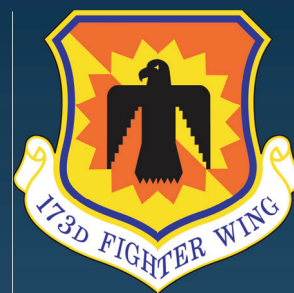


# **Final Noise Study Environmental Impact Statement for Basing F-35A Lightning II Formal Training Unit at Kingsley Field Air National Guard Base, Klamath Falls, Oregon**



**September 2026**

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## ACRONYMS AND ABBREVIATIONS

|        |                                               |                      |                                                |
|--------|-----------------------------------------------|----------------------|------------------------------------------------|
| %      | percent                                       | ILS                  | Instrument Landing System                      |
| 173 FW | 173d Fighter Wing                             | IP                   | Instructor Pilot                               |
| A/B    | Afterburner                                   | IPUG                 | Instructor Pilot Upgrade                       |
| AAD    | Average Annual Day                            | kPa-s/m <sup>2</sup> | kilopascal-seconds per square meter            |
| AAM    | Advanced Acoustic Model                       | L <sub>dnmr</sub>    | Onset-Rate Adjusted Monthly Day-Night          |
| ACM    | Air Combat Maneuvering                        |                      | Average A-weighted Sound Level                 |
| ADAIR  | Adversary Air                                 | L <sub>eq</sub>      | Equivalent Sound Level                         |
| AEDT   | Aviation Environmental Design Tool            | L <sub>max</sub>     | Maximum Sound Level                            |
| AGL    | Above Ground Level                            | LMT                  | Crater Lake-Klamath Regional Airport           |
| ANG    | Air National Guard                            | MOA                  | Military Operation Area                        |
| ANGB   | Air National Guard Base                       | MRNmap               | Military Operating Area and Range              |
| ANSI   | American National Standards Institute         |                      | Noise Model                                    |
| ASA    | Acoustical Society of America                 | MSL                  | mean sea level                                 |
| ATCAA  | Air Traffic Control Assigned Airspace         | NA                   | Number of Events Above                         |
| ATCT   | Air Traffic Control Tower                     | NED                  | National Elevation Dataset                     |
| BAA    | Backup Aerospace Vehicle Authorized           | NEPA                 | National Environmental Policy Act              |
| BFM    | Basic Fighter Maneuver                        | NGB                  | National Guard Bureau                          |
| CDNL   | C-weighted Day-Night Average Sound Level      | NIPTS                | Noise Induced Permanent Threshold Shift        |
| DAF    | Department of the Air Force                   | PA                   | Probability of Awakening                       |
| dB     | Decibel                                       | PAA                  | Primary Aerospace Vehicle Authorized           |
| dBA    | A-weighted decibel                            | PDARS                | Performance Data Analysis and Reporting System |
| dBBC   | C-weighted decibel                            | PFO                  | Precautionary Flameout                         |
| DNL    | Day-Night Average Sound Level                 | PHL                  | Potential for Hearing Loss                     |
| DNWG   | Department of Defense Noise Working Group     | POI                  | Point of Interest                              |
| DoD    | Department of Defense                         | SEL                  | Sound Exposure Level                           |
| EA     | Environmental Assessment                      | TA                   | Time Above                                     |
| EIS    | Environmental Impact Statement                | TACAN                | Tactical Air Navigation System                 |
| EPA    | United States Environmental Protection Agency | TAF                  | Terminal Area Forecast                         |
| FAA    | Federal Aviation Administration               | TRACON               | Terminal Radar Approach Control                |
| FTU    | Formal Training Unit                          | U.S.                 | United States                                  |
| Hz     | Hertz                                         | USFS                 | United States Forest Service                   |
| IFR    | Instrument Flight Rules                       | USGS                 | United States Geological Survey                |
|        |                                               | VFR                  | Visual Flight Rules                            |
|        |                                               | W-                   | Warning Area                                   |

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## **1.0 INTRODUCTION**

### **1.1 BACKGROUND**

This Noise Study supports the Environmental Impact Statement (EIS) evaluating the potential effects associated with the Department of the Air Force (DAF) and National Guard Bureau (NGB) proposal to replace aging F-15C/D aircraft and maintain combat capability within Air National Guard (ANG) fighter wings operating the F-15C/D. The F-15C/D fleet has reached the end of its service life and is being phased out due to increasing maintenance requirements and diminishing parts availability.



For Kingsley Field Air National Guard Base (ANGB) at Crater Lake-Klamath Regional Airport (LMT), Oregon, the Proposed Action is the beddown, operation, and associated infrastructure construction of one formal training unit (FTU) squadron of F-35A Lightning II (F-35A) aircraft at the 173d Fighter Wing (173 FW). The Proposed Action includes replacement of the aging F-15C/D aircraft at Kingsley Field ANGB, continued training from LMT/Kingsley Field ANGB and within existing military training airspace used by the 173 FW, and associated infrastructure improvements to support F-35A operations. Figure 1-1 depicts the vicinity of the airport and Figure 1-2 presents the 173 FW-associated military training airspace.



Military aircraft noise modeling was accomplished using the Department of Defense's (DoD) NOISEMAP software while civilian aircraft were modeled using the Federal Aviation Administration's (FAA) Aviation Environmental Design Tool (AEDT) Version 3f software program. The data used in support of the study (i.e., numbers and types of aircraft, time of day, runway assignments, type of operation) were obtained from recent noise studies and coordination with representatives from the FAA, air traffic controllers, and the NGB. Standardized flight profile data (power settings, airspeeds, etc.) available with AEDT were used for civilian aircraft operations.

For analyses prepared in accordance with FAA Order 1050.1G, forecast information is an important input to the noise analysis under the National Environmental Policy Act (NEPA). Airports can rely on a forecast they prepare, and is approved by the FAA, or they can seek approval from the FAA to use the Terminal Area Forecast (TAF), which is issued annually and projects civilian and commercial operations into the near future, and these projections are utilized to determine operational levels associated with the noise impact analysis. This study utilizes the FAA's 2023 TAF for annual civil operational and Performance Data Analysis and Reporting System (PDARS) for flight track analysis and development (FAA 2024a; LMT 2024).

Military flight operations were based on interviews with members of the 173 FW and updated as needed to reflect Existing Conditions (2023) dataset and planning-scenario assumptions used for comparative modeling, which were determined to provide a reasonable basis for estimating future operations for NEPA analysis. Transient military operations were based upon prior studies, such as the Environmental

Assessment (EA) Combat Air Forces: Adversary Air, Kingsley Field Air National Guard Base, Oregon (DAF 2020), with updates for changes in the fleet mix.

This analysis includes multiple F-35A departure afterburner usage scenarios (5 percent, 50 percent, and 95 percent) for sensitivity analysis. The 95 percent afterburner departure assumption is used for the primary Proposed Action analysis because it reflects the expected FTU training departure profile. Unless otherwise noted, values in this Noise Study reflect the Existing Conditions (2023) and planning-scenario datasets used for comparative modeling in the EIS and are not intended to represent current-day operations.

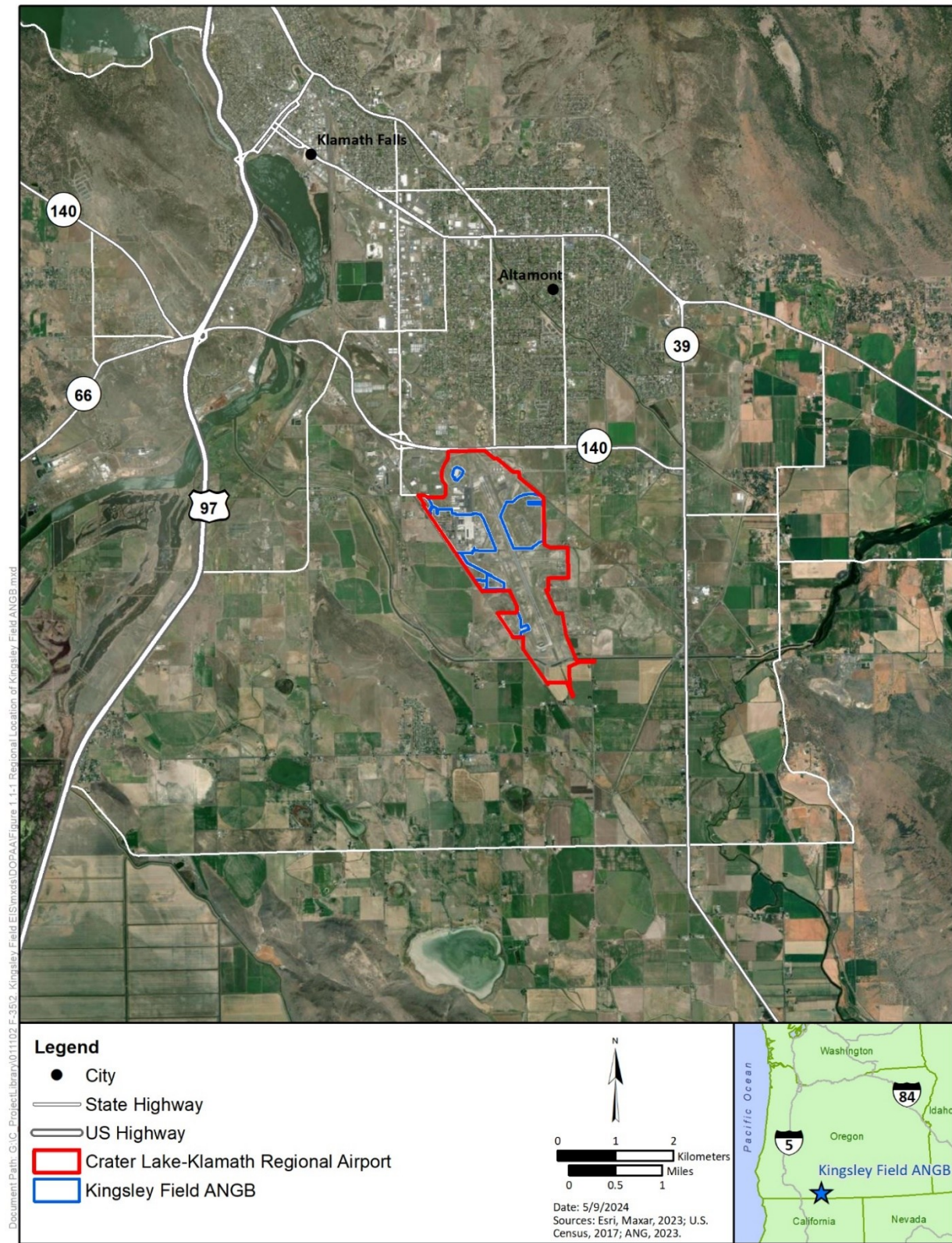
The EIS Proposed Action includes up to 24 Primary Aerospace Vehicles Authorized (PAA) and 2 Backup Aerospace Vehicles Authorized (BAA) assigned to the FTU squadron; noise modeling reflects the operational assumptions used for comparative analysis and therefore models the F-35A flight activity associated with the Proposed Action training profile.

Accordingly, the following aircraft alternatives and afterburner usage scenarios were modeled for the 173 FW:

- F-15C/D – 26 PAA (Existing Conditions [2023] and No Action Alternative)
- F-35A – 24 PAA (Proposed Action)
  - 5 percent afterburner usage
  - 50 percent afterburner usage
  - 95 percent afterburner usage

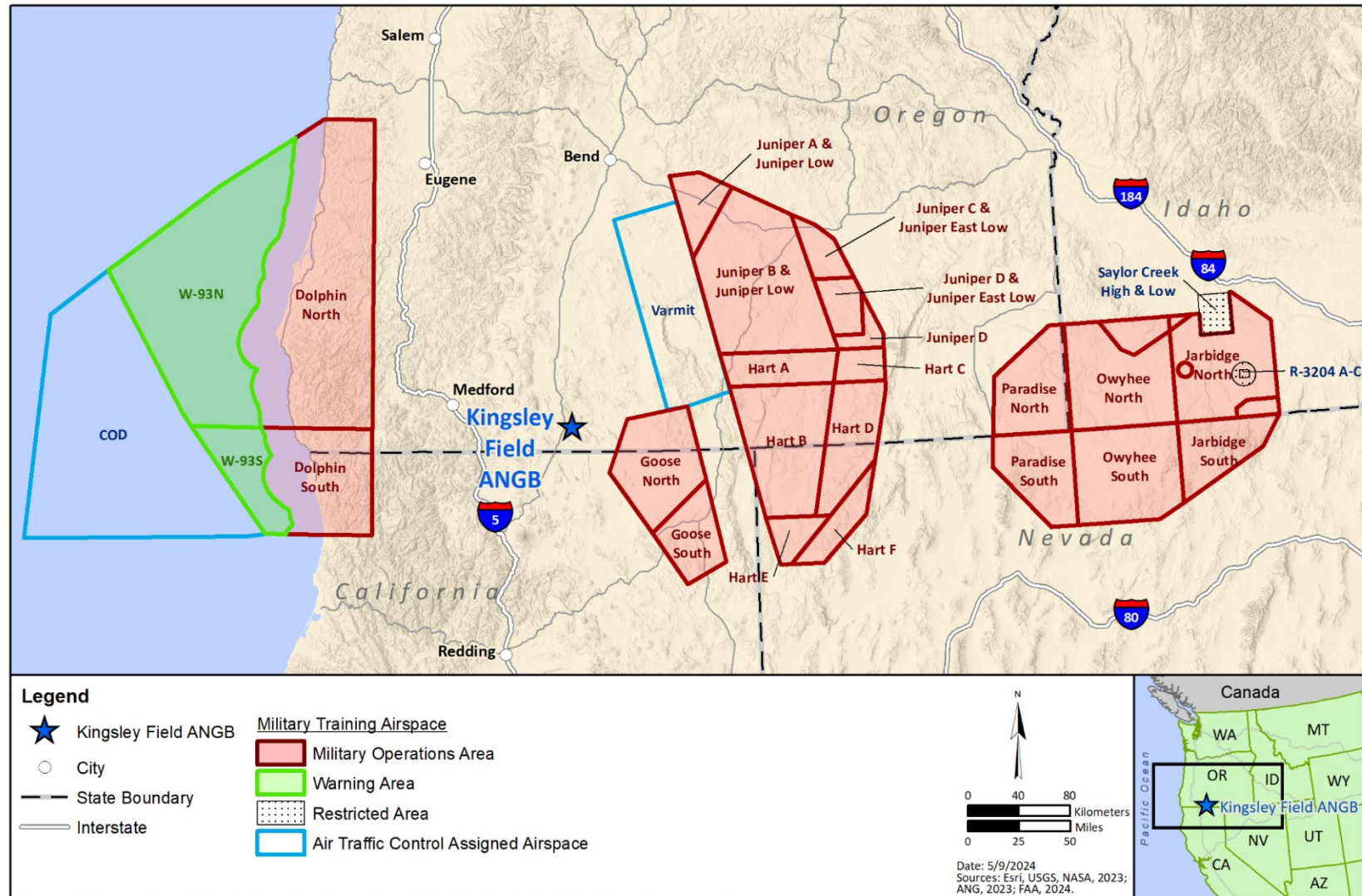


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**Figure 1-1 Regional Location of LMT/Kingsley Field ANGB**





**Figure 1-2 Military Training Airspace Associated with the 173 FW**

## **1.2 DOCUMENT STRUCTURE**

Section 1.0 introduced this study; while Section 2.0 describes the methodology used in the analysis. Section 3.0 provides the modeling data used and the noise exposure for Existing Conditions (2023). Section 4.0 presents the No Action Alternative data and results, and Section 5.0 provides the F-35A alternative with three afterburner scenarios. Section 6.0 presents conclusions and Section 7.0 provides the references.

## **2.0 METHODOLOGY**

The DoD and the Federal Interagency Committee on Noise (1978) identify noise metrics used to describe noise exposure for impact assessment, while the Defense Noise Working Group (DNWG) provides guidance on military noise modeling methodology. The following subsections describe these noise metrics and noise modeling methodology.

### **2.1 NOISE MODELING AND PRIMARY NOISE METRICS**

The DoD prescribes use of the Noisemap suite of computer programs (Wyle 1998; Wasmer Consulting 2006) containing the core computational programs called “NMAP,” version 7.3, and “MRNMap,” version 3.0, and the FAA’s AEDT 3f for analysis of aircraft noise. For this Noise Study, the Noisemap suite of programs refers to BASEOPS as the input module, Noisemap as the noise model for predicting noise exposure in the airfield environment, and MRNMap as the noise model used to predict noise exposure in the military training airspace. Supersonic noise is estimated with BOOMAP2021. NMPlot is the tool used to combine grid points from NOISEMAP and AEDT to generate Day-Night Average Sound Level (DNL) noise contours. Table 2-1 presents noise modeling parameters used in this analysis. Human hearing sensitivity to differing sound pitch, measured in cycles per second or hertz (Hz), varies by frequency. To account for this effect, this analysis utilizes A-weighting, which emphasizes sound roughly within the range of typical speech and de-emphasizes very low and very high frequency sounds. All decibels (dB) presented in this study utilize A-weighted (dBA or dB[A]) but are presented as dB for brevity, unless otherwise noted.

**Table 2-1 Noise Modeling Parameters**

| Table 2-1 Noise Modeling Parameters                                   |                                                                                            |         |
|-----------------------------------------------------------------------|--------------------------------------------------------------------------------------------|---------|
| Software                                                              | Analysis                                                                                   | Version |
| NMAP                                                                  | Airfield noise – military aircraft                                                         | 7.3     |
| AEDT                                                                  | Airfield noise – civilian aircraft                                                         | 3f      |
| MRNMap                                                                | Military Training Airspace Noise (subsonic)                                                | 3.0     |
| BOOMAP                                                                | Military Training Airspace Noise (supersonic)                                              | 2021    |
| Parameter                                                             | Description                                                                                |         |
| Receiver Grid Spacing                                                 | 500 ft in x and y                                                                          |         |
| Metrics                                                               | DNL and CDNL (primary)<br>L <sub>dnmr</sub> , SEL, L <sub>max</sub> , L <sub>eq</sub> , NA |         |
| Basis                                                                 | AAD Operations (NMAP/AEDT);<br>Average Month (MRNMap)                                      |         |
| Topography                                                            |                                                                                            |         |
| Elevation Data Source                                                 | USGS 30m NED                                                                               |         |
| Elevation Grid Spacing                                                | 500 ft in x and y                                                                          |         |
| Impedance Data Source                                                 | USGS Hydrography DLG                                                                       |         |
| Impedance Grid spacing                                                | 500 ft in x and y                                                                          |         |
| Flow Resistivity of Ground (soft/hard)                                | 225 kPa-s/m <sup>2</sup> / 100,000 kPa-s/m <sup>2</sup>                                    |         |
| Military Modeled Weather (Monthly Averages 2018-2023; March selected) |                                                                                            |         |
| Temperature                                                           | 59°F                                                                                       |         |
| Relative Humidity                                                     | 70%                                                                                        |         |
| Barometric Pressure                                                   | 29.92 in Hg                                                                                |         |

*Legend:* °F = degrees Fahrenheit; % = percent; AAD = Average Annual Day; AEDT = Aviation Environmental Design Tool; CDNL = C-weighted Day-Night Average Sound Level; DLG = Digital Line Graph; DNL = Day-Night Average Sound Level; ft = feet; in Hg = inches Mercury; kPa-s/m<sup>2</sup> = kilopascal-seconds per square meter;  $L_{dnmr}$  = Onset-Rate Adjusted Monthly Day-Night Average Sound Level;  $L_{eq}$  = Equivalent Sound Level;  $L_{max}$  = maximum sound level; m = meters; NA = Number of Events Above; NED = National Elevation Dataset; SEL = Sound Exposure Level; USGS = United States Geological Survey.

The primary noise metric utilized in this analysis for characterizing noise exposure is Day-Night Average Sound Level ( $L_{dn}$ , also written as DNL), which is A-weighted applicable for subsonic aircraft operations. The assessment period of DNL reflects an Average Annual Day (AAD). DNL is a cumulative metric that includes all noise events occurring in a 24-hour period with a nighttime noise weighting applied to events occurring after 10 p.m. (2200) and before 7 a.m. (0700). The daytime period is defined as 7 a.m. (0700) to 10 p.m. (2200). An adjustment (weighting) of 10 dB is added to events occurring during the nighttime period to account for the added intrusiveness while people are most likely to be relaxing at home or sleeping. Note that “daytime” and “nighttime” in calculation of DNL are sometimes referred to as “acoustic day” and “acoustic night” and always correspond to the times given above. This is often different than the “day” and “night” used commonly in military aviation, which are directly related to the times of sunrise and sunset applicable for military training in dark conditions. These times vary latitudinally, and throughout the year with the seasonal changes.

Similar to DNL, C-weighted Day-Night Average Sound Level (CDNL) represents a cumulative metric that includes all noise events occurring in a 24-hour period with a nighttime noise weighting applied to events occurring after 10 p.m. (2200) and before 7 a.m. (0700). FAA requires the use of AAD for describing DNL, which was used in this analysis for airfield operations at LMT. CDNL is C-weighted for impulsive sounds

that contain greater low frequency noise, like ordnance or supersonic “booms,” to better reflect the level of annoyance generated by these activities that may occur in military training airspace.

DoD Noise Program Policy (DoD Instruction 4715.13, 28 January 2020) requires the use of the DNL noise metric to describe aircraft noise exposure levels at airfields based on AAD for the purpose of long-term compatible land use planning. Consistent with that standard, this study analyzed both military and civil operations at the airfield on an average annual basis. Flight activity in the military training airspace can vary throughout the year, so AAD may not always be the most informative approach for military operations. Therefore, military training airspace analysis typically considers the ‘busiest month’ to better represent activity during an average day of that month. However, in this case, military training airspace operations were relatively consistent throughout the year, and no single month materially represented a higher-use condition. Therefore, average annual daily operations were used as the basis for the military training airspace noise analysis.

Assessment of noise associated with a Proposed Action requires prediction of future conditions that cannot be easily measured until after implementation or would require excessive cost or time to measure. The solution to this includes the use of computer software to simulate the future conditions, as detailed in the following sections. A recent congressionally mandated study compared the accuracy of noise modeling methods described in this section to real-world field measurements. The report found that DoD-approved noise models operate as intended providing accurate prediction of noise exposure levels from aircraft operations for use in impact assessments and long-term land use planning (Department of the Navy 2021). The study also determined that the largest variable in any aircraft noise-modeling effort is the expected operational flight parameter data, such as runway and flight track utilization, altitudes at various points in the flight track, engine power settings, and other parameters.

## **2.1.1 Crater Lake-Klamath Regional Airport (LMT)**

This section discusses the airport facilities, including the airspace, air traffic control tower (ATCT), and runways at LMT, and the aircraft noise modeling.

### **2.1.1.1 Airport Facilities**

#### Airspace

The airspace surrounding LMT, and all airspace within the United States (U.S.) National Airspace System, is classified into a number of classes (A, B, C, D, E, and G) based on the level of air traffic control services, operating requirements, and the nature of operations. LMT is surrounded by Class D airspace when the air traffic control tower is in operation, which is positively controlled by an ATCT that operates from 7 a.m. (0700) to 10 p.m. (2200) daily. LMT’s Class D airspace extends to 2,500 feet above ground level (AGL) and has a radius of 5.4 nautical miles (or approximately 6.2 statute miles). Class D airspace rules require aircraft to maintain positive radio contact with the ATCT at the airport when operating within the airspace. The airspace surrounding the airport shifts to uncontrolled airspace designated as Class G airspace when the tower is not in operation. The LMT Class D airspace is flanked to the southeast by the Goose Military Operations Area (MOA).

### Air Traffic Control Tower

The airport’s ATCT is an FAA facility that is staffed daily between the hours of 7 a.m. (0700) and 10 p.m. (2200). ATCT personnel are responsible for the movement of aircraft at the airport. The LMT ATCT is operated by the 173 FW, which adheres to all rules and regulations set forth by the federal government.

### Runways

Table 2-2 describes the runway details utilized within this Noise Study. LMT has two runways with Runway 14/32, oriented northwest/southeast, and Runway 07/25, oriented east/west, as depicted in Figure 2-1. The majority of aircraft operations, including all DoD aircraft operations, occur along Runway 14/32, which is 10,302 feet long and 150 feet wide. Helicopters were modeled to arrive at runway ends before turning to head to their ramp to park. This Noise Study uses runway identifiers and facility status consistent with the modeled dataset used for the analysis. Current airport references may differ (e.g., Runway 08/26 redesignation and Runway 14 Instrument Landing System [ILS] status); these updates are noted for context and do not affect the modeling results.

**Table 2-2 LMT Runway Details for Noise Modeling**

| <i>Rwy<sup>1</sup></i> | <i>Start</i>                    | <i>End</i>                      | <i>Length</i> | <i>Width</i> | <i>Elevation</i> | <i>Displaced<br/>Threshold</i> | <i>Traffic<br/>Pattern</i> | <i>Instrument<br/>Approach</i> |
|------------------------|---------------------------------|---------------------------------|---------------|--------------|------------------|--------------------------------|----------------------------|--------------------------------|
| 07                     | 42-09.379118N<br>121-44.555740W | 42-09.372875N<br>121-43.392607W | 5,258 ft      | 100 ft       | 4,091 ft         | 307 ft                         | Left                       | N/A                            |
| 14                     | 42-10.152295N<br>121-44.424328W | 42-08.577477N<br>121-43.578923W | 10,302 ft     | 150 ft       | 4,091 ft         | N/A                            | Left                       | ILS <sup>1</sup>               |
| 25                     | 42-09.372875N<br>121-43.392607W | 42-09.379118N<br>121-44.555740W | 5,258 ft      | 100 ft       | 4,090 ft         | N/A                            | Left                       | N/A                            |
| 32                     | 42-08.577477N<br>121-43.578923W | 42-10.152295N<br>121-44.424328W | 10,302 ft     | 150 ft       | 4,095 ft         | N/A                            | Left                       | ILS                            |

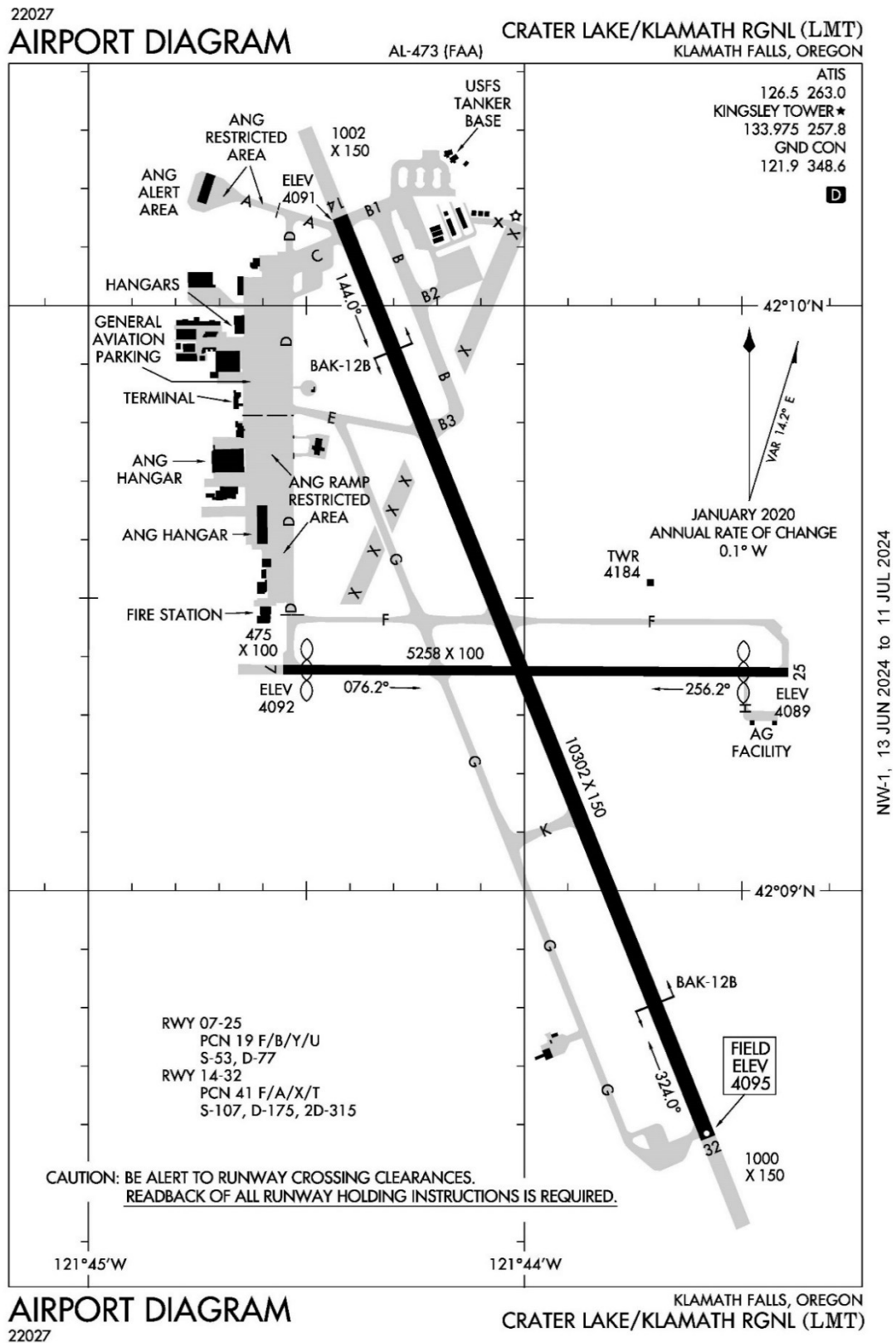
*Notes:* <sup>1</sup>At the time of noise modeling, future plans included redesignation of Runway 07/25 to Runway 08/26 and adjustment of painted runway threshold end point locations. Since completion of the noise study, Runway 07/25 has been redesignated Runway 08/26, and the Runway 14 ILS became operational (February 2026). Table values reflect the modeled dataset used for analysis

*Legend:* Start and End in Degrees Minutes Latitude and Longitude; ft = feet; ILS=Instrument Landing System; LMT = Crater Lake-Klamath Regional Airport; N/A=Not Applicable; Rwy = Runway.

*Source:* AIRNAV 2024.

### Aircraft Noise Modeling

The noise modeling was completed in accordance with DoD and FAA policies. The noise modeling information was developed iteratively with a team primarily made up of representatives from the installation’s flying squadrons and air traffic controllers as well as the NGB. The team reviewed available LMT flight track data from the FAA’s PDARS. Based on that review, FAA determined that the FAA’s 2022 National Noise Inventory provided a better basis for deriving the civilian fleet mix of operations at LMT and provided that dataset for use in the noise analysis. A review of the 2019 PDARS data also identified the need to model flight tracks for civilian aircraft between Runways 14/32, flight tracks to the practice area southwest of the airfield, and closed pattern operations for all runways (FAA 2024b; LMT 2024).



**Figure 2-1 LMT Airport Layout**

In accordance with DoD and FAA policies, the noise analysis used the Noisemap software suite and AEDT that relies upon modeled aircraft flight tracks (paths over the ground) and profiles, which include altitude, airspeed, power settings, and other flight conditions. The data was compiled in a data validation package, reviewed by the team, and approved for use by the NGB team prior to modeling (NGB 2024a). This data has been combined with the numbers of each type of operation by aircraft/track/profile, local climate, terrain surrounding the airfield, and similar data related to aircraft engine runs that occur at specific locations on the ground (e.g., pre- and post-flight and maintenance activities). Appendix A shows summary flight tracks, as well as representative flight profiles for the aircraft operations modeled. Because Advanced Acoustic Model (AAM) sound hemispheres are not available for the existing based F-15C/D, all military aircraft are modeled with NMAP to provide a consistent manner of analysis across alternatives in accordance with DoD standards (DoD 2022).

Noisemap's ability to account for the effects of sound propagation includes consideration of varying terrain elevation, taken from the U.S. Geological Survey (USGS) National Elevation Dataset (NED), and ground impedance conditions, taken from USGS Hydrography data. In this case, "soft ground" (e.g., grass-covered ground) is modeled with a flow resistivity of 225 kilopascal-seconds per square meter (kPa-s/m<sup>2</sup>) and "hard ground" (in this case, water) is modeled with a flow resistivity of 100,000 kPa-s/m<sup>2</sup>. For ambient temperature, humidity, and pressure, each month was assigned a temperature, relative humidity, and barometric pressure from data available for that month for the years 2018 through 2023. Noisemap then determined and used the month with the weather values that produced the median results in terms of noise propagation effect, which in this case was the month of March (with the values noted in Table 2-1). Modeling civil operations with AEDT software relied upon standard software weather conditions.

The results of the DoD's Noisemap and FAA's AEDT modeling were combined for all aircraft activity at the airport for Existing Conditions (2023), the No Action Alternative, and the Proposed Action three afterburner scenarios. The combined noise exposure is presented in terms of contours (i.e., which are lines of equal DNL value). DNL contours of 65 to 85 dB, presented in 5-dB increments, provide a graphical depiction of the aircraft noise environment at and adjacent to LMT. In addition to the DNL plots, specific noise sensitive locations (schools, hospitals, places of worship, and residential neighborhoods) have been identified in the surrounding communities referred to as representative Points of Interest (POIs). Table 2-3 and Figure 2-2 show the 26 selected representative POIs used for this study. Section 2.2 provides a discussion on the supplemental metric noise calculations performed for each POI.

### **2.1.2 Military Training Airspace**

In the military training airspace environment, the Onset-Rate Adjusted Monthly Day-Night Average Sound Level ( $L_{dnmr}$ ) serves as the primary noise metric, with predicted sound levels based on the month with the most aircraft activity in each military training airspace to account for the sporadic nature of operations. Under DNWG guidance,  $L_{dnmr}$  is the U.S. Government standard for modeling and predicting cumulative noise exposure in the military training airspace environment and for evaluating community noise exposure in that setting.  $L_{dnmr}$  is identical to the DNL except that an additional weighting is applied to account for the startle effect due to the quick increase in sound level created by aircraft operating at low altitudes and high rates of speed (over 400 knots). The weighting is based on how quickly the sound increases when heard by an observer on the ground, described as 'rise-time' rate, and ranges for 0 up to 11 dB. Thus, DNL will always be equal to or lower than  $L_{dnmr}$  but DNL is also presented for FAA impact consideration under FAA Order 1050.1G.



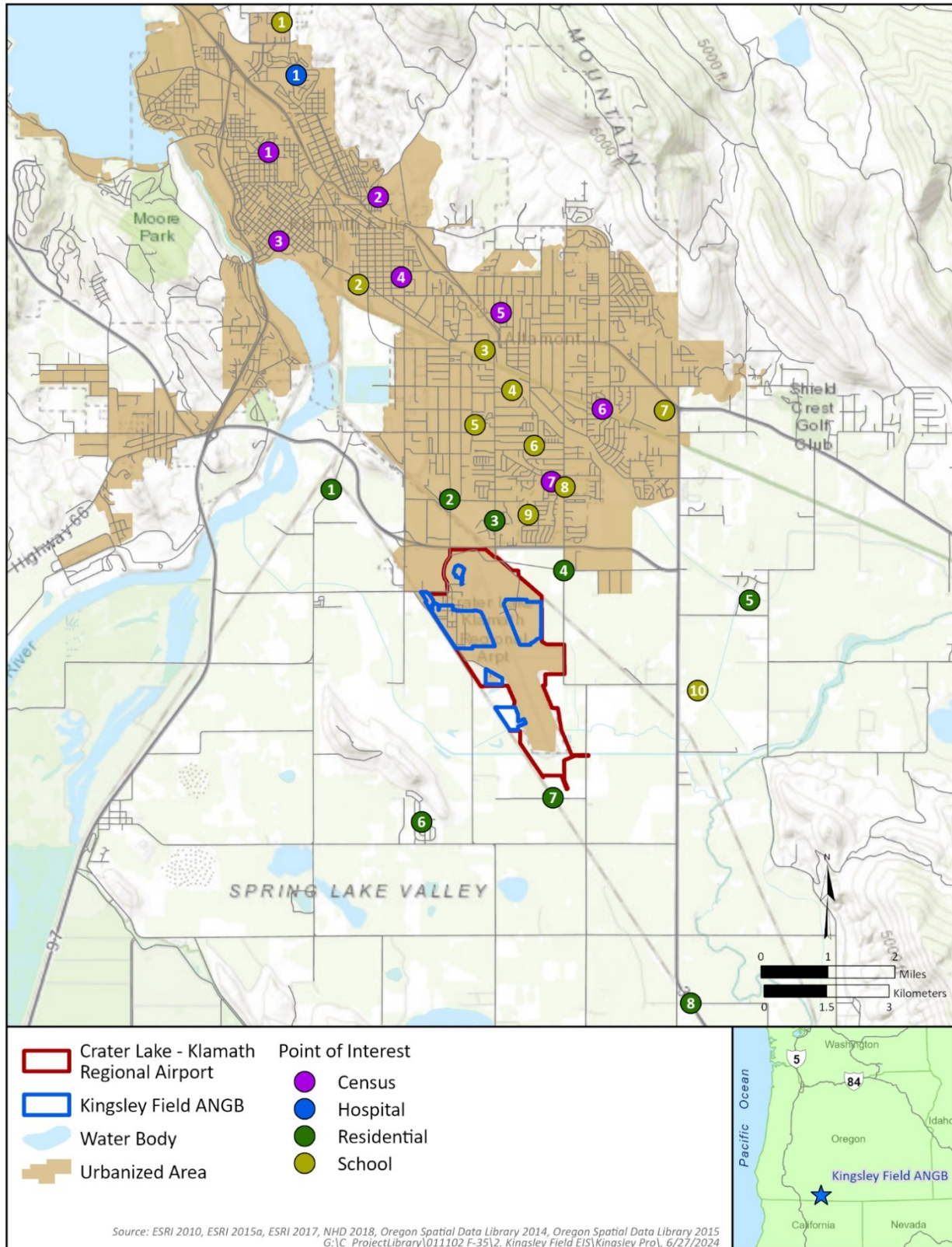
**Table 2-3 POIs Adjacent to LMT**

| <i>Map ID</i> | <i>Point Type</i>     | <i>Named POI<sup>1</sup></i>       |
|---------------|-----------------------|------------------------------------|
| C-01          | Census Tract Centroid | Census Tract 9719                  |
| C-02          | Census Tract Centroid | Census Tract 9717                  |
| C-03          | Census Tract Centroid | Census Tract 9718                  |
| C-04          | Census Tract Centroid | Census Tract 9716                  |
| C-05          | Census Tract Centroid | Census Tract 9712                  |
| C-06          | Census Tract Centroid | Census Tract 9713                  |
| C-07          | Census Tract Centroid | Census Tract 9714                  |
| H-01          | Healthcare Facility   | Sky Lakes Medical Center           |
| R-01          | Residential Area      | Neighborhood                       |
| R-02          | Residential Area      | Anderson Avenue and Altamont Drive |
| R-03          | Residential Area      | Highland Way and Summit Street     |
| R-04          | Residential Area      | Airway Drive and Homedale Road     |
| R-05          | Residential Area      | Neighborhood                       |
| R-06          | Residential Area      | Neighborhood                       |
| R-07          | Residential Area      | Lombardy Lane and railroad tracks  |
| R-08          | Residential Area      | Neighborhood                       |
| S-01          | School                | Oregon Institute of Tech           |
| S-02          | School                | Klamath Family Head Start          |
| S-03          | School                | Triad School                       |
| S-04          | School                | Mazama High School                 |
| S-05          | School                | Stearns Elementary School          |
| S-06          | School                | Peterson Elementary                |
| S-07          | School                | Klamath Community College          |
| S-08          | School                | Brixner Jr High School             |
| S-09          | School                | Hosanna Christian School           |
| S-10          | School                | Henley High School                 |

*Notes:* <sup>1</sup>The census tracts represent neighborhoods surrounding LMT where noise sensitive locations (such as residences, schools, places of worship, etc. are likely to occur).

*Legend:* ID = Identification; LMT = Crater Lake-Klamath Regional Airport; POI = Point of Interest.

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***at Kingsley Field ANGB, Klamath Falls, Oregon***  
***Final – September 2026***



**Figure 2-2 Representative POIs Adjacent to LMT**

If military training airspace utilization varies substantially by month, a higher-use period may be used to characterize cumulative exposure. For this study, training activity for the existing F-15C/D and proposed F-35A scenarios is sufficiently distributed across the year such that average annual daily operations were used as the basis for the military training airspace noise analysis. Noise modeling in the military training airspace was conducted using conservative assumptions regarding location and profiles of overland training activity to characterize potential noise exposure in areas nearest noise-sensitive receptors. This approach provides a conservative estimate of the greatest  $L_{dnmr}$  that could occur within the military training airspace.  $L_{dnmr}$  for a typical year would be less because a portion of training would occur in overwater military training airspace, where there would be no noise impacts to humans. Both the rise-time weighting and potential busy month modeling of operations applicable to  $L_{dnmr}$  result in calculated  $L_{dnmr}$  that will always be equal to or greater than DNL for the same activity.

Using the MRNMap model contained in the Noisemap software suite, noise modeling requires determining the use of each military training airspace and building each aircraft's flight profiles based on the aircraft's configuration (airspeed and power setting) and the amount of time spent at various altitudes throughout. The modeling details for operation within the overland military training airspace (altitude distributions, speeds, and power settings) was developed iteratively with a team primarily made up of representatives from LMT, the 173 FW, as well representatives from the NGB. The data, including the validation package, were reviewed by LMT, 173 FW, NGB, and FAA prior to modeling to ensure that the data met the necessary standards for use in the noise study (NGB 2024a). The ambient temperature, humidity, and pressure were assumed to be the same as at the airfield (see Table 2-1).

The software program, BOOMAP2021, provides a method to estimate CDNL generated by supersonic flight operations in the military training airspace based upon empirical data. This version of the software allows the user to select or create boundaries for the analysis, identify the average ground height underneath the military training airspace, and input the supersonic operations as individual mission types and aircraft name pairs with user defined speeds and durations (Blue Ridge Research and Consulting 2021).

## **2.2 ADDITIONAL (SUPPLEMENTAL) NOISE METRICS**

While a cumulative metric such as DNL is appropriate for characterizing the overall noise environment at airfields (and the equivalent  $[L_{dnmr}]$  in the military training airspace), a complete characterization of noise exposure at noise sensitive locations requires additional metrics. The DoD expands upon DNL with the following supplemental metrics described in the DNWG guidelines (DNWG 2009a):

- A measure of the greatest sound level generated by single aircraft events: Maximum Sound Level ( $L_{max}$ )
- A combination of the sound level and duration: Sound Exposure Level (SEL)
- Number of Events at or above a specified threshold (NA)
- Equivalent Sound Level ( $L_{eq}$ )
- Time Above a specified level (TA)
- Probability of Awakening (PA)

NA, TA, and  $L_{eq}$  use a specified period of time that can include an average 24-hour day, DNL daytime, DNL nighttime, school day, or other time period appropriate for the analysis. Details on the use of these supplemental metrics in this study are described in the following sections.

### **2.2.1 Maximum Sound Level**

The highest A-weighted sound level measured during a single event in which the sound changes with time is called the maximum A-weighted sound level or  $L_{\max}$ .  $L_{\max}$  is the maximum level that occurs over one-eighth of a second and denoted as “fast” response on a sound level meter (American National Standards Institute [ANSI] 1988).  $L_{\max}$  is used in this study for the calculation of numbers of events above, as described in Section 2.2.5 and 2.2.6, and to compare single-event noise levels between different aircraft types in Section 4.2.2. Although useful in determining when a noise event may interfere with conversation, TV or radio listening, or other common activities,  $L_{\max}$  does not fully describe the noise because it does not account for how long the sound is heard.

### **2.2.2 Sound Exposure Level**

SEL combines both the intensity of a sound and its duration by providing the sound level that would contain the same sound energy of an event if occurring over a 1 second period. This means that SEL does not represent a sound level that is heard directly at any given time. However, SEL provides a much better metric for comparison of aircraft flyovers than  $L_{\max}$  because it allows normalization of disparate events to their 1 second energy average. SEL values are larger than those for  $L_{\max}$  for the same event because aircraft noise events last more than a few seconds. Section 4.2.2 provides single-event SEL comparisons across different aircraft while operating in the military training airspace.

### **2.2.3 Equivalent Sound Level**

The  $L_{\text{eq}}$  is a “cumulative” metric that combines a series of noise events over a period of time by averaging the sound energy. The time period specified for  $L_{\text{eq}}$  is typically provided along with the value and relates to a type of activity and presented in parentheses (e.g.,  $L_{\text{eq}(24)}$  for 24 hours). An  $L_{\text{eq}(8)}$  is used in this study to represent a typical school day occurring from 7 a.m. (0700) to 3 p.m. (1500).

### **2.2.4 Potential for Hearing Loss**

People exposed to high noise environments over a long period of time are at an increased risk of experiencing permanent hearing loss. Hearing loss is generally interpreted as a decrease in the ear’s sensitivity to perceived sound, which can be either temporary or permanent. Various governmental organizations, including the Occupational Safety and Health Administration, have identified noise thresholds varying from 70 to 85 dB  $L_{\text{eq}}$  to protect workers with the exposure assumption of 40 hours per week over a 40-year work lifetime.

Exposure to noise for people residing in areas adjacent to airfields is quite different from a work environment. When people are indoors, the sound levels experienced decrease due to building attenuation. Additionally, when people spend time away from home, the exposure to noise from the airfield in question is removed so the Occupational Safety and Health Administration standards would tend to overpredict the hearing loss risk. By definition, DNL is equal to or greater than  $L_{\text{eq}}$ , so the DoD selected a screening threshold of DNL 80 dB of residences to ensure a conservative approach to assessing the potential for hearing loss (DNWG 2012). If residences are identified within the DNL 80 dB, or greater, additional analysis of  $L_{\text{eq}}$  should be performed.

Noise induced permanent threshold shift (NIPTS) is estimated as an average over all people exposed to a noise. The actual value of NIPTS for any given person will depend on their physical sensitivity to noise where some will experience more hearing loss than others. The U.S. Environmental Protection Agency (EPA) Guidelines provide information on this variation in sensitivity in the form of the NIPTS exceeded by 10 percent of the population, as documented in DNWG 2012. For example, individuals exposed to 80 dB  $L_{eq(24hr)}$ , the most sensitive of the population, would be expected to show a degradation to their hearing of 7 dB over time while an average individual would experience a degradation of 3 dB. To put these numbers into perspective, changes in hearing level of less than 5 dB are generally not considered noticeable or significant. Furthermore, there is no known evidence that a NIPTS of 5 dB is perceptible or has any practical significance for the individual. Lastly, the variability in audiometric testing is generally assumed to be  $\pm 5$  dB (EPA 1974).

### **2.2.5 Non-School Speech Interference**

Aircraft noise events can disrupt activities like conversation or watching television when indoor  $L_{max}$  exceeds 50 dB because word intelligibility decreases at that level (DNWG 2013). This study determines the number of potential speech interfering events at non-school POIs (such as residential or hospital) during a 15-hour day (from 7 a.m. [0700] until 10 p.m. [2200]) and presents the average hourly number of events as NA.

### **2.2.6 Classroom Learning Interference**

A noisy environment can adversely affect and interfere with classroom learning. Various governmental organizations have identified both  $L_{eq}$  and number of interfering events as suitable criteria for classroom impacts. Consistent with DoD recommendations, this study used an exterior  $L_{eq}$  of 60 dB (equivalent to 45 dB interior  $L_{eq}$  with windows open) as a screening criteria to determine schools at risk of classroom learning effects (DNWG 2009a). Locations that exceed this threshold have been further analyzed by counting the number of events per hour above an interior  $L_{max}$  of 50 dB, which equates to the highest permissible classroom level for speech intelligibility. The standard noise level reduction due to building attenuation of 15 dB for windows open and 25 dB for windows closed have been utilized to convert between exterior and interior sound levels. The duration, in minutes, that interior sound levels would exceed 50 dB has also been computed to provide an assessment of the relative time per day that students and teachers may be impacted.

### **2.2.7 Residential Sleep Disturbance**

#### **2.2.7.1 Background**

Sleep disturbance can be caused by excessive noise, which can hinder people's ability to fall asleep or cause people to wake from sleep. A method for calculation of the PA from at least one event per night is described in ANSI/Acoustical Society of America (ASA) S12.9-2008/Part 6. The standard utilizes the estimated interior SEL caused by aircraft events along with the number of occurrences per night to calculate the PA from that event. The resulting PA estimates the percentage of the population that would be awakened at least once per night under the noise conditions assessed. For instance, 1 percent PA estimates that 1 percent of the population would be awakened. Multiple events can be combined to determine the PA for all events during a single night. ANSI recommends that only nighttime events occurring during the DNL nighttime

with SELs between 50 and 100 dB should be used for this PA calculation. Data suggests that events below 50 dB do not contribute significantly to PA and the formula under-predicts PA for events over 100 dB. The DNWG for environmental impact analysis has endorsed this ANSI/ASA 2008 methodology (DNWG 2009b).

In addition to the ANSI/ASA 2008 methodology, the DNWG guidance identifies outdoor numbers of events (commonly abbreviated as NA) above an SEL of 90 dB as an additional criterion for sleep disturbance analysis:

*Currently, there are no established criteria for evaluating sleep disturbance from aircraft noise, although recent studies have suggested a benchmark of an outdoor SEL of 90 dB as an appropriate tentative criterion when comparing the effects of different operational alternatives. The corresponding indoor SEL would be approximately 25 dB lower (at 65 dB) with doors and windows closed, and approximately 15 dB lower (at 75 dB) with doors or windows open.*

As described in DNWG (2009b), comparison of exterior number of events above 90 dB SEL across multiple study scenarios allows for sleep disturbance impacts to be considered. This does make use of the same PA formula identified in ANSI/ASA 2008 but groups all events as either equal to 90 dB exterior SEL or below the threshold for consideration.

As of July 2018, the ANSI and ASA have withdrawn the 2008 standard, which formed the basis of much of the DNWG 2009b guidance:

*The decision of Working Group S12/WG 15 to withdraw ANSI/ASA S12.9-2008/Part 6 implies that the method for calculating “at least one behavioral awakening per night” contained in the former Standard should no longer be relied upon for environmental impact assessment purposes. The Working Group believes that continued reliance on the 2008 Standard would lead to unreliable and difficult-to-interpret predictions of transportation-noise-induced sleep disturbance (ANSI/ASA 2018).*

Without a reliable and standardized method to compute PA, or updated guidance from DNWG, this study presents the sleep impact analysis utilizing the previous standard (ANSI/ASA 2008; DNWG 2009b) for environmental impact disclosure purposes. The reader is cautioned that the PA metric provides only a crude estimate because it cannot truly account for all variables that could affect a person’s sleep. A comparison of the Existing Conditions (2023) and various Proposed Action scenario awakening percentages showing large changes to PA could provide some insight on whether a particular action would be likely to increase or decrease sleep impacts. However, any additional conclusions may not be supportable.

## **2.3 IMPACT METHODOLOGY**

Analysis methodologies differ across governmental agencies due to differing activities and requirements applicable to each agency when determining the potential for significant impacts. Table 2-4 presents a summary of the DoD and FAA standards, which includes prescribed software models, noise metrics, and significance determination. As discussed in Section 2.1 this analysis uses the DoD NOISEMAP suite of computer programs to model military and U.S. Forest Service (USFS) aircraft and AEDT for civil aircraft to comply with both DoD and FAA requirements. Although USFS aircraft are not military aircraft, after a



review by operators, the profiles and operations were determined to be accurate so modeling with NOISEMAP was maintained in this analysis to be consistent with prior noise studies at LMT.

