10.00
GBU31L	Air-to-Ground	N/A	N/A	7543	551847	4146967	3.79	0.21	4.00
GBU31L	Air-to-Ground	N/A	N/A	7605	513529	4144999	12.47	5.53	18.00
GBU31L	Air-to-Ground	N/A	N/A	7608	519955	4139374	2.99	0.01	3.00
GBU32L	Air-to-Ground	N/A	N/A	7629	509917	4144038	2.73	1.27	4.00
GBU38L	Air-to-Ground	N/A	N/A	62 TBD TGT	638017	4084486	19.86	0.14	20.00
GBU38L	Air-to-Ground	N/A	N/A	6201	637409	4088318	3.97	0.03	4.00
GBU38L	Air-to-Ground	N/A	N/A	6202	639759	4086935	16.91	0.09	17.00
GBU38L	Air-to-Ground	N/A	N/A	6204	638017	4084486	21.88	0.12	22.00
GBU38L	Air-to-Ground	N/A	N/A	63 TBD TGT	635271	4058538	0.99	0.01	1.00
GBU38L	Air-to-Ground	N/A	N/A	64 TBD TGT	623455	4085010	5.96	0.04	6.00
GBU38L	Air-to-Ground	N/A	N/A	6410	623455	4085010	4.97	0.03	5.00
GBU38L	Air-to-Ground	N/A	N/A	6412	621338	4086641	10.92	0.08	11.00
GBU38L	Air-to-Ground	N/A	N/A	6414	622985	4075870	4.98	0.02	5.00
GBU38L	Air-to-Ground	N/A	N/A	6417	623017	4074616	1.99	0.01	2.00
GBU38L	Air-to-Ground	N/A	N/A	65 TBD TGT	606563	4061868	13.90	0.10	14.00
GBU38L	Air-to-Ground	N/A	N/A	6504	611486	4066044	6.95	0.05	7.00
GBU38L	Air-to-Ground	N/A	N/A	6506	606903	4065322	9.93	0.07	10.00
GBU38L	Air-to-Ground	N/A	N/A	6507	610008	4071727	1.99	0.01	2.00
GBU38L	Air-to-Ground	N/A	N/A	6508	611697	4071897	11.92	0.08	12.00
GBU38L	Air-to-Ground	N/A	N/A	6511	606563	4061868	1.99	0.01	2.00
GBU38L	Air-to-Ground	N/A	N/A	7107	507782	4165043	1.99	0.01	2.00
GBU38L	Air-to-Ground	N/A	N/A	7109	505024	4161471	0.99	0.01	1.00
GBU38L	Air-to-Ground	N/A	N/A	7442	575477	4157672	1.99	0.01	2.00
GBU38L	Air-to-Ground	N/A	N/A	7506	543183	4146667	8.07	0.93	9.00
GBU38L	Air-to-Ground	N/A	N/A	7508	542061	4146173	4.72	0.28	5.00
GBU38L	Air-to-Ground	N/A	N/A	7532	547932	4142019	3.98	0.02	4.00
GBU38L	Air-to-Ground	N/A	N/A	7605	513529	4144999	0.69	0.31	1.00
GBU39L	Air-to-Ground	N/A	N/A	6412	621338	4086641	20.00	0.00	20.00
HIMARS (RRPR)	Air-to-Ground	N/A	N/A	64 TBD TGT	623455	4085010	13.00	0.00	13.00
HIMARS (RRPR)	Air-to-Ground	N/A	N/A	65 TBD TGT	606563	4061868	1.00	0.00	1.00
LAW Rocket 66MM (HEAT)	Air-to-Ground	N/A	N/A	65 TBD TGT	606563	4061868	3.00	0.00	3.00
M117L (LD)	Air-to-Ground	N/A	N/A	6202	639759	4086935	18.00	0.00	18.00
M117L (LD)	Air-to-Ground	N/A	N/A	7432	571565	4148304	12.00	0.00	12.00
M117L (LD)	Air-to-Ground	N/A	N/A	7442	575477	4157672	6.00	0.00	6.00
M117L (LD)	Air-to-Ground	N/A	N/A	7515	540542	4144155	18.00	0.00	18.00
MK82L HD	Air-to-Ground	N/A	N/A	6202	639759	4086935	21.99	0.01	22.00
MK82L HD	Air-to-Ground	N/A	N/A	6204	638017	4084486	43.93	0.07	44.00
MK82L HD	Air-to-Ground	N/A	N/A	6209	637367	4075940	1.99	0.01	2.00
MK82L HD	Air-to-Ground	N/A	N/A	6410	623455	4085010	1.99	0.01	2.00
MK82L HD	Air-to-Ground	N/A	N/A	6414	622985	4075870	1.99	0.01	2.00

Ordnance	Firing Location			Target Location			0700-2200	2200-0700	Total
	Name	Easting (11)	Northing (11)	Name	Easting (11)	Northing (11)			
MK82L HD	Air-to-Ground	N/A	N/A	6417	623017	4074616	5.99	0.01	6.00
MK82L HD	Air-to-Ground	N/A	N/A	6504	611486	4066044	3.99	0.01	4.00
MK82L HD	Air-to-Ground	N/A	N/A	6508	611697	4071897	1.99	0.01	2.00
MK82L HD	Air-to-Ground	N/A	N/A	7107	507782	4165043	4.00	0.00	4.00
MK82L HD	Air-to-Ground	N/A	N/A	7114	506560	4160956	6.00	0.00	6.00
MK82L HD	Air-to-Ground	N/A	N/A	7433	575822	4149974	4.00	0.00	4.00
MK82L HD	Air-to-Ground	N/A	N/A	7519	532188	4145772	4.00	0.00	4.00
MK82L HD	Air-to-Ground	N/A	N/A	7532	547932	4142019	4.16	1.84	6.00
MK82L HD	Air-to-Ground	N/A	N/A	76 TBD TGT	509917	4144038	2.00	0.00	2.00
MK82L HD	Air-to-Ground	N/A	N/A	7605	513529	4144999	3.98	0.02	4.00
MK82L LD	Air-to-Ground	N/A	N/A	62 TBD TGT	638017	4084486	6.77	0.23	7.00
MK82L LD	Air-to-Ground	N/A	N/A	6202	639759	4086935	72.74	0.26	73.00
MK82L LD	Air-to-Ground	N/A	N/A	6204	638017	4084486	307.34	0.66	308.00
MK82L LD	Air-to-Ground	N/A	N/A	6209	637367	4075940	24.00	0.00	24.00
MK82L LD	Air-to-Ground	N/A	N/A	64 TBD TGT	623455	4085010	14.51	0.49	15.00
MK82L LD	Air-to-Ground	N/A	N/A	6410	623455	4085010	22.92	0.08	23.00
MK82L LD	Air-to-Ground	N/A	N/A	6412	621338	4086641	36.82	0.18	37.00
MK82L LD	Air-to-Ground	N/A	N/A	6413	622215	4076342	10.92	0.08	11.00
MK82L LD	Air-to-Ground	N/A	N/A	6414	622985	4075870	50.65	0.35	51.00
MK82L LD	Air-to-Ground	N/A	N/A	6417	623017	4074616	9.93	0.07	10.00
MK82L LD	Air-to-Ground	N/A	N/A	65 TBD TGT	606563	4061868	1.93	0.07	2.00
MK82L LD	Air-to-Ground	N/A	N/A	6502	608910	4060927	8.94	0.06	9.00
MK82L LD	Air-to-Ground	N/A	N/A	6504	611486	4066044	55.23	0.77	56.00
MK82L LD	Air-to-Ground	N/A	N/A	6505	611910	4066783	1.93	0.07	2.00
MK82L LD	Air-to-Ground	N/A	N/A	6506	606903	4065322	56.58	0.42	57.00
MK82L LD	Air-to-Ground	N/A	N/A	6507	610008	4071727	17.92	0.08	18.00
MK82L LD	Air-to-Ground	N/A	N/A	6508	611697	4071897	10.87	0.13	11.00
MK82L LD	Air-to-Ground	N/A	N/A	6511	606563	4061868	23.39	0.61	24.00
MK82L LD	Air-to-Ground	N/A	N/A	71 TBD TGT	506560	4160956	7.00	0.00	7.00
MK82L LD	Air-to-Ground	N/A	N/A	7105	507245	4160163	11.09	4.91	16.00
MK82L LD	Air-to-Ground	N/A	N/A	7107	507782	4165043	8.00	0.00	8.00
MK82L LD	Air-to-Ground	N/A	N/A	7109	505024	4161471	38.82	17.18	56.00
MK82L LD	Air-to-Ground	N/A	N/A	74 TBD TGT	568061	4146054	16.00	0.00	16.00
MK82L LD	Air-to-Ground	N/A	N/A	7408	566703	4149767	12.00	0.00	12.00
MK82L LD	Air-to-Ground	N/A	N/A	7421	572418	4162404	1.39	0.61	2.00
MK82L LD	Air-to-Ground	N/A	N/A	7430	568678	4153688	1.00	0.00	1.00
MK82L LD	Air-to-Ground	N/A	N/A	7433	575822	4149974	1.00	0.00	1.00
MK82L LD	Air-to-Ground	N/A	N/A	7442	575477	4157672	11.09	4.91	16.00
MK82L LD	Air-to-Ground	N/A	N/A	7504	550985	4147329	2.77	1.23	4.00
MK82L LD	Air-to-Ground	N/A	N/A	7506	543183	4146667	45.07	6.93	52.00
MK82L LD	Air-to-Ground	N/A	N/A	7532	547932	4142019	15.25	6.75	22.00
MK82L LD	Air-to-Ground	N/A	N/A	7534	548262	4145649	11.09	4.91	16.00
MK82L LD	Air-to-Ground	N/A	N/A	76 TBD TGT	509917	4144038	7.00	0.00	7.00