**Table 2-4 Summary of DoD and FAA Noise Analysis Standard Methodologies**

| <i>Category</i>            | <i>Analysis Type</i>              | <i>DoD</i>                                                                                                                                                                           | <i>FAA</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------------------------|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Software                   | Airfield                          | NMAP, RNM, AAM<br>(part of the NOISEMAP Suite of programs) <sup>1,2</sup>                                                                                                            | AEDT <sup>3,4</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                            | Military Training Airspace        | MR_NMAP<br>(Part of the NOISEMAP Suite of programs) <sup>1</sup><br>BOOMAP96 (for supersonic operations)                                                                             | AEDT, but recognizes the DoD's MRNMAP and BOOMAP96 model <sup>3,4</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Primary Noise Metric       | Airfield                          | DNL                                                                                                                                                                                  | DNL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                            | Military Training Airspace        | L <sub>dnmr</sub>                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Supplemental Noise Metrics | Terminology                       | Representative POIs <sup>5</sup>                                                                                                                                                     | Noise Sensitive Area <sup>4</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                            | Classroom Learning Interference   | L <sub>eq(8hr)</sub> 60 dB for screening; NA65 and TA65 for impacts during school hours (corresponding to interior L <sub>max</sub> of 60 dB) <sup>5</sup>                           | DNL is the recommended metric. DNL analysis may optionally be supplemented on a case-by-case basis with prior permission from FAA <sup>4</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                            | Speech Interference (Average Day) | NA65 for windows open and NA75 for windows closed <sup>5</sup>                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                            | Sleep Disturbance                 | Probability of awakening utilizing ANSI S12.9-2008. Formally withdrawn by ANSI/ASA in 2018 but still used for disclosure purposes until better methodology is developed <sup>6</sup> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                            | Potential for Hearing Loss        | Report the number of people living within each 1 dB L <sub>eq(24)</sub> contour band inside of the 80 DNL contour <sup>7</sup>                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Significance Criteria      | Near an Airfield                  | Evaluating context and intensity of impacts through off-base acreage population and household affected by each DNL contour                                                           | <p>DNL Noise exposure contours at least 65, 70, and 75 dB and shall identify noise increases of DNL 1.5 dB or more over noise sensitive areas that are exposed to noise at or above the DNL 65 dB noise exposure level, or that would be exposed at or above the DNL 65 dB level due to a 1.5 dB or greater increase<sup>4</sup></p> <ul style="list-style-type: none"> <li>• The number of people residing within each noise contour at or above DNL 65 dB and the net change.</li> <li>• The location and number of noise sensitive uses in addition to residences (e.g., schools, hospitals, parks, recreation areas) exposed to DNL 65 dB or greater.</li> <li>• The identification of noise sensitive areas exposed to aircraft noise above DNL 60 dB but below DNL 65 dB and projected to experience an increase of DNL 3 dB or more, only when DNL 1.5 dB increases are</li> </ul> |

| <b>Category</b> | <b>Analysis Type</b>             | <b>DoD</b>                                                                                                                                                           | <b>FAA</b>                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 |                                  |                                                                                                                                                                      | documented within the DNL 65 dB contour.<br><ul style="list-style-type: none"> <li>• Discussion of the noise impact on noise sensitive areas within the DNL 65 dB contour.</li> <li>• Maps and other means to depict land uses within the noise study area.</li> </ul>                                                                                                                     |
|                 | Under Military Training Airspace | Context and Intensity determination based on primary metrics 65 dB noise contours ( $L_{dnmr}$ ) and supplemental metric levels (SEL and $L_{max}$ ), as appropriate | Change-of-exposure tables and maps at population centers to identify where noise will change by the following specified amounts <sup>4</sup> :<br><ul style="list-style-type: none"> <li>• For DNL 65 dB and higher:<br/>+ DNL 1.5 dB</li> <li>• For DNL 60 dB to &lt;65 dB:<br/>+ DNL 3 dB (“reportable”)</li> <li>• For DNL 45 dB to &lt;60 dB:<br/>+ DNL 5 dB (“reportable”)</li> </ul> |

Notes: <sup>1</sup>DoD Instruction 4715.13. DoD Operational Noise Program. January 28.

<sup>2</sup>Deputy Assistant Secretary of Defense 2022. Helicopter modeling for NAS JRB New Orleans occurred prior to the AAM software release, so the helicopter portion of the analysis utilized the Rotary Noise Model (RNM).

<sup>3</sup>FAA Memorandum. Guidance on determining which version of the AEDT to use for FAA actions and studies. September 27.

<sup>4</sup>FAA 1050.1G, FAA National Environmental Policy Act Implementing Procedures. 30 June 2025.

<sup>5</sup>DNWG 2009a. Using Supplemental Noise Metrics and Analysis Tools. December.

<sup>6</sup>DNWG 2009b. Sleep Disturbance from Aviation Noise. December.

<sup>7</sup>DNWG 2026. Noise-Induced Hearing Impairment. March.

Legend: AEDT = Aviation Environmental Design Tool; ANSI = American National Standards Institute; ASA = Acoustical Society of America; dB = decibel; DNL = Day-Night Average Sound Level; DNWG = Defense Noise Working Group; DoD = Department of Defense; EIS = Environmental Impact Statement; FAA = Federal Aviation Administration;  $L_{dnmr}$  = Onset-Rate Adjusted Day-Night Average Sound Level;  $L_{eq(24)}$  = 24-hour Equivalent Sound Level;  $L_{eq(8hr)}$  = 8-hour Equivalent Sound Level;  $L_{max}$  = Maximum Sound Level; NA = Number of Events Above; POI = Point of Interest; TA = Time Above.

### **3.0 EXISTING CONDITIONS (2023)**

The following subsections detail the modeling data and the resultant noise exposure for the Existing Conditions (2023) at the airfield as well as within the military training airspace associated with 173 FW operations.

#### **3.1 INSTALLATION/AIRPORT**

##### **3.1.1 Modeling Data**

###### **3.1.1.1 173d FIGHTER WING**

The 173 FW historically served as an FTU for F-15C/D pilots with an annual target of 55 pilots per year. However, due to aging aircraft and associated maintenance limitations, the 173 FW generated fewer operations in recent years. For Existing Conditions (2023) noise modeling, Fiscal Year 2023 airfield activity was based on a reduced training pattern of 8 aircraft for the first launch and 6 aircraft for the second launch each day (14 sorties per day). Using 260 weekdays per year and accounting for holidays and weather, this results in 3,360 annual sorties, as detailed in Table 3-1. Each sortie generates one departure, one arrival, and an average of one closed pattern event at Kingsley Field ANGB. Because closed pattern events count

as two tower operations, the modeled F-15C/D activity results in 13,440 annual airfield operations (Table 3-1).

**Table 3-1 Annual Airfield Operations at LMT/Kingsley Field ANGB (Existing Conditions [2023])**

| <i>Aircraft</i>    | <i>Departures</i> |              | <i>Arrivals</i> |              | <i>Closed Patterns Ops<sup>2</sup></i> |              | <i>Total</i>  |              | <i>Total</i>  |
|--------------------|-------------------|--------------|-----------------|--------------|----------------------------------------|--------------|---------------|--------------|---------------|
|                    | <i>Day</i>        | <i>Night</i> | <i>Day</i>      | <i>Night</i> | <i>Day</i>                             | <i>Night</i> | <i>Day</i>    | <i>Night</i> |               |
| F-15C/D            | 3,360             | 0            | 3,260           | 100          | 6,520                                  | 200          | 13,140        | 300          | 13,440        |
| Contract ADAIR     | 800               | 0            | 776             | 24           | 160                                    | 0            | 1,736         | 24           | 1,760         |
| Civil <sup>1</sup> | 9,102             | 165          | 9,101           | 165          | 5,664                                  | 0            | 23,867        | 330          | 24,197        |
| Transients         | 815               | 0            | 815             | 0            | 8                                      | 0            | 1,638         | 0            | 1,638         |
| <b>Total</b>       | <b>14,077</b>     | <b>165</b>   | <b>13,952</b>   | <b>289</b>   | <b>12,352</b>                          | <b>200</b>   | <b>40,381</b> | <b>654</b>   | <b>41,035</b> |

*Notes:* <sup>1</sup>Civil operations represent the combined annual runway operations of Air Carrier, Air Transport, and General Aviation.

<sup>2</sup>A portion of Local civil aircraft operations modeled as departures/arrivals because a significant portion of local GA flights involve departures and arrivals to the nearby practice area, in addition to touch and go pattern operations.

*Legend:* ADAIR = Adversary Air; ANGB = Air National Guard Base; LMT = Crater Lake-Klamath Regional Airport; Ops = operations.

*Sources:* FAA 2024b; NGB 2024b; DAF 2020.

The day and night periods in Table 3-1 refer to specific acoustic periods used for DNL-based airfield noise analysis and correspond to 7 a.m.–10 p.m. (0700–2200) for daytime and 10 p.m.–7 a.m. (2200–0700) for nighttime.

### 3.1.1.2 Adversary Air

As covered in the 2020 Adversary Air (ADAIR) EA, a private contractor began providing adversary training sorties beginning in 2021 utilizing the F-5E/F aircraft (DAF 2020). Although the ADAIR EA analyzed up to 2,000 annual sorties, the current contract provides for 800 sorties per year resulting in 1,760 annual operations at LMT/Kingsley Field ANGB. The current ADAIR contract is up for renewal, so the number of annual operations and/or the adversary aircraft type could change, which could potentially become F-16, A-3K, Mirage F-1, L-159, or similar. At the time of this analysis, no such details were available, so this analysis assumed that the F-5E/F would continue at the current level of operations for the foreseeable future under the No Action Alternative.

### 3.1.1.3 Transient Military and Other Agency

Table 3-2 details the transient military and USFS aircraft operations totaling 1,638 per year based upon the 2020 EA (DAF 2020) with applicable updates. Large force exercises, such as Sentry Eagle, and USFS operations are anticipated to continue for the foreseeable future, so these operations have been modeled at the same annual rate carried forward for Existing Conditions (2023), the No Action Alternative, and the Proposed Action to be fully implemented in 2029. However, the ratio of aircraft types participating in Sentry Eagle has since changed due to changes in the fighter aircraft mix resulting in an increase in F-35A aircraft across military services and a smaller proportion of F-15 and F-16 aircraft from the 2020 EA. The F-35A operations listed in Table 3-2 reflect transient activities and are not part of the permanent F-35A beddown under the Proposed Action. The proposed F-35A operations, including the beddown of up to 24 aircraft, would be part of the 173 FW's primary mission and would not include transient F-35A operations

as reflected here. Table 3-2 also includes the addition of four annual C-17 operations, not part of the 2020 operations.

**Table 3-2 Transient Military and USFS Operations at LMT/Kingsley Field ANGB**

| <i>Category</i>          | <i>Aircraft Type</i>      | <i>Total</i> |
|--------------------------|---------------------------|--------------|
| Sentry Eagle Exercises   | KC-135R                   | 52           |
|                          | F-15                      | 160          |
|                          | F-16                      | 160          |
|                          | F-35A                     | 346          |
|                          | F-18                      | 318          |
| Other Transient Military | A-10                      | 4            |
|                          | C-12                      | 12           |
|                          | C-17                      | 8            |
|                          | C-130J                    | 8            |
|                          | F-15                      | 6            |
|                          | F-16                      | 4            |
|                          | F-18                      | 46           |
|                          | T-38                      | 10           |
|                          | T-6                       | 4            |
|                          | Helos                     | 168          |
| USFS                     | Tankers (MD-83 and C-130) | 332          |
| <b>Total</b>             |                           | <b>1,638</b> |

*Legend:* ANGB = Air National Guard Base; LMT = Crater Lake-Klamath Regional Airport; USFS = United States Forest Service.

*Source:* Initially from DAF ADAIR EA 2020 with updated fleet mix for Sentry Eagle exercise and addition of C-17 operations.

#### 3.1.1.4 Civil Aircraft

The FAA TAF contains historical and forecast data for enplanements, airport operations, Terminal Radar Approach Control (TRACON) operations; and based aircraft at FAA towered airports, FAA contract tower airports, TRACON facilities, and non-FAA airports. Table 3-3 details the FAA TAF version 2023 issued in January 2024 that detailed annual operations by calendar year where 2023 corresponds with the Existing Conditions (2023), the No Action Alternative, and Proposed Action.

**Table 3-3 FAA Terminal Area Forecast at LMT by Calendar Year**

| <i>Category</i>       | <i>2023</i>   | <i>2024</i>   | <i>2025</i>   | <i>2026</i>   | <i>2027</i>   | <i>2028</i>   | <i>2029</i>   |
|-----------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| ITN AC                | 4             | 4             | 4             | 4             | 4             | 4             | 4             |
| ITN AT                | 2,503         | 2,528         | 2,553         | 2,579         | 2,605         | 2,631         | 2,657         |
| ATN GA                | 10,400        | 11,652        | 11,710        | 11,769        | 11,828        | 11,888        | 11,947        |
| LOC GA                | 11,290        | 11,324        | 11,358        | 11,392        | 11,426        | 11,460        | 11,494        |
| <i>Total Civil</i>    | <i>24,197</i> | <i>25,508</i> | <i>25,625</i> | <i>25,744</i> | <i>25,863</i> | <i>25,983</i> | <i>26,102</i> |
| ITN MIL               | 7,296         | 7,296         | 7,296         | 7,296         | 7,296         | 7,296         | 7,296         |
| LOC MIL               | 3,834         | 3,834         | 3,834         | 3,834         | 3,834         | 3,834         | 3,834         |
| <i>Total Military</i> | <i>11,130</i> | <i>11,130</i> | <i>11,130</i> | <i>11,130</i> | <i>11,130</i> | <i>11,130</i> | <i>11,130</i> |
| <b>Total Ops</b>      | <b>35,327</b> | <b>36,638</b> | <b>36,755</b> | <b>36,874</b> | <b>36,993</b> | <b>37,113</b> | <b>37,232</b> |

*Legend:* AC = Air Carrier; AT = Air Taxi; GA = General Aviation; ITN = Itinerant; LMT = Crater Lake-Klamath Regional Airport; LOC = Local; MIL = Military; Ops = Operations.

*Source:* FAA 2024b.

Although local civil aircraft operations generally conduct a large portion of their operations as visual closed patterns at LMT, significant numbers of local civil aircraft (primarily small propeller aircraft) operating at

LMT also train in the nearby designated practice area, as confirmed by LMT airfield staff (NGB 2024a). Therefore, of the 11,290 local civil aviation operations, approximately half (5,626 operations) are proportioned to departure/arrival operations (which fly to the practice area or within the local airspace) with the remaining (5,664 operations) modeled as local closed patterns at the LMT.

To determine the civil aircraft fleet mix, this data collection effort reviewed a year of LMT PDARS obtained from the FAA in 2021 as part of a prior effort initially considering basing F-15EX at LMT/Kingsley Field ANGB, but was subsequently canceled. This data returned approximately 88 percent of the runway events without a known aircraft type. With most aircraft types of the PDARS dataset “unknown,” this information would be inaccurate as a basis for fleet mix development. FAA provided a recommended fleet mix based upon the 2022 National Noise Inventory, which is presented in Appendix A (FAA 2024c). The most common modeled civil aircraft types include the CNA208 (representing Cessna 208 Caravan and similar), DHC6 (representing DeHavilland DHC-6-300 Twin Otter and similar), and 1900D (representing Raytheon Beech 1900-C/D, BAE Jetstream 1, and BAE Jetstream 200 Series). Additional details on the modeled fleet mix are provided in Table A-1 of the appendix. Civil aircraft were modeled with the latest FAA AEDT software while military aircraft were modeled with the DoD Noisemap. Detailed annual civil aircraft operations with modeled fleet mix is presented in Appendix A.

Based upon a review of the 2019 PDARS data and coordination with both the LMT manager and FAA, this analysis updated civil aircraft modeled flight tracks to include tracks between Runways 14/32 and the practice area southwest of the airfield, as well as modeling closed pattern flight tracks on all four runways for general aviation aircraft types (FAA 2024a; LMT 2024). Specifically, the predominance of flights to and from the practice area comprise local small propeller general aviation aircraft, as summarized in Table A-5 in Appendix A. Table A-3 in Appendix A details the resulting modeled runway utilization percentages for civil aircraft, which separates the small propeller general aviation from other civil (air carrier, air taxi, and other general aviation). Modeled annual civil aircraft flight operations utilized the 2023 TAF (FAA 2024b).

#### 3.1.1.5 Military Aircraft Operation Type Breakdown

The use of afterburner power depends upon the aircraft loading and weather conditions with heavy loadings and hot weather necessitating afterburner from brake release until approximately the end of the runway after liftoff for both the No Action Alternative and the Proposed Action scenarios. Existing Conditions (2023) reflect approximately 50 percent of F-15C/D departures utilizing afterburner and 50 percent with military power. All F-5E/F departures use afterburner from brake release until the end of the runway.

- F-15C/D Departures = 50 percent afterburner, 50 percent Mil
- F-5E/F Departures = 100 percent afterburner

Both the F-15C/D and F-5E/F return to LMT/Kingsley Field ANGB using the same general procedures with clear blue skies allowing the most Visual Flight Rules (VFR) arrivals utilizing the Tactical 90 approach and instrument meteorological conditions requiring Instrument Flight Rules (IFR) (either Instrument Landing System [ILS] or Tactical Air Navigation System [TACAN]).

**Table 3-4 Arrival Breakdown for F-15C/D and F-5E/F for All Scenarios**

|            |     |         |     |
|------------|-----|---------|-----|
| <b>VFR</b> | 75% | TAC 90  | 70% |
|            |     | Initial | 30% |
| <b>IFR</b> | 25% | ILS     | 50% |
|            |     | TACAN   | 50% |

*Legend:* % = percent; IFR = Instrument Flight Rules; ILS = Instrument Landing System; TACAN = Tactical Air Navigation System; VFR = Visual Flight Rules.

Closed patterns generally include both VFR and IFR. However, the use of IFR closed patterns at LMT/Kingsley Field ANGB are minimal to rare and the loudest portions (when aircraft are at low altitudes) coincide with the departure and arrival flight tracks already capturing that portion of flight activity. Therefore, the modeling of rare IFR pattern ops was accomplished utilizing other tracks and profiles, such as VFR. VFR patterns primarily occur to the west for both F-15C/D and F-5E/F.

- VFR West = 80 percent
- VFR East = 20 percent
- IFR = rare, not modeled

Based and transient military aircraft utilize the longer Runway 14/32 while avoiding the shorter Runway 07/25. Table A-3 in Appendix A details the modeled runway utilization percentages for military aircraft and Table A-4 presents the modeled military flight track utilization.

#### 3.1.1.6 Maintenance and Ground Run-up Operations

This section provides the existing ground run-up operations as listed in Table 3-5. No civil aircraft maintenance operations were modeled due to rarity and lack of sufficient maintenance records to support such modeling.

The commercial ADAIR contractor (TacAir) performs F-5E/F maintenance offsite but occasionally performs high power runs on the runway. Due to the rarity of occurrence and the co-location of F-5E/F engine runs with all aircraft departures on the runway, these maintenance operations do not need to be modeled for noise due to their negligible contribution.

### 3.1.2 Noise Exposure

Sections 3.1.2.1 through 3.1.2.6 focus on DoD best practices for impact analysis, as summarized in DNWG guidance (DNWG 2009a). The existing DNL contours, DNL at noise sensitive locations (the FAA terminology corresponding generally to DoD POIs), acreage, population, and household affected by DNL also apply to FAA.



**Table 3-5 F-15C/D Maintenance Runups at LMT/Kingsley Field ANGB**

| <i>Aircraft</i>                       | <i>Profile</i>              | <i>Description</i>     | <i>Pad</i>   | <i>Heading</i> | <i>Power (%NC)</i> | <i>Num Engines</i> | <i>Duration (minutes)</i> | <i>Annual Day Events</i> | <i>Annual Night Events</i> | <i>Annual Total Events</i> |
|---------------------------------------|-----------------------------|------------------------|--------------|----------------|--------------------|--------------------|---------------------------|--------------------------|----------------------------|----------------------------|
| F-15C/D<br>(modeled with F-15E PW220) | Engine Check                | 2 Engines              | Building 400 | 107.5          | 63                 | 2                  | 30                        | 13                       | 5                          | 18                         |
|                                       | Engine Check                | 2 Engines              | Building 400 | 107.5          | 80                 | 2                  | 1                         | 13                       | 5                          | 18                         |
|                                       | HH                          | Hush House Engine Runs | HH           | 62             | 63                 | 1                  | 113                       | 6                        |                            | 6                          |
|                                       | HH                          | Hush House Engine Runs | HH           | 62             | 80                 | 1                  | 30                        | 6                        |                            | 6                          |
|                                       | HH                          | Hush House Engine Runs | HH           | 62             | 90                 | 1                  | 40                        | 6                        |                            | 6                          |
|                                       | HH                          | Hush House Engine Runs | HH           | 62             | 92                 | 1                  | 8                         | 6                        |                            | 6                          |
|                                       | Engine Check Apron A        | 2 Engines              | MAIN APRNa   | 45             | 63                 | 2                  | 9                         | 19                       |                            | 19                         |
|                                       | Engine Check Apron A        | 2 Engines              | MAIN APRNa   | 45             | 80                 | 2                  | 1                         | 19                       |                            | 19                         |
|                                       | Pre Flight Apron A          | 2 Engines              | MAIN APRNa   | 45             | 63                 | 2                  | 30                        | 1207                     |                            | 1,207                      |
|                                       | Single Engine Check Apron A | 1 Engine               | MAIN APRNa   | 45             | 63                 | 1                  | 23                        | 139                      |                            | 139                        |
|                                       | Single Engine Check Apron A | 1 Engine               | MAIN APRNa   | 45             | 80                 | 1                  | 2                         | 139                      |                            | 139                        |
|                                       | Engine Check Apron B        | 2 Engines              | MAIN APRNb   | 315            | 63                 | 2                  | 9                         | 19                       |                            | 19                         |
|                                       | Engine Check Apron B        | 2 Engines              | MAIN APRNb   | 315            | 80                 | 2                  | 1                         | 19                       |                            | 19                         |
|                                       | Pre Flight Apron B          | 2 Engines              | MAIN APRNb   | 315            | 63                 | 2                  | 30                        | 1207                     |                            | 1,207                      |
|                                       | Single Engine Check Apron B | 1 Engine               | MAIN APRNb   | 315            | 63                 | 1                  | 23                        | 139                      |                            | 139                        |
|                                       | Single Engine Check Apron B | 1 Engine               | MAIN APRNb   | 315            | 80                 | 1                  | 2                         | 139                      |                            | 139                        |
|                                       | Trim North                  |                        | TRIM N       | 338            | 63                 | 2                  | 25                        | 2                        |                            | 2                          |
|                                       | Trim North                  |                        | TRIM N       | 338            | 80                 | 2                  | 8                         | 2                        |                            | 2                          |
|                                       | Trim North                  |                        | TRIM N       | 338            | 90                 | 2                  | 17                        | 2                        |                            | 2                          |
|                                       | Trim North                  |                        | TRIM N       | 338            | 90                 | 2                  | 6                         | 2                        |                            | 2                          |
|                                       | Trim South                  |                        | TRIM S       | 158            | 63                 | 2                  | 25                        | 2                        |                            | 2                          |
|                                       | Trim South                  |                        | TRIM S       | 158            | 80                 | 2                  | 8                         | 2                        |                            | 2                          |
|                                       | Trim South                  |                        | TRIM S       | 158            | 90                 | 2                  | 17                        | 2                        |                            | 2                          |
|                                       | Trim South                  |                        | TRIM S       | 158            | 90                 | 2                  | 6                         | 2                        |                            | 2                          |

*Legend:* %NC = percent speed of the compressor; ANGB = Air National Guard Base; HH = Hush House; LMT = Crater Lake-Klamath Regional Airport.

### 3.1.2.1 Day-Night Average Sound Level Contours and Point of Interest Levels

Figure 3-1 shows the DNL noise contours from 65 to 85 dB in 5-dB increments for the Existing Conditions (2023) at LMT overlaid on gradient mapping of DNL by color shading. Noise generated from aircraft operations at LMT occurs within and outside the airfield. Portions of the DNL 65 dB contour extend north

of the airfield by 1.8 miles, to the east and to the west 0.3 mile, and to the south 1.6 miles. The gradient shading shows how DNL noise exposure does not end at the plotted DNL 65 dB contour line, but instead continues beyond at reduced levels plotted down to DNL 55 dB that roughly corresponds to a level typical of a suburban environment.

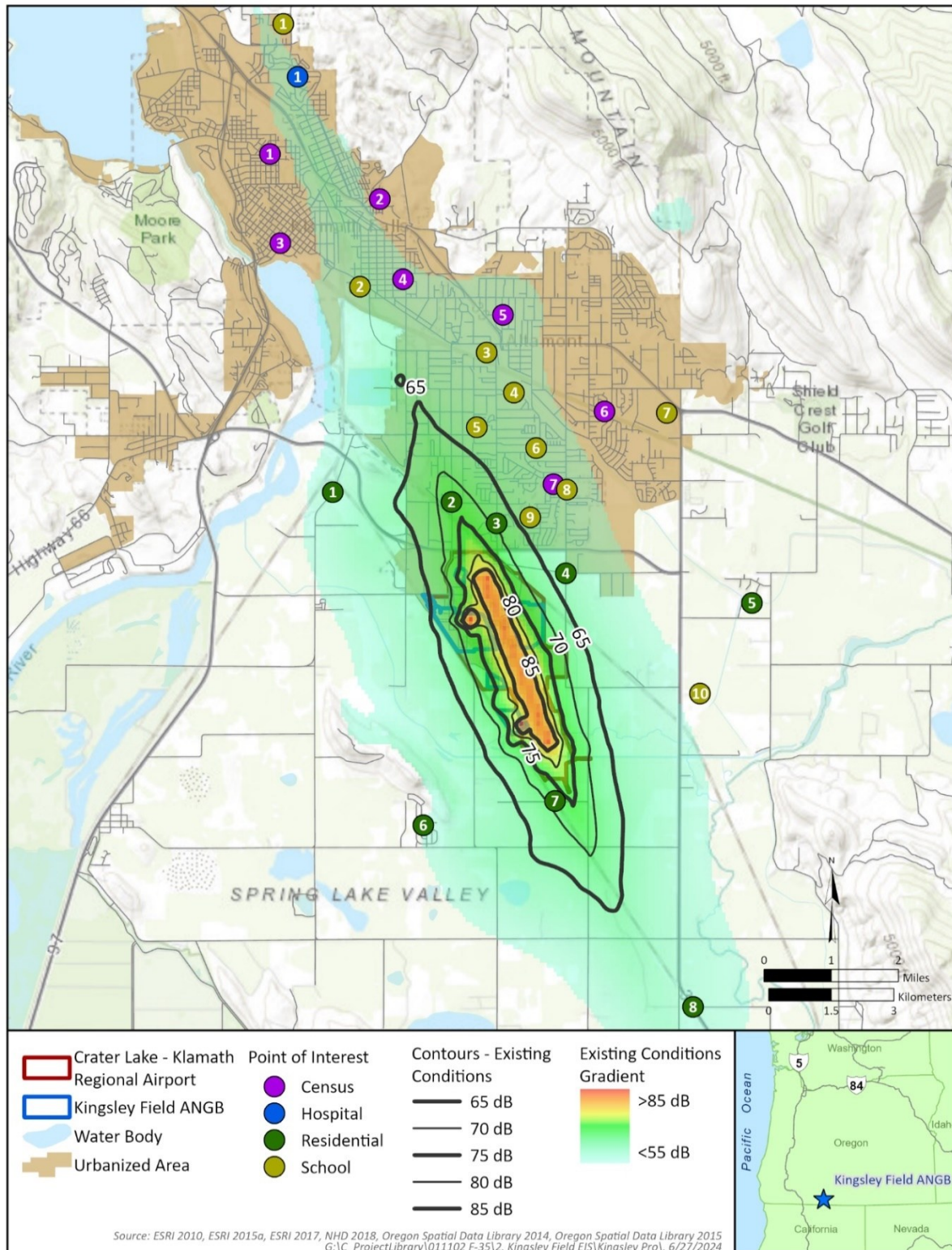
Table 3-6 shows the DNL values at each of the POIs under the Existing Conditions (2023). Values range from DNL 45 to 74 dB. Three residential POIs (R02 Anderson Avenue and Altamont Drive, R03 Highland Way and Summit Street, and R07 Lombardy Lane and railroad tracks) are exposed to DNL 65 dB or greater, which is the level that DoD land use recommendations for noise sensitive land uses begin (DoD Instruction 2021).

### 3.1.2.2 Acreage, Housing, and Population

Table 3-7 shows the acreage breakdown (excluding water bodies) within each noise contour band, with a total of 2,789 acres adjacent to LMT exposed to DNL 65 dB or greater for Existing Conditions (2023). That acreage includes 1,950 acres exposed to DNL 65 to 70 dB, 679 acres to DNL 70 to 75 dB, 154 acres to DNL 75 to 80 dB, and 5 acres to DNL 80 to 85 dB. No areas adjacent to LMT are exposed to DNL greater than 85 dB under the Existing Conditions (2023).

The population and household analysis utilized the 2022 U.S. Census American Community Survey to obtain the population in each census block (U.S. Census Bureau 2022a, 2022b). The full population is included when the entire census block group falls completely within each DNL contour band. For block groups partially within a DNL contour band the number of households and population were scaled based upon the proportion of block group area within each DNL contour band from 65 to 80 dB because households in these areas are generally equally distributed throughout each block group. Households are counted manually for DNL bands of 80 dB and above because populations in these high noise areas are often not evenly distributed and DNL 80 dB is the threshold to screen for the potential for hearing loss analysis.

Table 3-8 lists estimated households and population adjacent to LMT that are exposed to each DNL contour band under Existing Conditions (2023). Under Existing Conditions (2023), an estimated 746 households and 1,851 people are within the DNL 65 to 70 dB contour band, 336 households and 834 people within the DNL 70 to 75 dB, and 106 households and 262 people within the DNL 75 to 80 dB. A review of aerial imagery confirmed that no households exist within the DNL 80 to 85 dB band as these areas are undeveloped.



**Figure 3-1 Existing Conditions (2023) DNL Contours and Noise Gradients on and Adjacent to LMT**

**Table 3-6 Existing Conditions (2023) at POIs Noise Exposure Adjacent to LMT**

| <i>Map ID</i> | <i>Point Type</i>     | <i>Named POI<sup>1</sup></i>       | <i>DNL<sup>2</sup> (dB)</i> |
|---------------|-----------------------|------------------------------------|-----------------------------|
| C01           | Census Tract Centroid | Census Tract 9719                  | 52                          |
| C02           | Census Tract Centroid | Census Tract 9717                  | 54                          |
| C03           | Census Tract Centroid | Census Tract 9718                  | 52                          |
| C04           | Census Tract Centroid | Census Tract 9716                  | 56                          |
| C05           | Census Tract Centroid | Census Tract 9712                  | 56                          |
| C06           | Census Tract Centroid | Census Tract 9713                  | 52                          |
| C07           | Census Tract Centroid | Census Tract 9714                  | 60                          |
| H01           | Healthcare Facility   | Sky Lakes Medical Center           | 56                          |
| R01           | Residential Area      | Neighborhood                       | 58                          |
| R02           | Residential Area      | Anderson Avenue and Altamont Drive | <b>74<sup>2</sup></b>       |
| R03           | Residential Area      | Highland Way and Summit Street     | <b>69<sup>2</sup></b>       |
| R04           | Residential Area      | Airway Drive and Homedale Road     | 62                          |
| R05           | Residential Area      | Neighborhood                       | 47                          |
| R06           | Residential Area      | Neighborhood                       | 55                          |
| R07           | Residential Area      | Lombardy Lane and railroad tracks  | <b>72<sup>2</sup></b>       |
| R08           | Residential Area      | Neighborhood                       | 58                          |
| S01           | School                | Oregon Institute of Tech           | 54                          |
| S02           | School                | Klamath Family Head Start          | 60                          |
| S03           | School                | Triad School                       | 58                          |
| S04           | School                | Mazama High School                 | 58                          |
| S05           | School                | Stearns Elementary School          | 62                          |
| S06           | School                | Peterson Elementary                | 59                          |
| S07           | School                | Klamath Community College          | 48                          |
| S08           | School                | Brixner Jr High School             | 59                          |
| S09           | School                | Hosanna Christian School           | 63                          |
| S10           | School                | Henley High School                 | 53                          |

Notes: <sup>1</sup>The census tracts represent neighborhoods surrounding LMT where noise sensitive locations (such as residences, schools, places of worship, etc.) are likely to occur.

<sup>2</sup>Bold represents points exposed to DNL of 65 dB or greater.

Legend: dB = decibel; DNL = Day-Night Average Sound Level; ID = Identification; LMT = Crater Lake-Klamath Regional Airport; POI = Point of Interest.

**Table 3-7 LMT Existing Conditions (2023) – Noise Exposure Acreage**

| <i>DNL Band (dB)</i>  | <i>Existing Conditions (2023) Acreage</i> |                        |              |
|-----------------------|-------------------------------------------|------------------------|--------------|
|                       | <i>On LMT</i>                             | <i>Adjacent to LMT</i> | <i>Total</i> |
| 65–70                 | 84                                        | 1,950                  | 2,034        |
| 70–75                 | 266                                       | 679                    | 945          |
| 75–80                 | 335                                       | 154                    | 490          |
| 80–85                 | 237                                       | 5                      | 242          |
| 85+                   | 321                                       | 0                      | 321          |
| <b>Total &gt;65dB</b> | <b>1,243</b>                              | <b>2,789</b>           | <b>4,032</b> |

Note: Totals may not add due to rounding.

Legend: dB = decibel; DNL = Day-Night Average Sound Level; LMT = Crater Lake-Klamath Regional Airport.

**Table 3-8 LMT Existing Conditions (2023) – Estimated Households and Population**

| <i>DNL Band (dB)</i>      | <i>Existing Conditions (2023)</i> |                   |
|---------------------------|-----------------------------------|-------------------|
|                           | <i>Households</i>                 | <i>Population</i> |
| 65–70                     | 746                               | 1,851             |
| 70–75                     | 336                               | 834               |
| 75–80                     | 106                               | 262               |
| 80–85 <sup>2</sup>        | 0                                 | 0                 |
| 85+ <sup>2</sup>          | 0                                 | 0                 |
| <b>Totals<sup>1</sup></b> | <b>1,188</b>                      | <b>2,947</b>      |

*Notes:* <sup>1</sup>Totals may not add due to rounding.

<sup>2</sup>Households and population within the DNL 80 dB and greater determined through review of aerial imagery.

*Legend:* dB = decibel; DNL = Day-Night Average Sound Level; LMT = Crater Lake-Klamath Regional Airport.

### 3.1.2.3 Classroom Learning Interference

Table 3-9 presents the classroom learning interference for schools S-01 through S-10 experienced under Existing Conditions (2023). The school screening threshold of 60 dB  $L_{eq(8hr)}$  equates to an interior noise level of 45 dB  $L_{eq(8hr)}$  with windows open and represents the point at which studies have found classroom learning is affected (DNWG 2009a, 2013a). Existing Conditions (2023) at LMT results in seven schools that are exposed to exterior  $L_{eq(8hr)}$  greater than 60 dB. The greatest  $L_{eq(8hr)}$  of 67 dB occurs at S09 Hosanna Christian School. Additional school impact analysis involves determining the number of noise-generated speech interfering events per school day hour that exceed an interior  $L_{max}$  of 50 dB (equivalent to an exterior  $L_{max}$  of 65 dB for windows open). The number of classroom interfering events ranges from 1 event at one school, 2 at five schools, 3 events at three schools, and 4 events at one school, as presented in Table 3-9. TA at an interior level of 50 dB (equivalent to an exterior of 65 dB with windows open) varies from 3 minutes to 13 minutes per average school day.

**Table 3-9 LMT Existing Conditions (2023) – Classroom Learning Interference**

| <i>ID</i> | <i>Location<sup>1</sup></i> | <i>Outdoor <math>L_{eq(8hr)}</math> (dB)<sup>2</sup></i> | <i>Number of Speech Interfering Events per School Day Hour<sup>3</sup></i> | <i>Time above interior 50 dB per 8-hour school day (minutes)<sup>3</sup></i> |
|-----------|-----------------------------|----------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------|
| S01       | Oregon Institute of Tech    | 57                                                       | 1                                                                          | 3                                                                            |
| S02       | Klamath Family Head Start   | <b>63<sup>2</sup></b>                                    | 2                                                                          | 4                                                                            |
| S03       | Triad School                | <b>62<sup>2</sup></b>                                    | 2                                                                          | 4                                                                            |
| S04       | Mazama High School          | <b>62<sup>2</sup></b>                                    | 2                                                                          | 4                                                                            |
| S05       | Stearns Elementary School   | <b>66<sup>2</sup></b>                                    | 3                                                                          | 5                                                                            |
| S06       | Peterson Elementary         | <b>63<sup>2</sup></b>                                    | 3                                                                          | 7                                                                            |
| S07       | Klamath Community College   | 52                                                       | 2                                                                          | 6                                                                            |
| S08       | Brixner Jr High School      | <b>62<sup>2</sup></b>                                    | 3                                                                          | 9                                                                            |
| S09       | Hosanna Christian School    | <b>67<sup>2</sup></b>                                    | 4                                                                          | 13                                                                           |
| S10       | Henley High School          | 57                                                       | 2                                                                          | 8                                                                            |

*Notes:* <sup>1</sup>Table presents the analysis for the school POIs.

<sup>2</sup>Bold text represents schools exposed to exterior  $L_{eq(8hr)}$  of greater than 60 dB, equivalent to the recommended interior threshold of 45 dB with windows open.

<sup>3</sup>Assumes 90 percent of ANG daytime operations occur during the school day; windows open condition with Noise Level Reduction of 15 dB due to building attenuation.

*Legend:* dB = decibel; ID = Identification;  $L_{eq(8hr)}$  = 8-hour Equivalent Sound Level; LMT = Crater Lake-Klamath Regional Airport; NLR = Noise Level Reduction; POI = Point of Interest.

#### 3.1.2.4 Non-school Speech Interference

In addition to speech interference analysis, this study considers the potential for aircraft noise to interfere with non-school speech at all POIs during the DNL daytime period. Table 3-10 presents the Existing Conditions (2023) for speech interference (non-school) based upon the numbers of events per average hour during the DNL daytime period for both windows open and windows closed conditions. The number of speech interfering events with windows open ranges from 1 to 5 events per average hour. With windows closed, 7 POIs experience no interfering events per average hour, 12 POIs 1 event per average hour, and 7 POIs 2 to 3 events per average hour. The greatest of 3 events per hour with windows closed occurs at R02 Anderson Avenue and Altamont Drive, R03 Highland Way and Summit Street, and R07 Lombardy Lane and railroad tracks.

**Table 3-10 LMT Existing Conditions (2023) – Non-school Speech Interference Events per Average Hour (Daytime)**

| <i>Map ID<sup>1</sup></i> | <i>Named POI</i>                   | <i>Windows Open<sup>2</sup></i> | <i>Windows Closed<sup>3</sup></i> |
|---------------------------|------------------------------------|---------------------------------|-----------------------------------|
| C-01                      | Census Tract 9719                  | 1                               | 0                                 |
| C-02                      | Census Tract 9717                  | 1                               | 1                                 |
| C-03                      | Census Tract 9718                  | 1                               | 0                                 |
| C-04                      | Census Tract 9716                  | 1                               | 1                                 |
| C-05                      | Census Tract 9712                  | 1                               | 1                                 |
| C-06                      | Census Tract 9713                  | 2                               | 1                                 |
| C-07                      | Census Tract 9714                  | 2                               | 2                                 |
| H-01                      | Sky Lakes Medical Center           | 1                               | 0                                 |
| R-01                      | Neighborhood                       | 2                               | 1                                 |
| R-02                      | Anderson Avenue and Altamont Drive | 5                               | 3                                 |
| R-03                      | Highland Way and Summit Street     | 4                               | 3                                 |
| R-04                      | Airway Drive and Homedale Road     | 4                               | 2                                 |
| R-05                      | Neighborhood                       | 2                               | 0                                 |
| R-06                      | Neighborhood                       | 2                               | 1                                 |
| R-07                      | Lombardy Lane and railroad tracks  | 5                               | 3                                 |
| R-08                      | Neighborhood                       | 1                               | 0                                 |
| S-01                      | Oregon Institute of Technology     | 1                               | 0                                 |
| S-02                      | Klamath Family Head Start          | 2                               | 1                                 |
| S-03                      | Triad School                       | 2                               | 1                                 |
| S-04                      | Mazama High School                 | 2                               | 1                                 |
| S-05                      | Stearns Elementary School          | 2                               | 1                                 |
| S-06                      | Peterson Elementary                | 2                               | 1                                 |
| S-07                      | Klamath Community College          | 2                               | 0                                 |
| S-08                      | Brixner Junior High School         | 2                               | 2                                 |
| S-09                      | Hosanna Christian School           | 4                               | 2                                 |
| S-10                      | Henley High School                 | 2                               | 1                                 |

*Notes:* <sup>1</sup>School POI included because residential areas or other noise sensitive uses are often located nearby schools for which these results would apply

<sup>2</sup>Assumes 15 dB Noise Level Reduction.

<sup>3</sup>Assumes 25 dB Noise Level Reduction.

*Legend:* ID = Identification; LMT = Crater Lake-Klamath Regional Airport; POI = Point of Interest.

### 3.1.2.5 Probability of Awakening

Analysis of the potential for sleep disturbance involves determining the number and SEL of DNL nighttime aircraft events to estimate the PA metric. As presented in Table 3-11, PA with windows open ranges from negligible at 5 POIs, 1 to 5 percent at 20 POIs, and 10 percent at 1 POI. PA with windows closed is negligible at 14 POIs, 1 to 5 percent at 11 POIs, and 6 percent at 1 POI.

**Table 3-11 LMT Existing Conditions (2023) – Estimated Probability of Awakening**

| <b>Map ID</b> | <b>Named POI<sup>1</sup></b>       | <b>Windows Open<sup>2</sup></b> | <b>Windows Closed<sup>3</sup></b> |
|---------------|------------------------------------|---------------------------------|-----------------------------------|
| C-01          | Census Tract 9719                  | <1%                             | <1%                               |
| C-02          | Census Tract 9717                  | <1%                             | <1%                               |
| C-03          | Census Tract 9718                  | <1%                             | <1%                               |
| C-04          | Census Tract 9716                  | 1%                              | <1%                               |
| C-05          | Census Tract 9712                  | 1%                              | <1%                               |
| C-06          | Census Tract 9713                  | 1%                              | <1%                               |
| C-07          | Census Tract 9714                  | 1%                              | 1%                                |
| H-01          | Sky Lakes Medical Center           | <1%                             | <1%                               |
| R-01          | Neighborhood                       | 1%                              | 1%                                |
| R-02          | Anderson Avenue and Altamont Drive | 10%                             | 6%                                |
| R-03          | Highland Way and Summit Street     | 2%                              | 2%                                |
| R-04          | Airway Drive and Homedale Road     | 1%                              | 1%                                |
| R-05          | Neighborhood                       | 1%                              | <1%                               |
| R-06          | Neighborhood                       | 1%                              | 1%                                |
| R-07          | Lombardy Lane and railroad tracks  | 4%                              | 3%                                |
| R-08          | Neighborhood                       | 1%                              | <1%                               |
| S-01          | Oregon Institute of Technology     | <1%                             | <1%                               |
| S-02          | Klamath Family Head Start          | 1%                              | <1%                               |
| S-03          | Triad School                       | 1%                              | <1%                               |
| S-04          | Mazama High School                 | 1%                              | 1%                                |
| S-05          | Stearns Elementary School          | 1%                              | 1%                                |
| S-06          | Peterson Elementary                | 1%                              | 1%                                |
| S-07          | Klamath Community College          | 1%                              | <1%                               |
| S-08          | Brixner Junior High School         | 1%                              | 1%                                |
| S-09          | Hosanna Christian School           | 1%                              | 1%                                |
| S-10          | Henley High School                 | 1%                              | <1%                               |

*Notes:* <sup>1</sup>Non-residential POIs included because residential areas are often located nearby other noise sensitive areas for which these results would apply.

<sup>2</sup>Assumes 15 dB Noise Level Reduction.

<sup>3</sup>Assumes 25 dB Noise Level Reduction.

*Legend:* < = less than; % = percent; ID = Identification; LMT = Crater Lake-Klamath Regional Airport; POI = Point of Interest.

With a small number of DNL nighttime operations by 173 FW F-15C (approximately 25 operations per month), the majority of the PA results from civil aircraft operations.

### 3.1.2.6 Potential for Hearing Loss

DoD guidance prescribes analysis of the potential for hearing loss (PHL) due to elevated aircraft noise levels. The screening process begins by identifying residential areas exposed to DNL of 80 dB or greater (DNWG 2026). As presented in Tables 3-6 and 3-7, only 5 acres outside of LMT are exposed to 80 dB or



greater DNL and no households or people reside in those areas. Because no people reside in this area, no additional analysis is warranted for the Existing Conditions (2023) regarding the risk of the PHL.

## **3.2 MILITARY TRAINING AIRSPACE**

As depicted in Figure 1-2, the 173 FW utilizes both overland and overwater military training airspace. The following section describes the modeling data and resulting noise exposure for both subsonic and supersonic operations.

### **3.2.1 Modeling Data (Subsonic)**

Existing F-15C/D primarily utilize Juniper/Hart and Goose MOAs to the east of LMT/Kingsley Field ANGB for training while the Dolphin MOA along the coast to the west experiences occasional use. Table 3-12 details the existing operations for these military training airspace. The information below originates from data collected from the 173 FW (NGB 2024a) resulting in a total of 3,194 annual military training airspace sorties by F-15C/D. As previously mentioned, F-5E aircraft provide ADAIR for F-15C/D in the Juniper/Hart and Dolphin military training airspace generating a total of approximately 800 sorties per year. The W-93 overwater airspace, located approximately 15 miles offshore, is used for training but does not affect noise-sensitive land receptors and was not included in the noise modeling.

**Table 3-12 Military Training Airspace Annual Operations (Existing Conditions [2023])**

| <i>Aircraft</i> | <b>Juniper/Hart</b> |              | <b>Dolphin</b> |              | <b>Goose</b> |              | <b>Total Operations</b> |              |              |
|-----------------|---------------------|--------------|----------------|--------------|--------------|--------------|-------------------------|--------------|--------------|
|                 | <i>Day</i>          | <i>Night</i> | <i>Day</i>     | <i>Night</i> | <i>Day</i>   | <i>Night</i> | <i>Day</i>              | <i>Night</i> | <i>Total</i> |
| F-15C/D         | 1,495               | 46           | 71             | 3            | 1,531        | 48           | 3,097                   | 97           | 3,194        |
| F-5E (ADAIR)    | 740                 | 23           | 36             | 1            | 0            | 0            | 776                     | 24           | 800          |
| Other Mil       | 252                 | 0            | 0              | 0            | 0            | 0            | 252                     | 0            | 252          |
| <b>Total</b>    | 2,487               | 69           | 107            | 4            | 1,531        | 48           | 4,125                   | 121          | 4,246        |

*Legend:* ADAIR = Adversary Air; ANG = Air National Guard.

F-15C/D use of the military training airspace is based on the breakdown of the B-Course flight syllabus shown in Table 3-13 detailing the distribution of the use of the military training airspace, along with the number of F-15 and F-5 (supporting ADAIR), the time in the military training airspace, and the use of afterburner during training. The data in Table 3-13 applies to both subsonic and supersonic modeling. Note that no “red air” sorties are listed for events such as Basic Fighter Maneuvers (BFM), where the Instructor Pilot (IP) in the other F-15 is the red-air. In these cases, those sorties are listed as blue. The analysis assumes that all the F-15C sorties are proportional to this breakdown.

The analysis assumes an average sortie duration of 1.3 hours. Time spent flying within the military training airspace depends upon the transit time to it from LMT/Kingsley Field ANGB. The round-trip transit distance varies from approximately 50 miles to the Goose MOA to 200 miles to the Dolphin MOA, which equates to between 6 and 26 mins of travel time at 400 knots. The noise modeling assumes a mid-range transit time of approximately 18 minutes resulting in 60 minutes of flight time within the military training airspace per sortie. Therefore, the sorties in Table 3-12 are also equivalent to total hours flown in the military training airspace so the training events in Table 3-13 were scaled up to the existing 3,194 hours of F-15C/D training and modeled with the MRNMAP software. Due to the randomness of aircraft flight paths in the military training airspace, the analysis utilizes MRNMAP’s modeled areas rather than distinct flight paths.

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**Table 3-13 F-15C FTU B-Course Syllabus**

| <i>Event</i> | <i>Military Training Airspace Time</i> | <i>Blue F-15</i> | <i>Red Total</i> | <i>Red F-15C</i> | <i>Red F-5</i> | <i>Goose</i> | <i>Dolphin</i> | <i>Juniper</i> | <i>Juniper/Hart</i> | <i>Block 0</i> | <i>Block 1</i> | <i>Block 2</i> | <i>Block 3</i> | <i>Block 4</i> | <i>SS mins</i> |
|--------------|----------------------------------------|------------------|------------------|------------------|----------------|--------------|----------------|----------------|---------------------|----------------|----------------|----------------|----------------|----------------|----------------|
| TR-1         | 20                                     | 2                |                  |                  |                | 100%         |                |                |                     |                | 100%           |                |                |                |                |
| TR-2         | 20                                     | 2                |                  |                  |                | 100%         |                |                |                     |                | 100%           |                |                |                |                |
| TR-3         | 30                                     | 2                |                  |                  |                | 100%         |                |                |                     |                | 100%           |                |                |                |                |
| TR-4         | 30                                     | 2                |                  |                  |                | 100%         |                |                |                     |                | 100%           |                |                |                |                |
| TR-5         | 30                                     | 2                |                  |                  |                | 100%         |                |                |                     |                | 100%           |                |                |                |                |
| I-1          | 0                                      | 1                |                  |                  |                | N/A          |                |                |                     | N/A            |                |                |                |                |                |
| I-2          | 0                                      | 1                |                  |                  |                | N/A          |                |                |                     | N/A            |                |                |                |                |                |
| BFM-1        | 20                                     | 2                |                  |                  |                | 100%         |                |                |                     |                | 100%           |                |                |                | 4              |
| BFM-2        | 20                                     | 2                |                  |                  |                | 100%         |                |                |                     |                | 100%           |                |                |                | 4              |
| BFM-3        | 20                                     | 2                |                  |                  |                | 100%         |                |                |                     |                | 100%           |                |                |                | 4              |
| BFM-4        | 20                                     | 2                |                  |                  |                | 100%         |                |                |                     |                | 100%           |                |                |                | 4              |
| BFM-5        | 20                                     | 2                |                  |                  |                | 100%         |                |                |                     |                | 100%           |                |                |                | 4              |
| BFM-6        | 20                                     | 2                |                  |                  |                | 100%         |                |                |                     |                | 100%           |                |                |                | 4              |
| BFM-7        | 20                                     | 2                |                  |                  |                | 100%         |                |                |                     |                | 100%           |                |                |                | 4              |
| BFM-8        | 20                                     | 2                |                  |                  |                | 100%         |                |                |                     |                | 100%           |                |                |                | 4              |
| BFM-9        | 20                                     | 2                |                  |                  |                | 100%         |                |                |                     |                | 100%           |                |                |                | 4              |
| BFM-10       | 20                                     | 2                |                  |                  |                | 100%         |                |                |                     |                | 100%           |                |                |                | 4              |
| BFM-11       | 20                                     | 2                |                  |                  |                | 100%         |                |                |                     |                | 100%           |                |                |                | 4              |
| BFM-12       | 20                                     | 2                |                  |                  |                | 100%         |                |                |                     |                | 100%           |                |                |                | 4              |
| BFM-13       | 20                                     | 2                |                  |                  |                | 100%         |                |                |                     |                | 100%           |                |                |                | 4              |
| BFM-14       | 20                                     | 2                |                  |                  |                | 100%         |                |                |                     |                | 100%           |                |                |                | 4              |
| ACM-1        | 20                                     | 2                | 1                | 1                |                | 100%         |                |                |                     |                | 100%           |                |                |                |                |
| ACM-2        | 20                                     | 2                | 1                | 1                |                | 100%         |                |                |                     |                | 100%           |                |                |                |                |
| ACM-3        | 40                                     | 2                | 2                |                  | 2              |              | 5%             |                | 95%                 |                | 50%            | 50%            |                |                |                |
| ACM-4        | 40                                     | 2                | 2                |                  | 2              |              | 5%             |                | 95%                 |                | 50%            | 50%            |                |                |                |
| ACM-5        | 40                                     | 2                | 2                |                  | 2              |              | 5%             |                | 95%                 |                | 50%            | 50%            |                |                |                |
| TI-1         | 60                                     | 2                | 0                |                  |                |              | 5%             |                | 95%                 |                | 5%             | 45%            | 45%            | 5%             | 10             |
| TI-2         | 40                                     | 2                | 4                | 1                | 3              |              | 5%             |                | 95%                 |                | 5%             | 45%            | 45%            | 5%             | 10             |
| TI-3         | 40                                     | 2                | 4                | 1                | 3              |              | 5%             |                | 95%                 |                | 5%             | 45%            | 45%            | 5%             | 10             |
| TI-4         | 40                                     | 2                | 4                | 1                | 3              |              | 5%             |                | 95%                 |                | 5%             | 45%            | 45%            | 5%             | 10             |
| TI-5         | 40                                     | 4                | 6                | 2                | 4              |              | 5%             |                | 95%                 |                | 5%             | 45%            | 45%            | 5%             | 10             |

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| <i>Event</i>      | <i>Military<br/>Training<br/>Airspace<br/>Time</i> | <i>Blue<br/>F-15</i> | <i>Red<br/>Total</i> | <i>Red<br/>F-15C</i>   | <i>Red<br/>F-5</i>   | <i>Goose</i> | <i>Dolphin</i> | <i>Juniper</i> | <i>Juniper/<br/>Hart</i> | <i>Block<br/>0</i> | <i>Block<br/>1</i> | <i>Block<br/>2</i> | <i>Block<br/>3</i> | <i>Block<br/>4</i> | <i>SS<br/>mins</i> |
|-------------------|----------------------------------------------------|----------------------|----------------------|------------------------|----------------------|--------------|----------------|----------------|--------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| TI-6              | 40                                                 | 4                    | 6                    | 2                      | 4                    |              | 5%             |                | 95%                      |                    | 5%                 | 45%                | 45%                | 5%                 | 10                 |
| ACT               | 40                                                 | 4                    | 6                    | 2                      | 4                    |              | 5%             |                | 95%                      | 5%                 | 5%                 | 45%                | 40%                | 5%                 | 10                 |
| NINT-1            | 30                                                 | 2                    | 0                    |                        |                      |              | 5%             |                | 95%                      |                    | 50%                | 50%                |                    |                    | 4                  |
| NINT-2            | 30                                                 | 2                    | 0                    |                        |                      |              | 5%             |                | 95%                      |                    | 50%                | 50%                |                    |                    | 4                  |
| NINT-3            | 30                                                 | 2                    | 2                    |                        | 2                    |              | 5%             |                | 95%                      |                    | 5%                 | 45%                | 45%                | 5%                 | 10                 |
| LASDT-1           | 30                                                 | 2                    | 0                    |                        |                      |              |                | 100%           |                          | 90%                | 10%                |                    |                    |                    | 2                  |
| LASDT-2           | 30                                                 | 2                    | 2                    |                        | 2                    |              |                | 100%           |                          | 75%                | 25%                |                    |                    |                    | 2                  |
| <i>1 B course</i> |                                                    | 80                   |                      | 11                     | 31                   |              |                |                |                          |                    |                    |                    |                    |                    |                    |
|                   |                                                    |                      |                      | <b>Total<br/>F-15C</b> | <b>Total<br/>F-5</b> |              |                |                |                          |                    |                    |                    |                    |                    |                    |
|                   |                                                    |                      |                      | <b>91</b>              | <b>31</b>            |              |                |                |                          |                    |                    |                    |                    |                    |                    |

*Legend:* % percent; N/A = Not Applicable; SS mins = supersonic minutes.