Ordnance	Firing Location			Target Location			0700-2200	2200-0700	Total
	Name	Easting (11)	Northing (11)	Name	Easting (11)	Northing (11)			
MK82L LD	Air-to-Ground	N/A	N/A	7605	513529	4144999	31.25	6.75	38.00
MK82L LD	Air-to-Ground	N/A	N/A	7629	509917	4144038	18.02	7.98	26.00
MK82L LD CF	Air-to-Ground	N/A	N/A	6204	638017	4084486	4.00	0.00	4.00
MK82L LD CF	Air-to-Ground	N/A	N/A	7442	575477	4157672	19.00	0.00	19.00
MK82L LD CF	Air-to-Ground	N/A	N/A	7506	543183	4146667	19.00	0.00	19.00
MK82L LD CF	Air-to-Ground	N/A	N/A	7508	542061	4146173	19.00	0.00	19.00
MK82L Retarder (AIR) HD/LD	Air-to-Ground	N/A	N/A	6202	639759	4086935	4.97	0.03	5.00
MK82L Retarder (AIR) HD/LD	Air-to-Ground	N/A	N/A	6506	606903	4065322	9.93	0.07	10.00
MK82L Retarder (AIR) HD/LD	Air-to-Ground	N/A	N/A	6508	611697	4071897	3.97	0.03	4.00
MK82L Retarder (AIR) HD/LD	Air-to-Ground	N/A	N/A	6511	606563	4061868	1.99	0.01	2.00
MK83L HD	Air-to-Ground	N/A	N/A	7547	530496	4141962	4.00	0.00	4.00
MK84L HD	Air-to-Ground	N/A	N/A	6204	638017	4084486	6.00	0.00	6.00
MK84L HD	Air-to-Ground	N/A	N/A	7114	506560	4160956	1.00	0.00	1.00
MK84L HD	Air-to-Ground	N/A	N/A	7610	511689	4139413	6.97	0.03	7.00
MK84L HD	Air-to-Ground	N/A	N/A	7621	515832	4143666	6.97	0.03	7.00
MK84L LD	Air-to-Ground	N/A	N/A	6202	639759	4086935	4.00	0.00	4.00
MK84L LD	Air-to-Ground	N/A	N/A	6204	638017	4084486	16.99	0.01	17.00
MK84L LD	Air-to-Ground	N/A	N/A	6417	623017	4074616	1.00	0.00	1.00
MK84L LD	Air-to-Ground	N/A	N/A	6506	606903	4065322	1.99	0.01	2.00
MK84L LD	Air-to-Ground	N/A	N/A	6508	611697	4071897	1.00	0.00	1.00
MK84L LD	Air-to-Ground	N/A	N/A	71 TBD TGT	506560	4160956	1.00	0.00	1.00
MK84L LD	Air-to-Ground	N/A	N/A	7114	506560	4160956	1.00	0.00	1.00
MK84L LD	Air-to-Ground	N/A	N/A	7504	550985	4147329	0.99	0.01	1.00
MK84L LD	Air-to-Ground	N/A	N/A	7534	548262	4145649	5.55	2.45	8.00
MK84L LD	Air-to-Ground	N/A	N/A	7605	513529	4144999	19.41	8.59	28.00
YES - LIVE	Air-to-Ground	N/A	N/A	65 TBD TGT	606563	4061868	1.93	0.07	2.00
155MM (ILLUM)	GG_LF3	613240	4058259	64 TBD TGT	623455	4085010	1.00	0.00	1.00
155MM (ILLUM)	GG_LF4	646129	4051155	65 TBD TGT	606563	4061868	1.00	0.00	1.00
155MM (ILLUM)	GG_LF5	613240	4058259	64 TBD TGT	623455	4085010	1.00	0.00	1.00
155MM (ILLUM)	GG_LF6	611472	4066001	65 TBD TGT	606563	4061868	1.00	0.00	1.00
155MM (ILLUM)	GG_LF7	611697	4071903	6504	611486	4066044	3.00	0.00	3.00
155MM (ILLUM)	GG_LF8	606906	4065331	6508	611697	4071897	5.00	0.00	5.00
155MM (ILLUM)	GG_LF9	610005	4071694	6506	606903	4065322	1.00	0.00	1.00
155MM (ILLUM)	GG_LF10	646129	4051155	6507	610008	4071727	1.00	0.00	1.00
155MM (ILLUM)	GG_LF13	613240	4058259	64 TBD TGT	623455	4085010	1.00	0.00	1.00
155MM (ILLUM)	GG_LF14	646129	4051155	65 TBD TGT	606563	4061868	1.00	0.00	1.00
155MM (ILLUM)	GG_LF15	646129	4051155	64 TBD TGT	623455	4085010	1.00	0.00	1.00
155MM (ILLUM)	GG_LF19	611472	4066001	65 TBD TGT	606563	4061868	1.00	0.00	1.00
155MM (SMOKE)	GG_LF16	646129	4051155	64 TBD TGT	623455	4085010	1.00	0.00	1.00
155MM (SMOKE)	GG_LF11	613240	4058259	64 TBD TGT	623455	4085010	1.00	0.00	1.00
155MM (SMOKE)	GG_LF12	646129	4051155	65 TBD TGT	606563	4061868	1.00	0.00	1.00
155MM (SMOKE)	GG_LF17	646129	4051155	64 TBD TGT	623455	4085010	1.00	0.00	1.00

Ordnance	Firing Location			Target Location			0700-2200	2200-0700	Total
	Name	Easting (11)	Northing (11)	Name	Easting (11)	Northing (11)			
155MM (SMOKE)	GG_LF18	613240	4058259	64 TBD TGT	623455	4085010	1.00	0.00	1.00
120MM Mor Cart (HE)	GG_LF31	613240	4058259	65 TBD TGT	606563	4061868	1.00	0.00	1.00
120MM Mor Cart (HE)	GG_LF32	613240	4058259	65 TBD TGT	606563	4061868	1.00	0.00	1.00
120MM Mor Cart (HE)	GG_LF33	646129	4051155	65 TBD TGT	606563	4061868	1.00	0.00	1.00
120MM Mor Cart (HE)	GG_LF34	613240	4058259	64 TBD TGT	623455	4085010	1.00	0.00	1.00
120MM Mor Cart (HE)	GG_LF35	646129	4051155	65 TBD TGT	606563	4061868	1.00	0.00	1.00
120MM Mor Cart (HE)	GG_LF36	613240	4058259	64 TBD TGT	623455	4085010	1.00	0.00	1.00
120MM Mor Cart (HE)	GG_LF37	613240	4058259	65 TBD TGT	606563	4061868	1.00	0.00	1.00
120MM Mor Cart (HE)	GG_LF38	613240	4058259	65 TBD TGT	606563	4061868	1.00	0.00	1.00
120MM Mor Cart (HE)	GG_LF39	613240	4058259	65 TBD TGT	606563	4061868	1.00	0.00	1.00
120MM Mor Cart (HE)	GG_LF40	613240	4058259	65 TBD TGT	606563	4061868	1.00	0.00	1.00
120MM Mor Cart (HE)	GG_LF41	613240	4058259	65 TBD TGT	606563	4061868	1.00	0.00	1.00
120MM Mor Cart (HE)	GG_LF42	611911	4066783	65 TBD TGT	606563	4061868	1.00	0.00	1.00
						Total	**401021.11**	**3980.89**	**405002.00**

Source: Schirg et al., 2016

5.0 Alternatives 2 and 3 Conditions

The LEIS includes a range of alternatives and sub-alternatives to meet the purpose and need of the project, in addition to a no-action alternative. A complete description of each alternative is contained in the LEIS (USAF, 2016c). The noise analysis addresses only Alternatives 2 and 3 which require a 30% increase in activity for the Restricted Areas, MOAs/ATCAAs, MTRs, Creech AFB and training ranges. Further, this increase applies to supersonic and subsonic operations, and large caliber munition expenditure. All other modeling parameters (flight profiles, assumptions) remain unchanged.

Table 5-1 provides a summary of operations for Restricted Areas, MOAs/ATCAAs, MTRs, Airfield and Training Ranges for the Baseline and Alternative 2 and 3 (with a 30% increase in total activity). For example, R4806 operations would increase from 23,109 in CY 2015 to 30,042 under Alternatives 2 and 3.

Table 5-1. Summary of Baseline and Alternatives 2 and 3 Operations

Facility	Name	CY 2015	Alternatives 2 and 3
Restricted Areas	R4806	23,109	30,042
	R4807	34,449	44,784
	R4808	34,485	44,831
	R4809	24,898	32,367
MOAs/ATCAAs	Reveille	25,531	33,190
	Coyote	25,325	32,923
	Caliente	46,396	60,315
	Elgin	26,912	34,986
	Sally / GCIs	5,355	6,962
	Sally / Transitions	91,250	118,625
MTRs	VR209	54	70
	VR222	3	4
Airfield	Creech AFB	44,220	57,486
Training Ranges	Ranges 61 - 66, 71, 74-77	405,002	526,503
	Restricted Areas (Mean)	**29,235**	**38,006**
	MOAs/ATCAAs (Mean)	**31,041**	**40,354**
	MOA / GCI	**5,355**	**6,962**
	MOA / Transitions	**91,250**	**118,625**
	MTRs	**54**	**70**
	Airfield	**3**	**4**
	Training Ranges	**405,002**	**526,503**

6.0 Noise Exposure

Using the operational data described in sections 4 and 5, MRNMAP, NOISEMAP, BOOMAP and BNOISE were used to calculate noise levels for subsonic operations within the SUAs (Ldnmr values), Creech AFB (DNL values), supersonic operations within the SUAs (CDNL values) and large caliber weapons noise (CDNL values).

6.1 Subsonic Aircraft Noise

MR_NMAP was used to calculate the overall noise exposure for subsonic operations for Restricted Areas, MOAs/ATCAAs, and MTRs, and NOISEMAP for Creech AFB. The aircraft sorties were distributed uniformly within Restricted Areas and MOAs/ATCAAs, and normally across the MTRs.

Restricted Areas, MOAs/ATCAAs, and MTRs

Baseline: Table 6-1 presents the resulting noise levels for Restricted Areas, MOAs/ATCAAs and MTRs (also depicted in Figure 6-1). The Baseline Ldnmr values for Restricted Areas, MOAs/ATCAAs and MTRs were calculated to vary from less than 45 dB to 69 dB.