### 3.2.2 Noise Exposure (Subsonic)

Table 3-14 presents the resulting distributed DNL and  $L_{dnmr}$  for each military training airspace due to existing operations.  $L_{dnmr}$  is similar to DNL except it includes a rise-time correction factor to account for the increase in annoyance from high-speed aircraft traveling at low altitudes. Because most training occurs above 10,000 feet mean sea level (MSL), the rise-time effect remains small, resulting in no difference between the two metrics for Existing Conditions (2023) when rounded to whole decibels.

**Table 3-14 Noise Exposure from Existing Conditions (2023)**  
**Military Training Airspace Operations**

| <i>Military Training Airspace<sup>1</sup></i> | <i>DNL<br/>(dB)</i> | <i>L<sub>dnmr</sub><br/>(dB)</i> |
|-----------------------------------------------|---------------------|----------------------------------|
| Goose North MOA/ATCAA                         | 45                  | 45                               |
| Goose South MOA/ATCAA                         | 45                  | 45                               |
| Juniper Low MOA                               | 48                  | 48                               |
| Juniper East Low MOA                          | 48                  | 48                               |
| Juniper A/B/C/D MOA/ATCAA <sup>1</sup>        | 35                  | 35                               |
| Hart A/B/C/D/E/F MOA/ATCAA                    | 35                  | 35                               |
| Dolphin North and South MOA/ATCAA             | <35                 | <35                              |

*Note:* <sup>1</sup>Noise level applies only to the parts of Juniper A/B/C/D outside of Juniper Low and Juniper East Low MOA, which are reported separately.

*Legend:* ADAIR = Adversary Air; ANG = Air National Guard; ATCAA = Air Traffic Control Assigned Airspace; dB = decibel; DNL = Day-Night Average Sound Level;  $L_{dnmr}$  = Onset-Rate Adjusted Monthly Day-Night Average A-weighted Sound Level; MOA = Military Operations Area.

The greatest DNL/ $L_{dnmr}$  of 48 dB occurs in the Juniper Low and Juniper East Low MOAs due to the lower floor and lower altitudes flown in these areas. The rest of the Juniper/Hart MOA complex outside of the Juniper Low and Juniper East Low areas experiences DNL/ $L_{dnmr}$  of 35 dB or less. Both Goose North and Goose South MOAs experience DNL/ $L_{dnmr}$  of 45 dB. The existing DNL/ $L_{dnmr}$  in Dolphin North and South MOA is less than 35 dB due to the relatively small number of sorties spread over a large area with a minimum altitude of 11,000 feet MSL.

### 3.2.3 Modeling Data (Supersonic)

The existing operating areas for the supersonic operations by the 173 FW comprise the Juniper/Hart MOA Complex limited to above 30,000 feet to minimize supersonic noise at ground level where human receptors could be impacted. Air Combat Maneuvering (ACM) involves offensive and defensive maneuvering, which may include reaching supersonic speeds.

BOOMAP2021 software used for this analysis was developed to analyze supersonic aircraft activity within military training airspace with updates that allow the user to enter aircraft altitude bands, ground height, Mach number, aircraft types, and supersonic duration. For the purposes of the analysis, all ACM sorties that train within Juniper/Hart MOA and listed in Table 3-13 are assumed to reach supersonic speeds for a portion of the training event. This includes both F-15C/D and the ADAIR flown by F-5.

### 3.2.4 Noise Exposure (Supersonic)

Using BOOMAP2021 software, the maximum CDNL is 39 C-weighted decibel (dBC), which occurs roughly in the center of the Juniper/Hart MOA complex. The relatively low CDNL value is primarily due to the 30,000-foot MSL minimum altitude required for existing supersonic operations within the Juniper/Hart MOA complex.

## 4.0 NO ACTION ALTERNATIVE

### 4.1 INSTALLATION/AIRPORT

#### 4.1.1 Modeling Data

##### 4.1.1.1 Military Aircraft

Under the No Action Alternative, modeled 173 FW F-15C/D aircraft operations are reduced relative to Existing Conditions (2023) to a training pattern of 6 aircraft for the first launch and 4 aircraft for the second launch each day (10 sorties per day). This equates to approximately 2,400 annual sorties (9,600 annual operations), representing an approximate 29 percent reduction from Existing Conditions (2023) (Table 4-1). Contract ADAIR aircraft, military transients, and other agency transients are assumed to remain consistent with Existing Conditions (2023).

**Table 4-1 Annual Airfield Operations at LMT/Kingsley Field ANGB (No Action Alternative)**

| Aircraft           | Departures    |            | Arrivals      |            | Closed Patterns Ops <sup>2</sup> |            | Total         |            | Total         |
|--------------------|---------------|------------|---------------|------------|----------------------------------|------------|---------------|------------|---------------|
|                    | Day           | Night      | Day           | Night      | Day                              | Night      | Day           | Night      |               |
| F-15C/D            | 2,400         | 0          | 2,328         | 72         | 4,656                            | 144        | 9,384         | 216        | 9,600         |
| Contract ADAIR     | 800           | 0          | 776           | 24         | 160                              | 0          | 1,736         | 24         | 1,760         |
| Civil <sup>1</sup> | 9,818         | 178        | 9,818         | 178        | 6,110                            | 0          | 25,746        | 356        | 26,102        |
| Transients         | 815           | 0          | 815           | 0          | 8                                | 0          | 1,638         | 0          | 1,638         |
| <b>Total</b>       | <b>13,833</b> | <b>178</b> | <b>13,737</b> | <b>274</b> | <b>10,934</b>                    | <b>144</b> | <b>38,504</b> | <b>596</b> | <b>39,100</b> |

Notes: <sup>1</sup>Civil operations represent the combined annual runway operations of Air Carrier, Air Transport, and General Aviation.

<sup>2</sup>A portion of Local civil aircraft operations modeled as departures/arrivals because a significant portion of local GA flights involve departures and arrivals to the nearby practice area, in addition to touch and go pattern operations.

Legend: ADAIR = Adversary Air; ANGB = Air National Guard Base; LMT = Crater Lake-Klamath Regional Airport; Ops = operations.

Sources: FAA 2024b; NGB 2024b; DAF 2020.

Maintenance and ground run-up operations by F-15C/D would scale down proportional to the 29 percent reduction in flight operations while all other military or other agency operations would remain the same as Existing Conditions (2023).

##### 4.1.1.2 Civil Aircraft

As presented in Table 4-1 and based upon the FAA's 2023 TAF, in 2029 civil aircraft operations at LMT would be 26,102, representing an increase of approximately 8 percent from Existing Conditions (2023). The analysis assumes that the civil aircraft fleet mix for 2029 would not change from Existing Conditions (2023), as detailed in Appendix A.

#### **4.1.2 Noise Exposure**

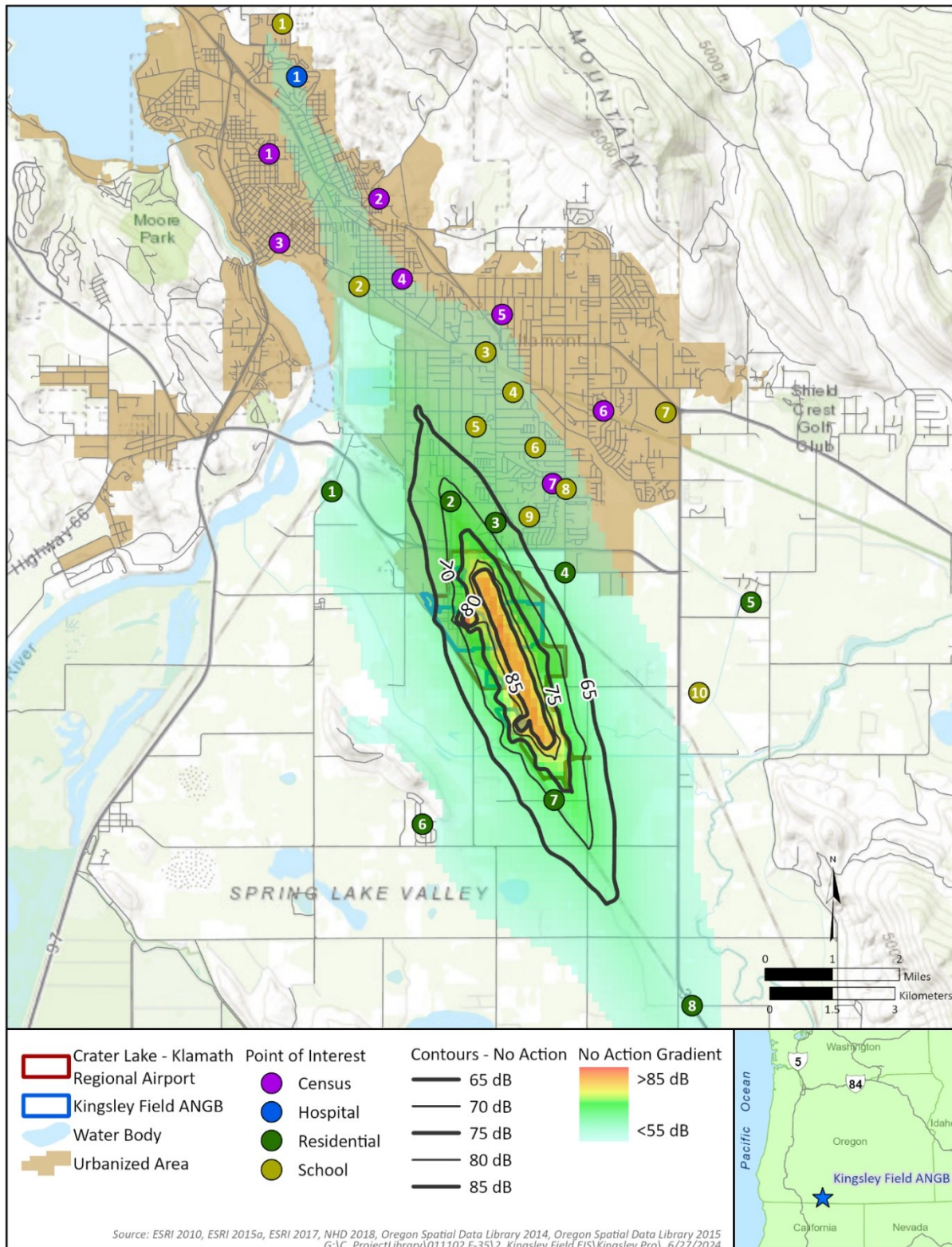
Sections 4.1.2.1 through 4.1.2.6 focus on DoD best practices for impact analysis, as summarized in DNWG guidance (DNWG 2009a). The No Action Alternative DNL contours, DNL at noise sensitive locations (the FAA terminology corresponding generally to DoD POIs), acreage, population, and household affected by DNL also apply to FAA.

##### **4.1.2.1 Day-Night Average Sound Level Contours and Point of Interest Levels**

Figure 4-1 shows the DNL noise contours from 65 to 85 dB in 5-dB increments for the No Action Alternative at LMT overlaid on gradient mapping of DNL by color shading. Noise generated from aircraft operations at LMT occurs within and outside the airfield. Portions of the DNL 65 dB contour extend north of the airfield by 1.7 miles, to the east and to the west 0.2 mile, and to the south 1.5 miles. The gradient shading shows how DNL noise exposure does not end at the plotted DNL 65 dB contour line, but instead continues beyond at reduced levels plotted down to DNL 55 dB that roughly corresponds a level typical of a suburban environment.

As depicted in Figure 4-2, when compared with Existing Conditions (2023), the No Action Alternative would result in an overall reduction in the size of the DNL contours by 1 to 2 dB due to the approximate 29 percent reduction in F-15C/D operations.

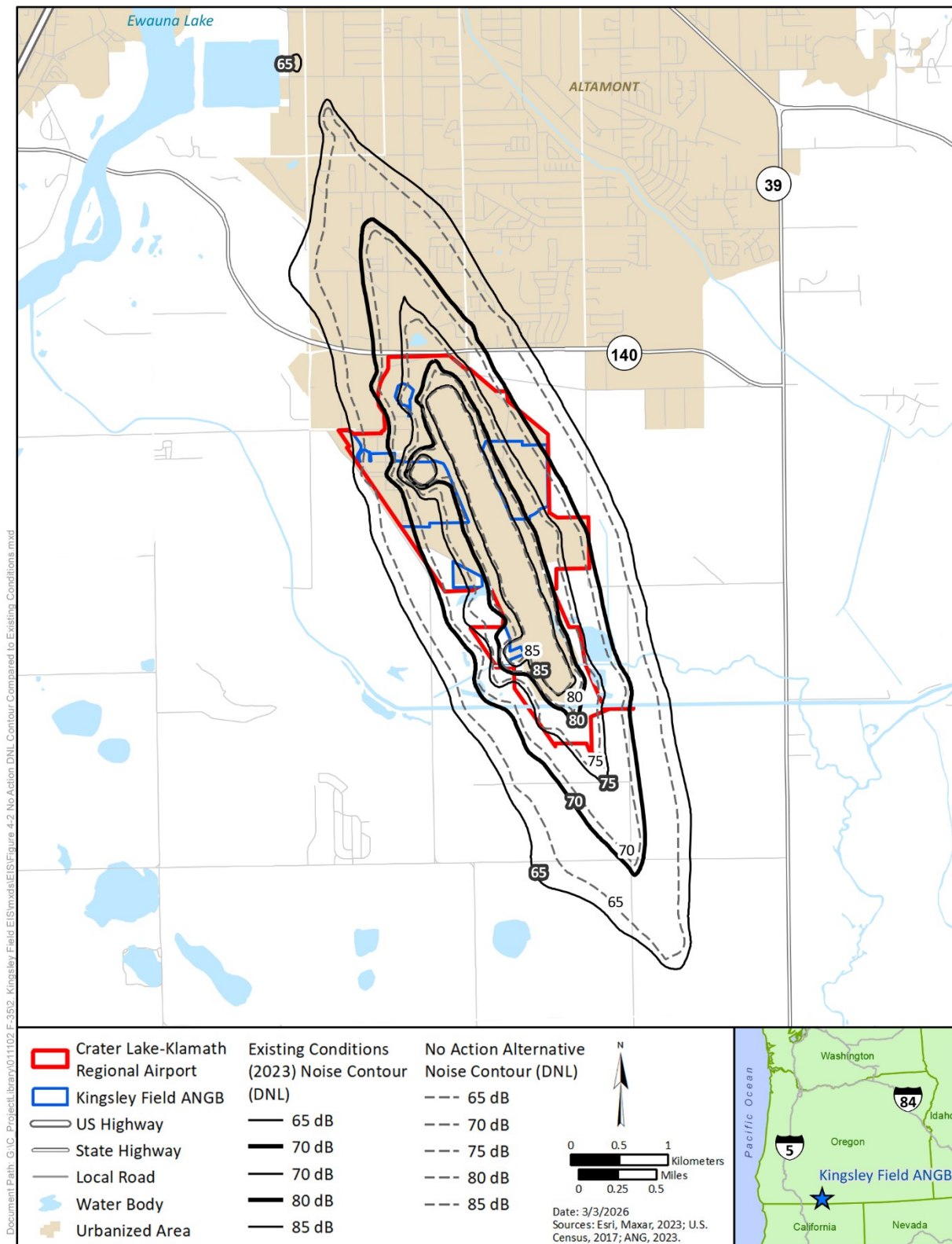
Table 4-2 shows the DNL values at each of the POIs under the No Action Alternative with values ranging from DNL 46 to 73 dB. Three residential POIs (R02 Anderson Avenue and Altamont Drive, R03 Highland Way and Summit Street, and R07 Lombardy Lane and railroad tracks) would be exposed to DNL 65 dB or greater consistent with Existing Conditions (2023). The relative change in DNL under the No Action Alternative when compared to Existing Conditions (2023) would be no change at 2 POIs, a reduction of 1 dB at 20 POIs, and a reduction of 2 dB at 4 POIs.



**Figure 4-1 No Action Alternative DNL Contours and Noise Gradients on and Adjacent to LMT**



**Noise Study**  
**Environmental Impact Statement for Basing F-35A Lightning II Formal Training Unit**  
**at Kingsley Field ANGB, Klamath Falls, Oregon**  
**Final – September 2026**



**Figure 4-2 No Action Alternative DNL Contour Comparison to Existing Conditions (2023) at LMT**

**Table 4-2 No Action Alternative DNL at POIs Noise Exposure Adjacent to LMT**

| <i>Map ID</i> | <i>Point Type</i>     | <i>Named POI<sup>1</sup></i>       | <i>Existing DNL<sup>2</sup> (dB)</i> | <i>No Action DNL<sup>2</sup> (dB)</i> | <i>No Action Change RE Existing DNL<sup>2</sup> (dB)</i> |
|---------------|-----------------------|------------------------------------|--------------------------------------|---------------------------------------|----------------------------------------------------------|
| C01           | Census Tract Centroid | Census Tract 9719                  | 52                                   | 52                                    | 0                                                        |
| C02           | Census Tract Centroid | Census Tract 9717                  | 54                                   | 53                                    | -1                                                       |
| C03           | Census Tract Centroid | Census Tract 9718                  | 52                                   | 51                                    | -1                                                       |
| C04           | Census Tract Centroid | Census Tract 9716                  | 56                                   | 56                                    | 0                                                        |
| C05           | Census Tract Centroid | Census Tract 9712                  | 56                                   | 55                                    | -1                                                       |
| C06           | Census Tract Centroid | Census Tract 9713                  | 52                                   | 50                                    | -2                                                       |
| C07           | Census Tract Centroid | Census Tract 9714                  | 60                                   | 58                                    | -2                                                       |
| H01           | Healthcare Facility   | Sky Lakes Medical Center           | 56                                   | 55                                    | -1                                                       |
| R01           | Residential Area      | Neighborhood                       | 58                                   | 57                                    | -1                                                       |
| R02           | Residential Area      | Anderson Avenue and Altamont Drive | <b>74<sup>2</sup></b>                | <b>73<sup>2</sup></b>                 | -1                                                       |
| R03           | Residential Area      | Highland Way and Summit Street     | <b>69<sup>2</sup></b>                | <b>68<sup>2</sup></b>                 | -1                                                       |
| R04           | Residential Area      | Airway Drive and Homedale Road     | 62                                   | 61                                    | -1                                                       |
| R05           | Residential Area      | Neighborhood                       | 47                                   | 46                                    | -1                                                       |
| R06           | Residential Area      | Neighborhood                       | 55                                   | 54                                    | -1                                                       |
| R07           | Residential Area      | Lombardy Lane and railroad tracks  | <b>72<sup>2</sup></b>                | <b>71<sup>2</sup></b>                 | -1                                                       |
| R08           | Residential Area      | Neighborhood                       | 58                                   | 57                                    | -1                                                       |
| S01           | School                | Oregon Institute of Technology     | 54                                   | 53                                    | -1                                                       |
| S02           | School                | Klamath Family Head Start          | 60                                   | 59                                    | -1                                                       |
| S03           | School                | Triad School                       | 58                                   | 57                                    | -1                                                       |
| S04           | School                | Mazama High School                 | 58                                   | 56                                    | -2                                                       |
| S05           | School                | Stearns Elementary School          | 62                                   | 61                                    | -1                                                       |
| S06           | School                | Peterson Elementary                | 59                                   | 58                                    | -1                                                       |
| S07           | School                | Klamath Community College          | 48                                   | 47                                    | -1                                                       |
| S08           | School                | Brixner Junior High School         | 59                                   | 57                                    | -2                                                       |
| S09           | School                | Hosanna Christian School           | 63                                   | 62                                    | -1                                                       |
| S10           | School                | Henley High School                 | 53                                   | 52                                    | -1                                                       |

*Notes:* <sup>1</sup>The census tracts represent neighborhoods surrounding LMT where noise sensitive locations (such as residences, schools, places of worship, etc. are likely to occur.

<sup>2</sup>Bold represents points exposed to DNL of 65 dB or greater.

*Legend:* dB = decibel; DNL = Day-Night Average Sound Level; ID = Identification; LMT = Crater Lake-Klamath Regional Airport; POI = Point of Interest.

#### 4.1.2.2 Acreage, Housing, and Population

Table 4-3 shows the acreage breakdown (excluding water bodies) within each noise contour band, resulting in a total of 2,177 acres adjacent to LMT exposed to DNL 65 dB or greater for the No Action Alternative. That acreage is comprised of 1,558 acres exposed to DNL 65 to 70 dB, 529 acres to DNL 70 to 75 dB, 89 acres to DNL 75 to 80 dB, and 2 acres to DNL 80 to 85 dB. No areas off-airport would be exposed to DNL greater than 85 dB under the No Action Alternative.

**Table 4-3 No Action Alternative – Noise Exposure Acreage**

| <i>DNL Band (dB)</i>  | <i>No Action Alternative Acreage</i> |                        |              | <i>Change Relative to Existing Conditions (2023)</i> |                        |              |
|-----------------------|--------------------------------------|------------------------|--------------|------------------------------------------------------|------------------------|--------------|
|                       | <i>On LMT</i>                        | <i>Adjacent to LMT</i> | <i>Total</i> | <i>On LMT</i>                                        | <i>Adjacent to LMT</i> | <i>Total</i> |
| 65–70                 | 133                                  | 1,558                  | 1,691        | 49                                                   | -392                   | -343         |
| 70–75                 | 284                                  | 529                    | 813          | 18                                                   | -150                   | -132         |
| 75–80                 | 335                                  | 89                     | 423          | -1                                                   | -66                    | -66          |
| 80–85                 | 204                                  | 2                      | 205          | -33                                                  | -4                     | -37          |
| 85+                   | 279                                  | -                      | 279          | -42                                                  | 0                      | -42          |
| <b>Total &gt;65dB</b> | 1,234                                | 2,177                  | 3,412        | -9                                                   | -612                   | -621         |

*Note:* Totals may not add due to rounding.

*Legend:* > = greater than; dB = decibel; DNL = Day-Night Average Sound Level; LMT = Crater Lake-Klamath Regional Airport.

Table 4-4 lists the estimated households and population off-airport that would be exposed to each DNL contour band under the No Action Alternative resulting in 588 households and 1,459 people within the DNL 65 to 70 dB contour band. A total of 300 households and 744 people would reside within the DNL 70 to 75 dB contour band and 58 households and 145 people within the DNL 75 to 80 dB contour band. A review of aerial imagery confirmed no households or people would be located within the 2 acres exposed to DNL 80 dB; therefore, no people would be affected.

**Table 4-4 No Action Alternative – Estimated Households and Population**

| <i>DNL Band (dB)</i> | <i>No Action Alternative</i> |                   | <i>Change Relative to Existing Conditions (2023)</i> |                   |
|----------------------|------------------------------|-------------------|------------------------------------------------------|-------------------|
|                      | <i>Households</i>            | <i>Population</i> | <i>Households</i>                                    | <i>Population</i> |
| 65–70                | 588                          | 1,459             | -158                                                 | -392              |
| 70–75                | 300                          | 744               | -36                                                  | -90               |
| 75–80                | 58                           | 145               | -48                                                  | -117              |
| 80–85                | 0                            | 0                 | 0                                                    | 0                 |
| 85+                  | 0                            | 0                 | 0                                                    | 0                 |
| <b>Totals</b>        | 946                          | 2,348             | -242                                                 | -599              |

*Legend:* dB = decibel; DNL = Day-Night Average Sound Level.

#### 4.1.2.3 Classroom Learning Interference

Table 4-5 presents the classroom learning interference for schools S-01 through S-10 that would be experienced under the No Action Alternative. Consistent with Existing Conditions (2023), this alternative would result in seven schools that would be exposed to exterior  $L_{eq(8hr)}$  greater than 60 dB equating to interior of 45 dB. The greatest  $L_{eq(8hr)}$  of 65 dB would occur at S05 Stearns Elementary School and S09

Hosanna Christian School. Additional school impact analysis involves determining the number of noise-generated speech interfering events per school day hour that exceed an interior  $L_{\max}$  of 50 dB (equivalent to an exterior  $L_{\max}$  of 65 dB for windows open). The number of classroom interfering events would range from 1 event at 2 schools, 2 at 7 schools, and 3 events at 1 school, as presented in Table 4-5. Five schools would experience a reduction of 1 fewer interfering event per average hour while the remaining would experience no change. TA at an interior level of 50 dB (equivalent to an exterior of 65 dB with windows open) would vary from 3 minutes to 10 minutes per average school day, which would be a reduction of 1 to 3 minutes at 8 schools and no change at 2 schools.

**Table 4-5 LMT No Action Alternative – Classroom Learning Interference**

| <i>ID</i> | <i>Location<sup>1</sup></i> | <i>Outdoor<br/><math>L_{eq(8hr)}</math><br/>(dB)<sup>2</sup></i> | <i>Change<br/>Outdoor<br/><math>L_{eq(8hr)}</math> dB<br/>Relative to<br/>Existing<br/>Conditions<br/>(2023)</i> | <i>Number of<br/>Speech<br/>Interfering<br/>Events per<br/>School Day<br/>Hour<sup>3</sup></i> | <i>Change<br/>Events per<br/>School Day<br/>Hour<br/>Relative to<br/>Existing<br/>Conditions<br/>(2023)</i> | <i>TA interior<br/>50 dB per 8-<br/>hour school<br/>day<br/>(minutes)<sup>3</sup></i> | <i>Change TA<br/>Relative to<br/>Existing<br/>Conditions<br/>(2023)</i> |
|-----------|-----------------------------|------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------|
| S01       | Oregon Institute of Tech    | 57                                                               | 0                                                                                                                | 1                                                                                              | 0                                                                                                           | 3                                                                                     | 0                                                                       |
| S02       | Klamath Family Head Start   | <b>62<sup>2</sup></b>                                            | -1                                                                                                               | 2                                                                                              | 0                                                                                                           | 4                                                                                     | 0                                                                       |
| S03       | Triad School                | <b>61<sup>2</sup></b>                                            | -1                                                                                                               | 2                                                                                              | 0                                                                                                           | 3                                                                                     | -1                                                                      |
| S04       | Mazama High School          | <b>60<sup>2</sup></b>                                            | -2                                                                                                               | 2                                                                                              | 0                                                                                                           | 3                                                                                     | -1                                                                      |
| S05       | Stearns Elementary School   | <b>65<sup>2</sup></b>                                            | -1                                                                                                               | 2                                                                                              | -1                                                                                                          | 4                                                                                     | -1                                                                      |
| S06       | Peterson Elementary         | <b>62<sup>2</sup></b>                                            | -1                                                                                                               | 2                                                                                              | -1                                                                                                          | 5                                                                                     | -2                                                                      |
| S07       | Klamath Community College   | 51                                                               | -1                                                                                                               | 1                                                                                              | -1                                                                                                          | 5                                                                                     | -1                                                                      |
| S08       | Brixner Junior High School  | <b>61<sup>2</sup></b>                                            | -1                                                                                                               | 2                                                                                              | -1                                                                                                          | 7                                                                                     | -2                                                                      |
| S09       | Hosanna Christian School    | <b>65<sup>2</sup></b>                                            | -2                                                                                                               | 3                                                                                              | -1                                                                                                          | 10                                                                                    | -3                                                                      |
| S10       | Henley High School          | 56                                                               | -1                                                                                                               | 2                                                                                              | 0                                                                                                           | 6                                                                                     | -2                                                                      |

Notes: <sup>1</sup>Table presents the analysis for the school POIs.

<sup>2</sup>Bold text represents schools exposed to exterior  $L_{eq(8hr)}$  of greater than 60 dB, equivalent to the recommended interior threshold of 45 dB with windows open.

<sup>3</sup>Assumes 90 percent of ANG daytime operations occur during the school day; windows open condition with Noise Level Reduction of 15 dB due to building attenuation.

Legend: dB = decibel; ID = Identification;  $L_{eq(8hr)}$  = 8-hour Equivalent Sound Level; LMT = Crater Lake-Klamath Regional Airport; POI = Point of Interest; TA= Time Above.

#### 4.1.2.4 Non-school Speech Interference

In addition to speech interference analysis, this study considers the potential for aircraft noise to interfere with non-school speech at all POIs during the DNL daytime period. Table 4-6 presents Existing Conditions (2023) for speech interference (non-school) based upon the numbers of events per average hour during the DNL daytime period for both windows open and windows closed conditions. The number of speech interfering events with windows open would range from 1 to 5 events per average hour with 12 POIs experiencing a reduction of 1 event per average hour. With windows closed, 13 POIs would experience no interfering events per average hour, 10 POIs 1 event per average hour, and 3 POIs two events per average hour.

**Table 4-6 LMT No Action Alternative – Non-school Speech Interference Events per Average Hour (Daytime)**

| <i>Map ID<sup>1</sup></i> | <i>Named POI</i>                   | <i>Windows Open<sup>2</sup></i> | <i>Windows Open Change Relative to Existing Conditions (2023)</i> | <i>Windows Closed<sup>3</sup></i> | <i>Windows Closed Change Relative to Existing Conditions (2023)</i> |
|---------------------------|------------------------------------|---------------------------------|-------------------------------------------------------------------|-----------------------------------|---------------------------------------------------------------------|
| C-01                      | Census Tract 9719                  | 1                               | 0                                                                 | 0                                 | 0                                                                   |
| C-02                      | Census Tract 9717                  | 1                               | 0                                                                 | 0                                 | -1                                                                  |
| C-03                      | Census Tract 9718                  | 1                               | 0                                                                 | 0                                 | 0                                                                   |
| C-04                      | Census Tract 9716                  | 1                               | 0                                                                 | 0                                 | -1                                                                  |
| C-05                      | Census Tract 9712                  | 1                               | 0                                                                 | 0                                 | -1                                                                  |
| C-06                      | Census Tract 9713                  | 1                               | 0                                                                 | -1                                | -1                                                                  |
| C-07                      | Census Tract 9714                  | 2                               | 1                                                                 | 0                                 | -1                                                                  |
| H-01                      | Sky Lakes Medical Center           | 1                               | 0                                                                 | 0                                 | 0                                                                   |
| R-01                      | Neighborhood                       | 1                               | 1                                                                 | -1                                | 0                                                                   |
| R-02                      | Anderson Avenue and Altamont Drive | 5                               | 2                                                                 | 0                                 | -1                                                                  |
| R-03                      | Highland Way and Summit Street     | 3                               | 2                                                                 | -1                                | -1                                                                  |
| R-04                      | Airway Drive and Homedale Road     | 3                               | 1                                                                 | -1                                | -1                                                                  |
| R-05                      | Neighborhood                       | 1                               | 0                                                                 | -1                                | 0                                                                   |
| R-06                      | Neighborhood                       | 1                               | 1                                                                 | -1                                | 0                                                                   |
| R-07                      | Lombardy Lane and railroad tracks  | 5                               | 2                                                                 | 0                                 | -1                                                                  |
| R-08                      | Neighborhood                       | 1                               | 0                                                                 | 0                                 | 0                                                                   |
| S-01                      | Oregon Institute of Technology     | 1                               | 0                                                                 | 0                                 | 0                                                                   |
| S-02                      | Klamath Family Head Start          | 2                               | 1                                                                 | 0                                 | 0                                                                   |
| S-03                      | Triad School                       | 1                               | 0                                                                 | -1                                | -1                                                                  |
| S-04                      | Mazama High School                 | 1                               | 0                                                                 | 0                                 | 0                                                                   |
| S-05                      | Stearns Elementary School          | 2                               | 1                                                                 | 0                                 | -1                                                                  |
| S-06                      | Peterson Elementary                | 2                               | 1                                                                 | 0                                 | 0                                                                   |
| S-07                      | Klamath Community College          | 1                               | 0                                                                 | 0                                 | -1                                                                  |
| S-08                      | Brixner Junior High School         | 1                               | 1                                                                 | 0                                 | -1                                                                  |
| S-09                      | Hosanna Christian School           | 3                               | 1                                                                 | -1                                | -1                                                                  |
| S-10                      | Henley High School                 | 1                               | 1                                                                 | 0                                 | -1                                                                  |

*Notes:* <sup>1</sup>School POIs included because residential areas or other noise sensitive uses are often located nearby schools for which these results would apply.

<sup>2</sup>Assumes 15 dB Noise Level Reduction.

<sup>3</sup>Assumes 25 dB Noise Level Reduction.

*Legend:* ID = Identification; LMT = Crater Lake-Klamath Regional Airport; POI = Point of Interest.

#### 4.1.2.5 Probability of Awakening

Analysis of the potential for sleep disturbance involves determining the number and SEL of DNL nighttime aircraft events to estimate the PA metric. As presented in Table 4-7, PA with windows open would range from negligible at 11 POIs and 1 to 10 percent at 15 POIs. PA with windows closed is negligible at 20 POIs and 1 to 6 percent at 6 POIs. With minimal DNL nighttime operations by 173 FW F-15C (approximately 18 operations per month), the majority of PA would be due to civil aircraft operations.

**Table 4-7 LMT No Action Alternative – Estimated Probability of Awakening**

| <i>Map ID</i> | <i>Named POI<sup>1</sup></i>       | <i>Windows Open<sup>2</sup></i> | <i>Change to Windows Open Relative to Existing Conditions (2023)</i> | <i>Windows Closed<sup>3</sup></i> | <i>Change to Windows Closed Relative to Existing Conditions (2023)</i> |
|---------------|------------------------------------|---------------------------------|----------------------------------------------------------------------|-----------------------------------|------------------------------------------------------------------------|
| C-01          | Census Tract 9719                  | <1%                             | 0%                                                                   | <1%                               | 0%                                                                     |
| C-02          | Census Tract 9717                  | <1%                             | 0%                                                                   | <1%                               | 0%                                                                     |
| C-03          | Census Tract 9718                  | <1%                             | 0%                                                                   | <1%                               | 0%                                                                     |
| C-04          | Census Tract 9716                  | <1%                             | -1%                                                                  | <1%                               | 0%                                                                     |
| C-05          | Census Tract 9712                  | <1%                             | -1%                                                                  | <1%                               | 0%                                                                     |
| C-06          | Census Tract 9713                  | <1%                             | -1%                                                                  | <1%                               | 0%                                                                     |
| C-07          | Census Tract 9714                  | 1%                              | 0%                                                                   | <1%                               | -1%                                                                    |
| H-01          | Sky Lakes Medical Center           | <1%                             | 0%                                                                   | <1%                               | 0%                                                                     |
| R-01          | Neighborhood                       | 1%                              | 0%                                                                   | 1%                                | 0%                                                                     |
| R-02          | Anderson Avenue and Altamont Drive | 10%                             | 0%                                                                   | 6%                                | 0%                                                                     |
| R-03          | Highland Way and Summit Street     | 2%                              | 0%                                                                   | 1%                                | -1%                                                                    |
| R-04          | Airway Drive and Homedale Road     | 1%                              | 0%                                                                   | 1%                                | 0%                                                                     |
| R-05          | Neighborhood                       | 1%                              | 0%                                                                   | <1%                               | 0%                                                                     |
| R-06          | Neighborhood                       | 1%                              | 0%                                                                   | <1%                               | -1%                                                                    |
| R-07          | Lombardy Lane and railroad tracks  | 4%                              | 0%                                                                   | 3%                                | 0%                                                                     |
| R-08          | Neighborhood                       | <1%                             | -1%                                                                  | <1%                               | 0%                                                                     |
| S-01          | Oregon Institute of Technology     | <1%                             | 0%                                                                   | <1%                               | 0%                                                                     |
| S-02          | Klamath Family Head Start          | <1%                             | -1%                                                                  | <1%                               | 0%                                                                     |
| S-03          | Triad School                       | 1%                              | 0%                                                                   | <1%                               | 0%                                                                     |
| S-04          | Mazama High School                 | 1%                              | 0%                                                                   | <1%                               | -1%                                                                    |
| S-05          | Stearns Elementary School          | 1%                              | 0%                                                                   | <1%                               | -1%                                                                    |
| S-06          | Peterson Elementary                | 1%                              | 0%                                                                   | <1%                               | -1%                                                                    |
| S-07          | Klamath Community College          | <1%                             | -1%                                                                  | <1%                               | 0%                                                                     |
| S-08          | Brixner Junior High School         | 1%                              | 0%                                                                   | <1%                               | -1%                                                                    |
| S-09          | Hosanna Christian School           | 1%                              | 0%                                                                   | 1%                                | 0%                                                                     |
| S-10          | Henley High School                 | 1%                              | 0%                                                                   | <1%                               | 0%                                                                     |

*Notes:* <sup>1</sup>Non-residential POIs included because residential areas are often located nearby other noise sensitive areas for which these results would apply.

<sup>2</sup>Assumes 15 dB Noise Level Reduction.

<sup>3</sup>Assumes 25 dB Noise Level Reduction.

*Legend:* < = less than; % = percent; ID = Identification; LMT = Crater Lake-Klamath Regional Airport; POI = Point of Interest.

#### 4.1.2.6 Potential for Hearing Loss

DoD guidance prescribes analysis of the PHL due to elevated aircraft noise levels. The screening process begins by identifying residential areas exposed to DNL of 80 dB or greater (DNWG 2026). As presented in Tables 4-3 and 4-4, only 2 acres outside of LMT are exposed to 80 dB or greater DNL and no households or people reside in those areas. Because no people reside in this area, no additional analysis is warranted for the No Action Alternative regarding the risk of the potential for hearing loss.

## **4.2 MILITARY TRAINING AIRSPACE**

### **4.2.1 Modeling Data (Subsonic)**

Existing F-15C/D primarily utilize Juniper/Hart and Goose MOAs to the east of LMT/Kingsley Field ANGB for training while the Dolphin MOA experiences occasional use, which would continue under the No Action Alternative but at a reduction of approximately 26 percent. Table 4-8 details the resulting operations for the 173 FW, F-5E ADAIR, and other military training airspace. The W-93 overwater airspace, located approximately 15 miles offshore, is used for training but does not affect noise-sensitive land receptors and was not included in the noise modeling.

**Table 4-8 No Action Alternative  
Annual Military Training Airspace Operations**

| <i>Aircraft</i> | <b>Juniper/Hart</b> |              | <b>Dolphin</b> |              | <b>Goose</b> |              | <b>Total Operations</b> |              |              |
|-----------------|---------------------|--------------|----------------|--------------|--------------|--------------|-------------------------|--------------|--------------|
|                 | <i>Day</i>          | <i>Night</i> | <i>Day</i>     | <i>Night</i> | <i>Day</i>   | <i>Night</i> | <i>Day</i>              | <i>Night</i> | <i>Total</i> |
| F-15C/D         | 1,099               | 34           | 52             | 2            | 1,126        | 35           | 2,277                   | 71           | 2,348        |
| F-5E (ADAIR)    | 740                 | 23           | 36             | 1            | 0            | 0            | 776                     | 24           | 800          |
| Other Mil       | 252                 | 0            | 0              | 0            | 0            | 0            | 252                     | 0            | 252          |
| <b>Total</b>    | <b>2,091</b>        | <b>57</b>    | <b>88</b>      | <b>3</b>     | <b>1,126</b> | <b>35</b>    | <b>3,305</b>            | <b>95</b>    | <b>3,400</b> |

*Legend:* ADAIR = Adversary Air; ANGB = Air National Guard Base.

As detailed in Table 3-13, the F-15C/D use of the military training airspace is based on the breakdown of the B-Course flight syllabus, which would continue under the No Action Alternative. The individual training exercises and proportional events for each would continue but the overall total hours would scale down to a total of 2,348 sorties, which equates to an estimated 2,348 hours in the military training airspace by 173 FW F-15C/D. All other modeling parameters would remain the same as Existing Conditions (2023).

### **4.2.2 Noise Exposure (Subsonic)**

Table 4-9 presents the resulting distributed DNL and  $L_{dnmr}$  for each military training airspace due to the No Action Alternative. Consistent with Existing Conditions (2023), most training would occur above 10,000 feet MSL, so the rise-time effect applied to  $L_{dnmr}$  would remain small resulting in no difference between the two metrics for Existing Conditions (2023) when rounded to whole decibels.



**Table 4-9 Noise Exposure from the No Action Alternative Military Training Airspace Operations**

| <i>Military Training Airspace<sup>1</sup></i> | <i>DNL (dB)</i> | <i>Change DNL (dB) from Existing Conditions (2023)</i> | <i>L<sub>dnmr</sub> (dB)</i> | <i>Change L<sub>dnmr</sub> (dB) from Existing Conditions (2023)</i> |
|-----------------------------------------------|-----------------|--------------------------------------------------------|------------------------------|---------------------------------------------------------------------|
| Goose North MOA/ATCAA                         | 44              | -1                                                     | 44                           | -1                                                                  |
| Goose South MOA/ATCAA                         | 44              | -1                                                     | 44                           | -1                                                                  |
| Juniper Low MOA                               | 47              | -1                                                     | 47                           | -1                                                                  |
| Juniper East Low MOA                          | 47              | -1                                                     | 47                           | -1                                                                  |
| Juniper A/B/C/D MOA/ATCAA <sup>1</sup>        | <35             | -1                                                     | <35                          | -1                                                                  |
| Hart A/B/C/D/E/F MOA/ATCAA                    | <35             | -1                                                     | <35                          | -1                                                                  |
| Dolphin North and South MOA/ATCAA             | <35             | N/A                                                    | <35                          | N/A                                                                 |

*Note:* <sup>1</sup>Noise level applies only to the parts of Juniper A/B/C/D outside of Juniper Low and Juniper East Low MOA, which are reported separately

*Legend:* ATCAA = Air Traffic Control Assigned Airspace; dB = decibel; DNL = Day-Night Average Sound Level; L<sub>dnmr</sub> = Onset-Rate Adjusted Monthly Day-Night Average A-weighted Sound Level; MOA = Military Operations Area.

The greatest DNL/L<sub>dnmr</sub> of 47 dB would occur in the Juniper Low and Juniper East Low MOAs due to the lower floor and lower altitudes flown in these areas. The rest of the Juniper/Hart MOA complex outside of the Juniper Low and Juniper East Low areas would experience DNL/L<sub>dnmr</sub> of less than 35 dB. Both Goose North and Goose South MOAs would experience DNL/L<sub>dnmr</sub> of 44 dB. The DNL/L<sub>dnmr</sub> in Dolphin North and South MOA would be less than 35 dB due to the relatively small number of sorties spread over a large area with a minimum altitude of 11,000 feet MSL. Overall, there would be an approximate 1 dB reduction in DNL/L<sub>dnmr</sub> across the military training airspace under the No Action Alternative when compared to Existing Conditions (2023).

#### **4.2.3 Modeling Data (Supersonic)**

The existing operating areas for the supersonic operations by the 173 FW comprise the Juniper/Hart MOA Complex limited to above 30,000 feet to minimize supersonic noise at ground level where human receptors could be impacted, which would continue but at a reduced number of annual operations.

#### **4.2.4 Noise Exposure (Supersonic)**

Using BOOMAP2021 software, the maximum CDNL would be 36 dBC, which occurs roughly in the center of the Juniper/Hart MOA complex. The CDNL would remain relatively low due primarily to the 30,000-foot MSL minimum altitude requirement for supersonic operations within the Juniper/Hart MOA complex.

### **5.0 PROPOSED ACTION ALTERNATIVE AND AFTERBURNER SCENARIOS**

The following section details the modeling data and the resultant noise exposure for three afterburner scenarios, in which the F-35A aircraft would replace the F-15C/D aircraft of the 173 FW at LMT, as described in Section 1.1. All other aircraft operations (other than the 173 FW) are assumed to remain unchanged from those described in Section 4.0, *No Action Alternative*.

## **5.1           INSTALLATION**

### **5.1.1       Modeling Data**

The Proposed Action would replace the existing F-15C/D aircraft with 24 PAA plus 2 BAA F-35A aircraft at LMT/Kingsley Field ANGB. The annual flying program for the F-35A is 250 hours per aircraft. Though aircraft may not achieve the full amount of annual flying hours, this analysis evaluates the full 250 hours per aircraft. Thus, with 24 PAA proposed for the F-35A, the total flying hour program for the 173 FW would be 6,000 hours annually. An average sortie duration of 1.3 equates to 4,615 annual sorties conducted at LMT/Kingsley Field ANGB. Resulting annual operations would be:

- Approximately 6,000 annual flying hours with an average sortie duration of 1.3 hours
- 4,615 annual F-35A sorties
- 20,780 annual airfield operations
  - 4,615 departures
  - 4,615 arrivals
  - 9,230 closed pattern ops
  - 2,320 Precautionary Flameout (PFO) training operations (1,160 PFO or chase, plus upwind departure or downwind turn after the PFO low approach)
- Same Daytime (0700–2200) and Nighttime (2200–0700) distribution as existing F-15C/D
- All other airfield operations would remain the same under the Proposed Action as presented in Section 4.0, *No Action Alternative*.

Although not directly a part of the Proposed Action, the noise study includes three modeled scenarios of different rates of afterburner use on departure operations at LMT/Kingsley Field ANGB. Afterburner use on departure results in greater acceleration and climb ability while within the airfield boundary, which generally provides a greater level of safety when compared with the lower thrust of military power departures. Because the 173 FW would support an FTU, the 95 percent afterburner scenario would be the most likely (and is carried forward in the EIS) but all three potential afterburner scenarios are analyzed in this Noise Study.

Table 5-1 details the modeled annual flight operations at LMT that would occur under any of the three proposed afterburner scenarios. Should the F-35A be based at LMT, that would eliminate all F-15C/D operations and would add 20,780 F-35A flight operations per year. All other aircraft operations would remain the same as described under the No Action Alternative, resulting in a total of 50,280 annual operations.

**Table 5-1 Proposed Action Annual Airfield Operations at LMT/Kingsley Field ANGB (2029)**

| <i>Aircraft</i> | <i>Departures</i> |              | <i>Arrivals</i> |              | <i>Closed Patterns Ops<sup>2</sup></i> |              | <i>Total</i>  |              | <i>Total</i>  |
|-----------------|-------------------|--------------|-----------------|--------------|----------------------------------------|--------------|---------------|--------------|---------------|
|                 | <i>Day</i>        | <i>Night</i> | <i>Day</i>      | <i>Night</i> | <i>Day</i>                             | <i>Night</i> | <i>Day</i>    | <i>Night</i> |               |
| F-35A           | 5,659             | 0            | 5,522           | 137          | 9,187                                  | 275          | 20,368        | 412          | 20,780        |
| Contract ADAIR  | 800               | 0            | 776             | 24           | 160                                    | 0            | 1,736         | 24           | 1,760         |
| Civil           | 9,818             | 178          | 9,818           | 178          | 6,110                                  | 0            | 25,746        | 356          | 26,102        |
| Transients      | 815               | 0            | 815             | 0            | 8                                      | 0            | 1,638         | 0            | 1,638         |
| <b>Total</b>    | <b>17,092</b>     | <b>178</b>   | <b>16,931</b>   | <b>339</b>   | <b>15,465</b>                          | <b>275</b>   | <b>49,488</b> | <b>792</b>   | <b>50,280</b> |

*Notes:* <sup>1</sup>Civil operations represent the combined annual runway operations of Air Carrier, Air Transport, and General Aviation.

<sup>2</sup>A portion of Local civil aircraft operations modeled as departures/arrivals because a significant portion of local GA flights involve departures and arrivals to the nearby practice area, in addition to touch and go pattern operations.

*Legend:* ADAIR = Adversary Air; ANGB = Air National Guard Base; LMT = Crater Lake-Klamath Regional Airport; Ops = operations.

*Sources:* FAA 2024b; NGB 2024b; DAF 2020.

#### 5.1.1.1 Departures

The principal difference between the proposed aircraft afterburner scenarios involves the use of afterburner for departure operations. The following describes the three scenarios considered in this analysis:

- F-35A Scenario A = F-35A afterburner use on 5 percent of departures
- F-35A Scenario B = F-35A afterburner use on 50 percent of departures
- F-35A Scenario C = F-35A afterburner use on 95 percent of departures (most likely)

#### 5.1.1.2 Arrivals and Closed Patterns

The F-35A proposed scenarios would follow the same arrival types at similar rates proportional to the existing F-15C/D and would perform closed patterns at LMT only as required (primarily for Functional Check Flights).

#### 5.1.1.3 DNL Nighttime (10 p.m.–7 a.m. [2200–0700]) Operations

DNL Nighttime operations at LMT would remain near zero for the F-35A proposed scenarios with DNL nighttime operations comprising 2 percent of operations.

#### 5.1.1.4 Runway Use

The proposed F-35A aircraft would utilize LMT runways at the same proportion as the No Action Alternative. Table A-3 in Appendix A provides details on the modeled runway utilization for military aircraft, which is applicable to all modeled scenarios.

#### 5.1.1.5 Maintenance or Static Operations

Table 5-2 presents the representative run-up operations profiles for the F-35A alternatives that would replace the existing F-15C/D run-ups. Note that the run-up type operations for F-35A would not change for the analyzed ‘afterburner scenarios,’ which only apply to departure flight operations.

**Table 5-2 F-35A Annual Maintenance and Ground Engine Runs**

| <i>Aircraft</i> | <i>Description</i>           | <i>Pad</i>                | <i>Heading</i> | <i>Power<br/>(%ETR<sup>1</sup>)</i> | <i>Num<br/>Engines</i> | <i>Duration</i> | <i>Annual<br/>Events<sup>2</sup></i> | <i>Day/Night<br/>Split<sup>3</sup></i> |
|-----------------|------------------------------|---------------------------|----------------|-------------------------------------|------------------------|-----------------|--------------------------------------|----------------------------------------|
| F-35A           | BIT                          | MAIN APRNa/<br>MAIN APRNb | 110            | 10                                  | 1                      | 5 mins          | 150                                  | 90% / 10%                              |
|                 |                              |                           | 110            | 31                                  | 1                      | 3 mins          |                                      |                                        |
|                 |                              |                           | 110            | 10                                  | 1                      | 5 mins          |                                      |                                        |
|                 | High<br>Speed, Low<br>Thrust | MAIN APRNa/<br>MAIN APRNb | 110            | 10                                  | 1                      | 5 mins          | 50                                   | 90% / 10%                              |
|                 |                              |                           | 110            | 10                                  | 1                      | 3 mins          |                                      |                                        |
|                 |                              |                           | 110            | 10                                  | 1                      | 5 mins          |                                      |                                        |

*Notes:* <sup>1</sup>ETR = Engine Thrust Request.

<sup>2</sup>Maintenance and ground run-ups would be the same for all modeled F-35A ‘Afterburner’ take-off scenarios.

<sup>3</sup>Day = 0700–2200, Night = 2200–0700.

*Legend:* % = percent; BIT = Built in Test.

### **5.1.2 Noise Exposure**

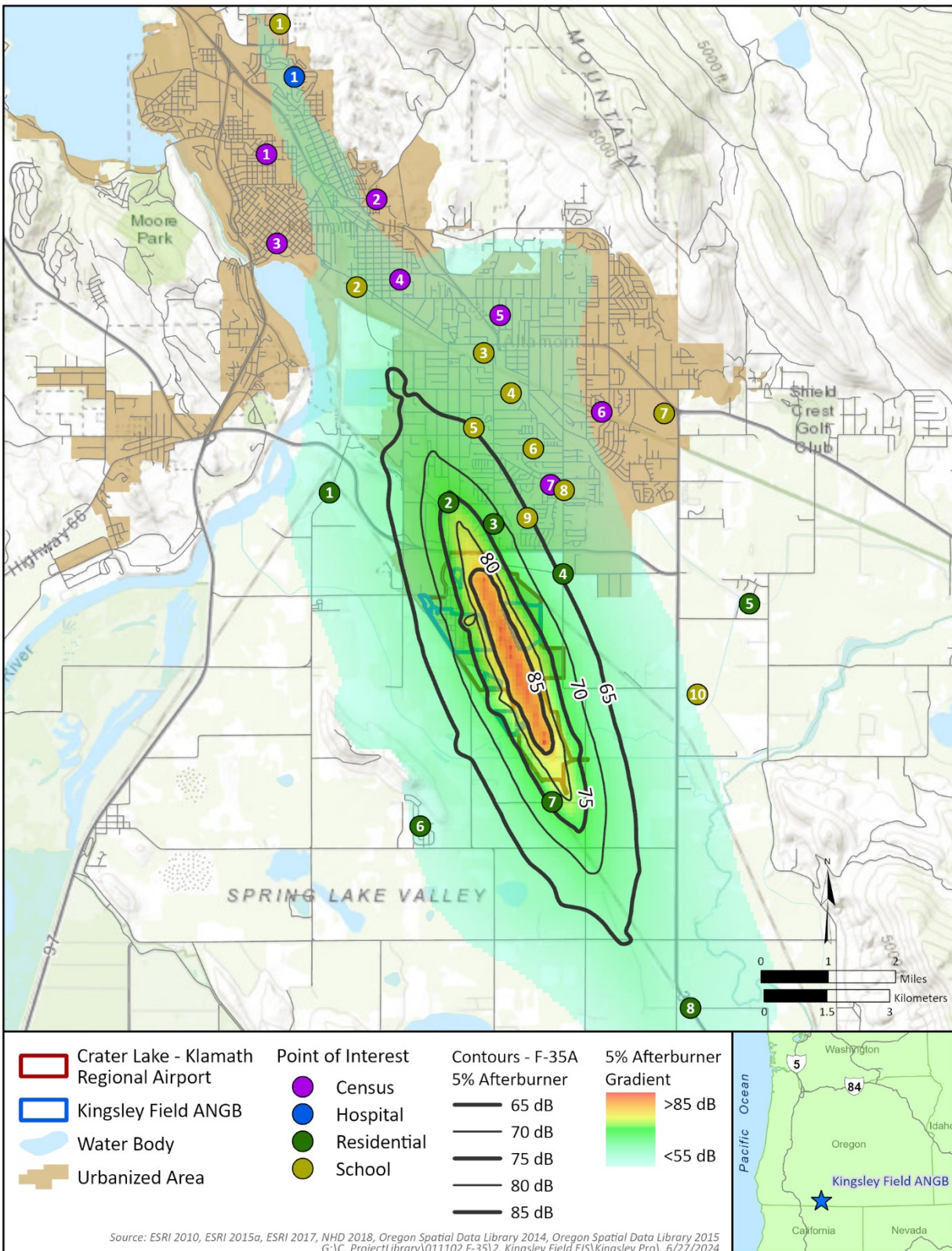
Sections 5.1.2.1 through 5.1.2.6 focus on DoD best practices for impact analysis at airfields, as summarized in DNWG guidance (DNWG 2009a). FAA Order 1050.1G impact analysis applicable to airfields is presented in Section 5.1.2.7.

#### **5.1.2.1 Day-Night Average Sound Level Contours and Point of Interest Levels**

Figure 5-1 shows the DNL noise contours from 65 to 85 dB in 5-dB increments for the F-35A at LMT with 5 percent afterburner usage. As with the No Action Alternative operations, noise generated by aircraft operations at LMT would occur within and outside of the airfield. Portions of the DNL 65 dB contour extend north of the airfield by 2.2 miles, to the east and to the west 0.4 mile, and to the south 2 miles. As depicted in Figure 5-2, when compared with the No Action Alternative, the F-35A 5 percent afterburner scenario would result in an increase in the size of the DNL contours in all directions as a result of the proposed increase in operations and the higher noise levels of the F-35A as compared to the F-15C/D.

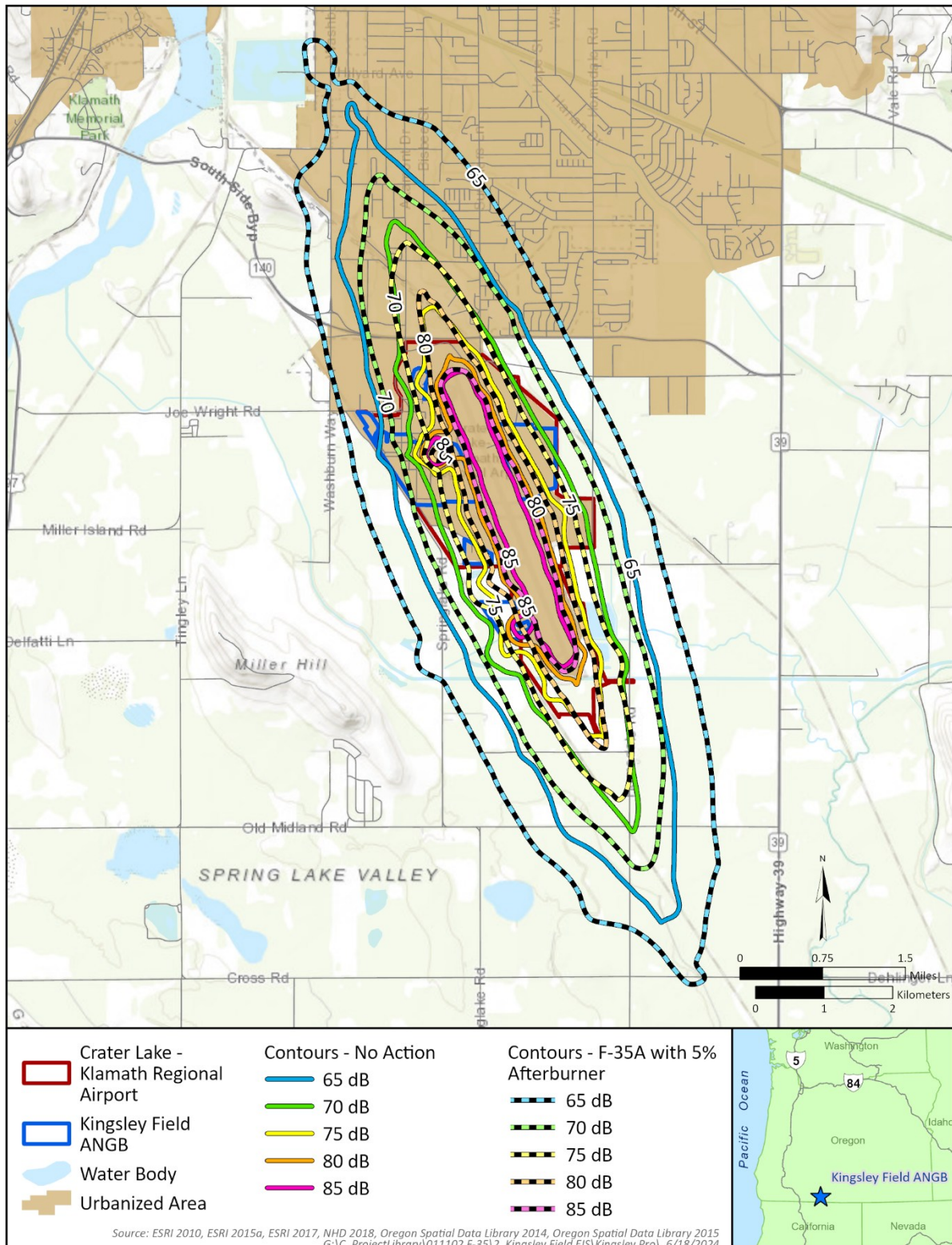
Figure 5-3 shows the DNL noise contours from 65 to 85 dB in 5-dB increments for the F-35A at LMT with 50 percent afterburner usage. As with No Action Alternative operations, noise generated by aircraft operations at LMT would occur within and outside of the airfield. Portions of the DNL 65 dB contour extend north of the airfield by 2.2 miles, to the east 0.4 miles, to the west 0.5 mile, and to the south 2 miles. As depicted in Figure 5-4, when compared with the No Action Alternative, the F-35A 50 percent afterburner scenario would result in an increase in the size of the DNL contours in all directions as a result of the proposed increase in operations and the higher noise levels of the F-35A as compared to the F-15C/D.

Figure 5-5 shows the DNL noise contours from 65 to 85 dB in 5-dB increments for the F-35A at LMT with 95 percent afterburner usage. As with the No Action Alternative operations, noise generated by aircraft operations at LMT would occur within and outside of the airfield. Portions of the DNL 65 dB contour extend north of the airfield by 2.2 miles, to the east 0.4 mile, to the west 0.5 mile, and to the south 2 miles. As depicted in Figure 5-6, when compared with the No Action Alternative, the F-35A 95 percent afterburner scenario would result in an increase in the size of the DNL contours in all directions as a result of the proposed increase in operations and the higher noise levels of the F-35A as compared to the F-15C/D. Figure 5-7 shows a comparison of the 65 dB noise contours for the Existing Conditions (2023), No Action Alternative, and the Proposed Action 5 percent, 50 percent, and 95 percent afterburner scenarios.

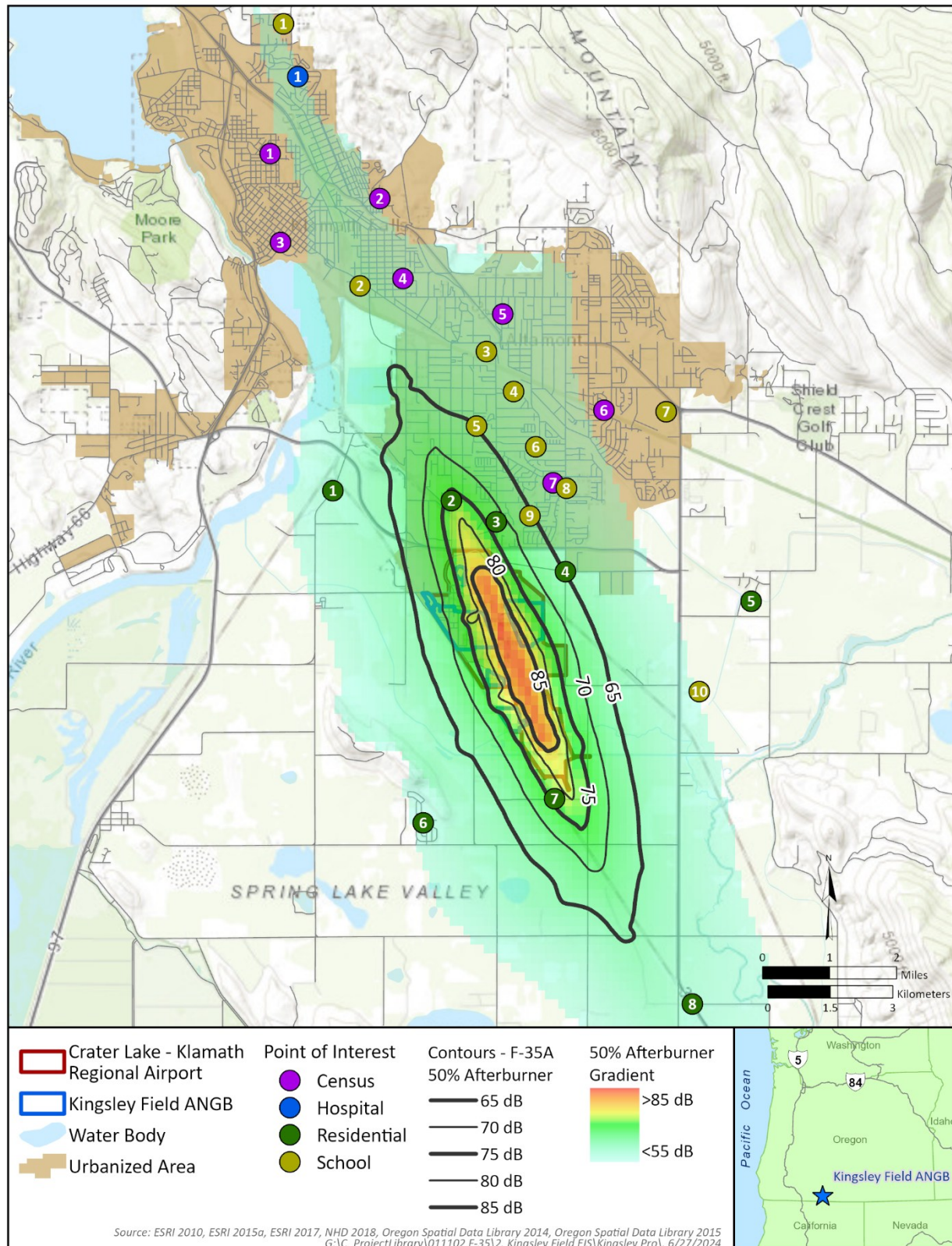


**Figure 5-1 Proposed Action F-35A DNL Contours and Gradient (5% Afterburner)**



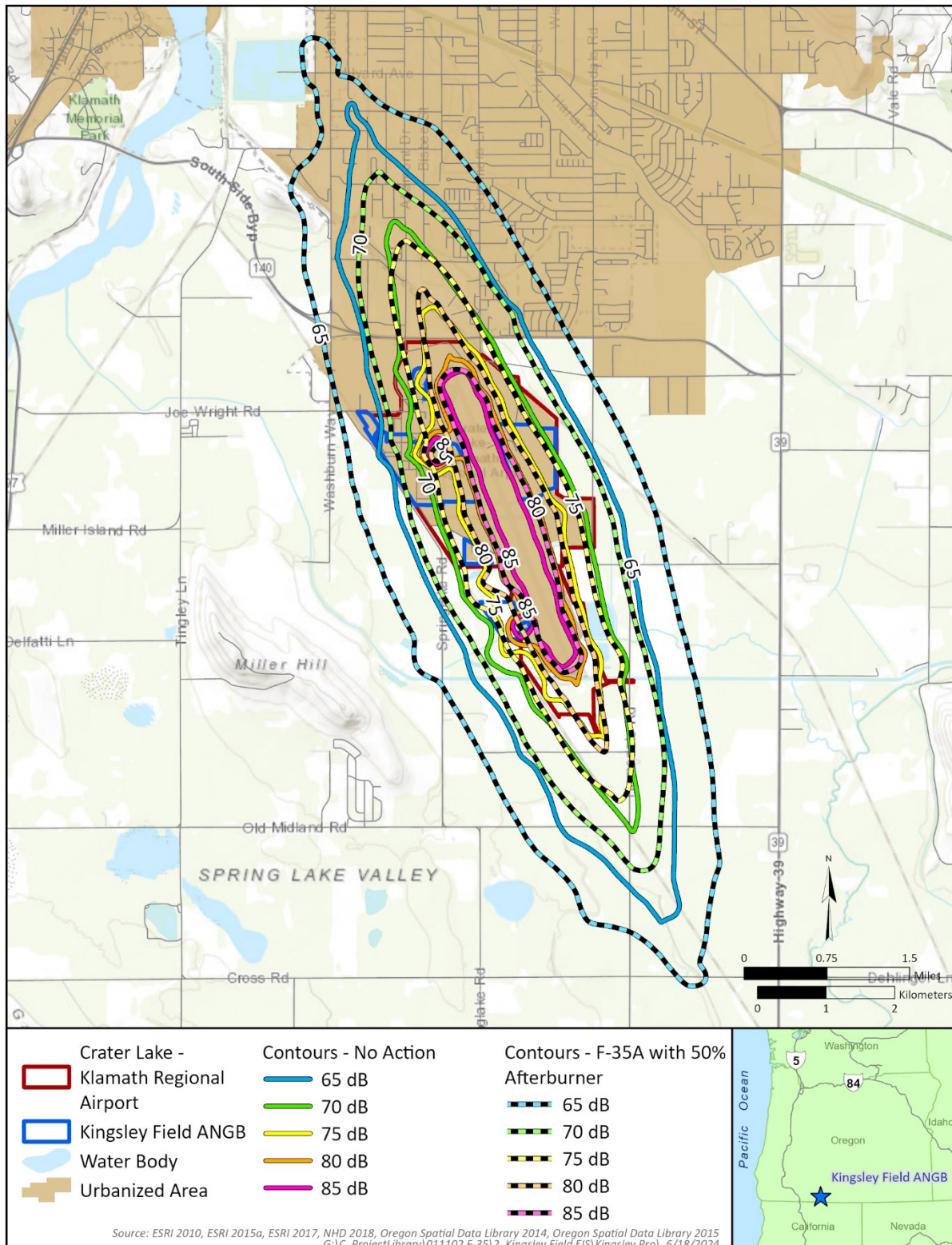


**Figure 5-2 Proposed Action F-35A (5% Afterburner) DNL Contours Comparison to No Action Alternative**



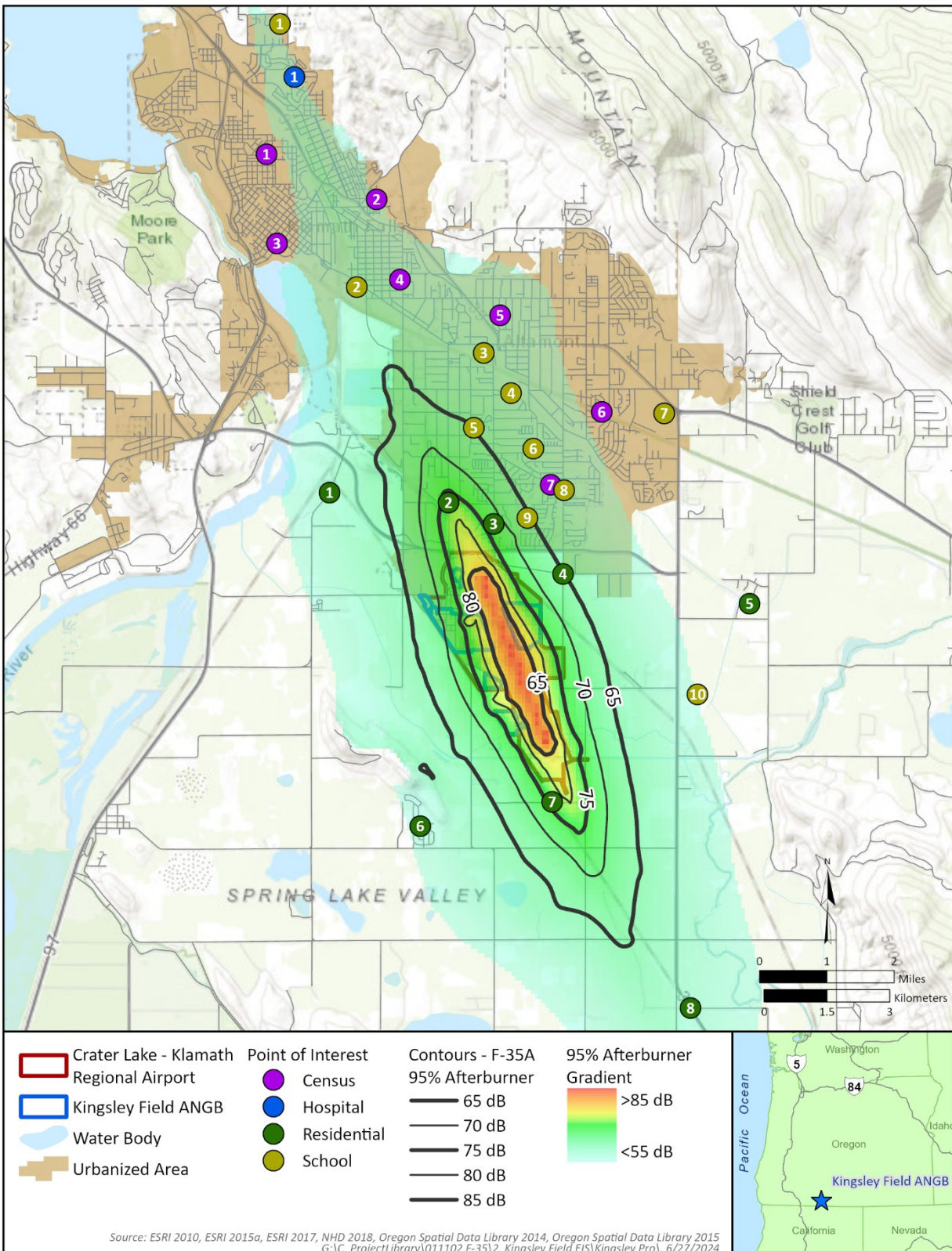
**Figure 5-3 Proposed Action F-35A DNL Contours and Gradient (50% Afterburner)**



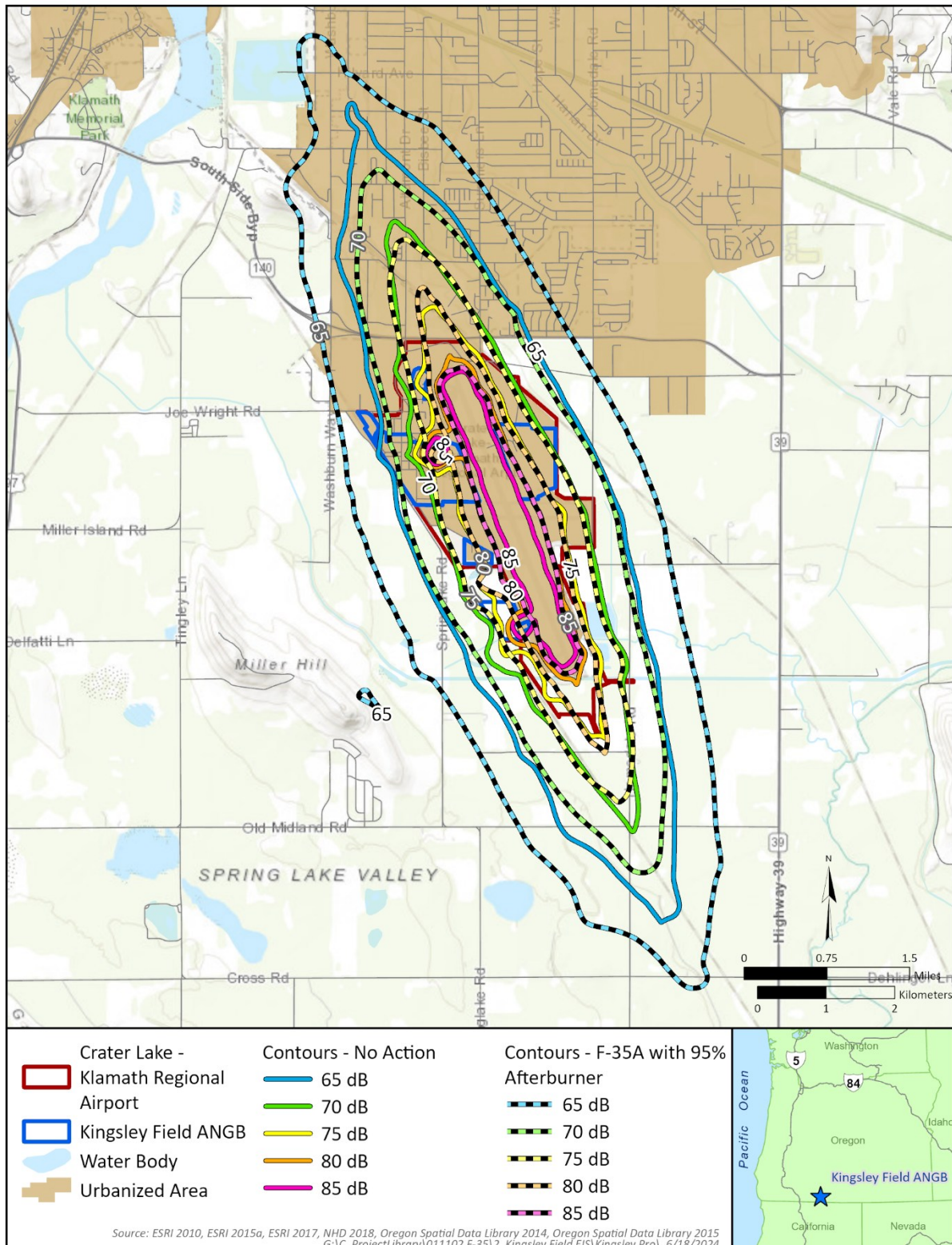


**Figure 5-4 Proposed Action F-35A (50% Afterburner) DNL Contours Comparison to No Action Alternative**



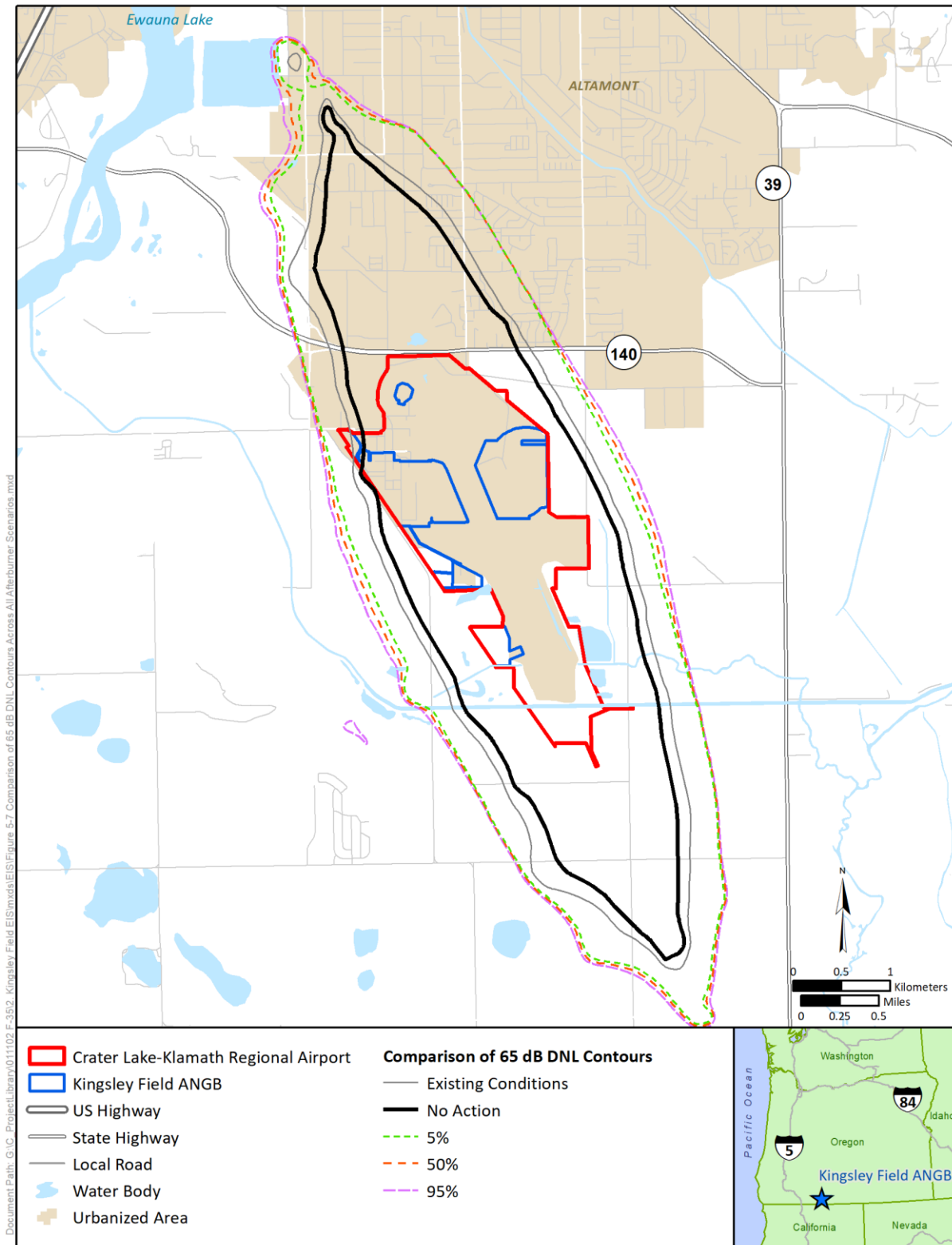


**Figure 5-5 Proposed Action F-35A DNL Contours and Gradient (95% Afterburner)**



**Figure 5-6 Proposed Action F-35A Comparison to No Action DNL Contours (95% Afterburner Departure Assumption)**





**Figure 5-7 Comparison of DNL 65 dB Contours for Existing Conditions (2023), No Action Alternative, and Proposed Action F-35A Afterburner Scenarios**

The three F-35A afterburner scenarios would result in very similar DNL 65 dB contours that would be larger than the No Action Alternative in all areas off-airport. The 95 percent afterburner condition would generally create the largest DNL 65 dB contour, followed by 50 percent afterburner in the middle, and 5 percent afterburner would be the smallest contour. This occurs because the F-35A engine generates greater noise levels while using afterburner during the initial acceleration along the runway contributing more noise adjacent to LMT. Because the F-35A would reduce power from afterburner to military power before the end of the runway and within the airport boundary, the effect on the DNL contours would be small. Additionally, the largest contributor to the length of the DNL 65 dB contours to the northwest and southeast would be closed pattern operations, which would be the same across the three F-35A afterburner scenarios. To the northeast, the largest contour is the 5 percent afterburner while the 95 percent afterburner would be the smallest. This occurs because a portion of departures turn right over the city in this general area. The additional thrust during the start of afterburner departures allows the F-35A to gain speed and altitude quicker along this turning flight path, reaching a slightly greater altitude and generating less noise at the ground. Although, in this case the difference in DNL would be very small and may not be perceptible.

Table 5-3 details the calculated DNL and the numbers of POIs that would be exposed to relevant DNL thresholds of 65, 70, and 75 dB at all POIs for the No Action Alternative and the three F-35A scenario alternatives. The F-35A 5 percent scenario would result in 5 POIs exposed to DNL of 65 dB or greater (an increase of 2 POIs). The F-35A 50 and 95 percent scenarios would result in 6 POIs exposed to DNL of 65 dB or greater (an increase of 3 POIs). The greatest DNL of 77 dB would occur at R02 Anderson Avenue and Altamont Drive under all three proposed F-35A scenarios followed by DNL of 76 dB at R07 Lombardy Lane and railroad tracks. In terms of change in DNL, all three scenarios would experience a similar increase of 1 to 5 dB greater than the No Action Alternative.

**Table 5-3 DNL at POIs for Proposed Action F-35A Afterburner Scenarios**  
**Adjacent to LMT**

| <i>Map ID</i> | <i>Named Point of Interest</i>     | <i>No Action</i> | <i>F-35A 5% AB</i>   | <i>F-35A 50% AB</i>  | <i>F-35A 95% AB</i>  |
|---------------|------------------------------------|------------------|----------------------|----------------------|----------------------|
| C01           | Census Tract 9719                  | 52               | 52 (0)               | 52 (0)               | 53 (+1)              |
| C02           | Census Tract 9717                  | 53               | 54 (+1)              | 55 (+2)              | 55 (+2)              |
| C03           | Census Tract 9718                  | 51               | 52 (+1)              | 53 (+2)              | 54 (+3)              |
| C04           | Census Tract 9716                  | 56               | 57 (+1)              | 58 (+2)              | 58 (+2)              |
| C05           | Census Tract 9712                  | 55               | 59 (+4)              | 58 (+3)              | 57 (+2)              |
| C06           | Census Tract 9713                  | 50               | 54 (+4)              | 54 (+4)              | 53 (+3)              |
| C07           | Census Tract 9714                  | 58               | 61 (+3)              | 61 (+3)              | 61 (+3)              |
| H01           | Sky Lakes Medical Center           | 55               | 56 (+1)              | 56 (+1)              | 57 (+2)              |
| R01           | Neighborhood                       | 57               | 60 (+3)              | 60 (+3)              | 60 (+3)              |
| R02           | Anderson Avenue and Altamont Drive | 73 <sup>1</sup>  | 77 (+4) <sup>1</sup> | 77 (+4) <sup>1</sup> | 77 (+4) <sup>1</sup> |
| R03           | Highland Way and Summit Street     | 68 <sup>1</sup>  | 72 (+4) <sup>1</sup> | 72 (+4) <sup>1</sup> | 73 (+5) <sup>1</sup> |
| R04           | Airway Drive and Homedale Road     | 61               | 64 (+3)              | 65 (+4) <sup>1</sup> | 65 (+4) <sup>1</sup> |
| R05           | Neighborhood                       | 46               | 51 (+5)              | 51 (+5)              | 51 (+5)              |
| R06           | Neighborhood                       | 54               | 56 (+2)              | 56 (+2)              | 56 (+2)              |
| R07           | Lombardy Lane and railroad tracks  | 71 <sup>1</sup>  | 76 (+5) <sup>1</sup> | 76 (+5) <sup>1</sup> | 76 (+5) <sup>1</sup> |
| R08           | Neighborhood                       | 57               | 59 (+2)              | 59 (+2)              | 59 (+2)              |
| S01           | Oregon Institute of Technology     | 53               | 54 (+1)              | 54 (+1)              | 54 (+1)              |

*Noise Study*  
*Environmental Impact Statement for Basing F-35A Lightning II Formal Training Unit*  
*at Kingsley Field ANGB, Klamath Falls, Oregon*  
*Final – September 2026*

| <i>Map ID</i> | <i>Named Point of Interest</i> | <i>No Action</i> | <i>F-35A 5% AB</i>         | <i>F-35A 50% AB</i>        | <i>F-35A 95% AB</i>        |
|---------------|--------------------------------|------------------|----------------------------|----------------------------|----------------------------|
| S02           | Klamath Family Head Start      | 59               | 60 (+1)                    | 61 (+2)                    | 61 (+2)                    |
| S03           | Triad School                   | 57               | 60 (+3)                    | 60 (+3)                    | 59 (+2)                    |
| S04           | Mazama High School             | 56               | 61 (+5)                    | 60 (+4)                    | 60 (+4)                    |
| S05           | Stearns Elementary School      | 61               | <b>65 (+4)<sup>1</sup></b> | <b>65 (+4)<sup>1</sup></b> | <b>65 (+4)<sup>1</sup></b> |
| S06           | Peterson Elementary            | 58               | 61 (+3)                    | 61 (+3)                    | 61 (+3)                    |
| S07           | Klamath Community College      | 47               | 50 (+3)                    | 50 (+3)                    | 49 (+2)                    |
| S08           | Brixner Junior High School     | 57               | 60 (+3)                    | 60 (+3)                    | 60 (+3)                    |
| S09           | Hosanna Christian School       | 62               | <b>65 (+3)<sup>1</sup></b> | <b>66 (+4)<sup>1</sup></b> | <b>66 (+4)<sup>1</sup></b> |
| S10           | Henley High School             | 52               | 55 (+3)                    | 55 (+3)                    | 55 (+3)                    |

*Note:* <sup>1</sup>Bold represents results that would exceed DNL 65 dB, which is the level at which the Air Force begins recommending land use controls for noise sensitive uses.

*Legend:* A/B = afterburner; DNL = Day-Night Average Sound Level; ID = Identification; LMT = Crater Lake-Klamath Regional Airport; POI = Point of Interest.

Table 5-4 presents the change in DNL at each POI for each action F-35A scenario relative to the No Action Alternative along with a summary of the number of POIs experiencing a decrease, no change, or several magnitudes of increase. The number of POIs exposed to DNL 70 dB or greater would increase from 2 to 3 and of those POIs, the number also exposed to 75 dB would increase by 2 from the No Action Alternative for all three proposed F-35A scenarios. The F-35A 5 percent scenario would result in 1 POI that would experience no change to DNL, 6 POIs that would experience an increase in DNL of 1 dB, 17 POIs that would experience an increase in DNL of 2 to 4 dB, and 2 POIs that would experience an increase in DNL of 5 dB or greater. The F-35A 50 percent scenario would result in 1 POI that would experience no change to DNL, 2 POIs that would experience an increase in DNL of 1 dB, 22 POIs that would experience an increase in DNL of 2 to 4 dB, and 1 POI that would experience an increase in DNL of 5 dB or greater. The F-35A 95 percent scenario would result in no POIs that would experience no change to DNL, 2 POIs that would experience an increase in DNL of 1 dB, 21 POIs that would experience an increase in DNL of 2 to 4 dB, and 3 POIs that would experience an increase in DNL of 5 dB or greater.

**Table 5-4 Change to DNL at POIs for Proposed Action F-35A Afterburner Scenarios Adjacent to LMT**

| <i>Condition</i>                                | <i>No Action Alternative</i> | <i>F-35A 5% AB</i> | <i>F-35A 50% AB</i> | <i>F-35A 95% AB</i> |
|-------------------------------------------------|------------------------------|--------------------|---------------------|---------------------|
| Number of POIs exposed to DNL 65 dB or greater  | 3                            | 5                  | 6                   | 6                   |
| Number of POIs exposed to DNL 70 dB or greater  | 2                            | 3                  | 3                   | 3                   |
| Number of POIs exposed to DNL 75 dB or greater  | 0                            | 2                  | 2                   | 2                   |
| Change to number of POIs exposed to DNL 65 dB   |                              | +2                 | +3                  | +3                  |
| Change to number of POIs exposed to DNL 70 dB   |                              | +1                 | +1                  | +1                  |
| Change to number of POIs exposed to DNL 75 dB   |                              | +2                 | +2                  | +2                  |
| Number of POIs with decrease of 1 dB or greater |                              | 0                  | 0                   | 0                   |
| Number of POIs with no change                   |                              | 1                  | 1                   | 0                   |
| Number of POIs with increase of 1 dB            |                              | 6                  | 2                   | 2                   |
| Number of POIs with increase of 2 to 4 dB       |                              | 17                 | 22                  | 21                  |
| Number of POIs with increase of 5 dB or greater |                              | 2                  | 1                   | 3                   |

*Legend:* % = percent; AB = afterburner; dB = decibel; DNL = Day-Night Average Sound Level; LMT = Crater Lake-Klamath Regional Airport; POI = Point of Interest.

#### 5.1.2.2 Acreage, Housing, and Population

Table 5-5 presents acreage for both on and adjacent to LMT for all proposed alternatives and the change in acreage relative to Existing Conditions (2023). Under the F-35A 5 percent scenario, acreage adjacent to LMT exposed to greater than DNL 65 dB would be 4,164, an increase of 1,987 from the No Action Alternative. The acreage would be composed of 2,619 acres exposed to DNL 65 to 70 dB (an increase of 1,061 acres), 1,066 acres exposed to DNL 70 to 75 dB (an increase of 537 acres), 410 acres exposed to DNL 75 to 80 dB (an increase of 321 acres), 71 acres exposed to DNL 80 to 85 dB (an increase of 69 acres). No areas off-airport would be exposed to DNL greater than 85 dB under the F-35A 5 percent scenario.

**Table 5-5 Acreage within DNL for Proposed Action F-35A Afterburner Scenarios on and Adjacent to LMT**

| <i>Scenario</i> | <i>DNL (dB)</i>        | <i>On LMT</i> | <i>Adjacent to LMT</i> | <i>Total</i> | <i>Change Relative to No Action Alternative</i> |                        |               |
|-----------------|------------------------|---------------|------------------------|--------------|-------------------------------------------------|------------------------|---------------|
|                 |                        |               |                        |              | <i>On LMT</i>                                   | <i>Adjacent to LMT</i> | <i>Total</i>  |
| F-35A<br>5% AB  | 65–70                  | 40            | 2,619                  | 2,659        | -93                                             | +1,061                 | +968          |
|                 | 70–75                  | 215           | 1,066                  | 1,281        | -69                                             | +537                   | +468          |
|                 | 75–80                  | 328           | 410                    | 738          | -6                                              | +321                   | +315          |
|                 | 80–85                  | 313           | 71                     | 384          | +109                                            | +69                    | +178          |
|                 | 85+                    | 351           | 0                      | 351          | +71                                             | 0                      | +71           |
|                 | <b>Total &gt;65 dB</b> | <b>1,247</b>  | <b>4,164</b>           | <b>5,412</b> | <b>+13</b>                                      | <b>+1,987</b>          | <b>+2,000</b> |
| F-35A<br>50% AB | 65–70                  | 34            | 2,707                  | 2,741        | -99                                             | +1,149                 | +1,050        |
|                 | 70–75                  | 194           | 1,130                  | 1,324        | -90                                             | +601                   | +511          |
|                 | 75–80                  | 328           | 421                    | 750          | -7                                              | +333                   | +326          |
|                 | 80–85                  | 317           | 81                     | 399          | +113                                            | +80                    | +193          |
|                 | 85+                    | 375           | 0                      | 375          | +96                                             | 0                      | +96           |
|                 | <b>Total &gt;65 dB</b> | <b>1,247</b>  | <b>4,340</b>           | <b>5,588</b> | <b>+13</b>                                      | <b>+2,163</b>          | <b>+2,176</b> |
| F-35A<br>95% AB | 65–70                  | 29            | 2,788                  | 2,817        | -104                                            | +1,229                 | +1,126        |
|                 | 70–75                  | 174           | 1,192                  | 1,366        | -110                                            | +663                   | +553          |
|                 | 75–80                  | 328           | 435                    | 763          | -7                                              | +346                   | +340          |
|                 | 80–85                  | 324           | 90                     | 413          | +120                                            | +88                    | +208          |
|                 | 85+                    | 393           | 2                      | 394          | +114                                            | +2                     | +115          |
|                 | <b>Total &gt;65 dB</b> | <b>1,247</b>  | <b>4,506</b>           | <b>5,753</b> | <b>+13</b>                                      | <b>+2,329</b>          | <b>+2,342</b> |

*Note:* Totals may not add due to rounding.

*Legend:* % = percent; > = greater than; A/B = afterburner; dB = decibel; DNL = Day-Night Average Sound Level; LMT = Crater Lake-Klamath Regional Airport.

Under the F-35A 50 percent afterburner scenario, acreage adjacent to LMT exposed to greater than DNL 65 dB would be 4,340, an increase of 2,163 from the No Action Alternative. The acreage would be composed of 2,707 acres exposed to DNL 65 to 70 dB (an increase of 1,149 acres), 1,130 acres exposed to DNL 70 to 75 dB (an increase of 601 acres), 421 acres exposed to DNL 75 to 80 dB (an increase of 333 acres), 81 acres exposed to DNL 80 to 85 dB (an increase of 80 acres). No areas off-airport would be exposed to DNL greater than 85 dB under the F-35A 50 percent scenario.

Under the F-35A 95 percent scenario, acreage adjacent to LMT exposed to greater than DNL 65 dB would be 4,506 an increase of 2,329 from the No Action Alternative. The acreage would be composed of 2,788 acres exposed to DNL 65 to 70 dB (an increase of 1,229 acres), 1,192 acres exposed to DNL 70 to 75 dB (an increase of 663 acres), 435 acres exposed to DNL 75 to 80 dB (an increase of 346 acres), 90 acres



exposed to DNL 80 to 85 dB (an increase of 88 acres), and 2 acres exposed to greater than DNL 85 dB (an increase of 2 acres).

Table 5-6 presents the acreage, households, and population estimations by DNL band for each proposed scenario at LMT for areas adjacent to LMT.

**Table 5-6 Acreage, Households, and Estimated Population by DNL Contour  
Adjacent to LMT (Proposed Action and No Action Alternative)**

| Scenario        | DNL (dB)     | Acreage<br>Adjacent<br>to LMT | Households   | Estimated<br>Population | Change from No Action Alternative |             |                         |
|-----------------|--------------|-------------------------------|--------------|-------------------------|-----------------------------------|-------------|-------------------------|
|                 |              |                               |              |                         | Acreage                           | Households  | Estimated<br>Population |
| F-35A<br>5% AB  | 65–70        | 2,619                         | 1,118        | 2,774                   | +1,061                            | +530        | +1,315                  |
|                 | 70–75        | 1,066                         | 371          | 921                     | +537                              | +71         | +177                    |
|                 | 75–80        | 410                           | 244          | 606                     | +321                              | +186        | +461                    |
|                 | 80–85        | 71                            | 0            | 0                       | +69                               | +0          | +0                      |
|                 | 85+          | 0                             | 0            | 0                       | +0                                | +0          | +0                      |
|                 | <b>Total</b> | <b>4,164</b>                  | <b>1,733</b> | <b>4,301</b>            | <b>+1,987</b>                     | <b>+787</b> | <b>+1,953</b>           |
| F-35A<br>50% AB | 65–70        | 2,707                         | 1,155        | 2,866                   | +1,149                            | +567        | +1,407                  |
|                 | 70–75        | 1,130                         | 393          | 975                     | +601                              | +93         | +231                    |
|                 | 75–80        | 421                           | 251          | 623                     | +332                              | +193        | +478                    |
|                 | 80–85        | 81                            | 1            | 3                       | +79                               | +1          | +3                      |
|                 | 85+          | 0                             | 0            | 0                       | +0                                | +0          | +0                      |
|                 | <b>Total</b> | <b>4,340</b>                  | <b>1,800</b> | <b>4,467</b>            | <b>+2,163</b>                     | <b>+854</b> | <b>+2,119</b>           |
| F-35A<br>95% AB | 65–70        | 2,788                         | 1,190        | 2,953                   | +1,229                            | +602        | +1,494                  |
|                 | 70–75        | 1,192                         | 415          | 1,030                   | +663                              | +115        | +286                    |
|                 | 75–80        | 435                           | 259          | 643                     | +346                              | +201        | +498                    |
|                 | 80–85        | 90                            | 1            | 3                       | +88                               | +1          | +3                      |
|                 | 85+          | 2                             | 0            | 0                       | +2                                | 0           | 0                       |
|                 | <b>Total</b> | <b>4,506</b>                  | <b>1,865</b> | <b>4,629</b>            | <b>+2,329</b>                     | <b>+919</b> | <b>+2,281</b>           |

*Note:* Totals may not add due to rounding.

Households and population within the DNL 80 dB and greater determined through review of aerial imagery.

*Legend:* % = percent; A/B = afterburner; dB = decibel; DNL = Day-Night Average Sound Level; LMT = Crater Lake-Klamath Regional Airport.

Under the F-35A 5 percent scenario, a total of 1,733 households and 4,301 people would be exposed to DNL of 65 dB or greater, an increase of 787 households and 1,953 people. Of those totals, 371 households and 921 people would be exposed to DNL 70 to 75 dB (an increase of an additional 71 households and 177 people), 244 households and 606 people would be exposed to DNL 75 to 80 dB (an increase of an additional 186 households and 461 people). As confirmed through a review of aerial imagery, no households or people would be exposed to DNL greater than 80 dB. These changes would be due to the general increase in length and width of the DNL 65 dB contour to the north caused by the increase in operations, and the greater noise generated by the F-35A on departures.

Under the F-35A 50 percent scenario, a total of 1,800 households and 4,467 people would be exposed to DNL of 65 dB or greater, an increase of 854 households and 2,119 people. Of those totals, 393 households and 975 people would be exposed to DNL 70 to 75 dB (an increase of an additional 93 households and 231 people), 251 households and 623 people would be exposed to DNL 75 to 80 dB (an increase of an additional 193 households and 478 people). As confirmed through a review of aerial imagery, no households or people would be exposed to DNL greater than 80 dB. These changes would be due to the general increase in length

and width of the DNL 65 dB contour to the north caused by the increase in operations, and the greater noise generated by the F-35A on departures.

Under the F-35A 95 percent scenario, a total of 1,865 households and 4,629 people would be exposed to DNL of 65 dB or greater, an increase of 919 households and 2,281 people. Of those totals, 415 households and 1,030 people would be exposed to DNL 70 to 75 dB (an increase of an additional 115 households and 286 people), 259 households and 643 people would be exposed to DNL 75 to 80 dB (an increase of an additional 201 households and 498 people). A review of aerial imagery found one household within the DNL 80 dB and none exposed to DNL 85 dB, which would be an increase of one household from the No Action Alternative. These changes would be due to the general increase in length and width of the DNL 65 dB contour to the north caused by the increase in operations, and the greater noise generated by the F-35A on departures.

Because households would be exposed to DNL of 80 dB or greater, Section 5.1.2.6 provides an analysis of the PHL

#### 5.1.2.3 Classroom Learning Interference

Table 5-7 presents  $L_{eq(8hr)}$  for the 10 school POIs. Under all three F-35A scenarios, the number of school POIs exposed to greater than 60 dB  $L_{eq(8hr)}$  would remain at 7 consistent with the No Action Alternative. The  $L_{eq(8hr)}$  at each POI would increase 1 to 5 dB except at S01 Oregon Institute of Technology, which would decrease by 1 dB  $L_{eq(8hr)}$  under the 5 percent afterburner scenario.

**Table 5-7 Classroom Screening Criteria ( $L_{eq(8hr)}$ ) for POIs Adjacent to LMT**

| <i>ID</i>                                              | <i>Location</i>                | <i>No Action Alternative</i> | <i>F-35A 5% AB</i>         | <i>F-35A 50% AB</i>        | <i>F-35A 95% AB</i>        |
|--------------------------------------------------------|--------------------------------|------------------------------|----------------------------|----------------------------|----------------------------|
| S01                                                    | Oregon Institute of Technology | 57                           | 56 (-1)                    | 58 (+1)                    | 59 (+2)                    |
| S02                                                    | Klamath Family Head Start      | <b>62<sup>3</sup></b>        | <b>63 (+1)<sup>3</sup></b> | <b>65 (+3)<sup>3</sup></b> | <b>65 (+3)<sup>3</sup></b> |
| S03                                                    | Triad School                   | <b>61<sup>3</sup></b>        | <b>64 (+3)<sup>3</sup></b> | <b>65 (+4)<sup>3</sup></b> | <b>64 (+3)<sup>3</sup></b> |
| S04                                                    | Mazama High School             | <b>60<sup>3</sup></b>        | <b>65 (+5)<sup>3</sup></b> | <b>65 (+5)<sup>3</sup></b> | <b>64 (+4)<sup>3</sup></b> |
| S05                                                    | Stearns Elementary School      | <b>65<sup>3</sup></b>        | <b>69 (+4)<sup>3</sup></b> | <b>69 (+4)<sup>3</sup></b> | <b>69 (+4)<sup>3</sup></b> |
| S06                                                    | Peterson Elementary            | <b>62<sup>3</sup></b>        | <b>65 (+3)<sup>3</sup></b> | <b>65 (+3)<sup>3</sup></b> | <b>65 (+3)<sup>3</sup></b> |
| S07                                                    | Klamath Community College      | 51                           | 54 (+3)                    | 54 (+3)                    | 54 (+3)                    |
| S08                                                    | Brixner Junior High School     | <b>61<sup>3</sup></b>        | <b>64 (+3)<sup>3</sup></b> | <b>64 (+3)<sup>3</sup></b> | <b>64 (+3)<sup>3</sup></b> |
| S09                                                    | Hosanna Christian School       | <b>65<sup>3</sup></b>        | <b>69 (+4)<sup>3</sup></b> | <b>70 (+5)<sup>3</sup></b> | <b>70 (+5)<sup>3</sup></b> |
| S10                                                    | Henley High School             | 56                           | 58 (+2)                    | 59 (+3)                    | 59 (+3)                    |
| Number of School POIs greater than 60 dB $L_{eq(8hr)}$ |                                | 7                            | 7 (+0)                     | 7 (+0)                     | 7 (+0)                     |

*Notes:* <sup>1</sup>Assumes 90 percent of ANG daytime operations occur during the school day;

Windows open condition with NLR of 15 dB due to building attenuation.