Alternatives 2 and 3: Table 6-1 also presents the results for Alternatives 2 and 3 (also shown in Figure 6-1).With a 30% increase in operations, the Ldnmr values for Restricted Areas, MOAs/ATCAAs and MTRs would be expected to vary from less than 45 dB to 70 dB, an average 1 dB increase. For example, the Ldnmr value within R-4806 would be expected to increase from 60 dB for Baseline to 61 dB for Alternatives 2 and 3.

Table 6-1. Summary of Ldnmr Values for SUAs

SUA Name	Baseline	Alternative 2	Alternative 3
	Ldnmr (dBA)	Ldnmr (dBA) (Change)	Ldnmr (dBA) (Change)
R-4806	60	61 (+1)	61 (+1)
R-4807	66	67 (+1)	67 (+1)
R-4808	<45	46 (+1)	46 (+1)
R-4809	69	70 (+1)	70 (+1)
Caliente	67	68 (+1)	68 (+1)
Coyote	67	68 (+1)	68 (+1)
Elgin	60	61 (+1)	61 (+1)
Reveille	61	62 (+1)	62 (+1)
Sally	<45	<45 (+0)	<45 (+0)
VR-209	<45	<45 (+0)	<45 (+0)
VR-222	<45	<45 (+0)	<45 (+0)

Creech AFB

Baseline: The analysis of Creech AFB operations results in DNL contours of 65 to 85 dB plotted in increments of 5 dB for an average annual day condition (Figure 6-1). The 65 dB contour extends approximately 2 NM to the southwest and southeast mostly due to transient Military and RQ-170 operations.

Alternatives 2 and 3: With a 30% increase in operations, the 65 dB contour would be expected to extend slightly over 2 NM to the southwest and southeast due to transient Military and RQ-170 operations and the overall increase in the number of operations.