<sup>2</sup>Parenthetical number represents the change to  $L_{eq(8hr)}$  relative to Existing Conditions (2023).

<sup>3</sup>Bold represents results that would exceed the screening threshold of 60 dB  $L_{eq(8hr)}$ .

*Legend:* % = percent; A/B = afterburner; ID = Identification;  $L_{eq(8hr)}$  = 8-hour equivalent sound level; LMT = Crater Lake-Klamath Regional Airport; POI = Point of Interest.

Table 5-8 presents the average number of speech interfering events per school day hour from LMT aircraft operations. The 5 percent afterburner scenario would result in 1 additional event per hour at 2 school POIs, 3 additional events at 7 POIs, and no change at 1 POI. Both the 50 and 95 percent afterburner scenarios would result in 1 additional event per hour at 3 POIs, 2 additional events per hour at 4 POIs, and 3 additional events at 3 POIs.

**Table 5-8 Classroom Speech Interfering Events per School Day Hour  
Adjacent to LMT**

| <b>ID</b> | <b>Location</b>                | <b>No Action<br/>Alternative</b> | <b>F-35A<br/>5% AB</b> | <b>F-35A<br/>50% AB</b> | <b>F-35A<br/>95% AB</b> |
|-----------|--------------------------------|----------------------------------|------------------------|-------------------------|-------------------------|
| S01       | Oregon Institute of Technology | 1                                | 1 (0)                  | 2 (+1)                  | 2 (+1)                  |
| S02       | Klamath Family Head Start      | 2                                | 3 (+1)                 | 3 (+1)                  | 3 (+1)                  |
| S03       | Triad School                   | 2                                | 3 (+1)                 | 3 (+1)                  | 3 (+1)                  |
| S04       | Mazama High School             | 2                                | 4 (+2)                 | 4 (+2)                  | 4 (+2)                  |
| S05       | Stearns Elementary School      | 2                                | 4 (+2)                 | 5 (+3)                  | 5 (+3)                  |
| S06       | Peterson Elementary            | 2                                | 4 (+2)                 | 4 (+2)                  | 4 (+2)                  |
| S07       | Klamath Community College      | 1                                | 3 (+2)                 | 4 (+3)                  | 4 (+3)                  |
| S08       | Brixner Junior High School     | 2                                | 4 (+2)                 | 4 (+2)                  | 4 (+2)                  |
| S09       | Hosanna Christian School       | 3                                | 5 (+2)                 | 6 (+3)                  | 6 (+3)                  |
| S10       | Henley High School             | 2                                | 4 (+2)                 | 4 (+2)                  | 4 (+2)                  |

Notes: <sup>1</sup>Assumes 90 percent of ANG daytime operations occur during the school day;  
Windows open condition with NLR of 15 dB due to building attenuation.  
<sup>2</sup>Parenthetical represents the change to average number of classroom speech interfering events per hour relative to Existing Conditions (2023).

Legend: % = percent; A/B = afterburner; ID = Identification; LMT = Crater Lake-Klamath Regional Airport.

Table 5-9 presents the estimated time in minutes during an average school day that interior noise levels would be above an interior level of 50 dB. Under the F-35A 5 percent scenario, 1 school POI would experience no change, 3 school POIs would experience an increase of 1 to 2 minutes per school day, and 6 school POIs would experience an increase of 3 to 5 minutes per school day. Under the F-35A 50 percent scenario, 3 school POIs would experience an increase of 3 to 5 minutes per school day, and 7 school POIs would experience an increase of 6 to 9 minutes per school day. Under the F-35A 95 percent scenario, 2 school POIs would experience an increase of 3 to 5 minutes per school day, 6 school POIs would experience an increase of 6 to 9 minutes per school day, and 2 school POIs would experience an increase of 10 to 14 minutes per school day.

**Table 5-9 Classroom Time Above Interior 50 dB during 8-hour School Day  
Adjacent to LMT**

| <b>ID</b> | <b>Location</b>                | <b>No Action<br/>Alternative</b> | <b>F-35A<br/>5% AB</b> | <b>F-35A<br/>50% AB</b> | <b>F-35A<br/>95% AB</b> |
|-----------|--------------------------------|----------------------------------|------------------------|-------------------------|-------------------------|
| S01       | Oregon Institute of Technology | 3                                | 4 (+1)                 | 6 (+3)                  | 8 (+5)                  |
| S02       | Klamath Family Head Start      | 4                                | 6 (+2)                 | 9 (+5)                  | 10 (+6)                 |
| S03       | Triad School                   | 3                                | 6 (+3)                 | 9 (+6)                  | 11 (+8)                 |
| S04       | Mazama High School             | 3                                | 6 (+3)                 | 9 (+6)                  | 10 (+7)                 |
| S05       | Stearns Elementary School      | 4                                | 9 (+5)                 | 12 (+8)                 | 13 (+9)                 |
| S06       | Peterson Elementary            | 5                                | 8 (+3)                 | 11 (+6)                 | 12 (+7)                 |
| S07       | Klamath Community College      | 5                                | 5 (0)                  | 8 (+3)                  | 9 (+4)                  |
| S08       | Brixner Junior High School     | 7                                | 10 (+3)                | 16 (+9)                 | 21 (+14)                |
| S09       | Hosanna Christian School       | 10                               | 11 (+1)                | 16 (+6)                 | 20 (+10)                |
| S10       | Henley High School             | 6                                | 11 (+5)                | 14 (+8)                 | 15 (+9)                 |

Notes: <sup>1</sup>Assumes 90 percent of ANG daytime operations occur during the school day;  
Windows open condition with NLR of 15 dB due to building attenuation.  
<sup>2</sup>Parenthetical represents the change to time above 50 dB, in minutes, relative to Existing Conditions (2023).

Legend: % = percent; A/B = afterburner; dB = decibel; ID = Identification; LMT = Crater Lake-Klamath Regional Airport.

#### 5.1.2.4 Non-school Speech Interference

Table 5-10 details the number of speech interfering events during the DNL daytime (7 a.m. to 10 p.m. [0700 to 2200]) per average day for both windows open and windows closed conditions. With windows open, under all three F-35A scenarios the number of daytime events would range from 1 to 2 per average hour at 9 POIs, 3 to 4 events at 12 POIs, and 5 to 7 events at 5 POIs. With windows closed, under the F-35A 5 percent scenario the number of daytime events would be none at 3 POIs, range from 1 to 2 per average hour at 18 POIs, and 3 to 4 events at 5 POIs. With windows closed, under the F-35A 50 percent scenario the number of daytime events would range from 1 to 2 per average hour at 21 POIs, and 3 to 4 events at 5 POIs. With windows closed, under the F-35A 95 percent scenario the number of daytime events would range from 1 to 2 per average hour at 18 POIs, and 3 to 4 events at 8 POIs.

**Table 5-10 Non-School Speech Interfering Events per Day During DNL Daytime  
(Windows Open/Windows Closed) Adjacent to LMT**

| <i>ID</i> | <i>Location</i>                    | <i>No Action<br/>Alternative</i> | <i>F-35A<br/>5% AB</i> | <i>F-35A<br/>50% AB</i> | <i>F-35A<br/>95% AB</i> |
|-----------|------------------------------------|----------------------------------|------------------------|-------------------------|-------------------------|
| C01       | Census Tract 9719                  | 1 / 0                            | 1 / 0                  | 1 / 1                   | 1 / 1                   |
| C02       | Census Tract 9717                  | 1 / 0                            | 2 / 1                  | 2 / 1                   | 2 / 1                   |
| C03       | Census Tract 9718                  | 1 / 0                            | 2 / 1                  | 2 / 1                   | 2 / 1                   |
| C04       | Census Tract 9716                  | 1 / 0                            | 2 / 1                  | 2 / 1                   | 2 / 1                   |
| C05       | Census Tract 9712                  | 1 / 0                            | 2 / 1                  | 2 / 1                   | 2 / 1                   |
| C06       | Census Tract 9713                  | 1 / 0                            | 3 / 1                  | 3 / 1                   | 3 / 1                   |
| C07       | Census Tract 9714                  | 2 / 1                            | 3 / 2                  | 3 / 2                   | 3 / 3                   |
| H01       | Sky Lakes Medical Center           | 1 / 0                            | 2 / 0                  | 2 / 1                   | 2 / 1                   |
| R01       | Neighborhood                       | 1 / 1                            | 3 / 2                  | 3 / 2                   | 3 / 2                   |
| R02       | Anderson Avenue and Altamont Drive | 5 / 2                            | 7 / 4                  | 7 / 4                   | 7 / 4                   |
| R03       | Highland Way and Summit Street     | 3 / 2                            | 5 / 4                  | 5 / 4                   | 5 / 4                   |
| R04       | Airway Drive and Homedale Road     | 3 / 1                            | 5 / 3                  | 5 / 3                   | 5 / 3                   |
| R05       | Neighborhood                       | 1 / 0                            | 3 / 1                  | 3 / 1                   | 3 / 1                   |
| R06       | Neighborhood                       | 1 / 1                            | 3 / 2                  | 3 / 2                   | 3 / 2                   |
| R07       | Lombardy Lane and railroad tracks  | 5 / 2                            | 7 / 4                  | 7 / 4                   | 7 / 4                   |
| R08       | Neighborhood                       | 1 / 0                            | 2 / 1                  | 2 / 1                   | 2 / 1                   |
| S01       | Oregon Institute of Technology     | 1 / 0                            | 1 / 0                  | 2 / 1                   | 2 / 1                   |
| S02       | Klamath Family Head Start          | 2 / 1                            | 3 / 1                  | 3 / 1                   | 3 / 1                   |
| S03       | Triad School                       | 1 / 0                            | 2 / 1                  | 2 / 1                   | 2 / 1                   |
| S04       | Mazama High School                 | 1 / 0                            | 3 / 2                  | 3 / 2                   | 3 / 2                   |
| S05       | Stearns Elementary School          | 2 / 1                            | 4 / 2                  | 4 / 2                   | 4 / 2                   |
| S06       | Peterson Elementary                | 2 / 1                            | 3 / 2                  | 3 / 2                   | 3 / 2                   |
| S07       | Klamath Community College          | 1 / 0                            | 3 / 1                  | 3 / 1                   | 3 / 1                   |
| S08       | Brixner Junior High School         | 1 / 1                            | 3 / 2                  | 3 / 2                   | 3 / 3                   |
| S09       | Hosanna Christian School           | 3 / 1                            | 5 / 3                  | 5 / 3                   | 5 / 3                   |
| S10       | Henley High School                 | 1 / 1                            | 3 / 2                  | 3 / 2                   | 3 / 3                   |

*Note:* <sup>1</sup>Values represent events for conditions with windows open / windows closed.

*Legend:* % = percent; A/B = afterburner; DNL = Day-Night Average Sound Level; ID = Identification; LMT = Crater Lake-Klamath Regional Airport.

#### 5.1.2.5 Probability of Awakening

Table 5-11 presents the existing estimated PA and the change that would occur under each of the proposed F-35A scenarios. The PA results would be the same for all three proposed F-35A scenarios. With windows

open 11 POIs would experience no change to PA, 14 POIs would experience an increase of 1 percent, and 1 POI would experience a 2 percent increase. With windows closed 15 POIs would experience no change to PA and 11 POIs would experience an increase of 1 percent. The change to the PA would be small because the proportion of nighttime flights (10 p.m. to 7 a.m.) by the 173 FW would remain low relative to civil aircraft.

**Table 5-11 Estimated Change to Probability of Awakening (Windows Open/Windows Closed) Relative to the No Action Alternative Adjacent to LMT**

| <i>ID</i>                                  | <i>Location</i>                    | <i>No Action Alternative</i> | <i>Change Relative to No Action Alternative</i> |                         |                         |
|--------------------------------------------|------------------------------------|------------------------------|-------------------------------------------------|-------------------------|-------------------------|
|                                            |                                    |                              | <i>F-35A<br/>5% AB</i>                          | <i>F-35A<br/>50% AB</i> | <i>F-35A<br/>95% AB</i> |
| C01                                        | Census Tract 9719                  | <1% / <1%                    | +1% / 0                                         | +1% / 0                 | +1% / 0                 |
| C02                                        | Census Tract 9717                  | <1% / <1%                    | +1% / 0                                         | +1% / 0                 | +1% / 0                 |
| C03                                        | Census Tract 9718                  | <1% / <1%                    | +1% / 0                                         | +1% / 0                 | +1% / 0                 |
| C04                                        | Census Tract 9716                  | <1% / <1%                    | +1% / 0                                         | +1% / 0                 | +1% / 0                 |
| C05                                        | Census Tract 9712                  | <1% / <1%                    | +1% / 0                                         | +1% / 0                 | +1% / 0                 |
| C06                                        | Census Tract 9713                  | <1% / <1%                    | +1% / 0                                         | +1% / 0                 | +1% / 0                 |
| C07                                        | Census Tract 9714                  | 1% / <1%                     | 0 / +1%                                         | 0 / +1%                 | 0 / +1%                 |
| H01                                        | Sky Lakes Medical Center           | <1% / <1%                    | 0 / 0                                           | 0 / 0                   | 0 / 0                   |
| R01                                        | Neighborhood                       | 1% / 1%                      | +1% / 0                                         | +1% / 0                 | +1% / 0                 |
| R02                                        | Anderson Avenue and Altamont Drive | 10% / 6%                     | +1% / +1%                                       | +1% / +1%               | +1% / +1%               |
| R03                                        | Highland Way and Summit Street     | 2% / 1%                      | +1% / +1%                                       | +1% / +1%               | +1% / +1%               |
| R04                                        | Airway Drive and Homedale Road     | 1% / 1%                      | +1% / 0                                         | +1% / 0                 | +1% / 0                 |
| R05                                        | Neighborhood                       | 1% / <1%                     | 0 / +1%                                         | 0 / +1%                 | 0 / +1%                 |
| R06                                        | Neighborhood                       | 1% / <1%                     | 0 / +1%                                         | 0 / +1%                 | 0 / +1%                 |
| R07                                        | Lombardy Lane and railroad tracks  | 4% / 3%                      | +2% / +1%                                       | +2% / +1%               | +2% / +1%               |
| R08                                        | Neighborhood                       | <1% / <1%                    | +1% / 0                                         | +1% / 0                 | +1% / 0                 |
| S01                                        | Oregon Institute of Technology     | <1% / <1%                    | 0 / 0                                           | 0 / 0                   | 0 / 0                   |
| S02                                        | Klamath Family Head Start          | <1% / <1%                    | +1% / 0                                         | +1% / 0                 | +1% / 0                 |
| S03                                        | Triad School                       | 1% / <1%                     | 0 / +1%                                         | 0 / +1%                 | 0 / +1%                 |
| S04                                        | Mazama High School                 | 1% / <1%                     | 0 / +1%                                         | 0 / +1%                 | 0 / +1%                 |
| S05                                        | Stearns Elementary School          | 1% / <1%                     | 0 / +1%                                         | 0 / +1%                 | 0 / +1%                 |
| S06                                        | Peterson Elementary                | 1% / <1%                     | 0 / +1%                                         | 0 / +1%                 | 0 / +1%                 |
| S07                                        | Klamath Community College          | <1% / <1%                    | +1% / 0                                         | +1% / 0                 | +1% / 0                 |
| S08                                        | Brixner Junior High School         | 1% / <1%                     | 0 / +1%                                         | 0 / +1%                 | 0 / +1%                 |
| S09                                        | Hosanna Christian School           | 1% / 1%                      | +1% / 0                                         | +1% / 0                 | +1% / 0                 |
| S10                                        | Henley High School                 | 1% / <1%                     | 0 / 0                                           | 0 / 0                   | 0 / 0                   |
| POIs with no change                        |                                    |                              | 11 / 15                                         | 11 / 15                 | 11 / 15                 |
| POIs with increase of 1 percent or greater |                                    |                              | 15 / 11                                         | 15 / 11                 | 15 / 11                 |

*Notes:* <sup>1</sup>Non-residential POIs included because residential areas are often located nearby other noise sensitive areas for which these results would apply.

<sup>2</sup>Assumes 15 dB Noise Level Reduction.

<sup>3</sup>Assumes 25 dB Noise Level Reduction.

*Legend:* % = percent; < = less than; A/B = afterburner; ID = Identification; LMT = Crater Lake-Klamath Regional Airport; POI = Point of Interest.

#### 5.1.2.6 Potential for Hearing Loss

Figures 5-8, 5-9, and 5-10 depict both the DNL 80 dB screening threshold and relevant  $L_{eq(24hr)}$  contours for PHL analysis for the proposed F-35A 5, 50, and 95 percent afterburner scenarios, respectively. All three of the proposed F-35A scenarios would result in acreage adjacent to LMT exposed to DNL 80 dB that would extend beyond LMT property to the north, south, southwest, and southeast by as much as 2,000 feet. Under the 5 percent afterburner scenario, portions of two residentially zoned properties south of LMT would be exposed to DNL 80 dB but no residential structures would be exposed to DNL 80 dB or greater so PHL would not be anticipated for any residents.

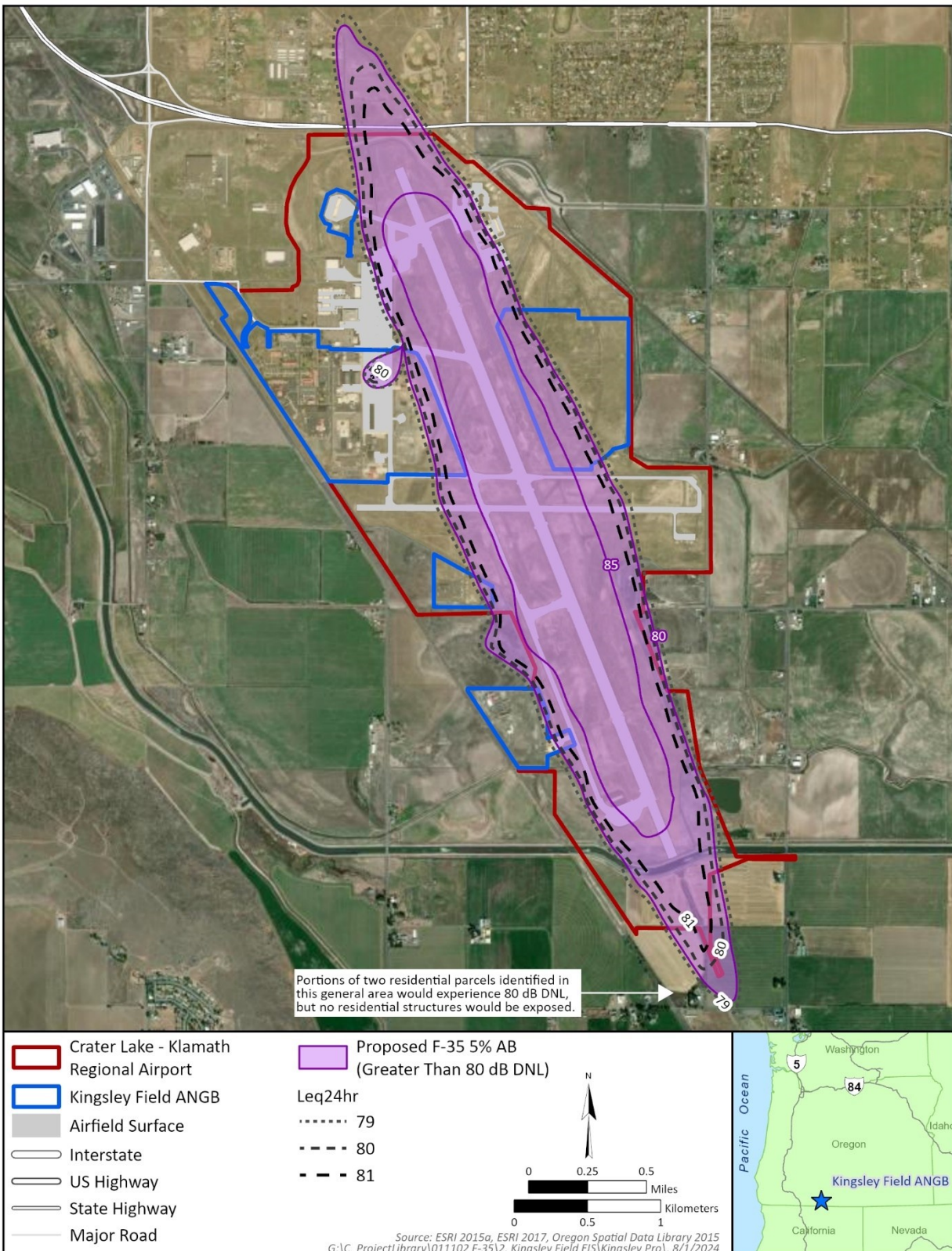
Under both the 50 and 95 percent afterburner scenarios, the same two residentially zoned properties south of LMT would be exposed to DNL 80 dB while one of the residential structures would also be within that contour. Therefore, the additional PHL analysis described in DNWG 2012 would apply that relies upon a separate noise metric,  $L_{eq(24hr)}$ , which is similar to DNL except without the nighttime adjustment. As presented in Figures 5-9 and 5-10 the 80 dB and above  $L_{eq(24hr)}$  contours would not affect any households in either scenario, which corresponds to an average NIPTS of 3 dB. However, one household would be within the 78 to 79 dB  $L_{eq(24hr)}$  band under both the F-35A 50 and 95 percent scenarios, which corresponds to an average NIPTS of 2 dB and a most sensitive NIPTS of 5.5 dB. For reference, changes in hearing level of less than 5 dB are generally not considered noticeable or significant. Furthermore, there is no known evidence that a NIPTS of 5 dB is perceptible or has any practical significance for the individual. Lastly, the variability in audiometric testing is generally assumed to be  $\pm 5$  dB (EPA 1974).

#### 5.1.2.7 FAA Order 1050.1G Airfield Impact Analysis

Because the FAA, which is a cooperating agency for this study, applies different significance criteria for noise impact analyses, this section presents results that support the two proposed alternatives presented in the EIS. FAA Order 1050.1G defines an impact as significant if it “would increase noise by DNL 1.5 dB or more for a noise sensitive area that is exposed to noise at or above the DNL 65 dB noise exposure level, or that would be exposed at or above the DNL 65 dB level due to a DNL 1.5 dB or greater increase, when compared to the No Action Alternative for the same timeframe.” Additionally, FAA Order 1050.1G requires disclosure of noise sensitive areas that would be exposed “to aircraft noise at or above DNL 60 dB but below DNL 65 dB and are projected to experience a noise increase of DNL 3 dB or more, only when DNL 1.5 dB increases are documented within the DNL 65 dB contour.”

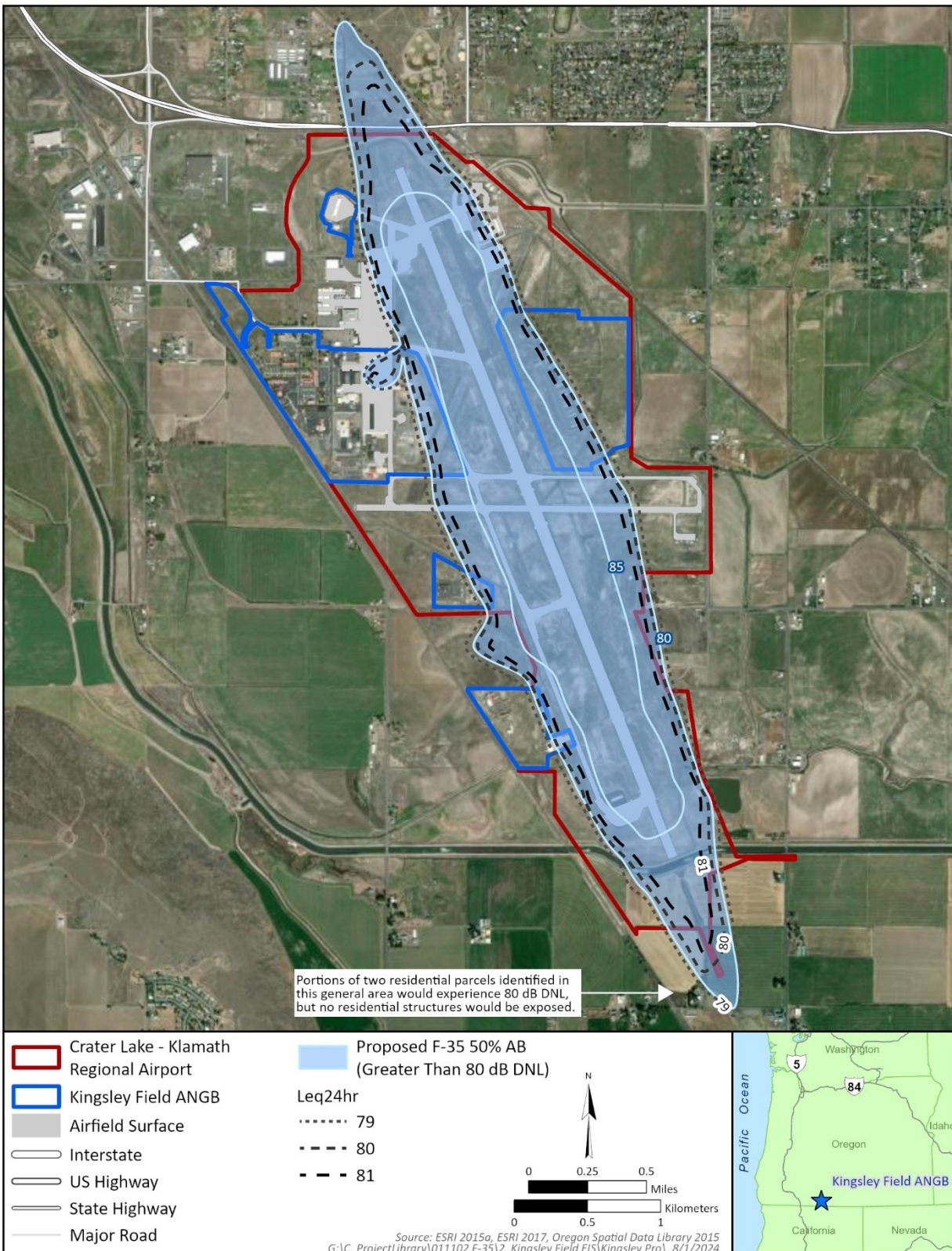
Table 5-12 quantifies the acreage, households, and population that would be affected according to FAA Order 1050.1G. Under the Proposed F-35A scenario with 5 percent afterburner a total of 4,112 acres, 1,901 households, and an estimated 4,716 people would be exposed to greater than DNL 65 dB under the F-35A 5 percent afterburner alternative while experiencing an increase of 1.5 dB or greater change to DNL relative to the No Action Alternative, which meets the FAA Order 1050.1G significance threshold for noise. Additionally, a total of 2,947 acres, 1,531 households, and an estimated 3,799 people would be exposed to DNL of 60 to 65 dB while experiencing a 3 dB or greater increase in DNL, which FAA criteria defines as a reportable noise increase.





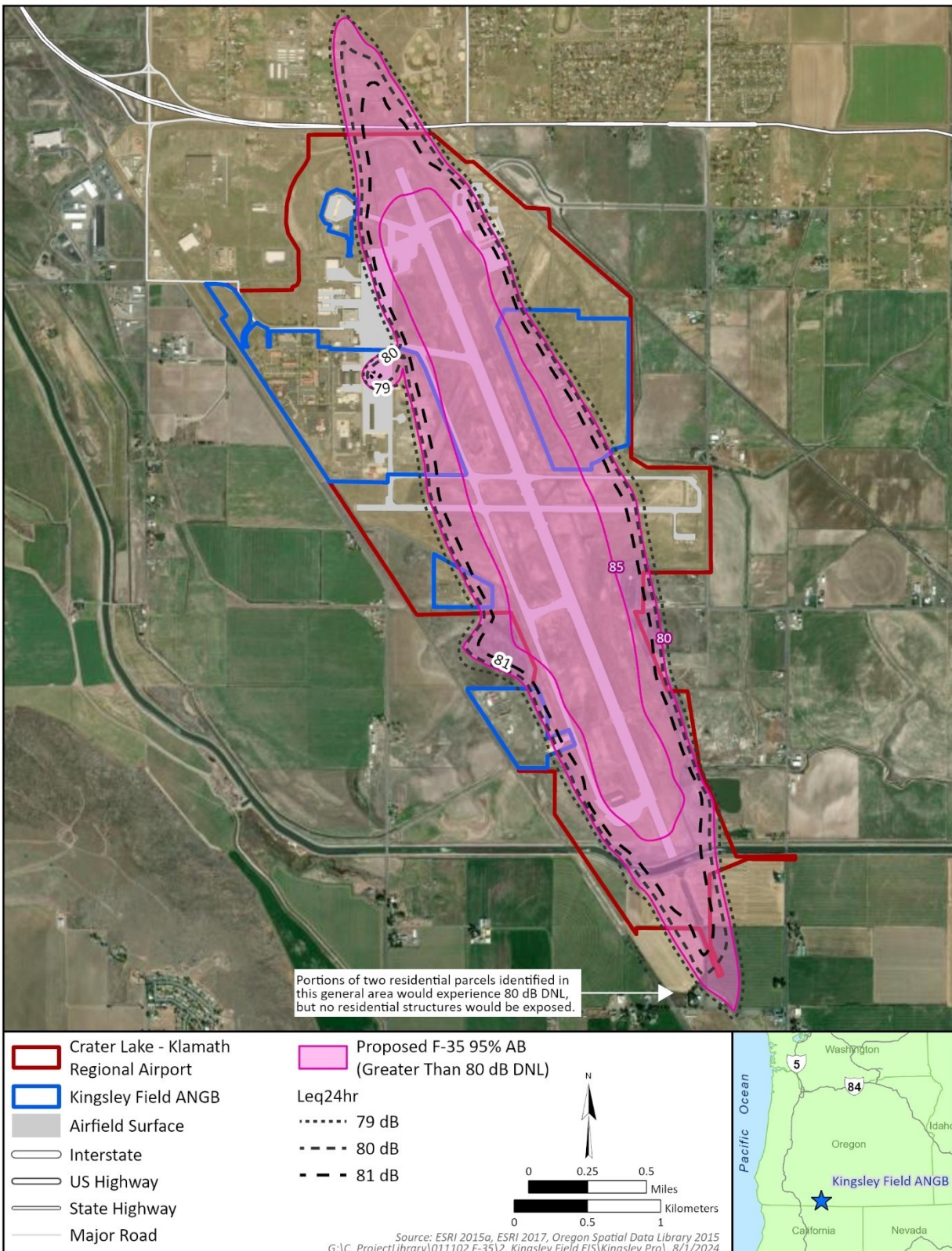
**Figure 5-8 Potential For Hearing Loss – Proposed F-35A 5 Percent Afterburner**





**Figure 5-9 Potential For Hearing Loss – Proposed F-35A 50 Percent Afterburner**





**Figure 5-10 Potential For Hearing Loss – Proposed F-35A 95 Percent Afterburner**

**Table 5-12 FAA DNL Exposure Thresholds Affecting Acreage, Population, and Households Under the Three Afterburner Scenarios**

| <i>Scenario</i> | <i>FAA Classification<sup>1</sup></i> | <i>Description</i>                           | <i>Acreage</i> | <i>Households</i> | <i>Population</i> |
|-----------------|---------------------------------------|----------------------------------------------|----------------|-------------------|-------------------|
| F-35A<br>5% AB  | Significant                           | +1.5 dB (or higher) Change within DNL 65+ dB | 4,112          | 1,901             | 4,716             |
|                 | Reportable                            | +3 dB (or higher) Change within DNL 60–65 dB | 2,947          | 1,531             | 3,799             |
| F-35A<br>50% AB | Significant                           | +1.5 dB (or higher) Change within DNL 65+ dB | 4,303          | 1,926             | 4,779             |
|                 | Reportable                            | +3 dB (or higher) Change within DNL 60–65 dB | 3,221          | 1,475             | 3,660             |
| F-35A<br>95% AB | Significant                           | +1.5 dB (or higher) Change within DNL 65+ dB | 4,486          | 1,948             | 4,834             |
|                 | Reportable                            | +3 dB (or higher) Change within DNL 60–65 dB | 3,466          | 1,430             | 3,549             |

*Note:* <sup>1</sup>FAA 1050.1G, FAA National Environmental Policy Act Implementing Procedures. 30 June 2025.

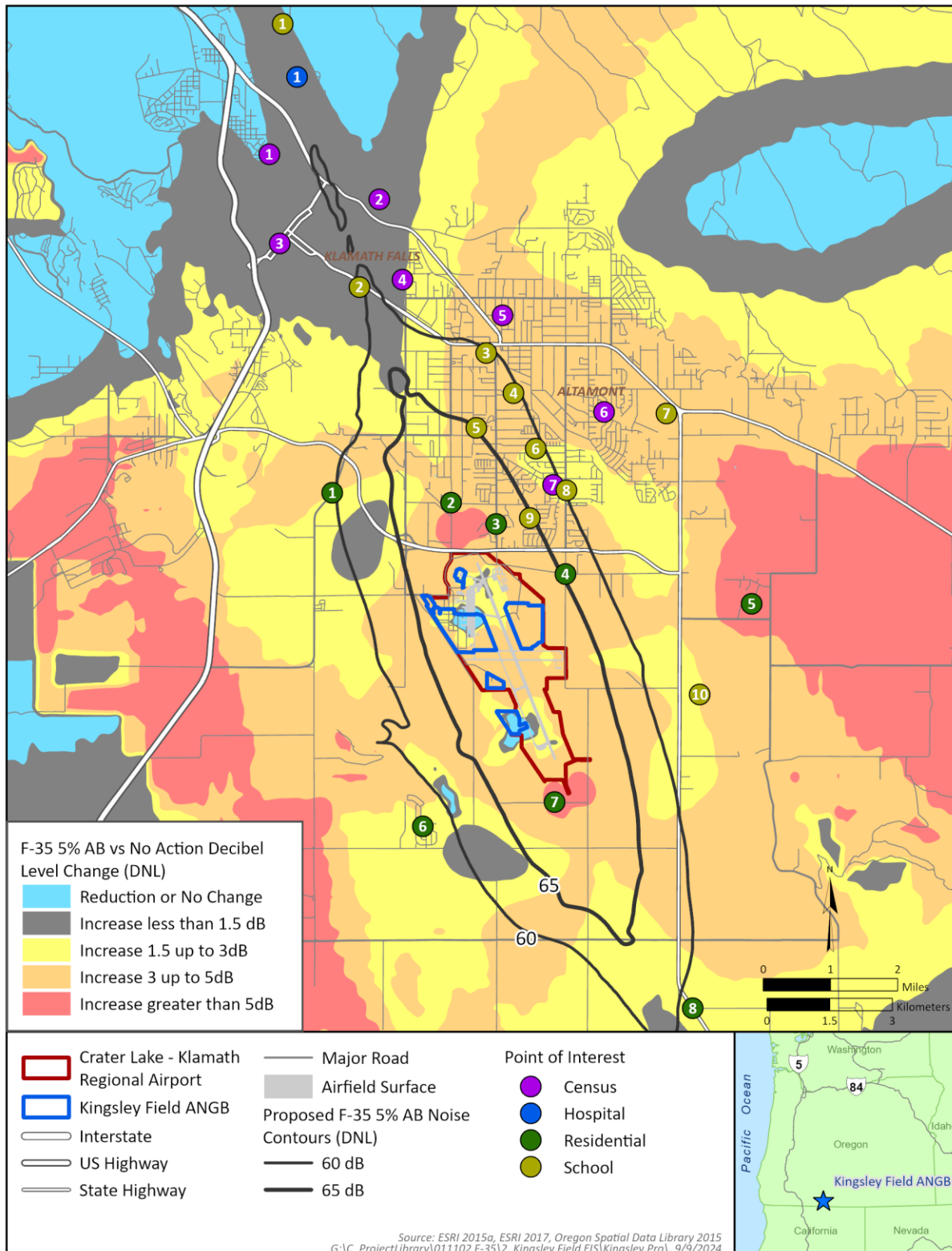
*Legend:* % = percent; A/B = afterburner; dB = decibel; DNL = Day-Night Average Sound Level; FAA = Federal Aviation Administration.

Under the Proposed F-35A scenario with 50 percent afterburner, a total of 4,303 acres, 1,926 households, and an estimated 4,779 people would be exposed to greater than DNL 65 dB under the F-35A 50 percent afterburner alternative while experiencing an increase of 1.5 dB or greater change to DNL relative to the No Action Alternative, which meets the FAA Order 1050.1G significance threshold for noise. Additionally, a total of 3,221 acres, 1,475 households, and an estimated 3,660 people would be exposed to DNL of 60 to 65 dB while experiencing a 3 dB or greater increase in DNL, which FAA criteria defines as a reportable noise increase.

Under the Proposed F-35A scenario with 95 percent afterburner, a total of 4,486 acres, 1,948 households, and an estimated 4,834 people would be exposed to greater than DNL 65 dB under the F-35A 95 percent afterburner alternative while experiencing an increase of 1.5 dB or greater change to DNL relative to the No Action Alternative, which meets the FAA Order 1050.1G significance threshold for noise. Additionally, a total of 3,466 acres, 1,430 households, and an estimated 3,549 people would be exposed to DNL of 60 to 65 dB while experiencing a 3 dB or greater increase in DNL, which FAA criteria defines as a reportable noise increase.

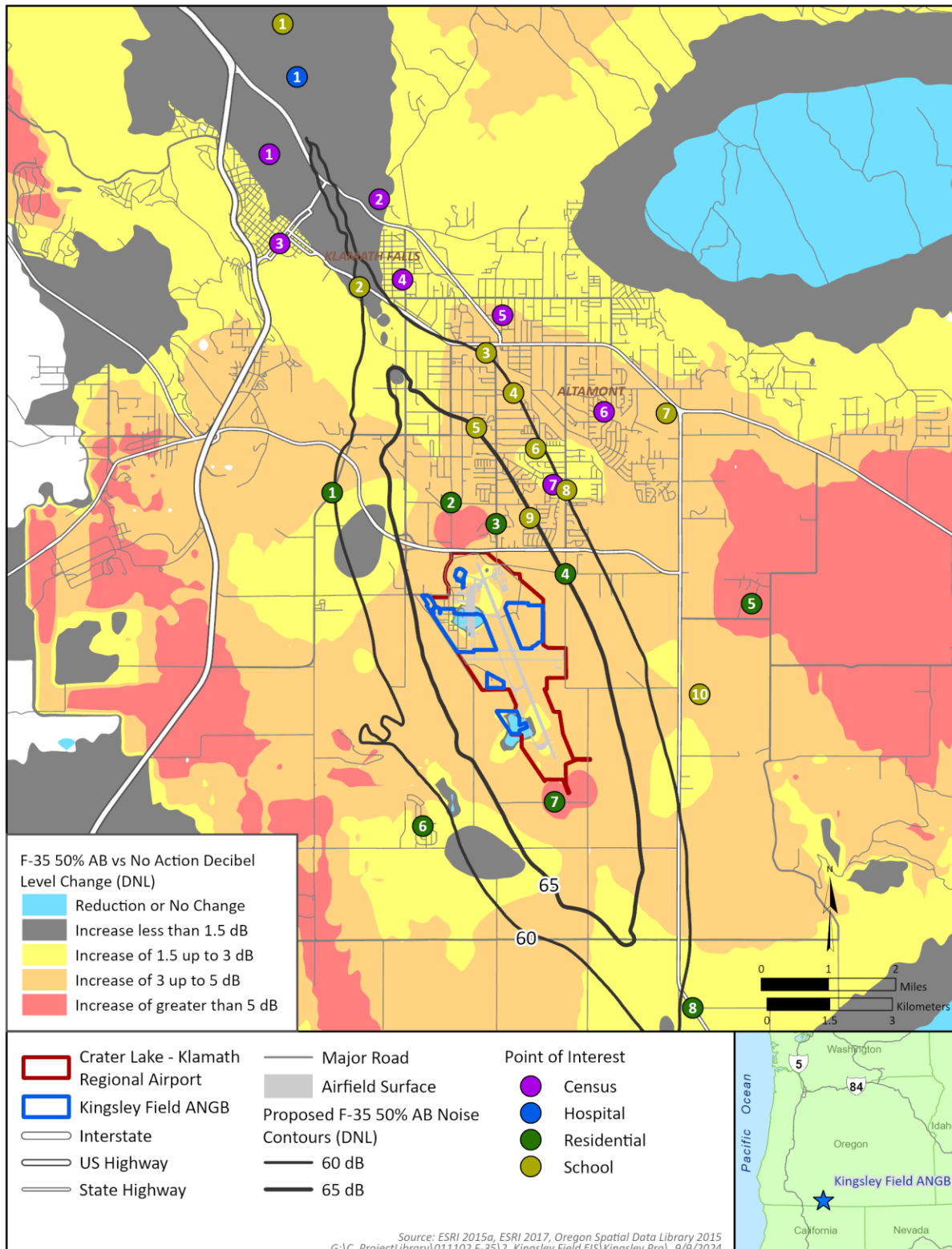
Because the potential for impacts from each of the three proposed afterburner scenarios would be very similar to one another, as shown in Table 5-12, and the 95 percent afterburner scenario would be the most likely outcome that is the scenario described in the EIS, Figures 5-11 through 5-13 present graphical depictions of change to DNL under each afterburner scenario.

Under the F-35A 5 percent scenario, areas on all sides of LMT would experience increases in DNL greater than 1.5 dB that would be exposed to DNL 65 dB. This would affect five noise sensitive locations (R-02, R-03, R-07, S-05, and S-09) that would be considered under FAA 1050.1G guidelines to experience a significant noise impact. Three noise sensitive locations (R-04, S-03, and S-04) that would be exposed to DNL between 60 and 65 dB would experience reportable increases of 3 dB or greater in DNL from the No Action Alternative under the Proposed Action F-35A 5 percent afterburner scenario.



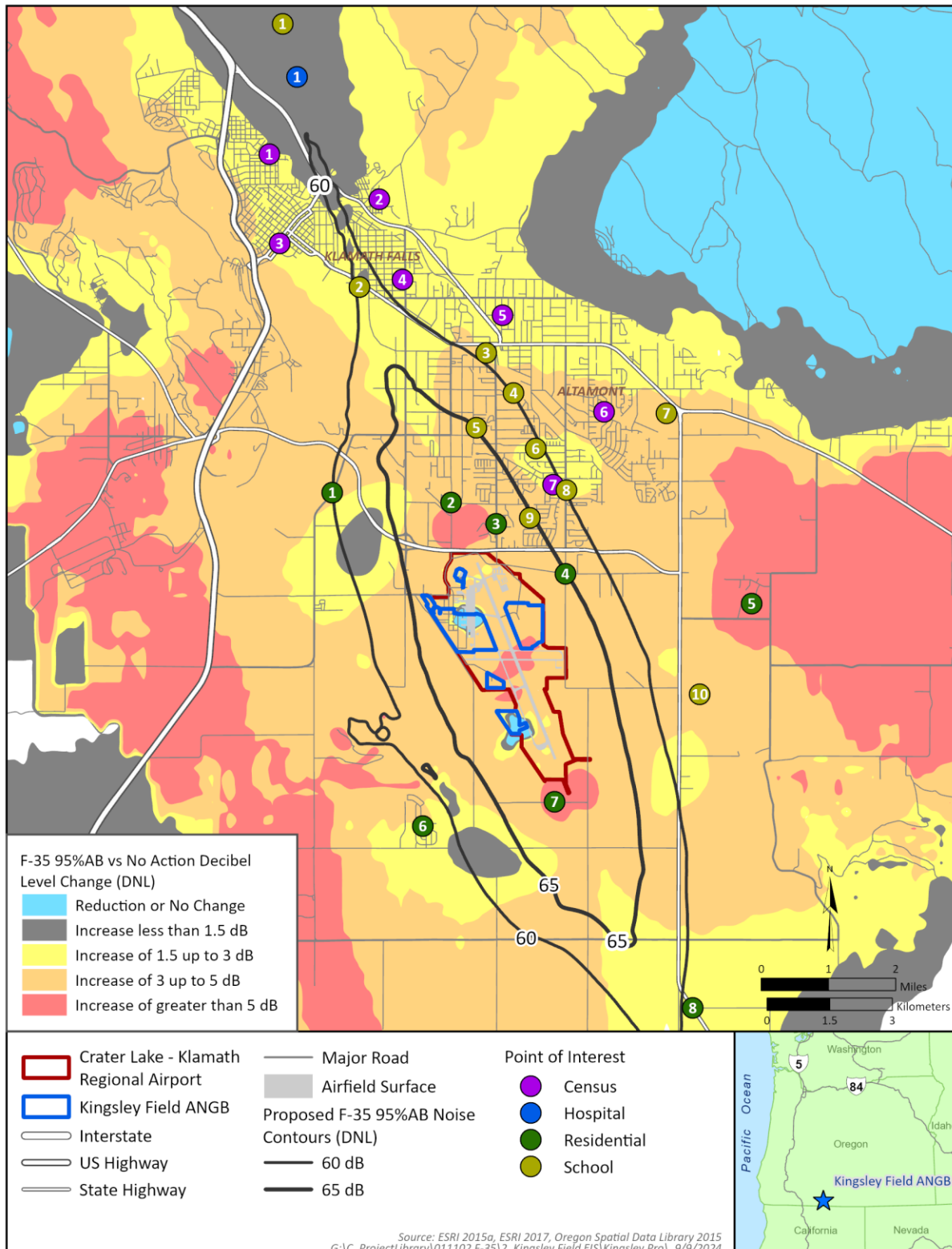
**Figure 5-11 F-35A 5 Percent Scenario Difference Contours Relative to No Action Alternative at LMT for FAA Analysis**





**Figure 5-12 F-35A 50 Percent Scenario Difference Contours Relative to No Action Alternative at LMT for FAA Analysis**





**Figure 5-13 Modeled DNL (Proposed Action F-35A; 95% Afterburner Departures) Relative to No Action for FAA Analysis**

Under the F-35A 50 percent scenario, areas on all sides of LMT would experience increases in DNL greater than 1.5 dB that would be exposed to DNL 65 dB. This would affect six noise sensitive locations (R-02, R-03, R-04, R-07, S-05, and S-09) that would be considered under FAA 1050.1G guidelines to experience a significant noise impact. One noise sensitive location (S-04) that would be exposed to DNL between 60 and 65 dB would experience reportable increases of 3 dB or greater in DNL from the No Action Alternative under the 50 percent scenario.

Under the F-35A 95 percent scenario, areas on all sides of LMT would experience increases in DNL greater than 1.5 dB that would be exposed to DNL 65 dB. This would affect six noise sensitive locations (R-02, R-03, R-04, R-07, S-05 and S-09) that would be considered under FAA 1050.1G guidelines to experience a significant noise impact. One noise sensitive location (S-04) that would be exposed to DNL between 60 and 65 dB would experience reportable increases of 3 dB or greater in DNL from the No Action Alternative under the Proposed Action 95 percent afterburner scenario.

## **5.2 MILITARY TRAINING AIRSPACE**

The following section details the modeling data and the resultant noise exposure for the three modeled F-35A afterburner scenarios for aircraft training activity in the 173 FW associated military training airspace. Under the Proposed Action, F-35A aircraft would replace the F-15C/D aircraft of the 173 FW. Because the three F-35A afterburner scenarios only differ by afterburner usage rates at LMT, the military training airspace conditions would be the same for each scenario of the same aircraft types so only one F-35A condition has been analyzed.

### **5.2.1 Modeling Data (Subsonic)**

The proposed F-35A aircraft would not require any changes to the current lateral or vertical configurations of any MOA, Restricted Area, Warning Area, or Air Traffic Control Assigned Airspace (ATCAA), nor would it alter their normal scheduled times of use. Since military training airspace scheduled activation times would not change from Existing Conditions (2023) or the No Action Alternative, the impacts to the National Airspace System would be unaffected. VFR aircraft would still be allowed to exercise their right to transition through MOAs and IFR aircraft would not experience any extra flight plan deviations because the military training airspace activation times would remain the same. Air Traffic Control would continue to provide the required separation pertaining to specific aircraft and type in the military training airspace.

Since there is a different mission set, the training syllabus for the F-35A is different from that of the F-15C/D. Table 5-13 depicts the F-35A FTU B-Course syllabus. Table 5-13 shows the distribution of the use of the military training airspace, along with the number of F-35A and F-5 (supporting ADAIR), the time in the military training airspace, and the use of afterburner during training. Note that no “red air” sorties are listed for events such as BFM, where the IP in the other F-35 is the red-air. In these cases, those sorties are listed as blue. The noise modeling assumes that training for courses other than the B-Course would be proportional to the data in Table 5-13, using the B-Course Equivalent percentages for the other courses (TX-1 [58 percent], TX-2 [40 percent], TX-3 [12 percent], STX [5 percent]). Instructor Pilot Upgrade (IPUG) programs of instruction (IPUG T1 and IPUG-T2) are assumed to be proportional to the rest of the syllabus, in terms of military training airspace use and flight profiles, since those courses are designed to mimic actual instruction. Consistent with Existing Conditions (2023) and the No Action Alternative, the F-35A average sortie duration would be approximately 1.3 hours resulting in roughly 1 hour of flight time within the military training airspace per sortie.

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**Table 5-13 F-35A FTU B-Course Syllabus**

| <i>Event</i> | <i>Military Training Airspace Time</i> | <i>Blue F-35</i> | <i>Red Total</i> | <i>Red F-35</i> | <i>Red F-5</i> | <i>Goose</i> | <i>Dolphin</i> | <i>Juniper</i> | <i>Juniper/Hart</i> | <i>Block 0</i> | <i>Block 1</i> | <i>Block 2</i> | <i>Block 3</i> | <i>Block 4</i> | <i>SS mins</i> |
|--------------|----------------------------------------|------------------|------------------|-----------------|----------------|--------------|----------------|----------------|---------------------|----------------|----------------|----------------|----------------|----------------|----------------|
| TR-1         | 20                                     | 2                | 0                |                 |                | 100%         |                |                |                     |                | 100%           |                |                |                |                |
| TR-2         | 20                                     | 2                | 0                |                 |                | 100%         |                |                |                     |                | 100%           |                |                |                |                |
| TR-3         | 20                                     | 2                | 0                |                 |                | 100%         |                |                |                     |                | 100%           |                |                |                |                |
| TR-4         | 20                                     | 2                | 0                |                 |                | 100%         |                |                |                     |                | 100%           |                |                |                |                |
| TR-5         | 20                                     | 2                | 0                |                 |                | 100%         |                |                |                     |                | 100%           |                |                |                |                |
| TR-6         | 20                                     | 2                | 0                |                 |                | 100%         |                |                |                     |                | 100%           |                |                |                |                |
| BFM-1        | 30                                     | 2                | 0                |                 |                | 100%         |                |                |                     |                | 100%           |                |                |                | 20%            |
| BFM-2        | 30                                     | 2                | 0                |                 |                | 100%         |                |                |                     |                | 100%           |                |                |                | 20%            |
| BFM-3        | 30                                     | 2                | 0                |                 |                | 100%         |                |                |                     |                | 100%           |                |                |                | 20%            |
| BFM-4        | 30                                     | 2                | 0                |                 |                | 100%         |                |                |                     |                | 100%           |                |                |                | 20%            |
| BFM-5        | 30                                     | 2                | 0                |                 |                | 100%         |                |                |                     |                | 100%           |                |                |                | 20%            |
| BFM-6        | 30                                     | 2                | 0                |                 |                | 100%         |                |                |                     |                | 100%           |                |                |                | 20%            |
| BFM-7        | 30                                     | 2                | 0                |                 |                | 100%         |                |                |                     |                | 100%           |                |                |                | 20%            |
| ACM-1        | 40                                     | 2                | 4                | 0.8             | 3.2            | 5%           | 32%            |                | 63%                 |                | 50%            | 50%            |                |                | 20%            |
| ACM-2        | 40                                     | 2                | 4                | 0.8             | 3.2            | 5%           | 32%            |                | 63%                 |                | 50%            | 50%            |                |                | 20%            |
| ACM-3        | 40                                     | 2                | 4                | 0.8             | 3.2            | 5%           | 32%            |                | 63%                 |                | 50%            | 50%            |                |                | 20%            |
| TI-1         | 40                                     | 2                | 4                | 0.8             | 3.2            |              |                |                | 100%                | 5%             | 30%            | 30%            | 30%            | 5%             | 25%            |
| TI-2         | 40                                     | 2                | 4                | 0.8             | 3.2            |              |                |                | 100%                | 5%             | 30%            | 30%            | 30%            | 5%             | 25%            |
| TI-3         | 40                                     | 2                | 4                | 0.8             | 3.2            |              |                |                | 100%                | 5%             | 30%            | 30%            | 30%            | 5%             | 25%            |
| TI-4         | 40                                     | 4                | 8                | 1.6             | 6.4            |              |                |                | 100%                | 5%             | 30%            | 30%            | 30%            | 5%             | 25%            |
| DCA          | 40                                     | 4                | 8                | 1.6             | 6.4            |              |                |                | 100%                | 5%             | 30%            | 30%            | 30%            | 5%             | 25%            |
| SA-1         | 60                                     | 2                | 0                |                 |                | 50%          | 10%            |                | 40%                 |                | 10%            | 90%            |                |                |                |
| SA-2         | 60                                     | 2                | 0                |                 |                | 50%          | 10%            |                | 40%                 |                | 10%            | 90%            |                |                |                |
| SA-3         | 60                                     | 2                | 0                |                 |                | 50%          | 10%            |                | 40%                 |                | 10%            | 90%            |                |                |                |
| SA-4         | 60                                     | 2                | 0                |                 |                | 50%          | 10%            |                | 40%                 |                | 10%            | 90%            |                |                |                |
| SA-5         | 60                                     | 2                | 0                |                 |                | 50%          | 10%            |                | 40%                 |                | 10%            | 90%            |                |                |                |
| SA-6         | 60                                     | 2                | 0                |                 |                | 50%          | 10%            |                | 40%                 |                | 10%            | 90%            |                |                |                |
| CAS-1        | 60                                     | 2                | 0                |                 |                | 50%          | 10%            |                | 40%                 |                | 10%            | 90%            |                |                |                |
| CAS-2        | 60                                     | 2                | 0                |                 |                | 50%          | 10%            |                | 40%                 |                | 10%            | 90%            |                |                |                |
| SEAD-1       | 60                                     | 4                | 0                |                 |                |              |                |                | 100%                | 5%             | 25%            | 35%            | 35%            |                |                |
| SEAD-2       | 60                                     | 4                | 0                |                 |                |              |                |                | 100%                | 5%             | 25%            | 35%            | 35%            |                |                |

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| <i>Event</i> | <i>Military Training Airspace Time</i> | <i>Blue F-35</i> | <i>Red Total</i> | <i>Red F-35</i>    | <i>Red F-5</i>   | <i>Goose</i> | <i>Dolphin</i> | <i>Juniper</i> | <i>Juniper/Hart</i> | <i>Block 0</i> | <i>Block 1</i> | <i>Block 2</i> | <i>Block 3</i> | <i>Block 4</i> | <i>SS mins</i> |
|--------------|----------------------------------------|------------------|------------------|--------------------|------------------|--------------|----------------|----------------|---------------------|----------------|----------------|----------------|----------------|----------------|----------------|
| SEAD-3       | 60                                     | 4                | 0                |                    |                  |              |                |                | 100%                | 5%             | 25%            | 35%            | 35%            |                |                |
| STK-1        | 60                                     | 4                | 2                | 0.4                | 1.6              |              |                |                | 100%                | 5%             | 25%            | 35%            | 35%            |                | 25%            |
| STK-2        | 60                                     | 4                | 2                | 0.4                | 1.6              |              |                |                | 100%                | 5%             | 25%            | 35%            | 35%            |                | 25%            |
| STK-3        | 60                                     | 4                | 2                | 0.4                | 1.6              |              |                |                | 100%                | 5%             | 25%            | 35%            | 35%            |                | 25%            |
| OCA-1        | 60                                     | 4                | 4                | 0.8                | 3.2              |              |                |                | 100%                | 5%             | 25%            | 35%            | 35%            |                | 25%            |
| OCA-2        | 60                                     | 4                | 4                | 0.8                | 3.2              |              |                |                | 100%                | 5%             | 25%            | 35%            | 35%            |                | 25%            |
| OCA-3        | 60                                     | 4                | 4                | 0.8                | 3.2              |              |                |                | 100%                | 5%             | 25%            | 35%            | 35%            |                | 25%            |
| OCA-4        | 60                                     | 4                | 4                | 0.8                | 3.2              |              |                |                | 100%                | 5%             | 25%            | 35%            | 35%            |                | 25%            |
| OCA-5        | 60                                     | 4                | 4                | 0.8                | 3.2              |              |                |                | 100%                | 5%             | 25%            | 35%            | 35%            |                | 25%            |
| LASDT-1      | 60                                     | 2                | 0                |                    |                  |              |                | 100%           |                     | 75%            | 25%            |                |                |                | 5%             |
| LASDT-2      | 60                                     | 2                | 0                |                    |                  |              |                | 100%           |                     | 75%            | 25%            |                |                |                | 5%             |
| 1 B course   |                                        | 110              |                  | 13.2               | 52.8             |              |                |                |                     |                |                |                |                |                |                |
|              |                                        |                  |                  | <b>Total F-15C</b> | <b>Total F-5</b> |              |                |                |                     |                |                |                |                |                |                |
|              |                                        |                  |                  | <b>124</b>         | <b>53</b>        |              |                |                |                     |                |                |                |                |                |                |

*Legend:* % percent; SS mins = supersonic minutes.

## 5.2.2 Noise Exposure (Subsonic)

Aircraft altitudes, speeds, and power settings vary while operating within the military training airspace based upon the training exercise. For comparison, Table 5-14 presents single-event noise levels in terms of SEL and  $L_{max}$  for the F-15C/D, and F-35A. In general, the F-35A would be 3 to 5 dB greater in terms of SEL and 6 to 8 dB greater in  $L_{max}$  when compared to the F-15C/D at times when both aircraft would operate at military power and 400 knots.

**Table 5-14 SEL and  $L_{max}$  Comparison for Typical Military Training Airspace Profiles**

| <i>Altitude<br/>(feet AGL)</i> | <i>F-15C/D<br/>(PW-220)</i> |                             | <i>F-35A<br/>(PW-100)</i> |                             |
|--------------------------------|-----------------------------|-----------------------------|---------------------------|-----------------------------|
| <i>Metric</i>                  | <i>SEL</i>                  | <i><math>L_{max}</math></i> | <i>SEL</i>                | <i><math>L_{max}</math></i> |
| 500                            | 116                         | 111                         | 121                       | 119                         |
| 1,000                          | 111                         | 104                         | 115                       | 111                         |
| 2,000                          | 105                         | 97                          | 108                       | 103                         |
| 5,000                          | 95                          | 85                          | 99                        | 91                          |
| 10,000                         | 86                          | 75                          | 89                        | 81                          |

*Note:* All aircraft modeled at military power and 400 knots for comparison.

*Legend:* AGL = above ground level;  $L_{max}$  = Maximum Sound Level; SEL = Sound Exposure Level.

*Source:* NOISEMAP version 7.3.

Table 5-15 presents the resulting distributed DNL and  $L_{dnmr}$  for each military training airspace due to the three proposed F-35A scenarios. Consistent with Existing Conditions (2023) and the No Action Alternative, most training would occur above 10,000 feet MSL so the rise-time effect applied to  $L_{dnmr}$  would remain small resulting in no difference between the two metrics for Existing Conditions (2023) when rounded to whole decibels.

The greatest DNL/ $L_{dnmr}$  of 49 dB would occur in Juniper Low, Juniper East Low, Goose North, and Goose South MOAs due to a combination of an increase in operations in Goose and the lower floor and lower altitudes in Juniper Low and Juniper East Low MOAs. The rest of the Juniper/Hart MOA complex outside of the Juniper Low and Juniper East Low areas would experience DNL/ $L_{dnmr}$  of 40 dB. The DNL/ $L_{dnmr}$  in Dolphin North and South MOA would be less than 35 dB due to the relatively small number of sorties spread over a large area with a minimum altitude of 11,000 feet MSL. Overall, there would be an increase in DNL/ $L_{dnmr}$  of 2 to 5 dB across the military training airspace, except Dolphin North and South MOAs that would experience a negligible change from the No Action Alternative.

**Table 5-15 Noise Exposure from Proposed F-35A Military Training Airspace Operations**

| <i>Military Training Airspace<sup>1</sup></i> | <i>DNL (dB)</i> | <i>Change DNL (dB)<br/>from No Action<br/>Alternative</i> | <i>L<sub>dnmr</sub><br/>(dB)</i> | <i>Change L<sub>dnmr</sub><br/>(dB) from No<br/>Action Alternative</i> |
|-----------------------------------------------|-----------------|-----------------------------------------------------------|----------------------------------|------------------------------------------------------------------------|
| Goose North MOA/ATCAA                         | 49              | +5                                                        | 49                               | +5                                                                     |
| Goose South MOA/ATCAA                         | 49              | +5                                                        | 49                               | +5                                                                     |
| Juniper Low MOA                               | 49              | +2                                                        | 49                               | +2                                                                     |
| Juniper East Low MOA                          | 49              | +2                                                        | 49                               | +2                                                                     |
| Juniper A/B/C/D MOA/ATCAA <sup>1</sup>        | 40              | +5                                                        | 40                               | +5                                                                     |
| Hart A/B/C/D/E/F MOA/ATCAA                    | 40              | +5                                                        | 40                               | +5                                                                     |
| Dolphin North and South MOA/ATCAA             | <35             | N/A                                                       | <35                              | N/A                                                                    |

*Note:* <sup>1</sup>Noise level applies only to the parts of Juniper A/B/C/D outside of Juniper Low and Juniper East Low MOA, which are reported separately

*Legend:* < = less than; ADAIR = Adversary Air; ATCAA = Air Traffic Control Assigned Airspace; dB = decibel; DNL = Day-Night Average Sound Level; L<sub>dnmr</sub> = Onset-Rate Adjusted Monthly Day-Night A-weighted Sound Level; MOA = Military Operations Area; N/A = Not Applicable.

### **5.2.3 Modeling Data (Supersonic)**

Supersonic flight would primarily be associated with air combat training. Some of these training sorties require aircraft to exceed Mach 1.0 (supersonic) for brief periods of time, which creates a shock wave. Depending on the aircraft's altitude and the local atmospheric conditions, this shock wave can reach the ground, causing a "sonic boom." Higher altitudes and warmer surface temperatures can result in the sonic boom not reaching the surface of the earth. Lower altitudes for supersonic flight and higher speeds (higher Mach numbers) increase the likelihood and intensity of sonic booms.

Supersonic operations for the F-35A would occur in the same military training airspace as the existing F-15C/D in the Juniper/Hart MOA complex, but the frequency of supersonic events would increase proportional to the overall increase in sorties. Although the training exercises for the F-35A, as detailed in Table 5-13, would differ from the F-15C/D, they would be similar to the F-15C/D and supersonic would only occur above 30,000 feet MSL while over land.

### **5.2.4 Noise Exposure (Supersonic)**

Using BOOMAP2021 software the maximum CDNL would be 40 dBC, which would occur roughly in the center of the Juniper/Hart MOA complex and represents an increase in CDNL of approximately 4 dBC due primarily to the increase in operations under the proposed F-35A scenarios. The CDNL would remain relatively low due primarily to the 30,000-foot MSL minimum altitude requirement for supersonic operations within the Juniper/Hart MOA complex.

## **6.0 CONCLUSION**

Table 6-1 presents a quantitative summary of modeled noise exposure results relative to DoD noise criteria associated with the F-35A aircraft beddown, as compared to the No Action Alternative. Noise analysis results summarized in the table include acreage, households/population within applicable noise criteria areas, the number of affected POIs, number of affected school POIs, and PA for each of the three potential afterburner usage rates considered in the DoD significance evaluation framework.



**Table 6-1 Summary of Potential DoD Criteria Noise Impacts Associated with F-35A Scenarios at LMT**

| <i>Category</i>                                                                         | <i>Condition</i>                 | <i>No Action Alternative</i> | <i>F-35A 5% AB</i> | <i>F-35A 50% AB</i> | <i>F-35A 95% AB</i> |
|-----------------------------------------------------------------------------------------|----------------------------------|------------------------------|--------------------|---------------------|---------------------|
| DNL:<br>Number of POIs                                                                  | Exposed to > DNL 65 dB           | 3                            | 5 (+2)             | 6 (+3)              | 6 (+3)              |
|                                                                                         | Exposed to > DNL 70 dB           | 2                            | 3 (+1)             | 3 (+1)              | 3 (+1)              |
|                                                                                         | Exposed to > DNL 75 dB           | 0                            | 2 (+2)             | 2 (+2)              | 2 (+2)              |
|                                                                                         | Decrease of 1 dB or greater      |                              | 0                  | 0                   | 0                   |
|                                                                                         | No change                        |                              | 1                  | 1                   | 0                   |
|                                                                                         | Increase of 1 dB                 |                              | 6                  | 2                   | 2                   |
|                                                                                         | Increase of 2 to 4 dB            |                              | 16                 | 21                  | 21                  |
|                                                                                         | Increase of 5 dB or greater      |                              | 3                  | 2                   | 3                   |
| Off-Base Exposure to<br>DNL >65 dB                                                      | Acreage                          | 2,177                        | 4,164<br>(+1,987)  | 4,340<br>(+2,163)   | 4,506<br>(+2,329)   |
|                                                                                         | Households                       | 946                          | 1,733<br>(+787)    | 1,800<br>(+854)     | 1,865<br>(+919)     |
|                                                                                         | Estimated Population             | 2,348                        | 4,301<br>(+1,953)  | 4,467<br>(+2,119)   | 4,629<br>(+2,281)   |
| School, $L_{eq(8hr)}$ :<br>Number of School POIs                                        | Greater than 60 dB $L_{eq(8hr)}$ | 7                            | 7 (+0)             | 7 (+0)              | 7 (+0)              |
| School, Numbers of<br>Events per Average<br>School Day Hour:<br>Number of School POIs   | With No Interfering Events       | 0                            | 0 (+0)             | 0 (+0)              | 0 (+0)              |
|                                                                                         | With 1 Interfering Event         | 2                            | 1 (-1)             | 0 (-2)              | 0 (-2)              |
|                                                                                         | With >1 Interfering Events       | 8                            | 9 (+1)             | 10 (+2)             | 10 (+2)             |
| School, Time Above<br>Interior 50 dB for 8 Hour<br>School Day:<br>Number of School POIs | Duration of 5 min or less        | 5                            | 2 (-3)             | 0 (-5)              | 0 (-5)              |
|                                                                                         | Duration of >5–10 minutes        | 5                            | 6 (+1)             | 5(0)                | 4 (-1)              |
|                                                                                         | Duration of >10 minutes          | 0                            | 2 (+2)             | 5 (+5)              | 6 (+6)              |
| Speech Interfering Events<br>per Average Hour,<br>Windows Open:<br>Number of POIs       | With No Events                   | 0                            | 0                  | 0                   | 0                   |
|                                                                                         | With 1–2 Events                  | 21                           | 9 (-12)            | 9 (-12)             | 9 (-12)             |
|                                                                                         | With >2 Events                   | 5                            | 17 (+12)           | 17 (+12)            | 17 (+12)            |
| Speech Interfering Events<br>per Average Hour,<br>Windows Closed:<br>Number of POIs     | With No Events                   | 13                           | 3 (-10)            | 0 (-13)             | 0 (-13)             |
|                                                                                         | With 1-2 Events                  | 13                           | 18 (+5)            | 21 (+8)             | 18 (+5)             |
|                                                                                         | With >2 Events                   | 0                            | 5 (+5)             | 5 (+5)              | 8 (+8)              |
| Probability of Awakening<br>with Windows Open:<br>Number of POIs                        | With <1% PA                      | 11                           | 2 (-9)             | 2 (-9)              | 2 (-9)              |
|                                                                                         | With 1% to 10% PA                | 15                           | 22 (+7)            | 22 (+7)             | 22 (+7)             |
|                                                                                         | With >10% PA                     | 0                            | 1 (+1)             | 1 (+1)              | 1 (+1)              |
| Probability of Awakening<br>with Windows Closed:<br>Number of POIs                      | With <1% PA                      | 20                           | 11 (-9)            | 11 (-9)             | 11 (-9)             |
|                                                                                         | With 1% to 10% PA                | 6                            | 14 (+8)            | 14 (+8)             | 14 (+8)             |
|                                                                                         | With >10% PA                     | 0                            | 0 (+0)             | 0 (+0)              | 0 (+0)              |

*Notes:* Parenthetical represents change from No Action Alternative.

*Legend:* % = percent; < = less than; > = greater than; dB = decibel; DNL = Day-Night Average Sound Level; DoD = Department of Defense; LMT = Crater Lake-Klamath Regional Airport.

The DoD determination varies from the FAA determination of significance, where a significant impact would occur under the following FAA criteria: 1) noise sensitive land uses and population within the existing DNL 65 dB and greater footprint would be subject to an increase in DNL of 1.5 dB or greater; or 2) noise sensitive land uses and population would experience a DNL 1.5 dB or greater increase and be newly exposed to a DNL of 65 dB or greater. Table 6-2 highlights modeled changes in noise exposure relative to FAA noise level criteria associated with the F-35A aircraft beddown, as compared to the No Action Alternative. As detailed in Table 5-12, the modeled populations within the applicable criteria areas are 4,716, 4,779, and 4,834 people under the proposed F-35A 5 percent, 50 percent, and 95 percent afterburner scenarios, respectively. FAA criteria define a reportable change in noise exposure as a noise sensitive land use or population within the existing DNL 60–65 dB footprint that would be subject to an increase in DNL of 3.0 dB or greater. The population that would experience a reportable increase in noise would be 3,799, 3,660, and 3,549 people under the proposed F-35A 5 percent, 50 percent, and 95 percent afterburner scenarios, respectively.

**Table 6-2 Change in DNL at POIs and Significant Increases Associated with the F-35A Scenarios at LMT**

| <i>Map ID</i> | <i>Named Point of Interest</i>     | <i>No Action Alternative</i> | <i>F-35A 5% AB</i>         | <i>F-35A 50% AB</i>        | <i>F-35A 95% AB</i>        |
|---------------|------------------------------------|------------------------------|----------------------------|----------------------------|----------------------------|
| C01           | Census Tract 9719                  | 52                           | 52 (0)                     | 52 (0)                     | 53 (+1)                    |
| C02           | Census Tract 9717                  | 53                           | 54 (+1)                    | 55 (+2)                    | 55 (+2)                    |
| C03           | Census Tract 9718                  | 51                           | 52 (+1)                    | 53 (+2)                    | 54 (+3)                    |
| C04           | Census Tract 9716                  | 56                           | 57 (+1)                    | 58 (+2)                    | 58 (+2)                    |
| C05           | Census Tract 9712                  | 55                           | 59 (+4)                    | 58 (+3)                    | 57 (+2)                    |
| C06           | Census Tract 9713                  | 50                           | 54 (+4)                    | 54 (+4)                    | 53 (+3)                    |
| C07           | Census Tract 9714                  | 58                           | 61 (+3)                    | 61 (+3)                    | 61 (+3)                    |
| H01           | Sky Lakes Medical Center           | 55                           | 56 (+1)                    | 56 (+1)                    | 57 (+2)                    |
| R01           | Neighborhood                       | 57                           | 60 (+3)                    | 60 (+3)                    | 60 (+3)                    |
| R02           | Anderson Avenue and Altamont Drive | 73                           | <b>77 (+4)<sup>1</sup></b> | <b>77 (+4)<sup>1</sup></b> | <b>77 (+4)<sup>1</sup></b> |
| R03           | Highland Way and Summit Street     | 68                           | <b>72 (+4)<sup>1</sup></b> | <b>72 (+4)<sup>1</sup></b> | <b>73 (+5)<sup>1</sup></b> |
| R04           | Airway Drive and Homedale Road     | 61                           | 64 (+3)                    | <b>65 (+4)<sup>1</sup></b> | <b>65 (+4)<sup>1</sup></b> |
| R05           | Neighborhood                       | 46                           | 51 (+5)                    | 51 (+5)                    | 51 (+5)                    |
| R06           | Neighborhood                       | 54                           | 56 (+2)                    | 56 (+2)                    | 56 (+2)                    |
| R07           | Lombardy Lane and railroad tracks  | 71                           | <b>76 (+5)<sup>1</sup></b> | <b>76 (+5)<sup>1</sup></b> | <b>76 (+5)<sup>1</sup></b> |
| R08           | Neighborhood                       | 57                           | 59 (+2)                    | 59 (+2)                    | 59 (+2)                    |
| S01           | Oregon Institute of Technology     | 53                           | 54 (+1)                    | 54 (+1)                    | 54 (+1)                    |
| S02           | Klamath Family Head Start          | 59                           | 60 (+1)                    | 61 (+2)                    | 61 (+2)                    |
| S03           | Triad School                       | 57                           | 60 (+3)                    | 60 (+3)                    | 59 (+2)                    |
| S04           | Mazama High School                 | 56                           | 61 (+5)                    | 60 (+4)                    | 60 (+4)                    |
| S05           | Stearns Elementary School          | 61                           | <b>65 (+4)<sup>1</sup></b> | <b>65 (+4)<sup>1</sup></b> | <b>65 (+4)<sup>1</sup></b> |
| S06           | Peterson Elementary                | 58                           | 61 (+3)                    | 61 (+3)                    | 61 (+3)                    |
| S07           | Klamath Community College          | 47                           | 50 (+3)                    | 50 (+3)                    | 49 (+2)                    |
| S08           | Brixner Junior High School         | 57                           | 60 (+3)                    | 60 (+3)                    | 60 (+3)                    |
| S09           | Hosanna Christian School           | 62                           | <b>65 (+3)<sup>1</sup></b> | <b>66 (+4)<sup>1</sup></b> | <b>66 (+4)<sup>1</sup></b> |
| S10           | Henley High School                 | 52                           | 55 (+3)                    | 55 (+3)                    | 55 (+3)                    |

*Notes:* Parenthetical represents change from No Action Alternative.

<sup>1</sup>Bold represents results at noise sensitive locations that would be considered to be significant according to FAA Order 1050.1G.

*Legend:* % = percent; A/B = afterburner; DNL = Day-Night Average Sound Level; ID = Identification; LMT = Crater Lake-Klamath Regional Airport; POI = Point of Interest.

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## **Appendix A**

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### *Aircraft Modeling Details*

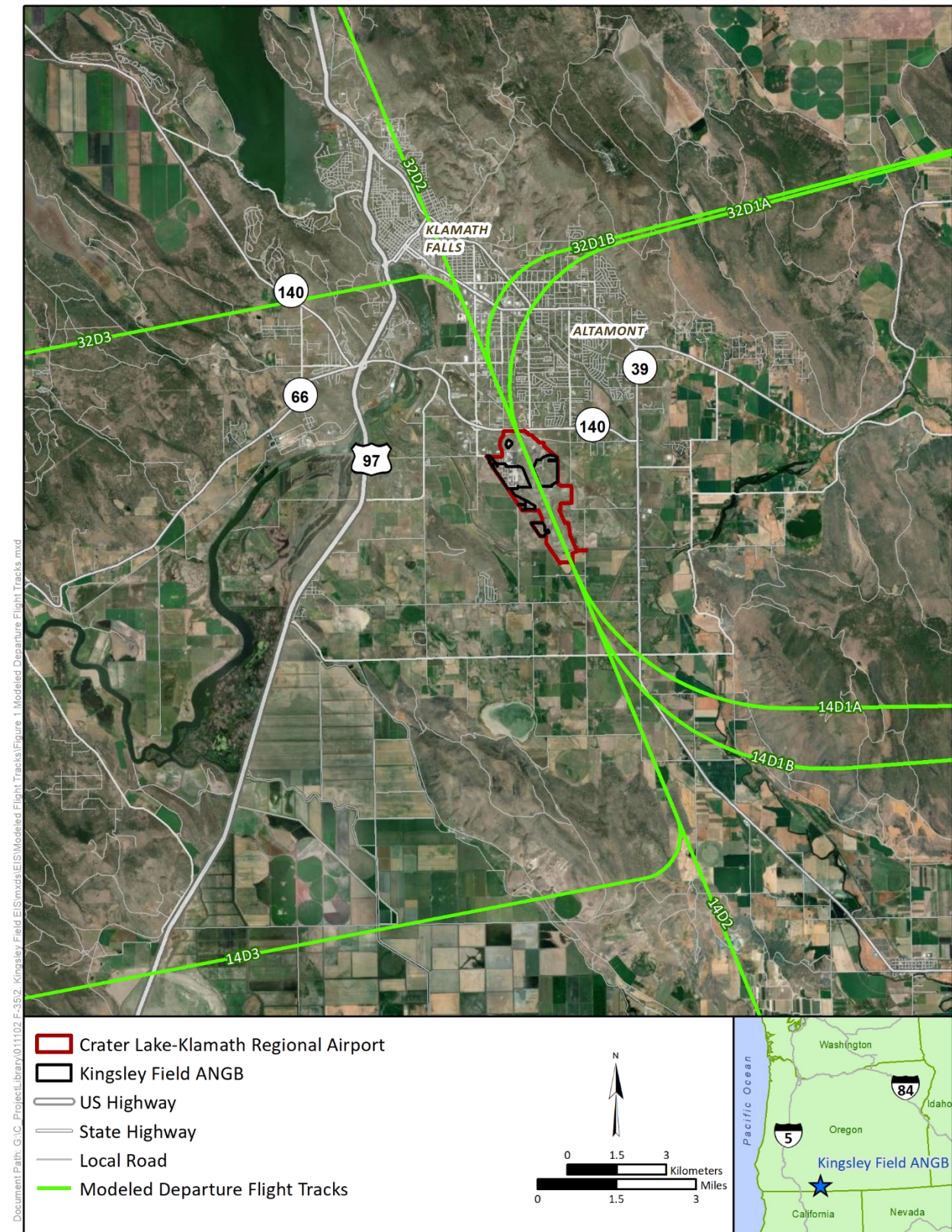


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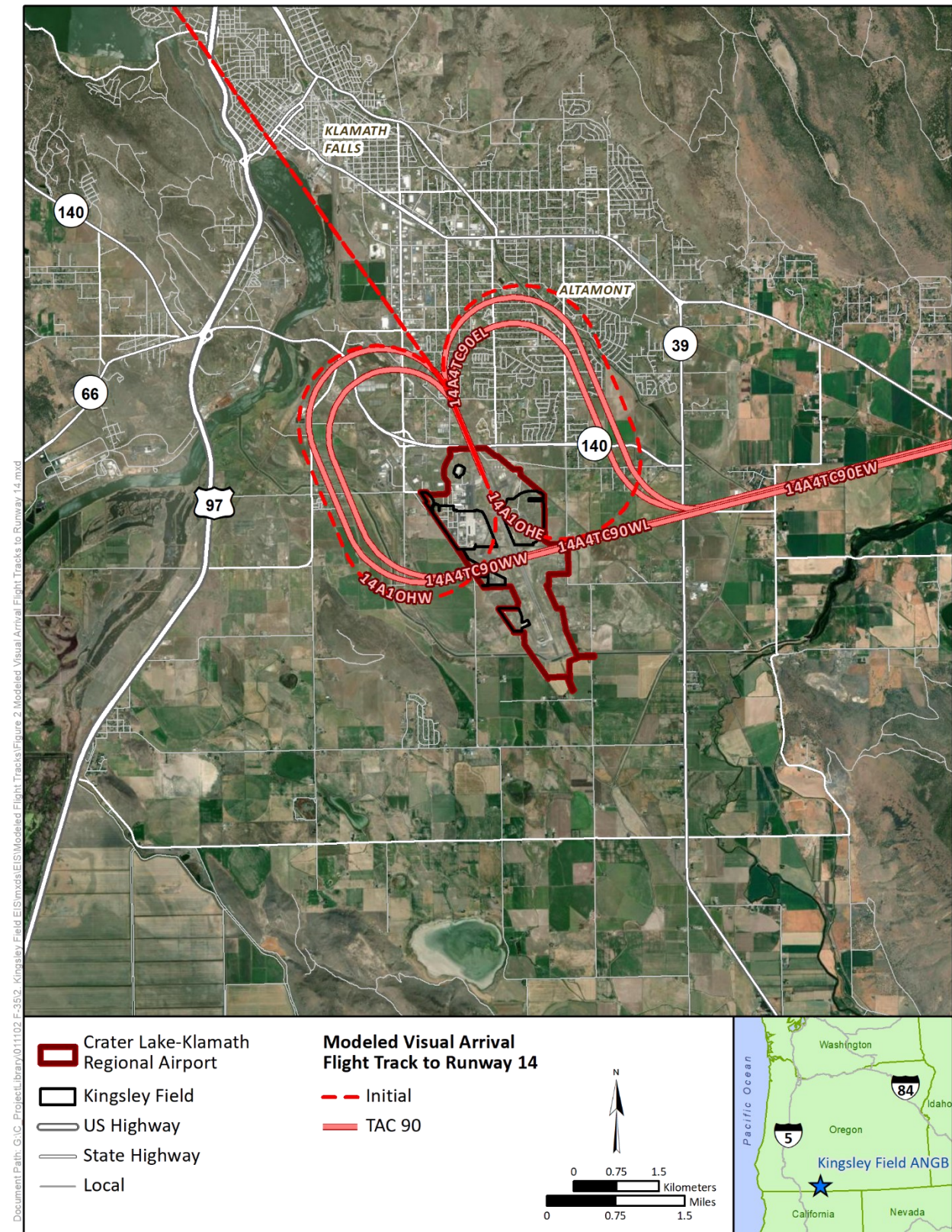
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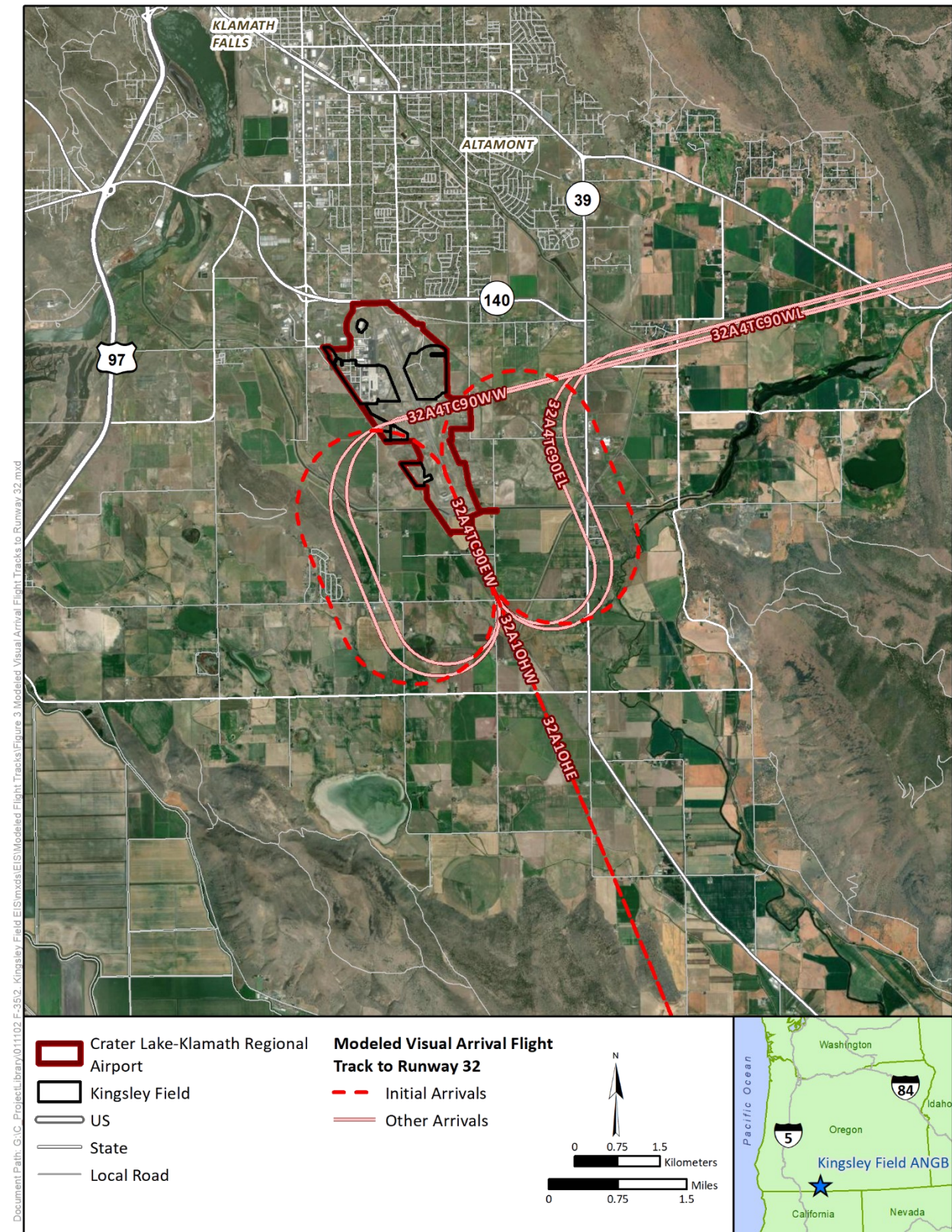


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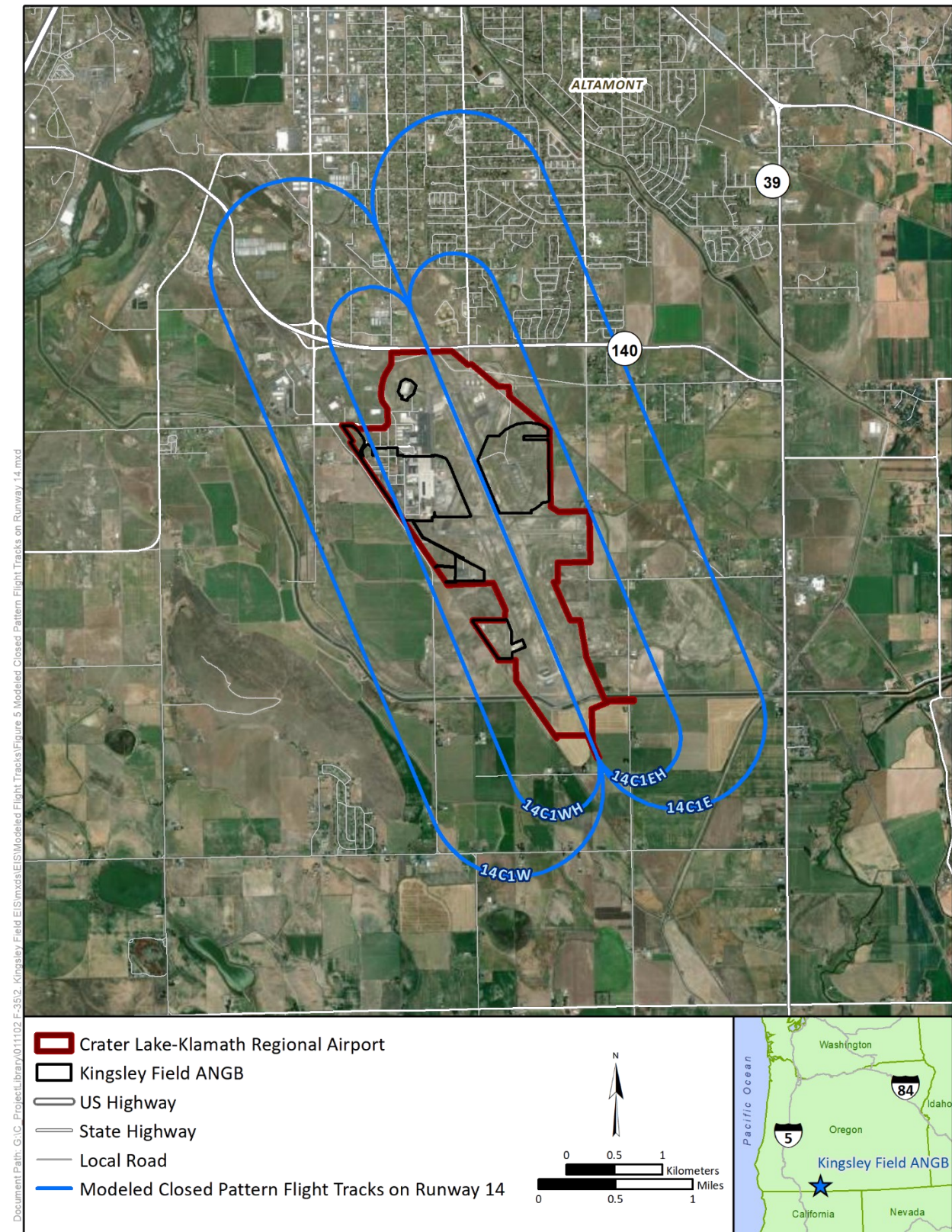


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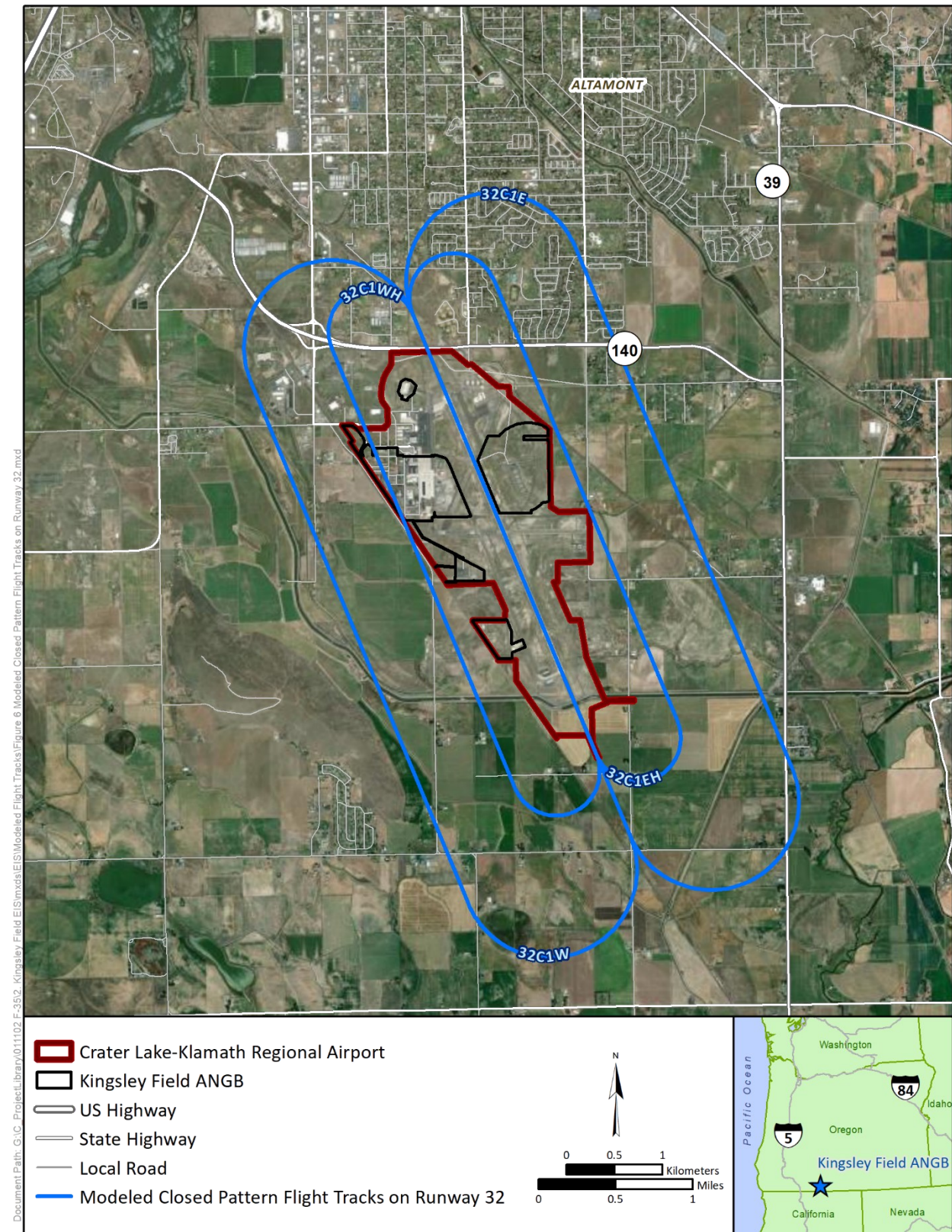


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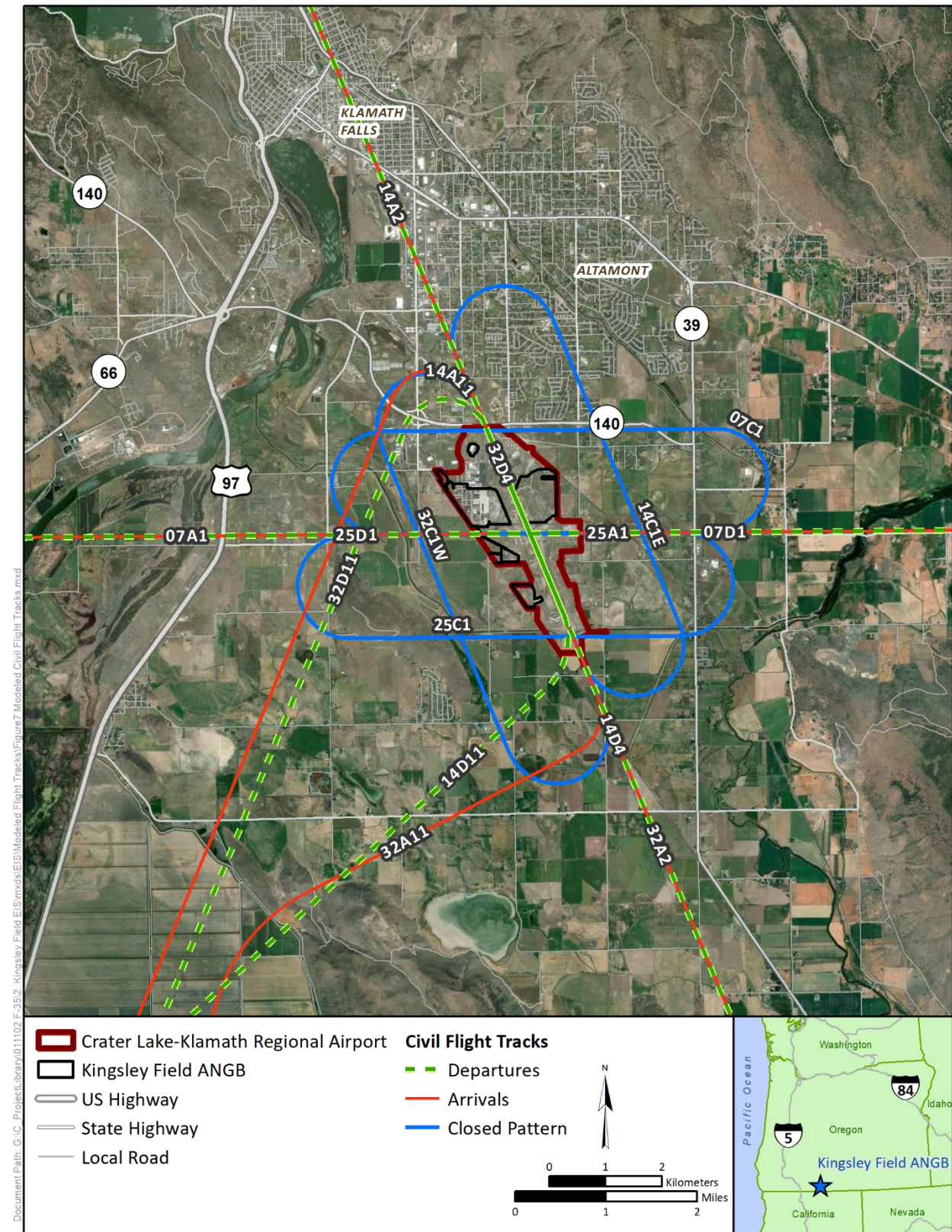


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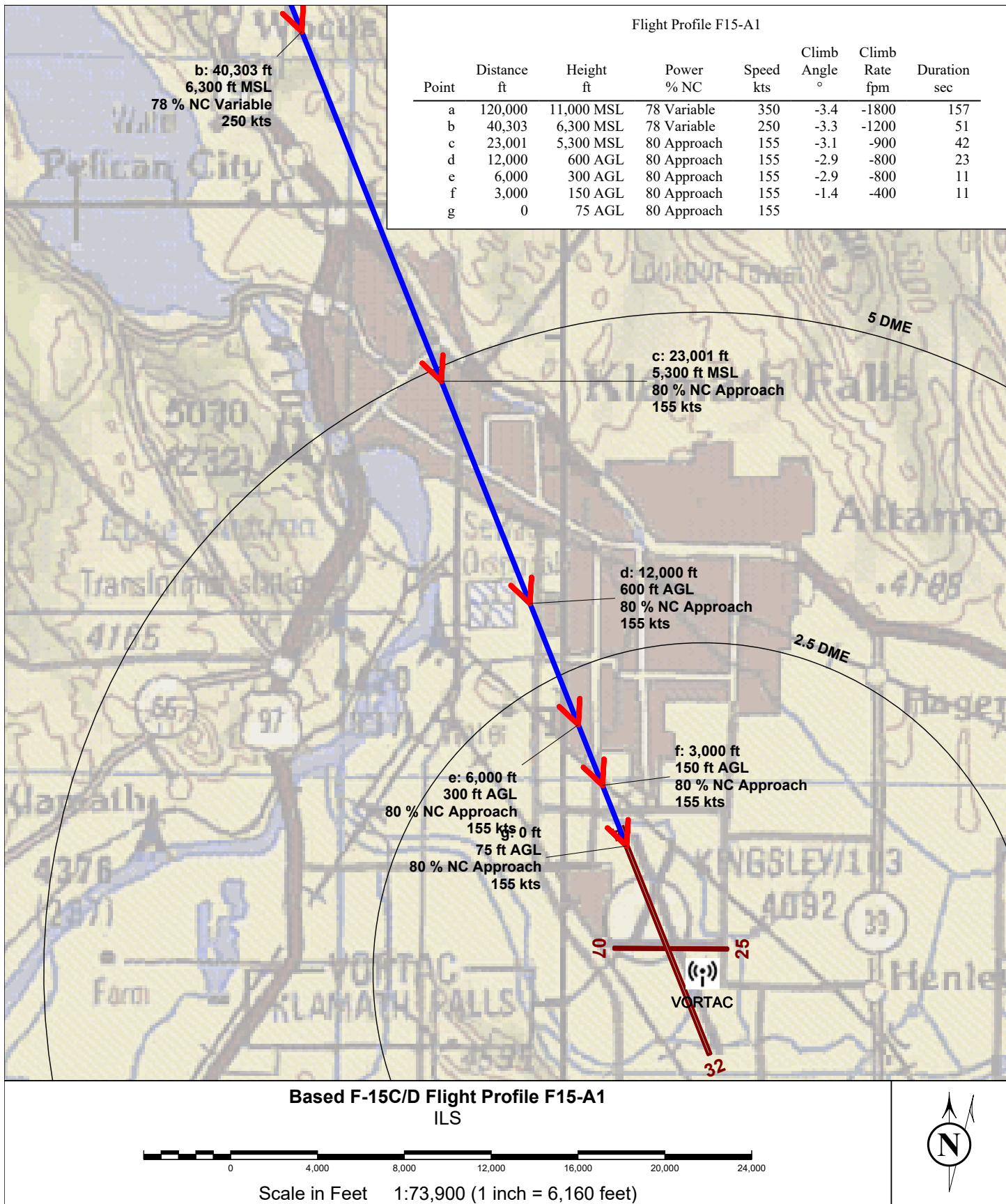


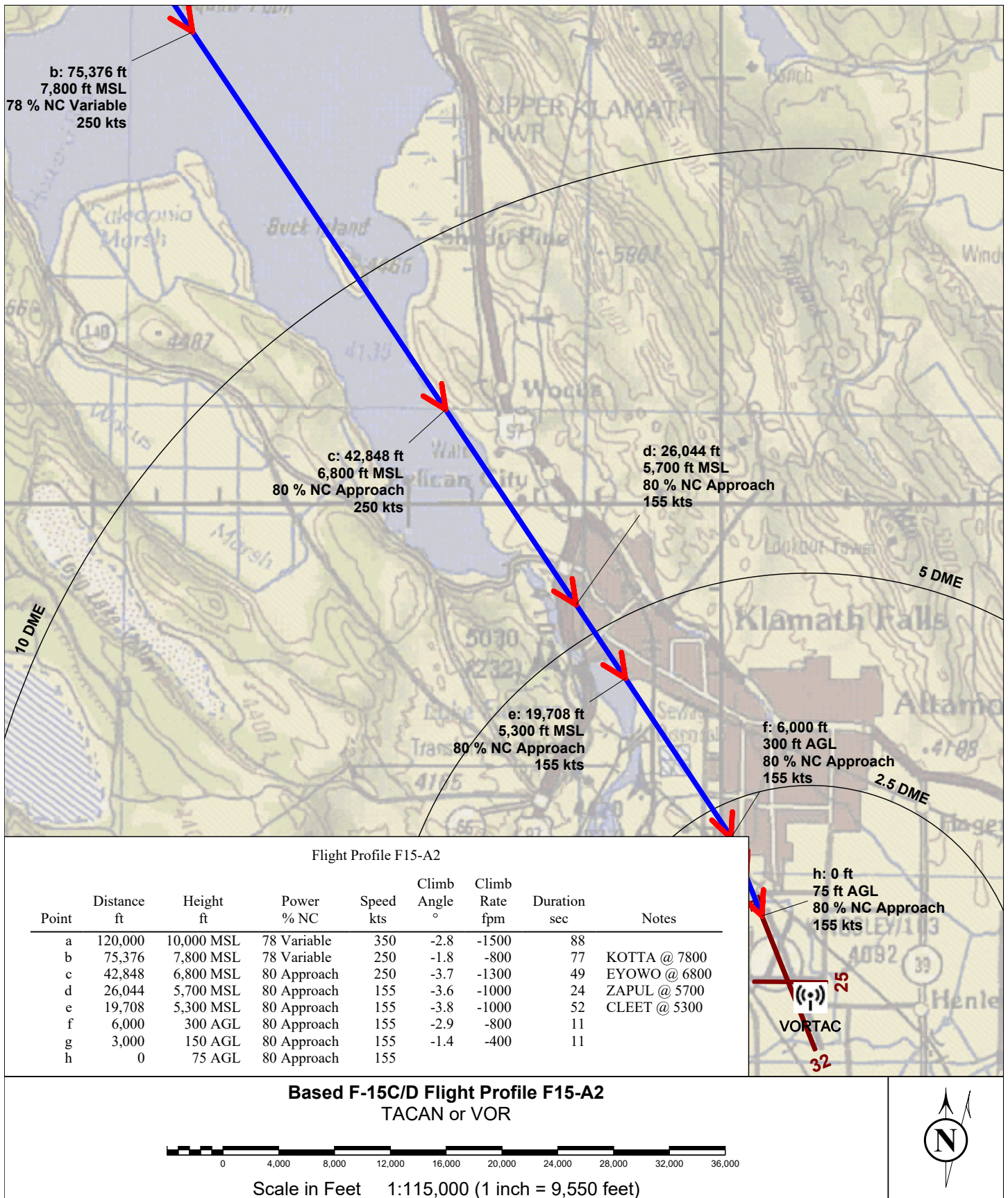


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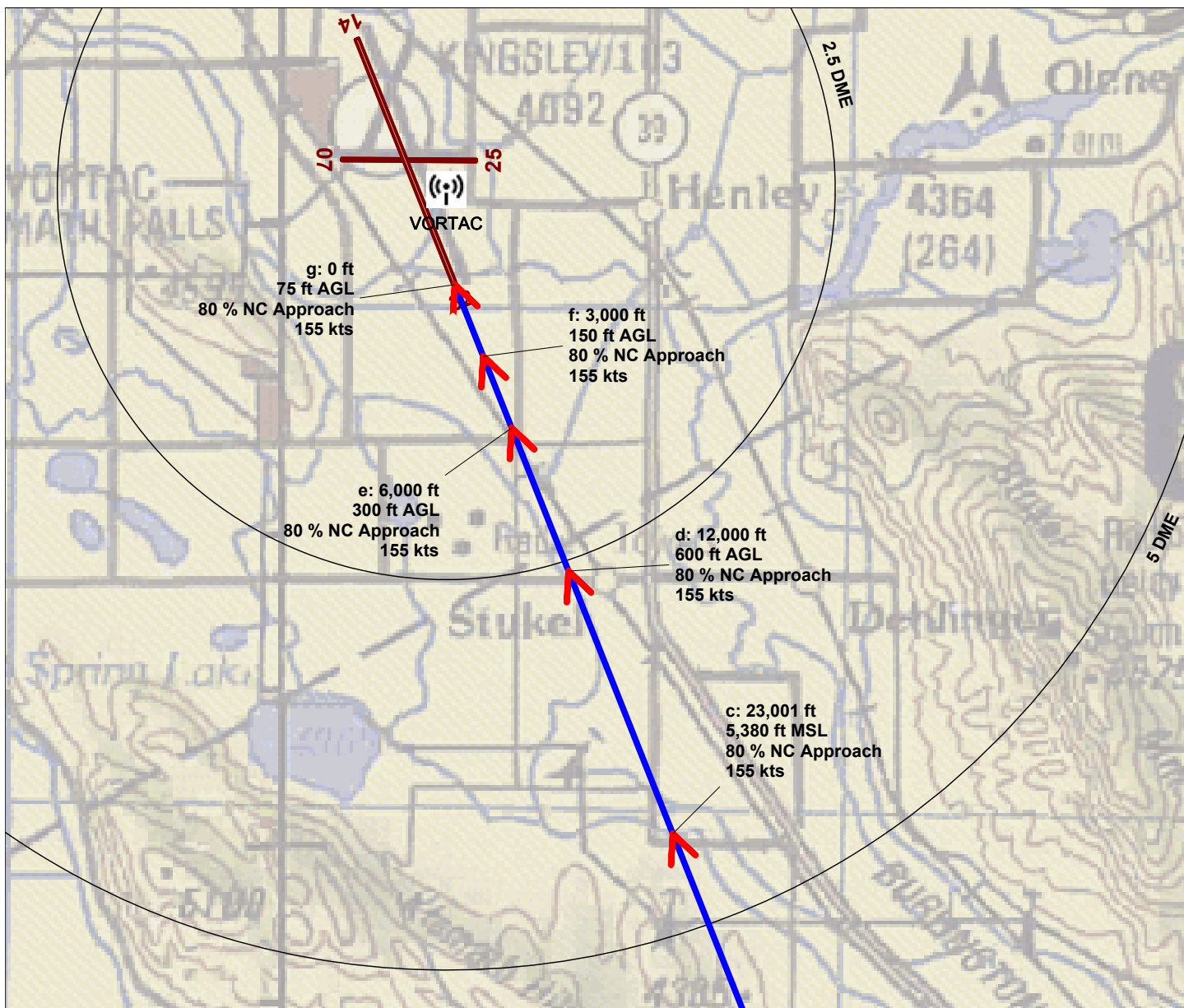
# **Maps of F-15C/D Flight Profiles**