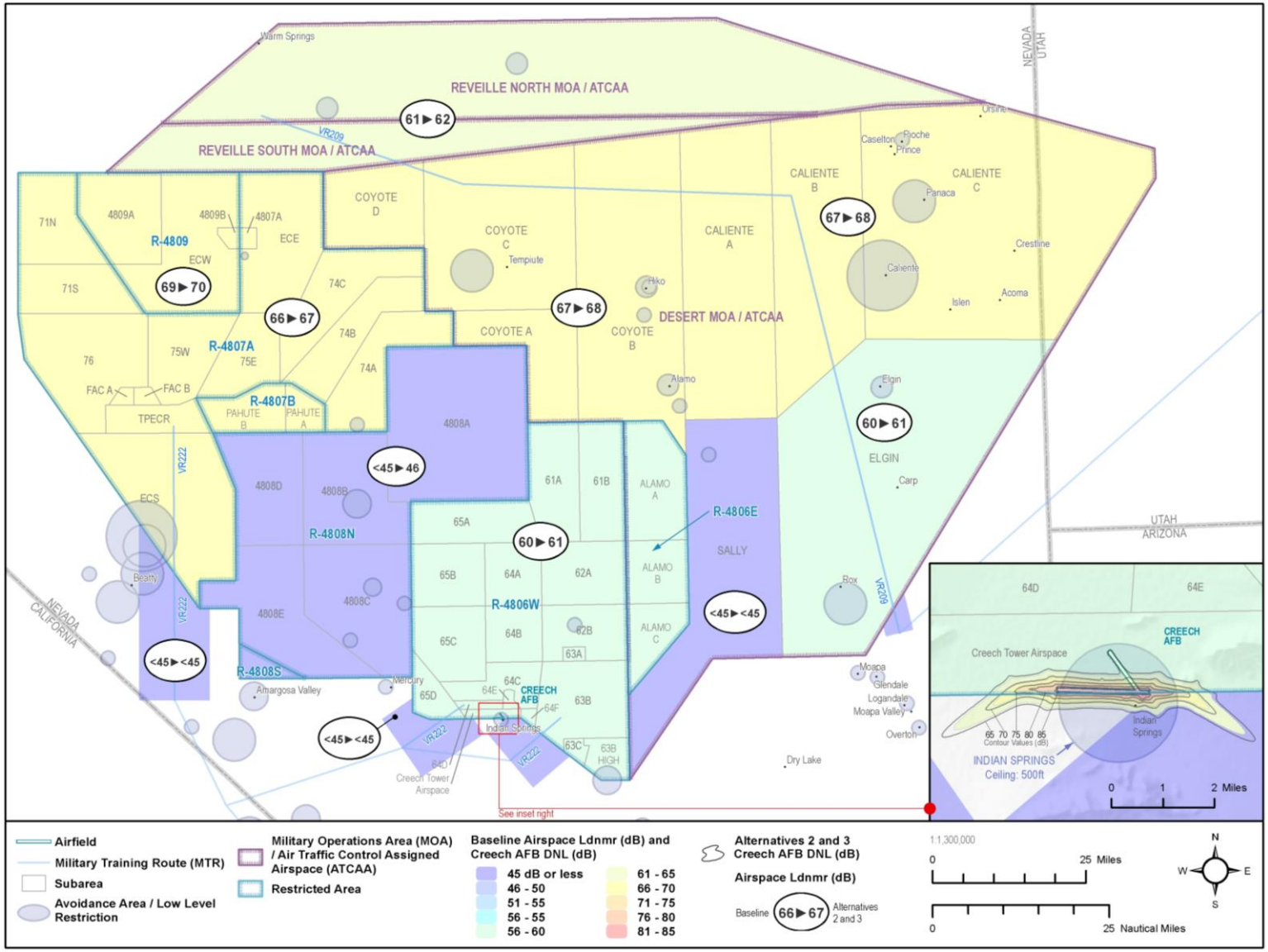

Figure 6-1. Subsonic Noise Exposure within NTTR

6.2 Supersonic Aircraft Noise

Aircraft flight in excess of the speed of sound (Mach 1) generate sonic boom. The BOOMAP software was used to analyze the operational data for supersonic flights (sections 4 and 5) and generate the CDNL values associated with these operations.

Restricted Areas and MOAs/ATCAAs

Baseline: Table 6-2 and Figure 6-2 show the CDNL values associated with Baseline supersonic operations. For example, Table 6-2 shows the CDNL values for the Baseline Condition vary from 51 dBC to 61 dBC. The number of sonic booms expected per day varies from 1 to 5.

Alternatives 2 and 3: Table 6-2 and Figure 6-2 also show the CDNL values associated with Alternatives 2 and 3. With a 30% increase in operations, the CDNL values would be expected to vary from 52 dBC to 62 dBC, an average 1 dBC increase. The number of sonic booms per day would be expected to increase for some of the SUAs and could vary from 1 to 6.

Table 6-2. Summary of CDNLValues for SUA

SUA Name	Baseline		Alternative 2		Alternative 3	
	CDNL (dBC)	Booms per Day	CDNL (dBC) (Change)	Booms per Day (Change)	CDNL (dBC) (Change)	Booms per Day (Change)
R-4806	58	1	59 (+1)	2 (+1)	59	2 (+1)
R-4807	51	2	52 (+1)	2 (+0)	52	2 (+0)
R-4808	54	1	55 (+1)	1 (+0)	55	1 (+0)
R-4809	60	1	61 (+1)	2 (+1)	61	2 (+1)
Caliente	61	5	62 (+1)	6 (+1)	62	6 (+1)
Coyote	60	2	61 (+1)	3 (+1)	61	3 (+1)
Elgin	54	1	55 (+1)	1 (+0)	55	1 (+0)
Reveille	56	1	57 (+1)	1 (+0)	57	1 (+0)
Sally	57	1	58 (+1)	2 (+1)	58	2 (+1)

In general, sonic booms may or may not reach the ground depending on environmental and flight conditions. Several factors influence the trajectory of a sonic boom and its magnitude on the ground, for example, aircraft altitude, temperature gradients, aircraft attitude, etc. Table 6-3 shows, for selected aircraft, typical sonic boom peak overpressures that could be expected on the ground (in pounds per square foot) at various altitudes and Mach numbers.

Table 6-3. Typical Sonic Boom Peak Overpressures (pounds per square foot)

Aircraft Type	Mach 1.1	Mach 1.2	Mach 1.3	Mach 1.4
10,000 feet AGL				
F-15	4.98	5.4	5.72	5.99
F-16	4.03	4.38	4.64	4.85
F-18	4.63	5.02	5.32	5.57
F-22*	5.02	5.48	5.82	6.1
F-35*	4.4	4.83	5.13	5.38
20,000 feet AGL				
F-15	2.68	2.87	3.04	3.17
F-16	2.16	2.32	2.45	2.56
F-18	2.48	2.66	2.8	2.93
F-22*	2.73	2.96	3.13	3.27
F-35*	2.4	2.61	2.77	2.9
30,000 feet AGL				
F-15	No Boom	1.9	1.99	2.07
F-16	No Boom	1.53	1.6	1.66
F-18	No Boom	1.74	1.82	1.89
F-22*	No Boom	1.99	2.09	2.18
F-35*	No Boom	1.78	1.87	1.95

* F-22 modeled as Fixed Wing Fighter of length 62.1 feet and weight 65,000 lbs.
* F-35 modeled as Fixed Wing Fighter of length 50.5 feet and weight 50,000 lbs.

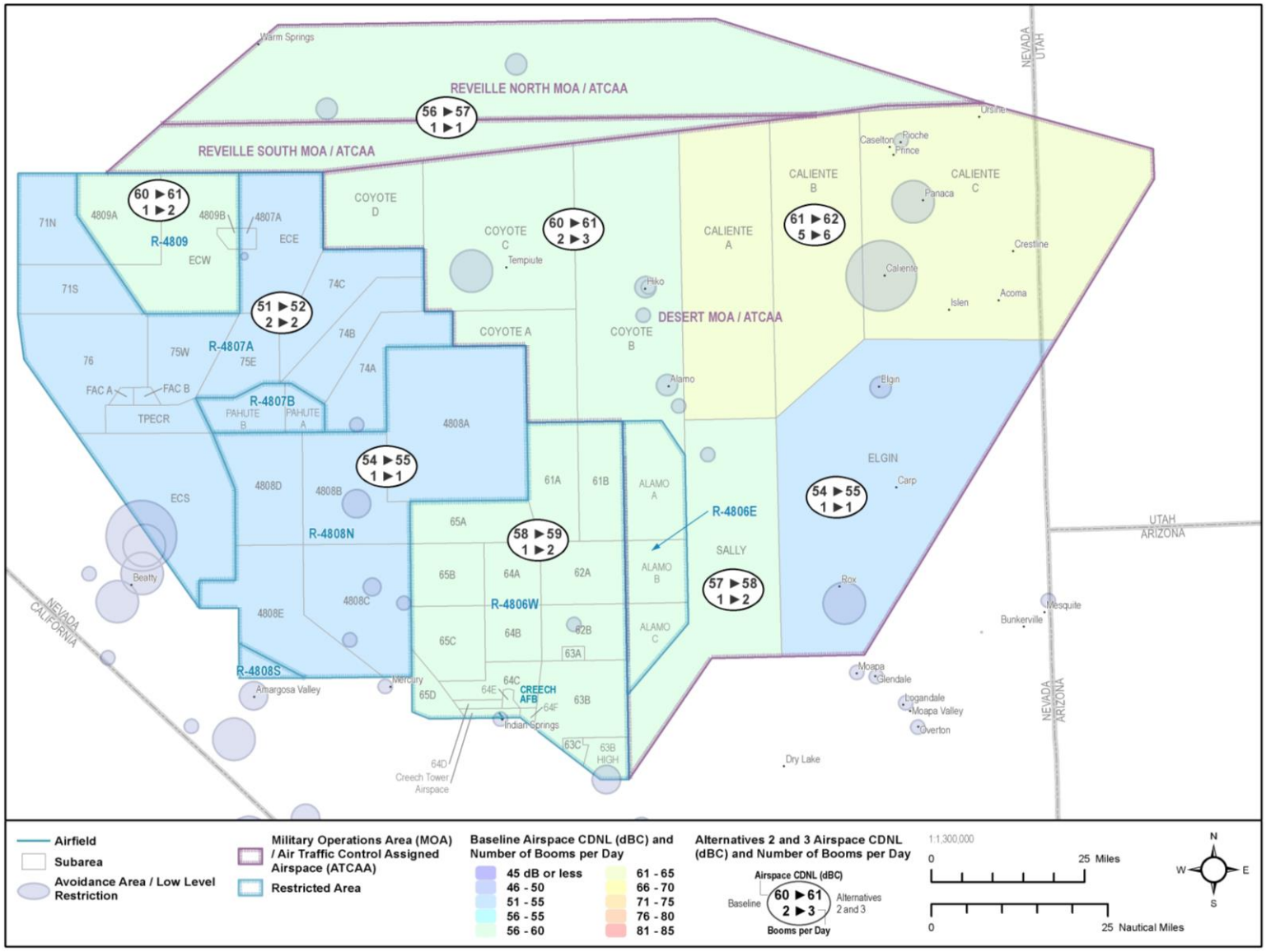

Figure 6-2. Supersonic Noise Exposure within NTTR

6.3 Large Caliber Weapons Noise

The BNOISE computer program was used to analyze the operational data for large caliber weapons in sections 4 and 5, and to calculate the overall blast noise exposure in CDNL. The resulting noise levels are presented in Figure 6-3. The 57, 62 and 70 dBC levels are reported consistent with AR 200-1 recommending the reporting of a Land Use Planning Zone (LUPZ) (57-62 dBC) and a Noise Zone I (less than 62 dBC) where noise-sensitive land uses such as housing, schools, and medical facilities need to be carefully managed, a Noise Zone II (62-70 dBC) where noise-sensitive land uses are normally not recommended and a Noise Zone III (70 dBC plus) where noise-sensitive land uses are not recommended.

Baseline: The CDNL contours for Baseline Conditions in Figure 6-3 are generally centered around the most active target complexes. The 57 dBC contours extend approximately 2-3 NM from active target areas.

Alternatives 2 and 3: With an increase of 30% in large caliber munitions expenditure, the CDNL contours for Alternatives 2 and 3 would be expected to show a slight increase relative to Baseline conditions of approximately 1 dBC. The 57 dBC contours would be expected to continue to extend approximately 2-3 NM from active target areas.