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Flight Profile F15-A3

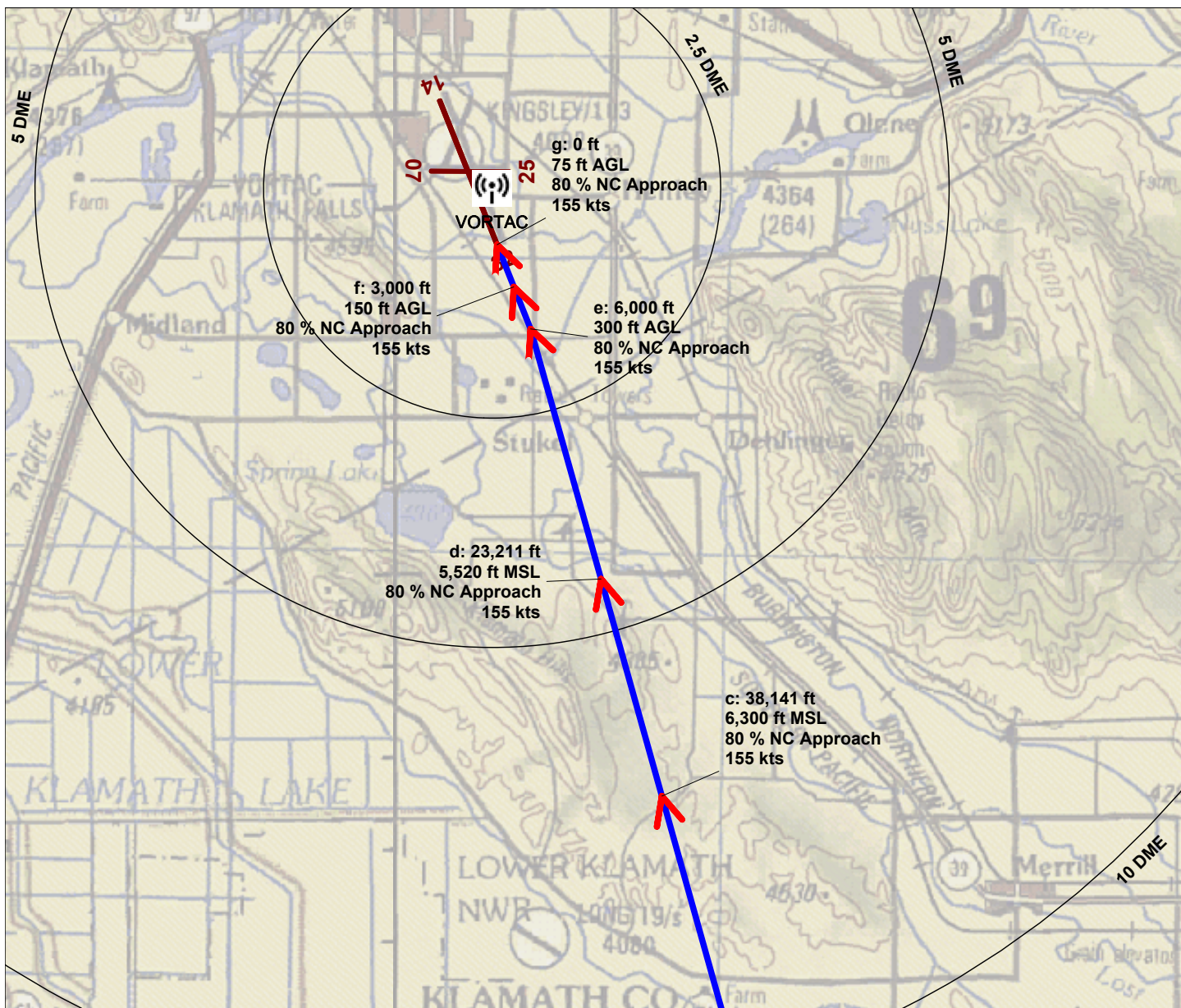
| Point | Distance<br>ft | Height<br>ft | Power<br>% NC | Speed<br>kts | Climb<br>Angle<br>° | Climb<br>Rate<br>fpm | Duration<br>sec | Notes        |
|-------|----------------|--------------|---------------|--------------|---------------------|----------------------|-----------------|--------------|
| a     | 120,000        | 11,000 MSL   | 78 Variable   | 350          | -3.4                | -1800                | 157             |              |
| b     | 40,303         | 6,300 MSL    | 78 Variable   | 250          | -3.0                | -1100                | 51              | MZAMA @ 6300 |
| c     | 23,001         | 5,380 MSL    | 80 Approach   | 155          | -3.6                | -1000                | 42              | SRCUS @ 5380 |
| d     | 12,000         | 600 AGL      | 80 Approach   | 155          | -2.9                | -800                 | 23              |              |
| e     | 6,000          | 300 AGL      | 80 Approach   | 155          | -2.9                | -800                 | 11              |              |
| f     | 3,000          | 150 AGL      | 80 Approach   | 155          | -1.4                | -400                 | 11              |              |
| g     | 0              | 75 AGL       | 80 Approach   | 155          |                     |                      |                 |              |

**Based F-15C/D Flight Profile F15-A3**  
ILS



Scale in Feet 1:73,900 (1 inch = 6,160 feet)





Flight Profile F15-A4

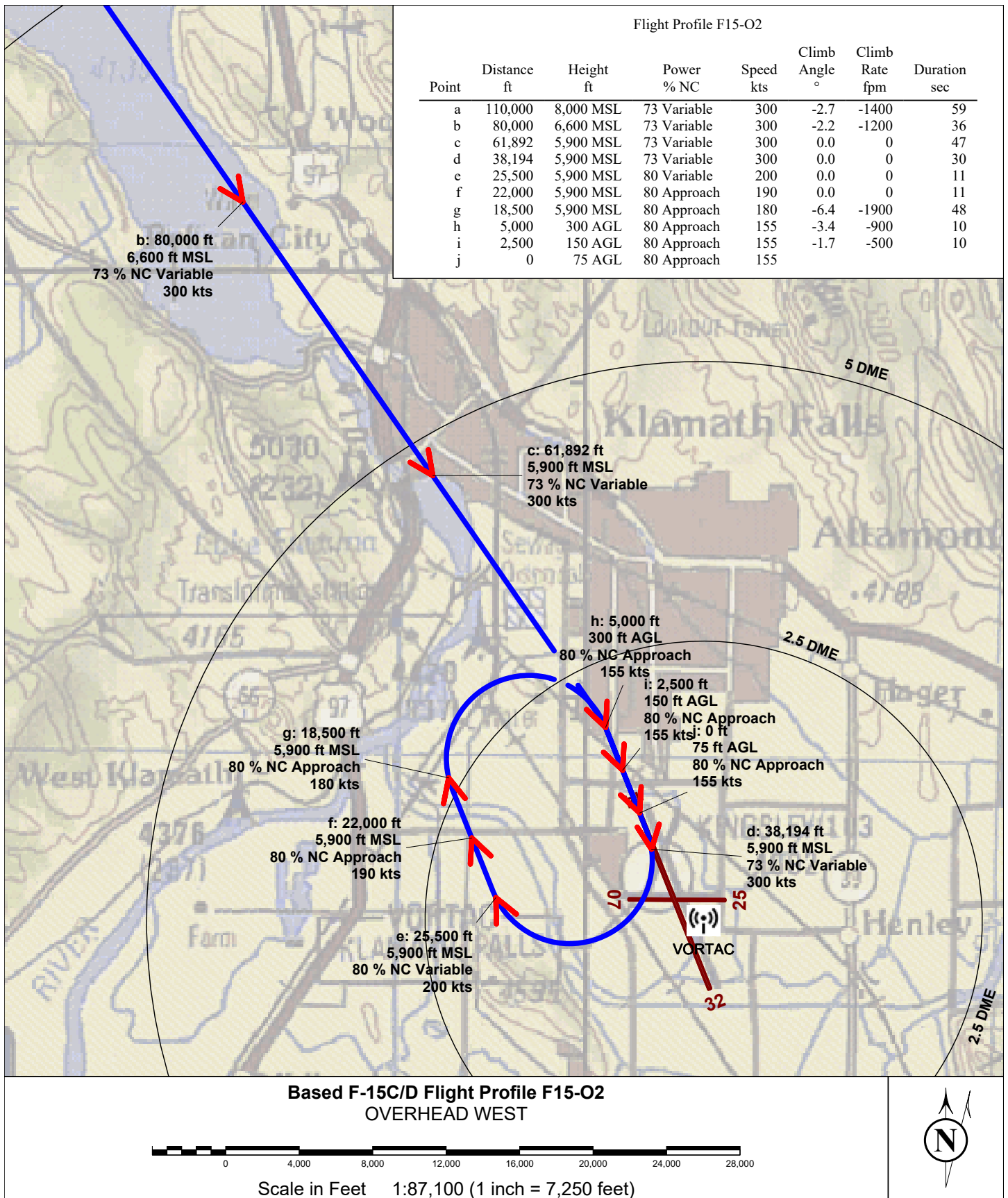
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|-------|----------------|--------------|---------------|--------------|---------------------|----------------------|-----------------|--------------|
| a     | 120,000        | 10,000 MSL   | 78 Variable   | 350          | -2.6                | -1400                | 88              |              |
| b     | 75,376         | 8,000 MSL    | 78 Variable   | 250          | -2.6                | -900                 | 109             | CURVN @ 8000 |
| c     | 38,141         | 6,300 MSL    | 80 Approach   | 155          | -3.0                | -800                 | 57              | JIDAL @ 6300 |
| d     | 23,211         | 5,520 MSL    | 80 Approach   | 155          | -3.7                | -1000                | 66              | FEPNU @ 5520 |
| e     | 6,000          | 300 AGL      | 80 Approach   | 155          | -2.9                | -800                 | 11              |              |
| f     | 3,000          | 150 AGL      | 80 Approach   | 155          | -1.4                | -400                 | 11              |              |
| g     | 0              | 75 AGL       | 80 Approach   | 155          |                     |                      |                 |              |

**Based F-15C/D Flight Profile F15-A4**  
TACAN or VOR

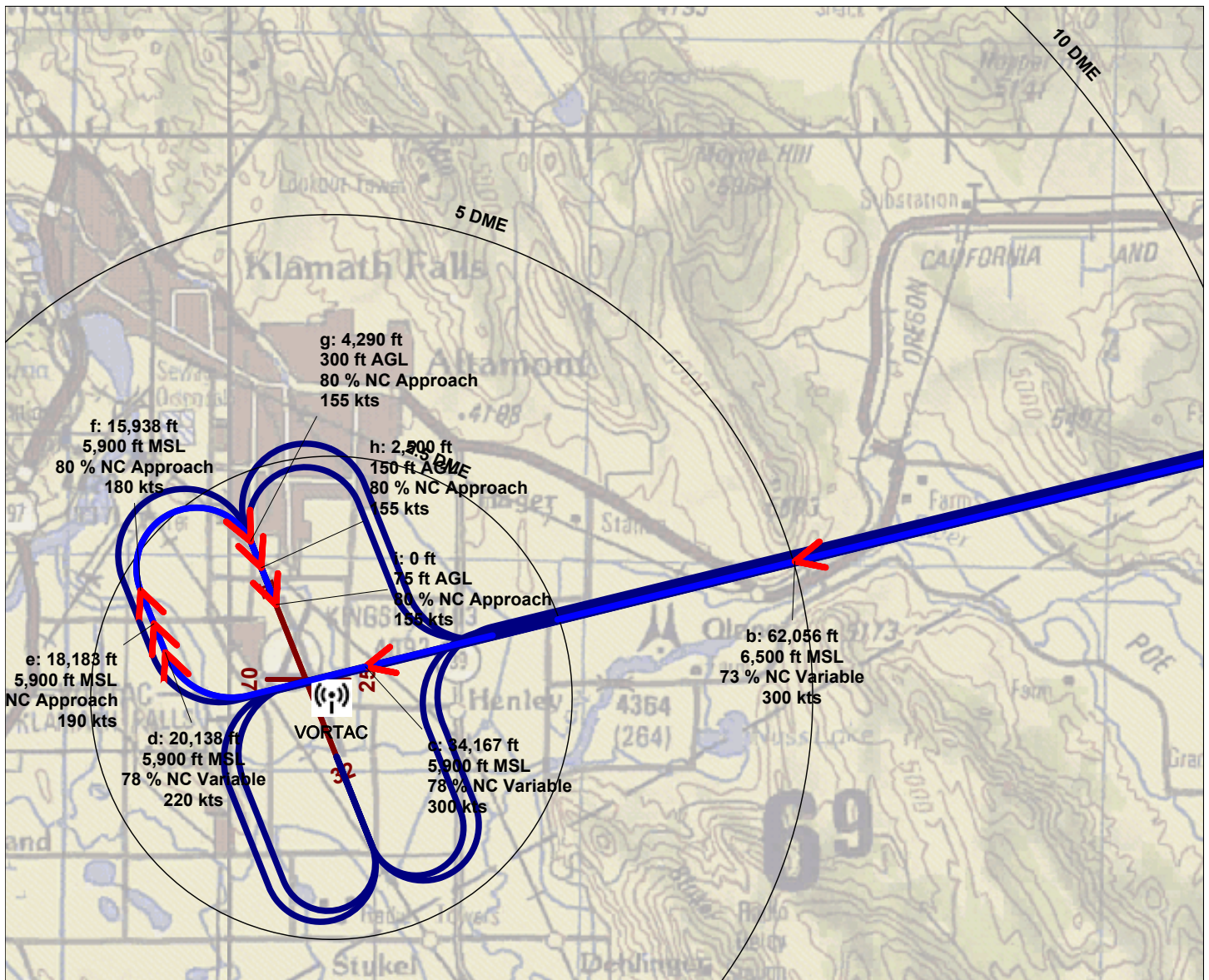


Scale in Feet 1:125,000 (1 inch = 10,500 feet)





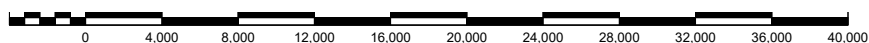




Flight Profile F15-T3

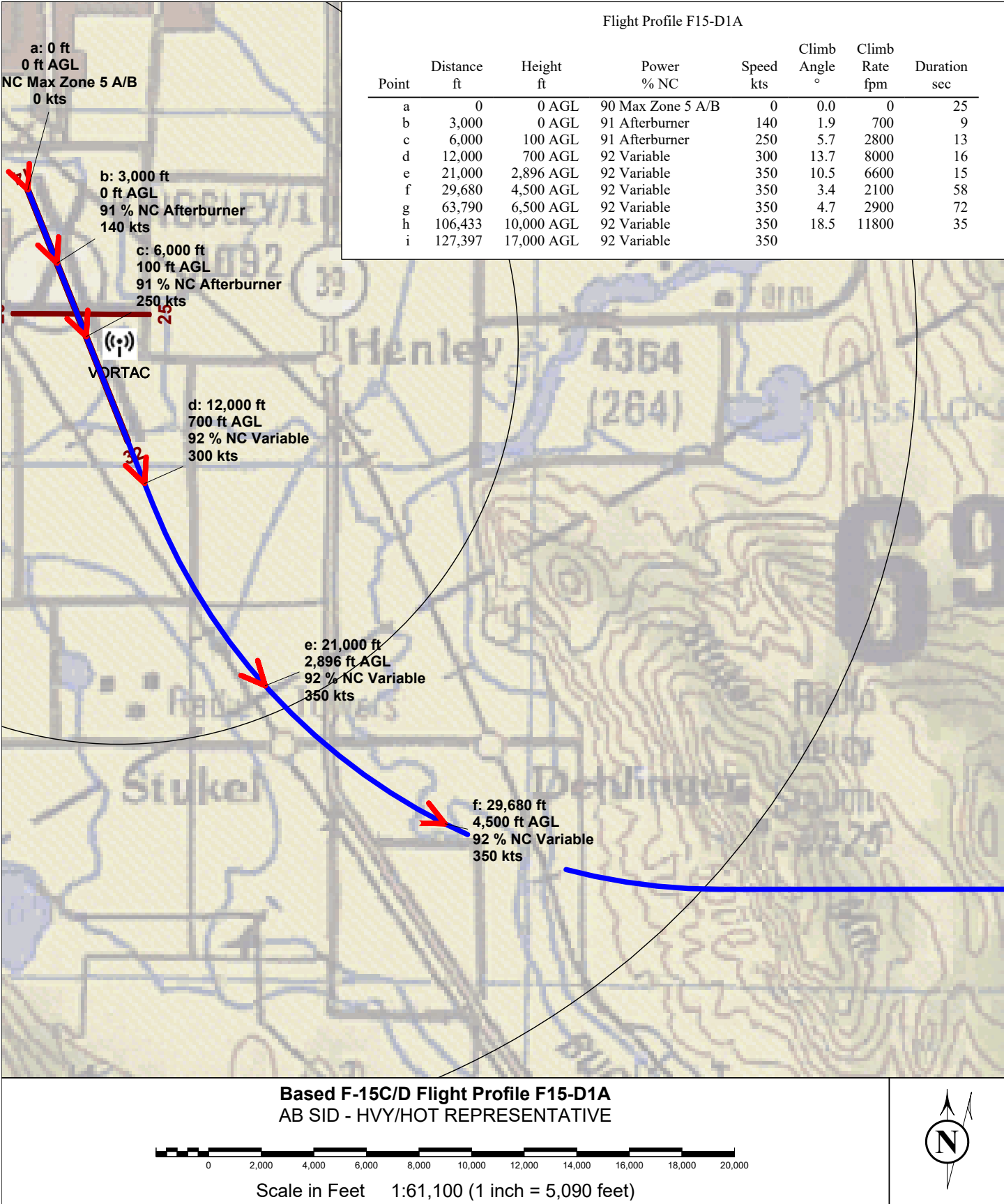
| Point | Distance<br>ft | Height<br>ft | Power<br>% NC | Speed<br>kts | Climb<br>Angle<br>° | Climb<br>Rate<br>fpm | Duration<br>sec |
|-------|----------------|--------------|---------------|--------------|---------------------|----------------------|-----------------|
| a     | 92,932         | 8,500 MSL    | 73 Variable   | 300          | -3.7                | -2000                | 61              |
| b     | 62,056         | 6,500 MSL    | 73 Variable   | 300          | -1.2                | -700                 | 55              |
| c     | 34,167         | 5,900 MSL    | 78 Variable   | 300          | 0.0                 | 0                    | 32              |
| d     | 20,138         | 5,900 MSL    | 78 Variable   | 220          | 0.0                 | 0                    | 6               |
| e     | 18,183         | 5,900 MSL    | 80 Approach   | 190          | 0.0                 | 0                    | 7               |
| f     | 15,938         | 5,900 MSL    | 80 Approach   | 180          | -7.4                | -2200                | 41              |
| g     | 4,290          | 300 AGL      | 80 Approach   | 155          | -4.8                | -1300                | 7               |
| h     | 2,500          | 150 AGL      | 80 Approach   | 155          | -1.7                | -500                 | 10              |
| i     | 0              | 75 AGL       | 80 Approach   | 155          |                     |                      |                 |

**Based F-15C/D Flight Profile F15-T3**  
TAC 90 WEST LEAD

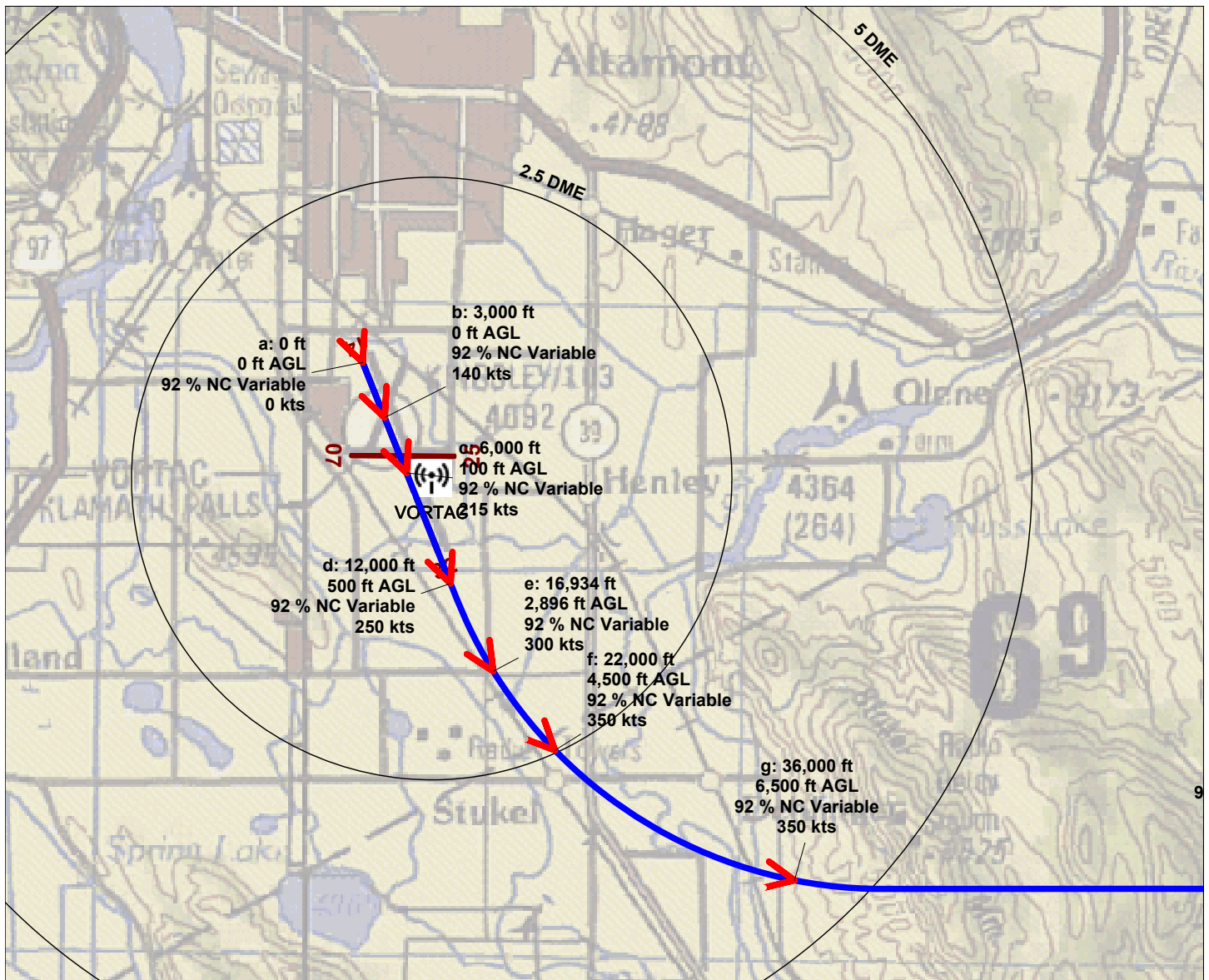


Scale in Feet 1:121,000 (1 inch = 10,100 feet)









**Flight Profile F15-D1M**

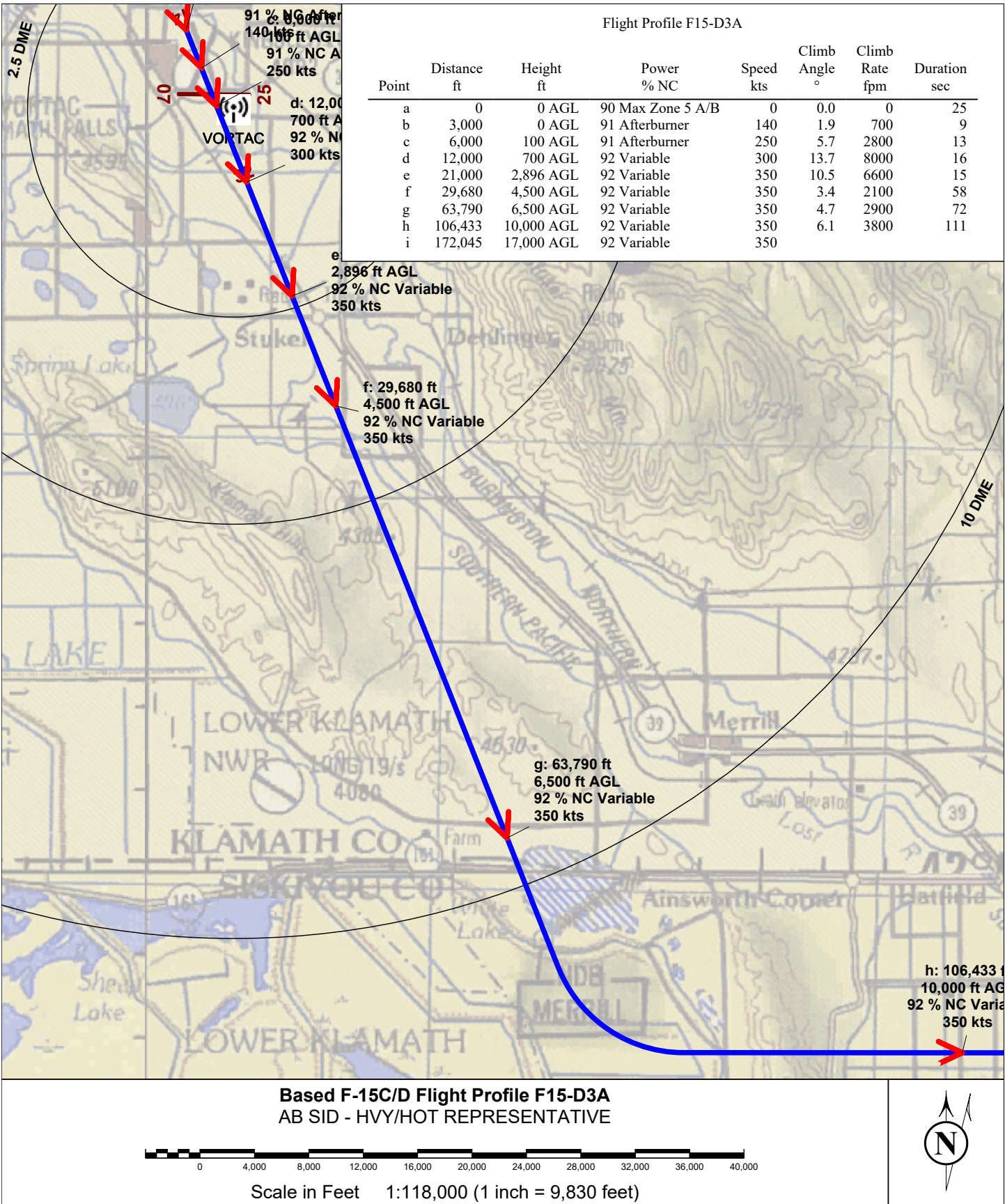
| Point | Distance<br>ft | Height<br>ft | Power<br>% NC | Speed<br>kts | Climb<br>Angle<br>° | Climb<br>Rate<br>fpm | Duration<br>sec |
|-------|----------------|--------------|---------------|--------------|---------------------|----------------------|-----------------|
| a     | 0              | 0 AGL        | 92 Variable   | 0            | 0.0                 | 0                    | 25              |
| b     | 3,000          | 0 AGL        | 92 Variable   | 140          | 1.9                 | 600                  | 10              |
| c     | 6,000          | 100 AGL      | 92 Variable   | 215          | 3.8                 | 1600                 | 15              |
| d     | 12,000         | 500 AGL      | 92 Variable   | 250          | 25.9                | 13500                | 11              |
| e     | 16,934         | 2,896 AGL    | 92 Variable   | 300          | 17.6                | 10400                | 9               |
| f     | 22,000         | 4,500 AGL    | 92 Variable   | 350          | 8.1                 | 5100                 | 24              |
| g     | 36,000         | 6,500 AGL    | 92 Variable   | 350          | 8.3                 | 5200                 | 41              |
| h     | 60,000         | 10,000 AGL   | 92 Variable   | 350          | 6.7                 | 4100                 | 102             |
| i     | 120,000        | 17,000 AGL   | 92 Variable   | 350          |                     |                      |                 |

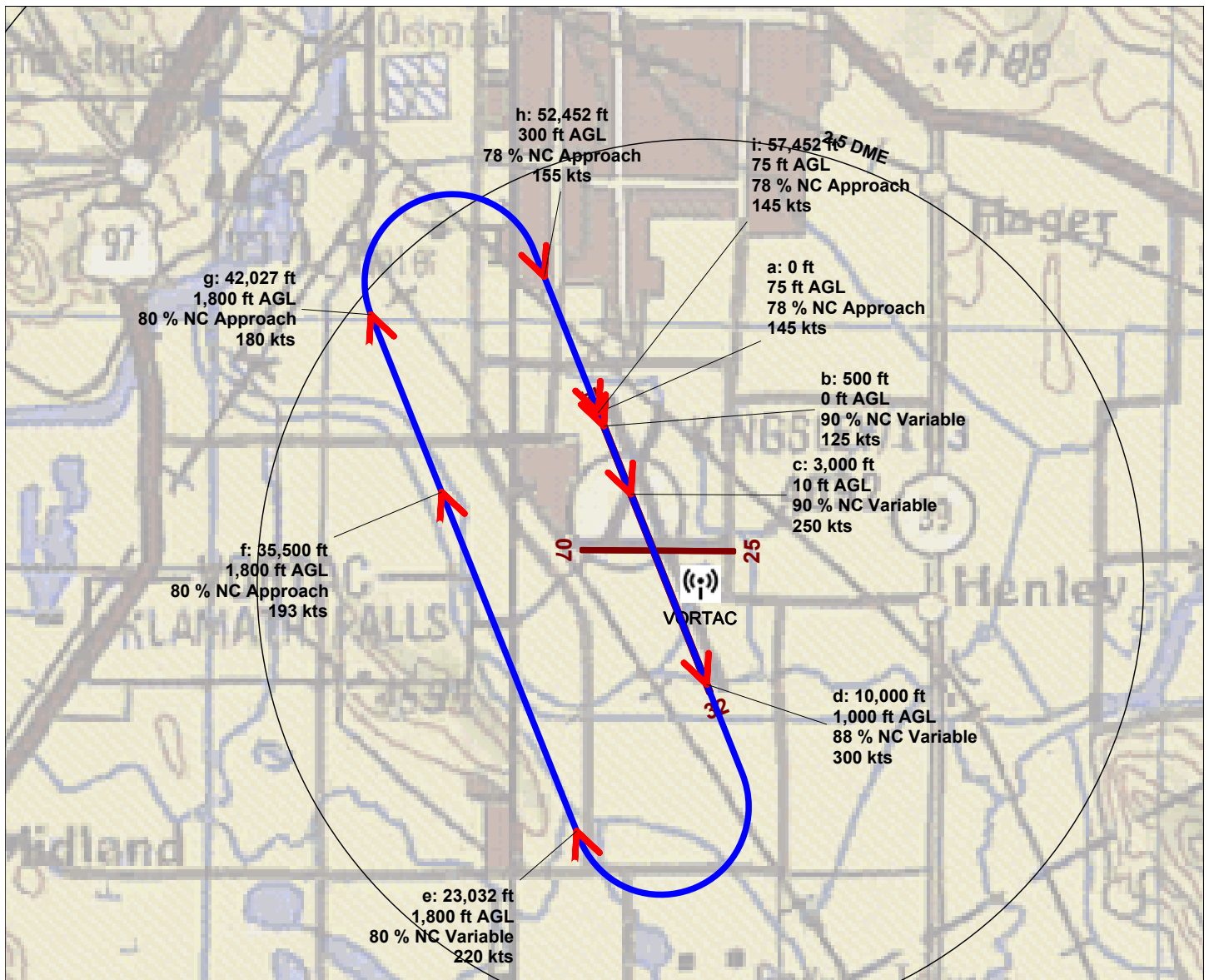
**Based F-15C/D Flight Profile F15-D1M**  
**MILPOWER SID - REPRESENTATIVE**



Scale in Feet    1:96,900 (1 inch = 8,080 feet)



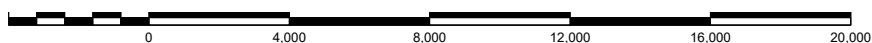




Flight Profile F15-C2

| Point | Distance<br>ft | Height<br>ft | Power<br>% NC | Speed<br>kts | Climb<br>Angle<br>° | Climb<br>Rate<br>fpm | Duration<br>sec | Notes                                     |
|-------|----------------|--------------|---------------|--------------|---------------------|----------------------|-----------------|-------------------------------------------|
| a     | 0              | 75 AGL       | 78 Approach   | 145          | -8.5                | -2100                | 2               |                                           |
| b     | 500            | 0 AGL        | 90 Variable   | 125          | 0.2                 | 100                  | 8               |                                           |
| c     | 3,000          | 10 AGL       | 90 Variable   | 250          | 8.0                 | 3900                 | 15              |                                           |
| d     | 10,000         | 1,000 AGL    | 88 Variable   | 300          | 3.5                 | 1600                 | 30              |                                           |
| e     | 23,032         | 1,800 AGL    | 80 Variable   | 220          | 0.0                 | 0                    | 36              |                                           |
| f     | 35,500         | 1,800 AGL    | 80 Approach   | 193          | 0.0                 | 0                    | 21              | Using variable due to extrapolation limit |
| g     | 42,027         | 1,800 AGL    | 80 Approach   | 180          | -8.2                | -2400                | 37              | Using variable due to extrapolation limit |
| h     | 52,452         | 300 AGL      | 78 Approach   | 155          | -2.6                | -700                 | 20              |                                           |
| i     | 57,452         | 75 AGL       | 78 Approach   | 145          |                     |                      |                 |                                           |

**Based F-15C/D Flight Profile F15-C2**  
**CLOSED PATTERN RUNWAY 14 WEST**



Scale in Feet 1:65,600 (1 inch = 5,470 feet)



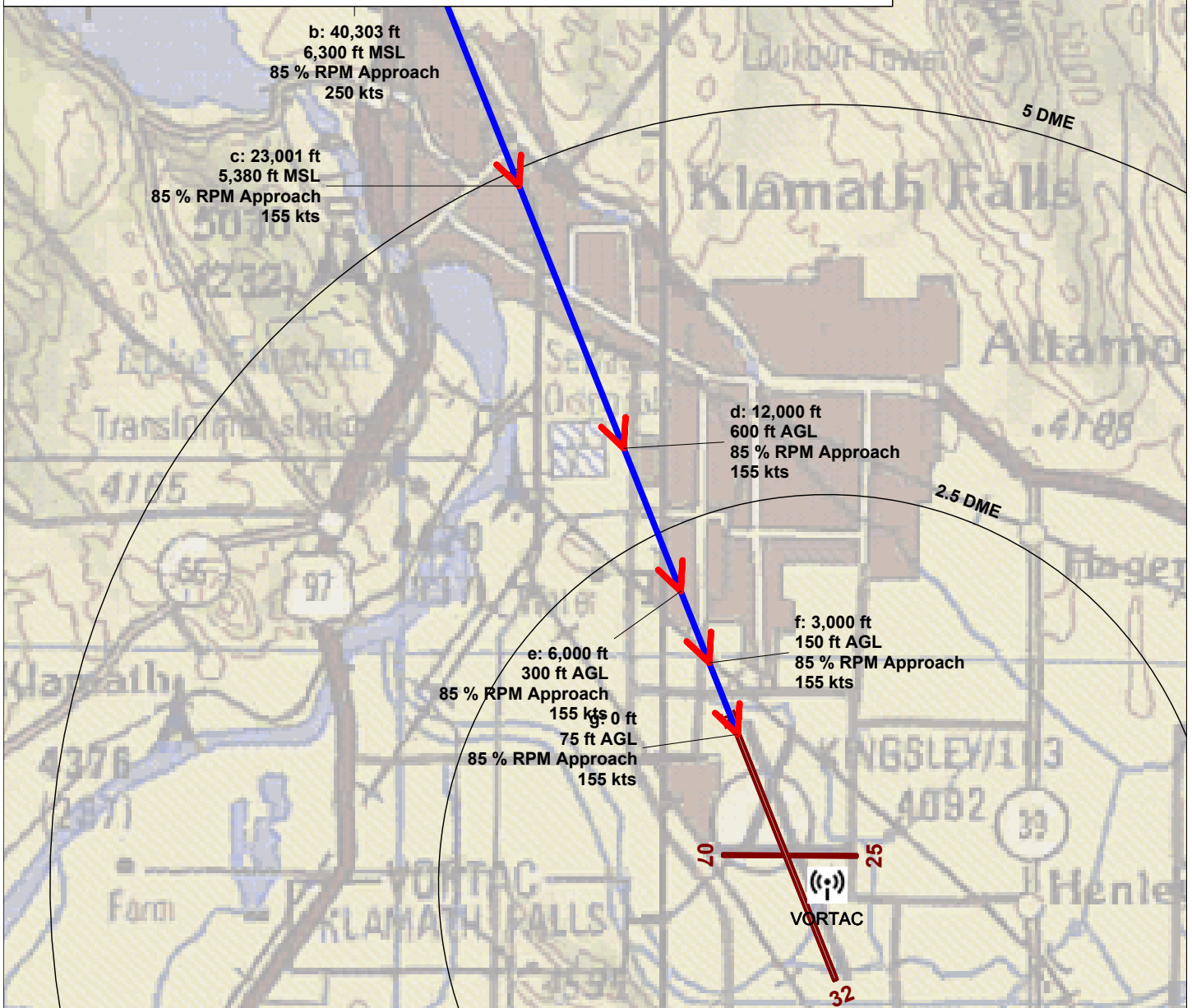
# **F-5E Adversary Air**

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Flight Profile F5-A1

| Point | Distance<br>ft | Height<br>ft | Power<br>% RPM | Speed<br>kts | Climb<br>Angle<br>° | Climb<br>Rate<br>fpm | Duration<br>sec | Notes        |
|-------|----------------|--------------|----------------|--------------|---------------------|----------------------|-----------------|--------------|
| a     | 120,000        | 11,000 MSL   | 85 Variable    | 350          | -3.4                | -1800                | 157             |              |
| b     | 40,303         | 6,300 MSL    | 85 Approach    | 250          | -3.0                | -1100                | 51              | MZAMA @ 6300 |
| c     | 23,001         | 5,380 MSL    | 85 Approach    | 155          | -3.6                | -1000                | 42              | SRCUS @ 5380 |
| d     | 12,000         | 600 AGL      | 85 Approach    | 155          | -2.9                | -800                 | 23              |              |
| e     | 6,000          | 300 AGL      | 85 Approach    | 155          | -2.9                | -800                 | 11              |              |
| f     | 3,000          | 150 AGL      | 85 Approach    | 155          | -1.4                | -400                 | 11              |              |
| g     | 0              | 75 AGL       | 85 Approach    | 155          |                     |                      |                 |              |

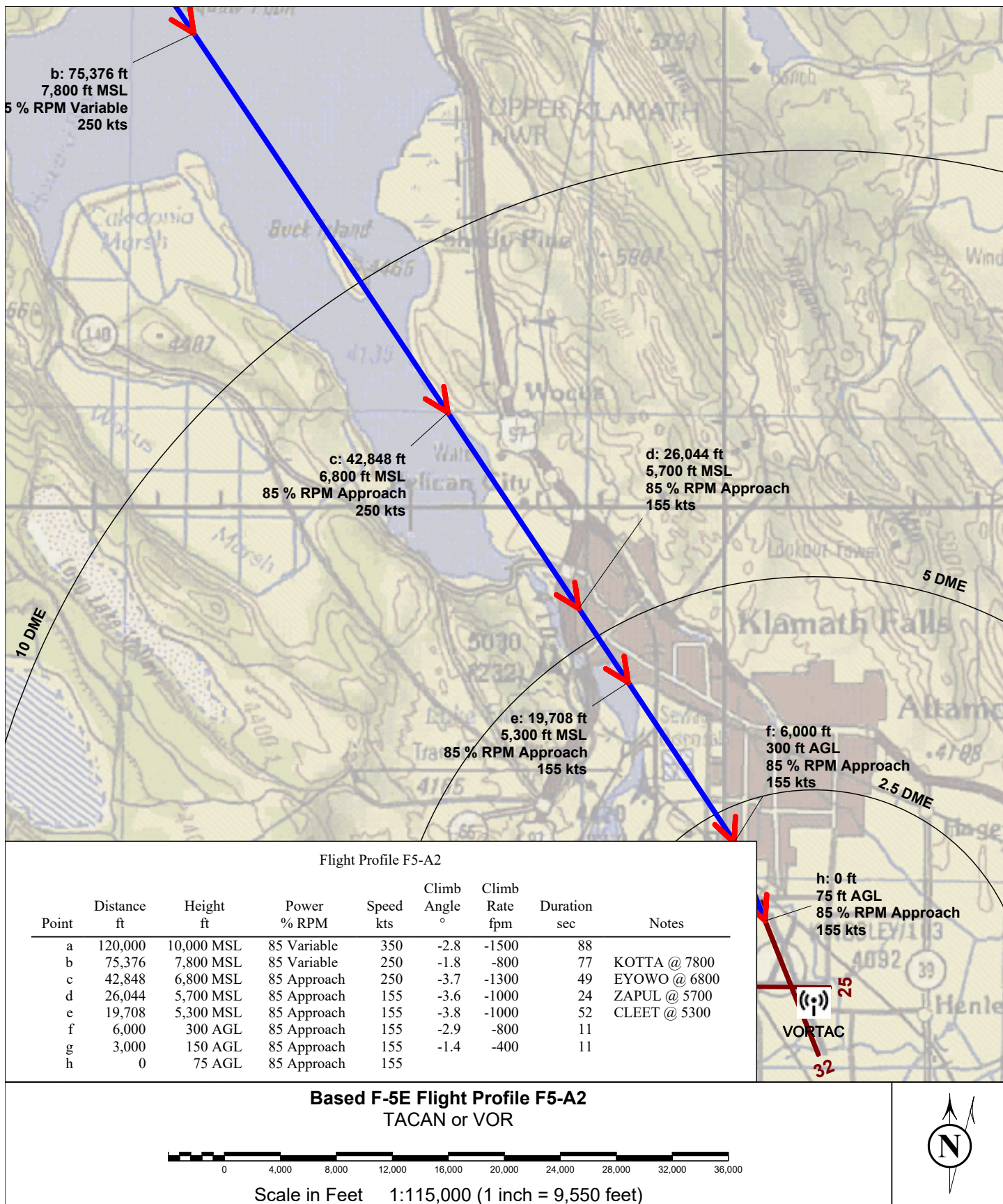


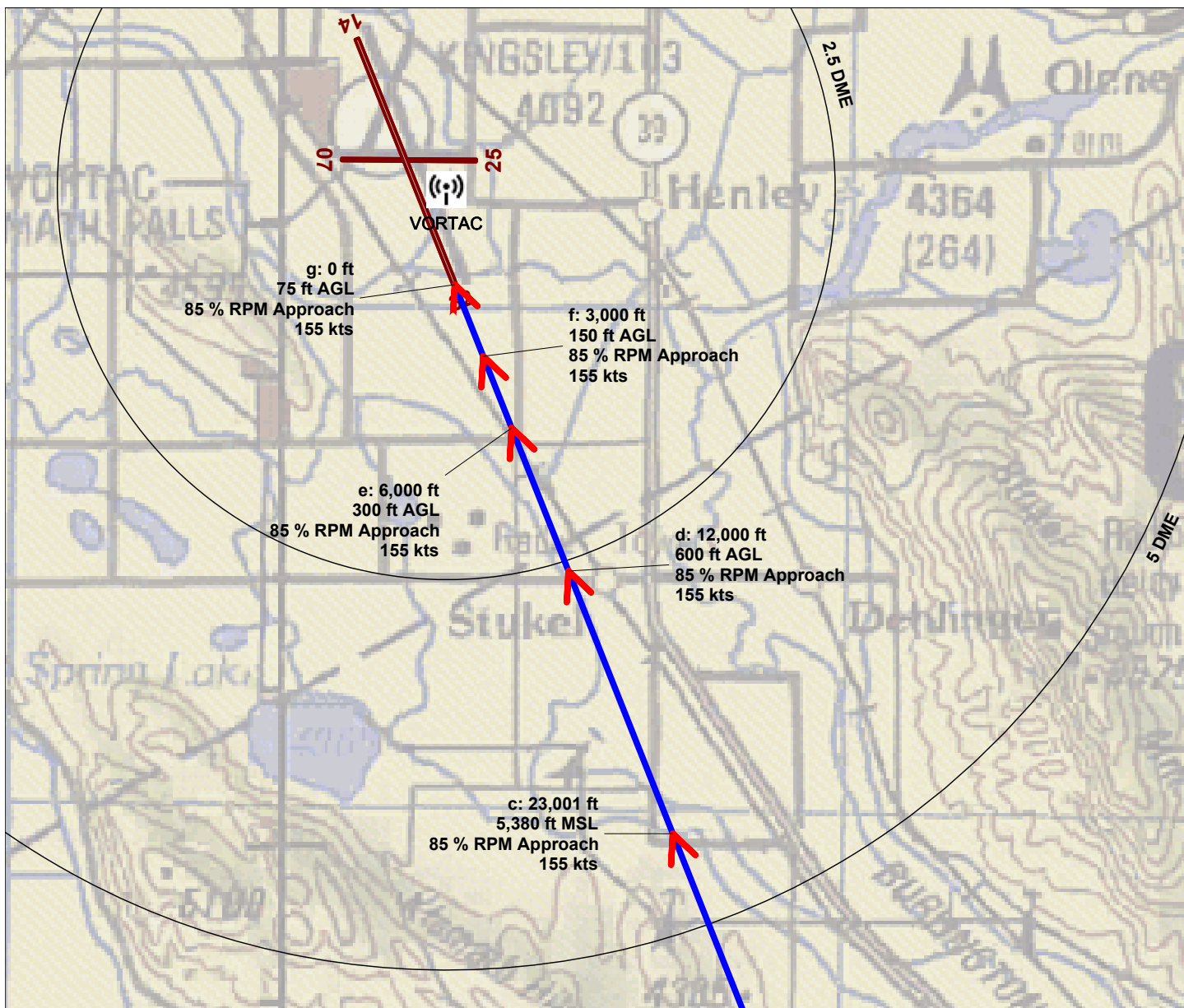
Based F-5E Flight Profile F5-A1  
ILS



Scale in Feet 1:73,900 (1 inch = 6,160 feet)







Flight Profile F5-A3

| Point | Distance<br>ft | Height<br>ft | Power<br>% RPM | Speed<br>kts | Climb<br>Angle<br>° | Climb<br>Rate<br>fpm | Duration<br>sec | Notes        |
|-------|----------------|--------------|----------------|--------------|---------------------|----------------------|-----------------|--------------|
| a     | 120,000        | 11,000 MSL   | 85 Variable    | 350          | -3.4                | -1800                | 157             |              |
| b     | 40,303         | 6,300 MSL    | 85 Approach    | 250          | -3.0                | -1100                | 51              | MZAMA @ 6300 |
| c     | 23,001         | 5,380 MSL    | 85 Approach    | 155          | -3.6                | -1000                | 42              | SRCUS @ 5380 |
| d     | 12,000         | 600 AGL      | 85 Approach    | 155          | -2.9                | -800                 | 23              |              |
| e     | 6,000          | 300 AGL      | 85 Approach    | 155          | -2.9                | -800                 | 11              |              |
| f     | 3,000          | 150 AGL      | 85 Approach    | 155          | -1.4                | -400                 | 11              |              |
| g     | 0              | 75 AGL       | 85 Approach    | 155          |                     |                      |                 |              |

**b: 40,303 ft  
6,300 ft MSL  
85 % RPM Approach  
250 kts**

**Based F-5E Flight Profile F5-A3  
ILS**



Scale in Feet 1:73,900 (1 inch = 6,160 feet)



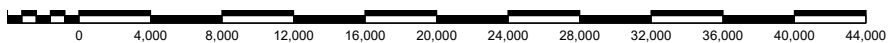




Flight Profile F5-A4

| Point | Distance<br>ft | Height<br>ft | Power<br>% RPM | Speed<br>kts | Climb<br>Angle<br>° | Climb<br>Rate<br>fpm | Duration<br>sec | Notes        |
|-------|----------------|--------------|----------------|--------------|---------------------|----------------------|-----------------|--------------|
| a     | 120,000        | 10,000 MSL   | 85 Variable    | 350          | -2.6                | -1400                | 88              |              |
| b     | 75,376         | 8,000 MSL    | 85 Variable    | 250          | -2.6                | -900                 | 109             | CURVN @ 8000 |
| c     | 38,141         | 6,300 MSL    | 85 Approach    | 155          | -3.0                | -800                 | 57              | JIDAL @ 6300 |
| d     | 23,211         | 5,520 MSL    | 85 Approach    | 155          | -3.7                | -1000                | 66              | FEPNU @ 5520 |
| e     | 6,000          | 300 AGL      | 85 Approach    | 155          | -2.9                | -800                 | 11              |              |
| f     | 3,000          | 150 AGL      | 85 Approach    | 155          | -1.4                | -400                 | 11              |              |
| g     | 0              | 75 AGL       | 85 Approach    | 155          |                     |                      |                 |              |