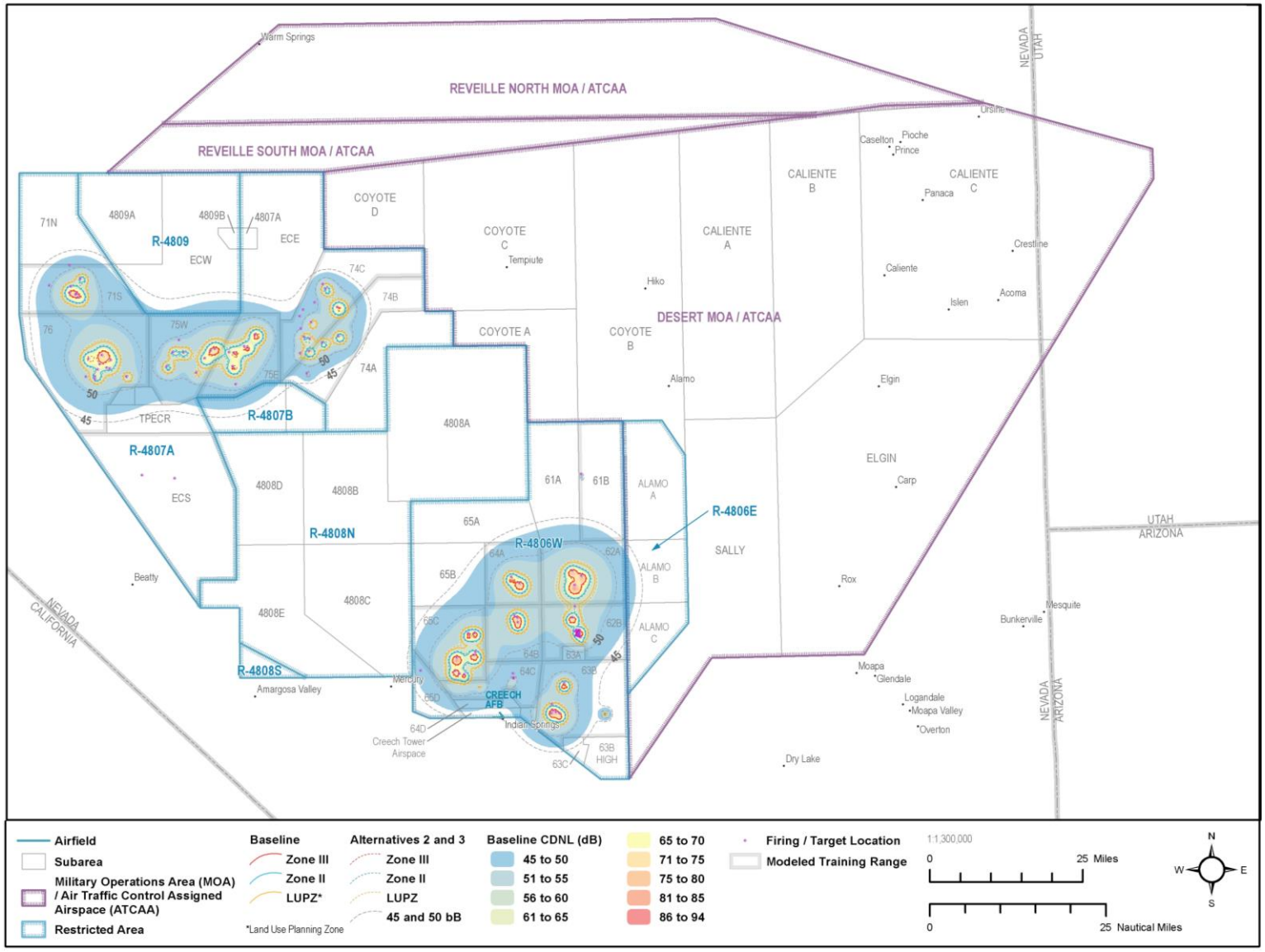

Figure 6-3. Large Caliber Weapons Noise Exposure within NTTR

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Acronyms

Acronym	Description
ACM	Air Combat Maneuvers
AFB	Air Force Base
AFI	Air Force Instruction
AGL	Above Ground Level
AICUZ	Air Installation Compatible Use Zone
AR	Army Regulations
ATCAA	Air Traffic Control Assigned Areas
BLM	Bureau of Land Management
BNOISE	Blast Noise
CAS	Close Air Support
CBU	Cluster Bomb Unit
CDNL	C-Weighted Day-Night Average Sound Level
C TIT	Turbine Inlet Temperature in Celsius
CY	Calendar Year
dBA	A-weighted decibel
dBC	C-weighted decibel
DNL	Day-Night Average Sound Level (A-weighted)
DoD	Department of Defense
DOI	Department of the Interior
EIS	Environmental Impact Statement
EPR	Engine Pressure Ratio
ESC	Electronic Systems Center
ESHP	Estimated Shaft Horse Power
ETR	Engine Thrust Request
GP	General Purpose
IR	Instrument Route
KIAS	Knots Indicated Airspeed
LBS/HR	Pounds per Hour
L_{dnmr}	Onset Rate Adjusted Day-Night Average Sound Level
LEIS	Legislative Environmental Impact Statement
LFO LITE	Level Flight Operation Light Weight
LUPZ	Land Use Planning Zone
MOA	Military Operations Areas
MLWA	Military Lands Withdrawal Act
MSL	Mean Sea Level
MR_NMAP	MOA and Range NOISEMAP
MTR	Military Training Route
$Mile^2$	Mile squared
Minute	Min
N1	Fan Speed
N2	Compressor Speed

Acronym	Description
NC	Compressor Speed
NEPA	National Environmental Policy Act of 1969
NF	Fan Speed
NM	Nautical Mile
NR	Compressor Speed
NTTR	Nevada Test and Training Range
PLA	Power Level Angle
Q-BPA	Torque
RPA	Remotely Piloted Aircraft
RPM	Revolutions Per Minute
SEL	Sound Exposure Level
SUA	Special Use Airspace
VR	Visual Route
USAF	US Air Force
UTM	Universal Transverse Mercator