**Based F-5E Flight Profile F5-A4**  
TACAN or VOR



Scale in Feet 1:129,000 (1 inch = 10,700 feet)

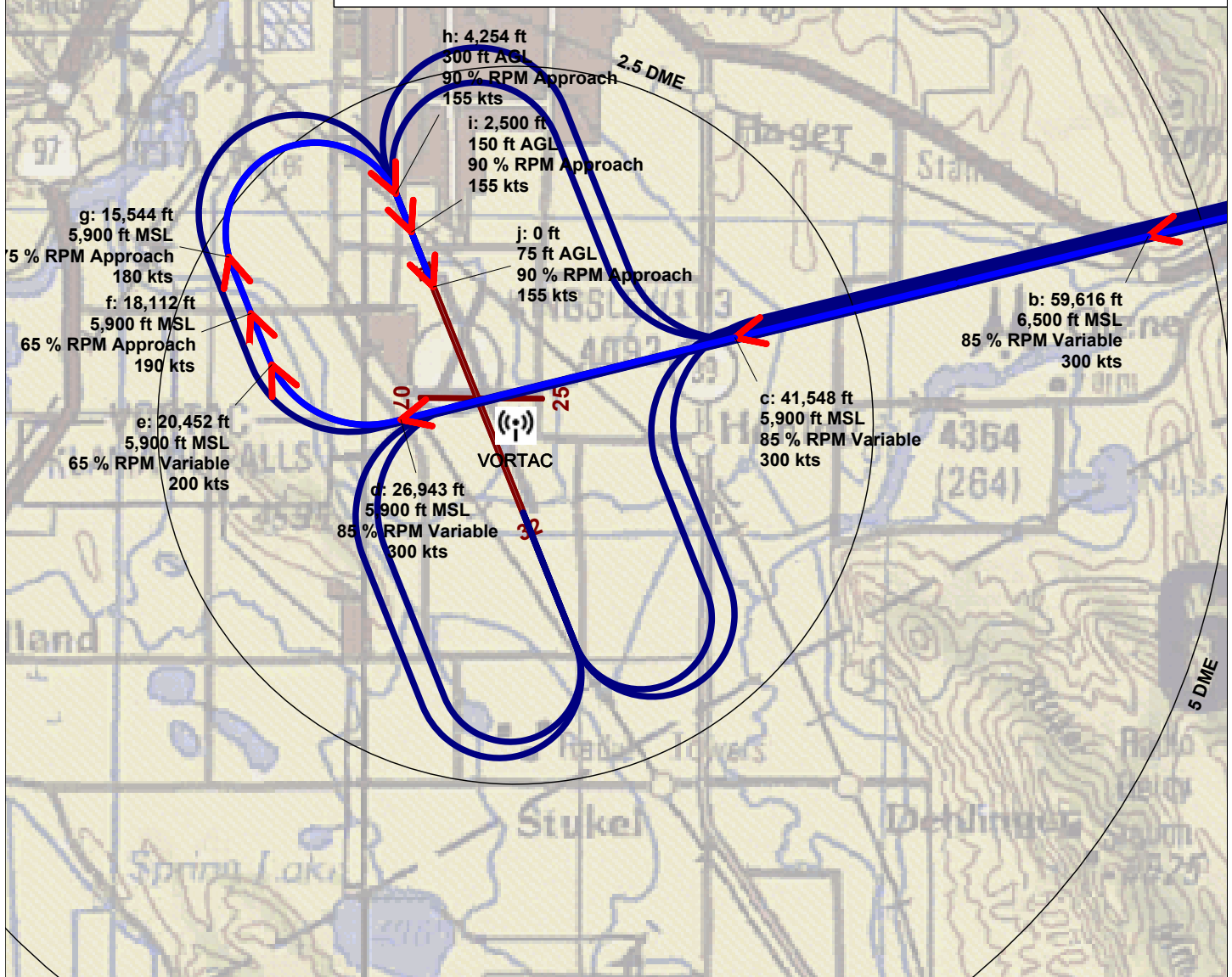






Flight Profile F5-T3

| Point | Distance<br>ft | Height<br>ft | Power<br>% RPM | Speed<br>kts | Climb<br>Angle<br>° | Climb<br>Rate<br>fpm | Duration<br>sec | Notes          |
|-------|----------------|--------------|----------------|--------------|---------------------|----------------------|-----------------|----------------|
| a     | 92,946         | 8,500 MSL    | 85 Variable    | 300          | -3.4                | -1800                | 66              |                |
| b     | 59,616         | 6,500 MSL    | 85 Variable    | 300          | -1.9                | -1000                | 36              |                |
| c     | 41,548         | 5,900 MSL    | 85 Variable    | 300          | 0.0                 | 0                    | 29              |                |
| d     | 26,943         | 5,900 MSL    | 85 Variable    | 300          | 0.0                 | 0                    | 15              |                |
| e     | 20,452         | 5,900 MSL    | 65 Variable    | 200          | 0.0                 | 0                    | 7               | Start downwind |
| f     | 18,112         | 5,900 MSL    | 65 Approach    | 190          | 0.0                 | 0                    | 8               | Drop Gear      |
| g     | 15,544         | 5,900 MSL    | 75 Approach    | 180          | -7.6                | -2300                | 40              |                |
| h     | 4,254          | 300 AGL      | 90 Approach    | 155          | -4.9                | -1300                | 7               |                |
| i     | 2,500          | 150 AGL      | 90 Approach    | 155          | -1.7                | -500                 | 10              |                |
| j     | 0              | 75 AGL       | 90 Approach    | 155          |                     |                      |                 |                |

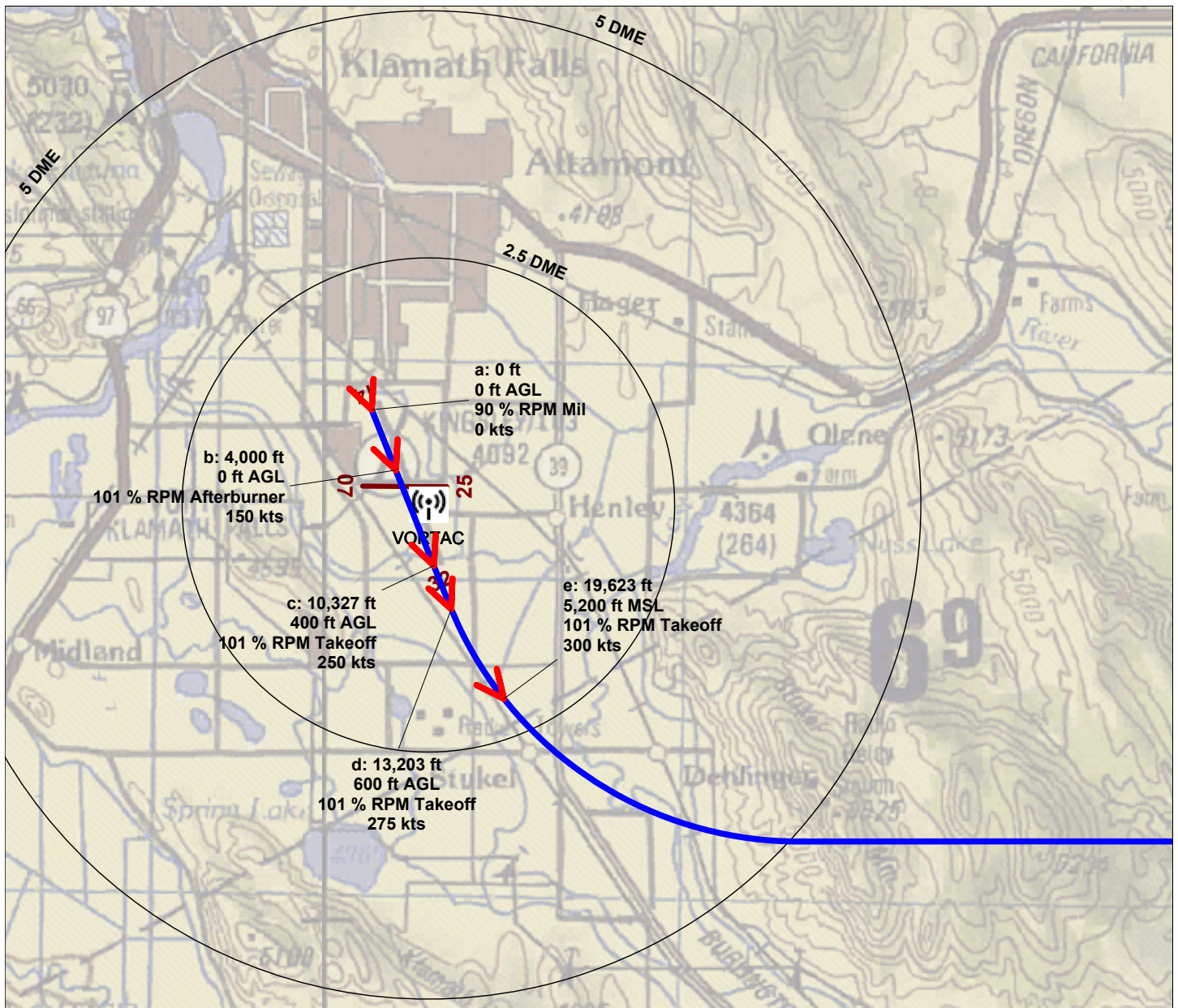


Based F-5E Flight Profile F5-T3  
TAC 90 WEST LEAD



Scale in Feet 1:82,900 (1 inch = 6,910 feet)

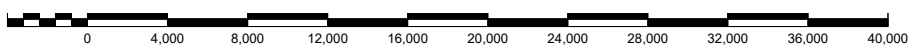




Flight Profile F5-D1A

| Point | Distance<br>ft | Height<br>ft | Power<br>% RPM  | Speed<br>kts | Climb<br>Angle<br>° | Climb<br>Rate<br>fpm | Duration<br>sec | Notes                                  |
|-------|----------------|--------------|-----------------|--------------|---------------------|----------------------|-----------------|----------------------------------------|
| a     | 0              | 0 AGL        | 90 Mil          | 0            | 0.0                 | 0                    | 32              |                                        |
| b     | 4,000          | 0 AGL        | 101 Afterburner | 150          | 3.6                 | 1300                 | 19              |                                        |
| c     | 10,327         | 400 AGL      | 101 Takeoff     | 250          | 4.0                 | 1800                 | 6               | cut A/B by end or Rwy most of the time |
| d     | 13,203         | 600 AGL      | 101 Takeoff     | 275          | 4.5                 | 2300                 | 13              |                                        |
| e     | 19,623         | 5,200 MSL    | 101 Takeoff     | 300          | 5.0                 | 2700                 | 107             | reach climb speed, 5 deg climb         |
| f     | 73,948         | 10,000 MSL   | 90 Takeoff      | 300          | 0.0                 | 0                    | 94              |                                        |
| g     | 121,479        | 10,000 MSL   | 85 Takeoff      | 300          |                     |                      |                 |                                        |

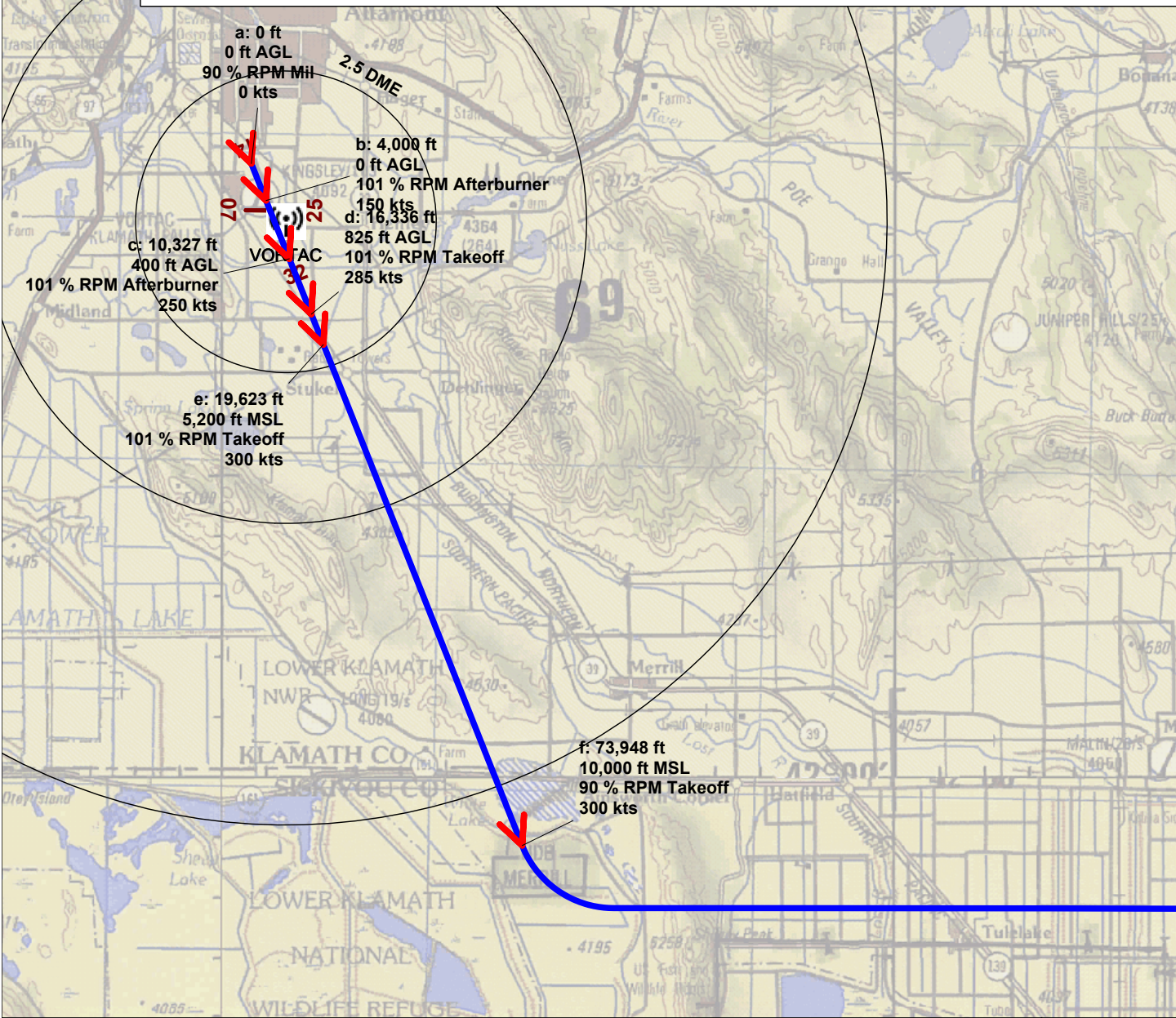
Based F-5E Flight Profile F5-D1A

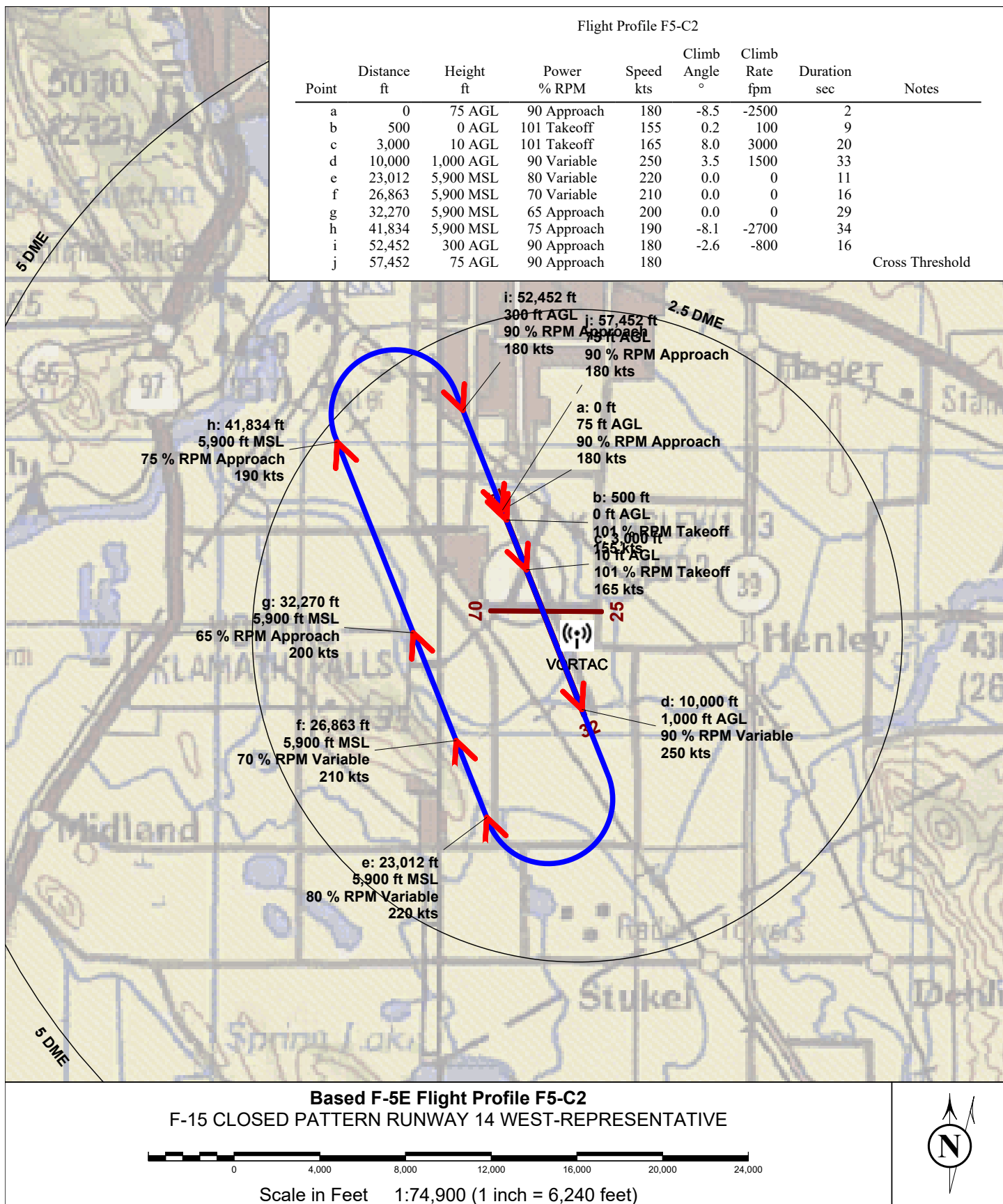


Scale in Feet 1:115,000 (1 inch = 9,590 feet)









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# **Maps of F-35A Flight Profiles**

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| Flight Profile F35-A1 |                |              |                |              |                     |                      |                 |                                                           |
|-----------------------|----------------|--------------|----------------|--------------|---------------------|----------------------|-----------------|-----------------------------------------------------------|
| Point                 | Distance<br>ft | Height<br>ft | Power<br>% ETR | Speed<br>kts | Climb<br>Angle<br>° | Climb<br>Rate<br>fpm | Duration<br>sec | Notes                                                     |
| a                     | 120,000        | 11,000 MSL   | 15 Variable    | 350          | -3.4                | -1700                | 164             | Begin descent from 10000 ft MSL, 350 kts; approx 20nm out |
| b                     | 40,303         | 6,300 MSL    | 40 Parallel    | 225          | -2.6                | -900                 | 51              | MZAMA @ 6300                                              |
| c                     | 23,001         | 5,500 MSL    | 40 Parallel    | 180          | -3.4                | -1100                | 77              | SRCUS @ 5380                                              |
| d                     | 0              | 50 AGL       | 40 Parallel    | 175          |                     |                      |                 | Assume cross threshold at 50 ft AGL                       |



Based F-35A Flight Profile F35-A1

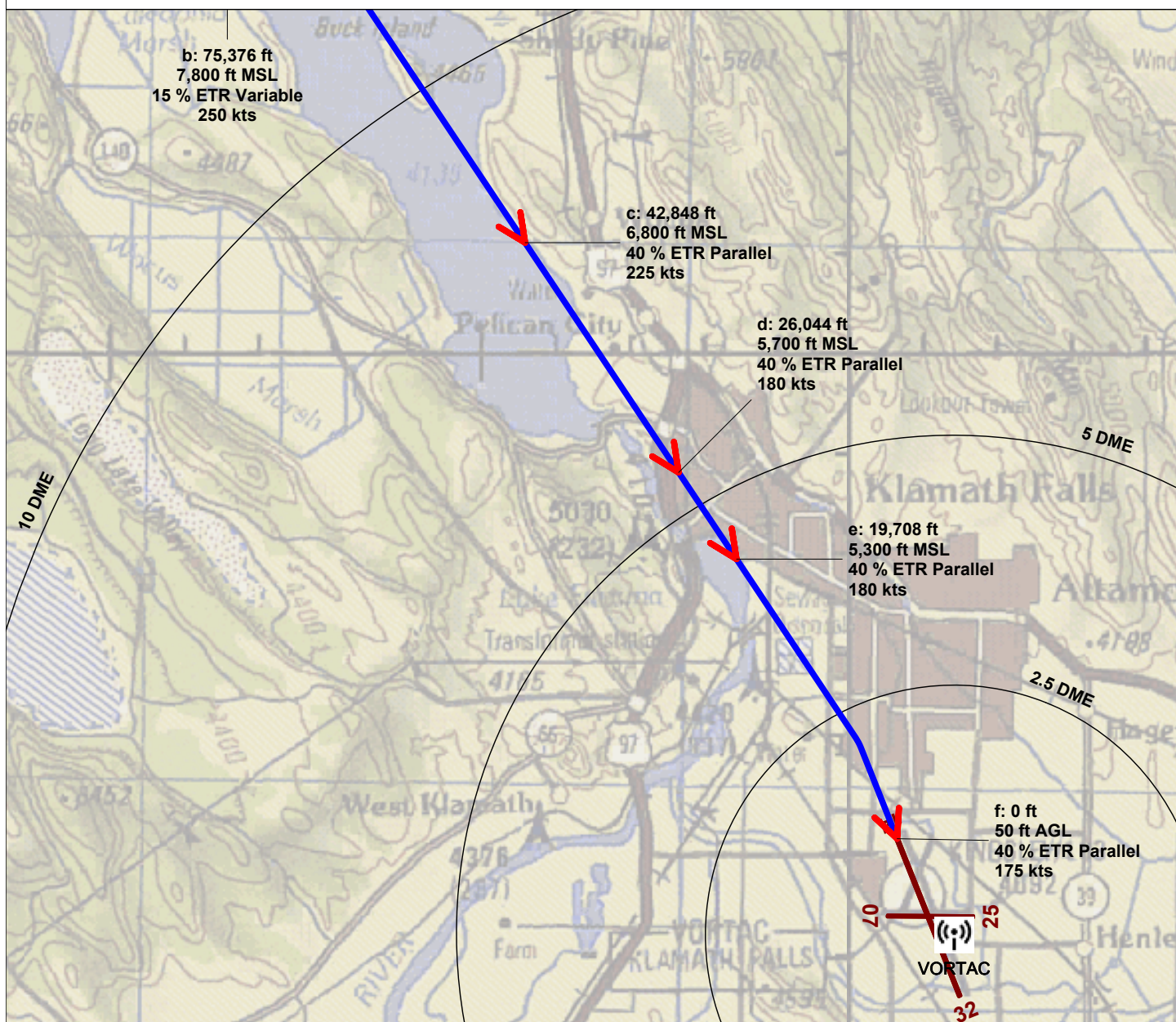
ILS

04000800012000160002000024000

Scale in Feet 1:73,900 (1 inch = 6,160 feet)

# Flight Profile F35-A2

| Point | Distance<br>ft | Height<br>ft | Power<br>% ETR | Speed<br>kts | Climb<br>Angle<br>° | Climb<br>Rate<br>fpm | Duration<br>sec | Notes                                                      |
|-------|----------------|--------------|----------------|--------------|---------------------|----------------------|-----------------|------------------------------------------------------------|
| a     | 120,000        | 10,000 MSL   | 15 Variable    | 350          | -2.8                | -1500                | 88              | Begin descent from 10000 ft MSL, 350 kts; approx 20nm out  |
| b     | 75,376         | 7,800 MSL    | 15 Variable    | 250          | -1.8                | -700                 | 81              | KOTTA @ 7800; Reduce speed to match existing F-15C profile |
| c     | 42,848         | 6,800 MSL    | 40 Parallel    | 225          | -3.7                | -1300                | 49              | EYOWO @ 6800; Gear down                                    |
| d     | 26,044         | 5,700 MSL    | 40 Parallel    | 180          | -3.6                | -1200                | 21              | ZAPUL @ 5700                                               |
| e     | 19,708         | 5,300 MSL    | 40 Parallel    | 180          | -3.4                | -1100                | 66              | CLEET @ 5300                                               |
| f     | 0              | 50 AGL       | 40 Parallel    | 175          |                     |                      |                 | Assume cross threshold at 50 ft AGL                        |

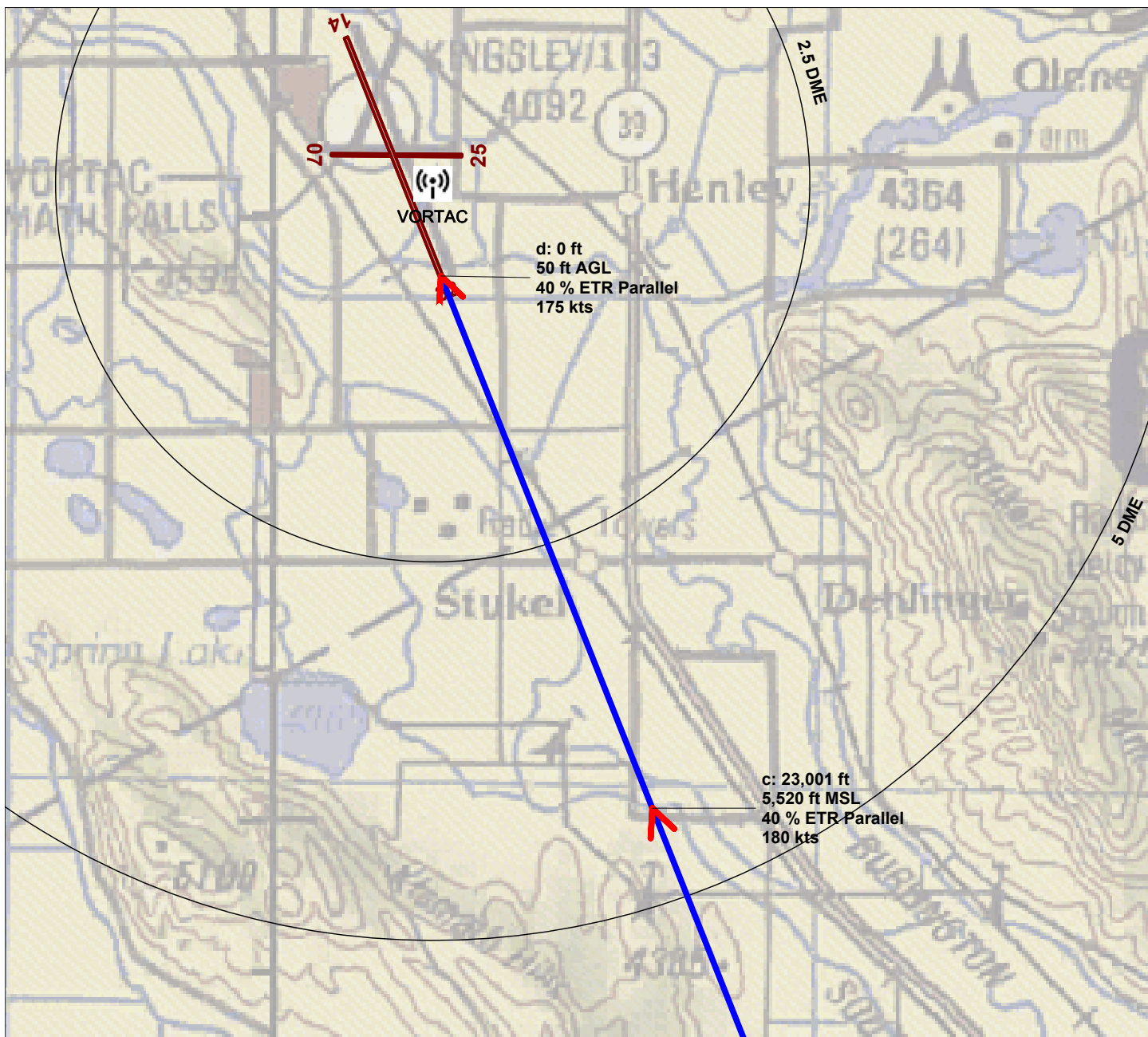


## Based F-35A Flight Profile F35-A2 TACAN or VOR



Scale in Feet 1:115,000 (1 inch = 9,550 feet)

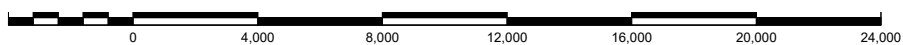




Flight Profile F35-A3

| Point | Distance<br>ft | Height<br>ft | Power<br>% ETR | Speed<br>kts | Climb<br>Angle<br>° | Climb<br>Rate<br>fpm | Duration<br>sec | Notes                                                     |
|-------|----------------|--------------|----------------|--------------|---------------------|----------------------|-----------------|-----------------------------------------------------------|
| a     | 120,000        | 11,000 MSL   | 15 Variable    | 350          | -3.4                | -1700                | 164             | Begin descent from 10000 ft MSL, 350 kts; approx 20nm out |
| b     | 40,303         | 6,300 MSL    | 40 Parallel    | 225          | -2.6                | -900                 | 51              | MZAMA @ 6300                                              |
| c     | 23,001         | 5,520 MSL    | 40 Parallel    | 180          | -3.4                | -1100                | 77              | SRCUS @ 5380                                              |
| d     | 0              | 50 AGL       | 40 Parallel    | 175          |                     |                      |                 | Assume cross threshold at 50 ft AGL                       |

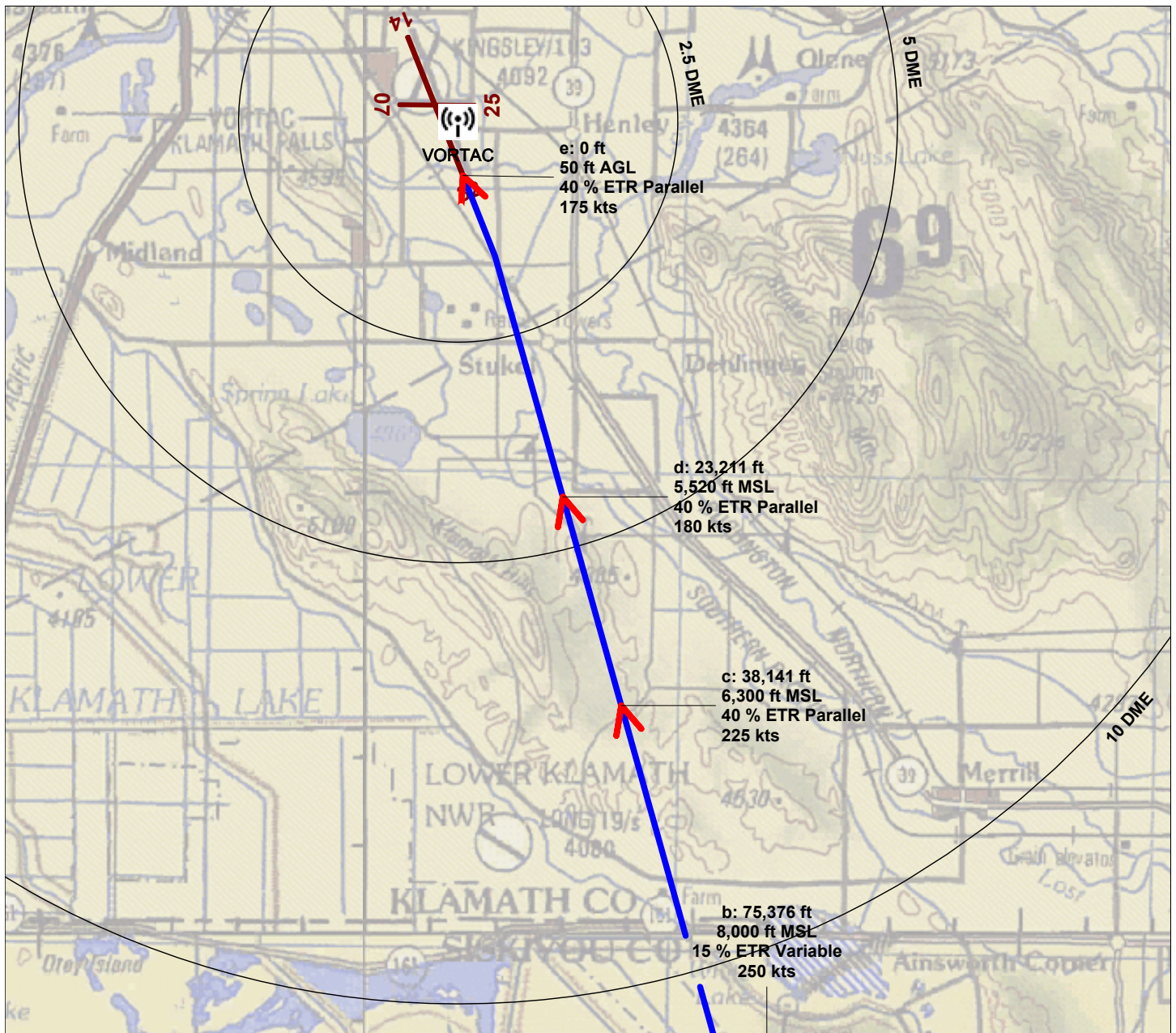
**Based F-35A Flight Profile F35-A3**  
ILS



Scale in Feet 1:73,900 (1 inch = 6,160 feet)







Flight Profile F35-A4

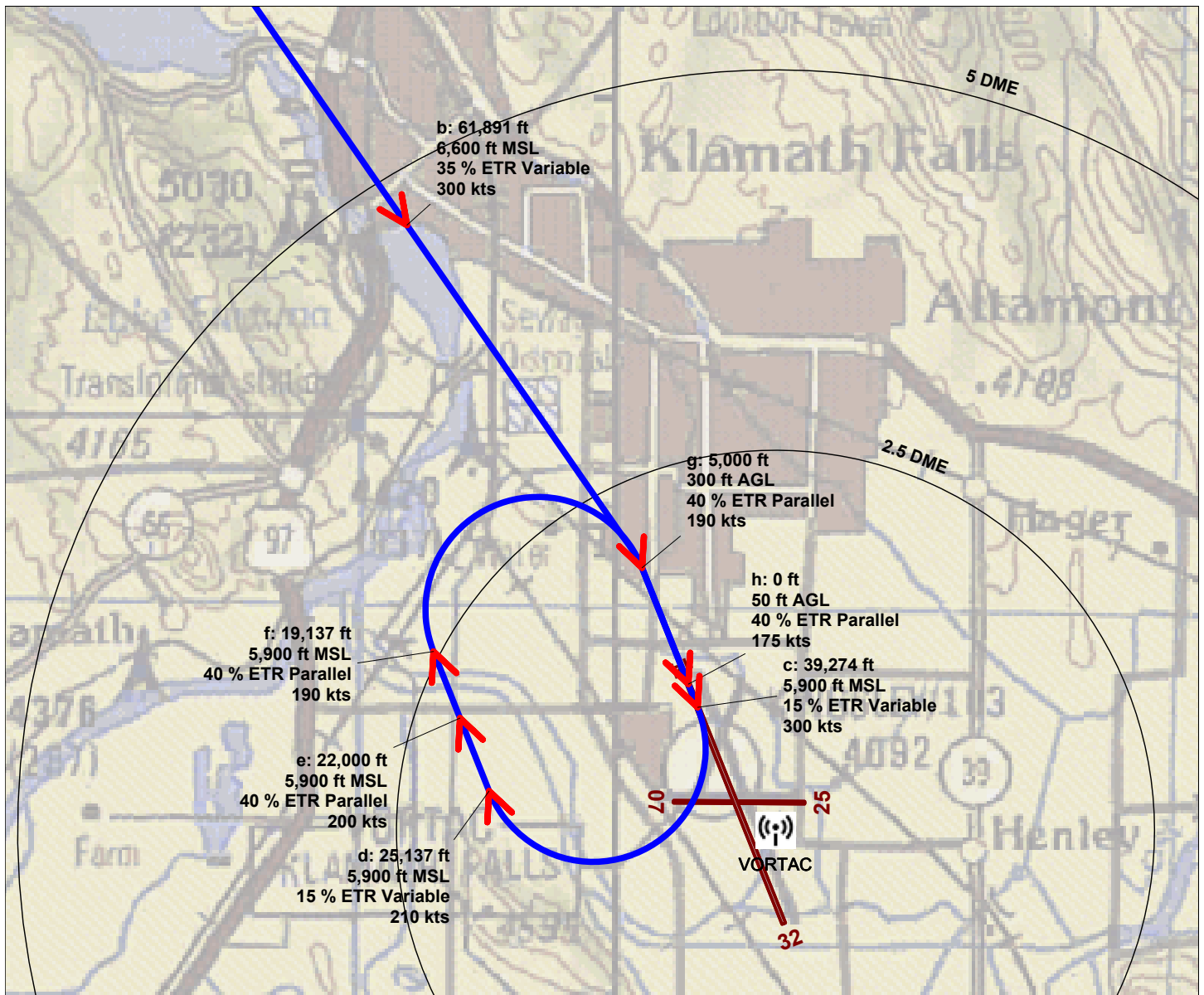
| Point | Distance<br>ft | Height<br>ft | Power<br>% ETR | Speed<br>kts | Climb<br>Angle<br>° | Climb<br>Rate<br>fpm | Duration<br>sec | Notes                                                     |
|-------|----------------|--------------|----------------|--------------|---------------------|----------------------|-----------------|-----------------------------------------------------------|
| a     | 120,000        | 10,000 MSL   | 15 Variable    | 350          | -2.6                | -1400                | 88              | Begin descent from 10000 ft MSL, 350 kts; approx 20nm out |
| b     | 75,376         | 8,000 MSL    | 15 Variable    | 250          | -2.6                | -1100                | 93              | CURVN @ 8000                                              |
| c     | 38,141         | 6,300 MSL    | 40 Parallel    | 225          | -3.0                | -1100                | 44              | JIDAL @ 6300                                              |
| d     | 23,211         | 5,520 MSL    | 40 Parallel    | 180          | -3.4                | -1100                | 77              | FEPNU @ 5520                                              |
| e     | 0              | 50 AGL       | 40 Parallel    | 175          |                     |                      |                 | Assume cross threshold at 50 ft AGL                       |

**Based F-35A Flight Profile F35-A4**  
TACAN or VOR



Scale in Feet 1:129,000 (1 inch = 10,700 feet)





Flight Profile F35-O2

| Point | Distance<br>ft | Height<br>ft | Power<br>% ETR | Speed<br>kts | Climb<br>Angle<br>° | Climb<br>Rate<br>fpm | Duration<br>sec | Notes                                                   |
|-------|----------------|--------------|----------------|--------------|---------------------|----------------------|-----------------|---------------------------------------------------------|
| a     | 110,000        | 8,000 MSL    | 15 Variable    | 300          | -1.7                | -900                 | 95              | begin descent from 10,000 ft MSL; approx 20 nm out      |
| b     | 61,891         | 6,600 MSL    | 35 Variable    | 300          | -1.8                | -900                 | 45              | Initial Point; level off at 1800 ft AGL; increase power |
| c     | 39,274         | 5,900 MSL    | 15 Variable    | 300          | 0.0                 | 0                    | 33              | begin break                                             |
| d     | 25,137         | 5,900 MSL    | 15 Variable    | 210          | 0.0                 | 0                    | 9               | wings level, begin downwind                             |
| e     | 22,000         | 5,900 MSL    | 40 Parallel    | 200          | 0.0                 | 0                    | 9               | gear down; increase power                               |
| f     | 19,137         | 5,900 MSL    | 40 Parallel    | 190          | -6.1                | -2000                | 44              | begin descent                                           |
| g     | 5,000          | 300 AGL      | 40 Parallel    | 190          | -2.9                | -900                 | 16              | wings level, begin 1 nm final                           |
| h     | 0              | 50 AGL       | 40 Parallel    | 175          |                     |                      |                 | Assume cross threshold at 50 ft AGL                     |

**Based F-35A Flight Profile F35-O2  
OVERHEAD WEST**



Scale in Feet 1:76,400 (1 inch = 6,370 feet)

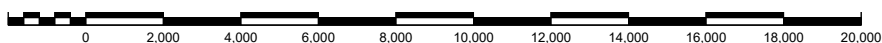




Flight Profile F35-PFO1

| Point | Distance<br>ft | Height<br>ft | Power<br>% ETR | Speed<br>kts | Climb<br>Angle<br>° | Climb<br>Rate<br>fpm | Duration<br>sec | Notes                                                              |
|-------|----------------|--------------|----------------|--------------|---------------------|----------------------|-----------------|--------------------------------------------------------------------|
| a     | 200,000        | 20,000 MSL   | 15 Variable    | 350          | -3.7                | -2000                | 335             | Assume descent from 20000 ft MSL, 350 kts                          |
| b     | 30,380         | 5,000 AGL    | 15 Parallel    | 250          | -9.7                | -4300                | 38              | Gear down                                                          |
| c     | 14,327         | 2,250 AGL    | 15 Parallel    | 250          | -10.3               | -4600                | 6               | start to arrest the descent                                        |
| d     | 11,971         | 1,820 AGL    | 15 Parallel    | 250          | -9.9                | -4400                | 4               | start decreasing aoa                                               |
| e     | 10,132         | 1,500 AGL    | 15 Parallel    | 250          | -8.1                | -3400                | 25              | start increasing the aoa and further arrest descent                |
| f     | 0              | 50 AGL       | 15 Parallel    | 225          |                     |                      |                 | Assume cross threshold at 50 ft AGL; Mil power applied later for a |

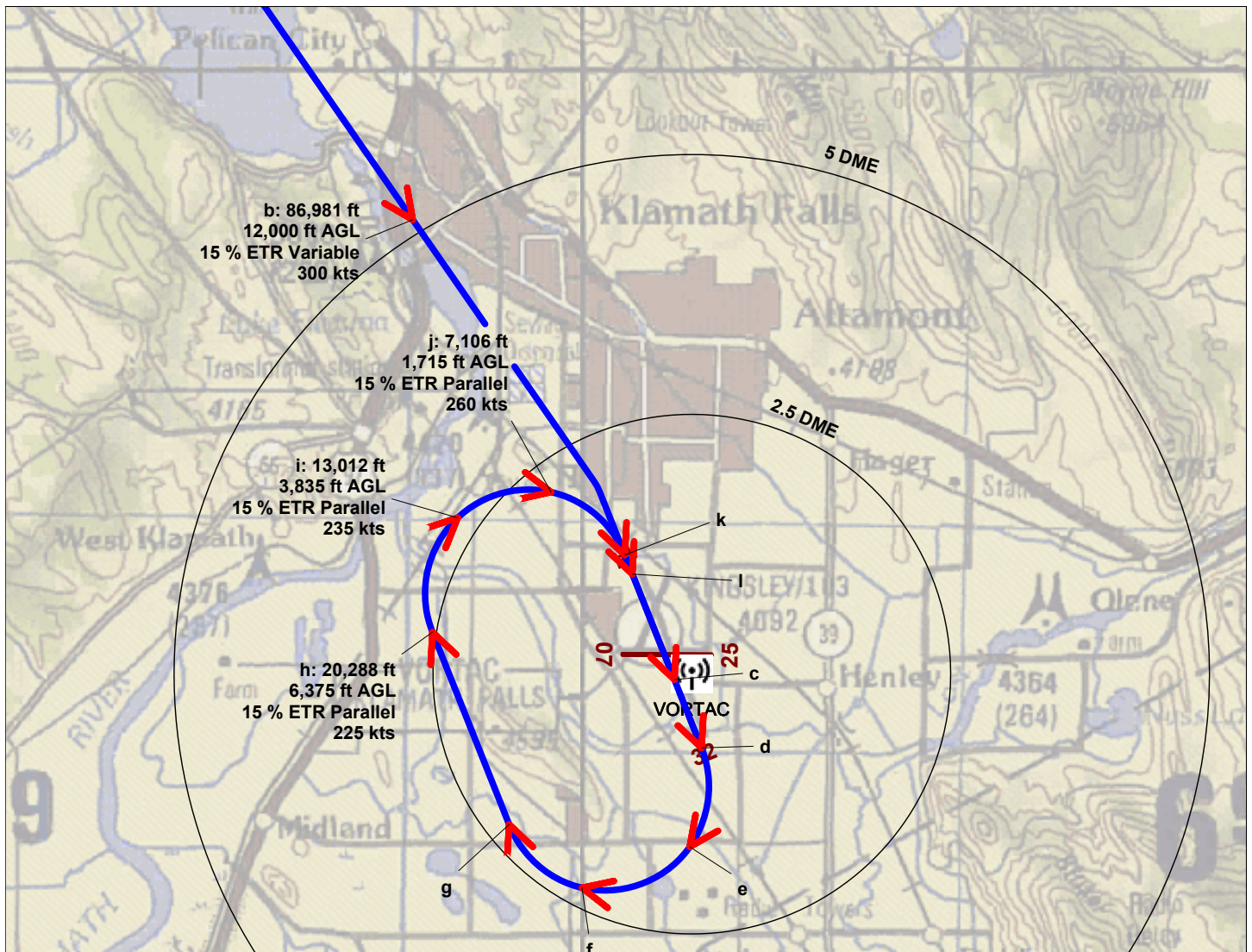
**Based F-35A Flight Profile F35-PFO1**  
**Precautionary Flame-out (PFO) Arrival (Straight-in) to a Go-Around**



Scale in Feet 1:59,400 (1 inch = 4,950 feet)



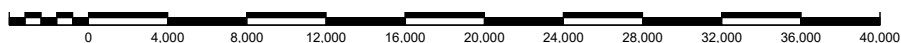




Flight Profile F35-PFO3

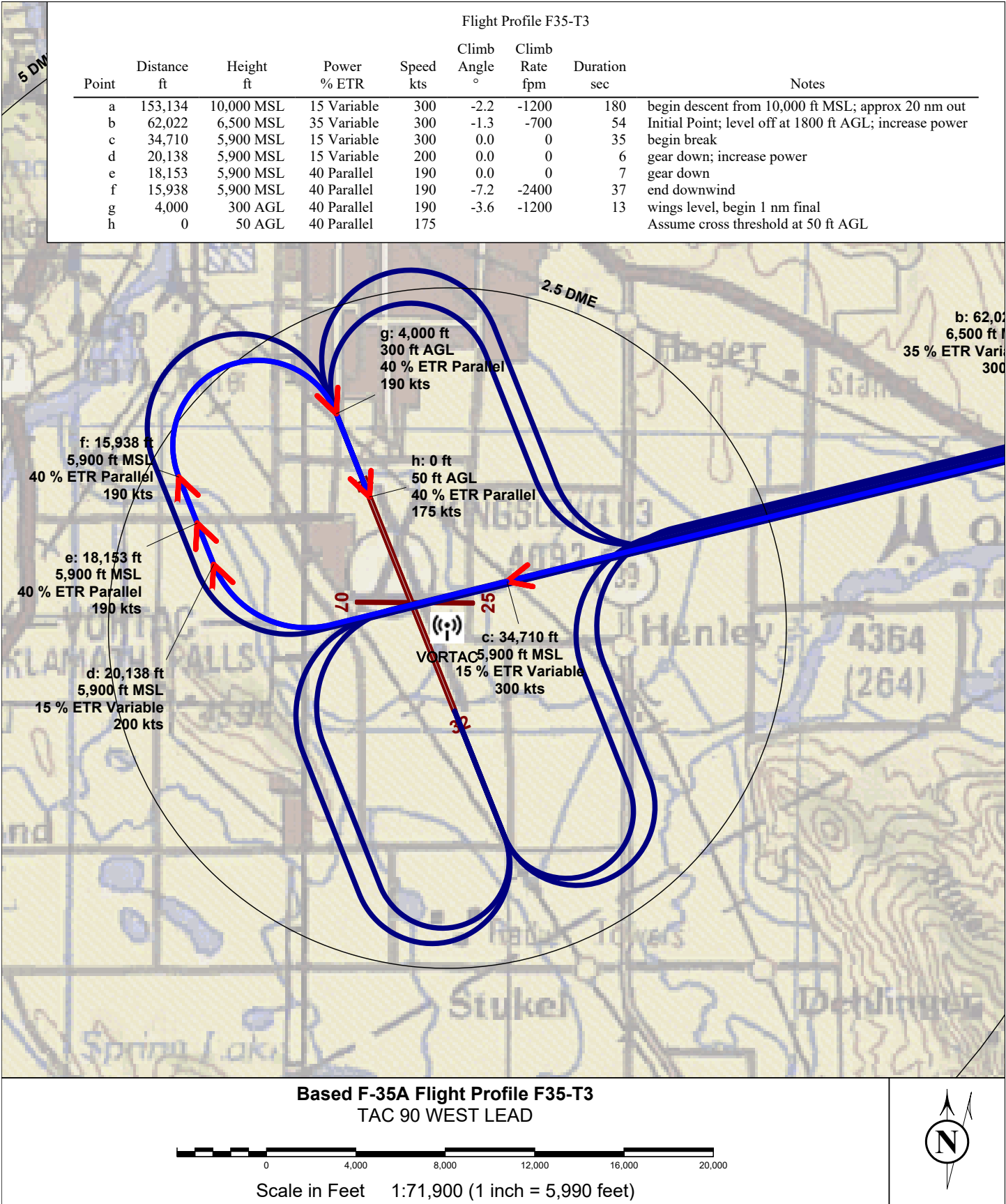
| Point | Distance<br>ft | Height<br>ft | Power<br>% ETR | Speed<br>kts | Climb<br>Angle<br>° | Climb<br>Rate<br>fpm | Duration<br>sec | Notes                                                              |
|-------|----------------|--------------|----------------|--------------|---------------------|----------------------|-----------------|--------------------------------------------------------------------|
| a     | 200,000        | 20,000 MSL   | 15 Variable    | 350          | -2.0                | -1100                | 206             | Assume descent from 20000MSL, 350 knots                            |
| b     | 86,981         | 12,000 AGL   | 15 Variable    | 300          | 0.0                 | 0                    | 65              | 3-5 nm from break                                                  |
| c     | 55,829         | 12,000 AGL   | 30 Variable    | 270          | 0.0                 | 0                    | 10              | 4,300 ft from break                                                |
| d     | 51,529         | 12,000 AGL   | 30 Variable    | 260          | -13.9               | -6400                | 14              | begin descent and begin roll                                       |
| e     | 45,453         | 10,500 AGL   | 15 Parallel    | 250          | -9.7                | -4100                | 18              | reach max roll angle, gear down                                    |
| f     | 38,285         | 9,275 AGL    | 15 Parallel    | 225          | -11.3               | -4500                | 15              | begin roll to wings level                                          |
| g     | 32,400         | 8,100 AGL    | 15 Parallel    | 225          | -8.1                | -3200                | 32              | wings level                                                        |
| h     | 20,288         | 6,375 AGL    | 15 Parallel    | 225          | -19.2               | -8100                | 19              | begin roll                                                         |
| i     | 13,012         | 3,835 AGL    | 15 Parallel    | 235          | -19.7               | -9000                | 14              | reach roll angle                                                   |
| j     | 7,106          | 1,715 AGL    | 15 Parallel    | 260          | -15.1               | -7000                | 14              | begin rolling to wings level                                       |
| k     | 1,200          | 125 AGL      | 15 Parallel    | 250          | -3.6                | -1500                | 3               | wings level                                                        |
| l     | 0              | 50 AGL       | 15 Parallel    | 225          |                     |                      |                 | Assume cross threshold at 50 ft AGL; Mil power applied later for a |

**Based F-35A Flight Profile F35-PFO3**  
Precautionary Flame-out (PFO) Arrival (Overhead Break)

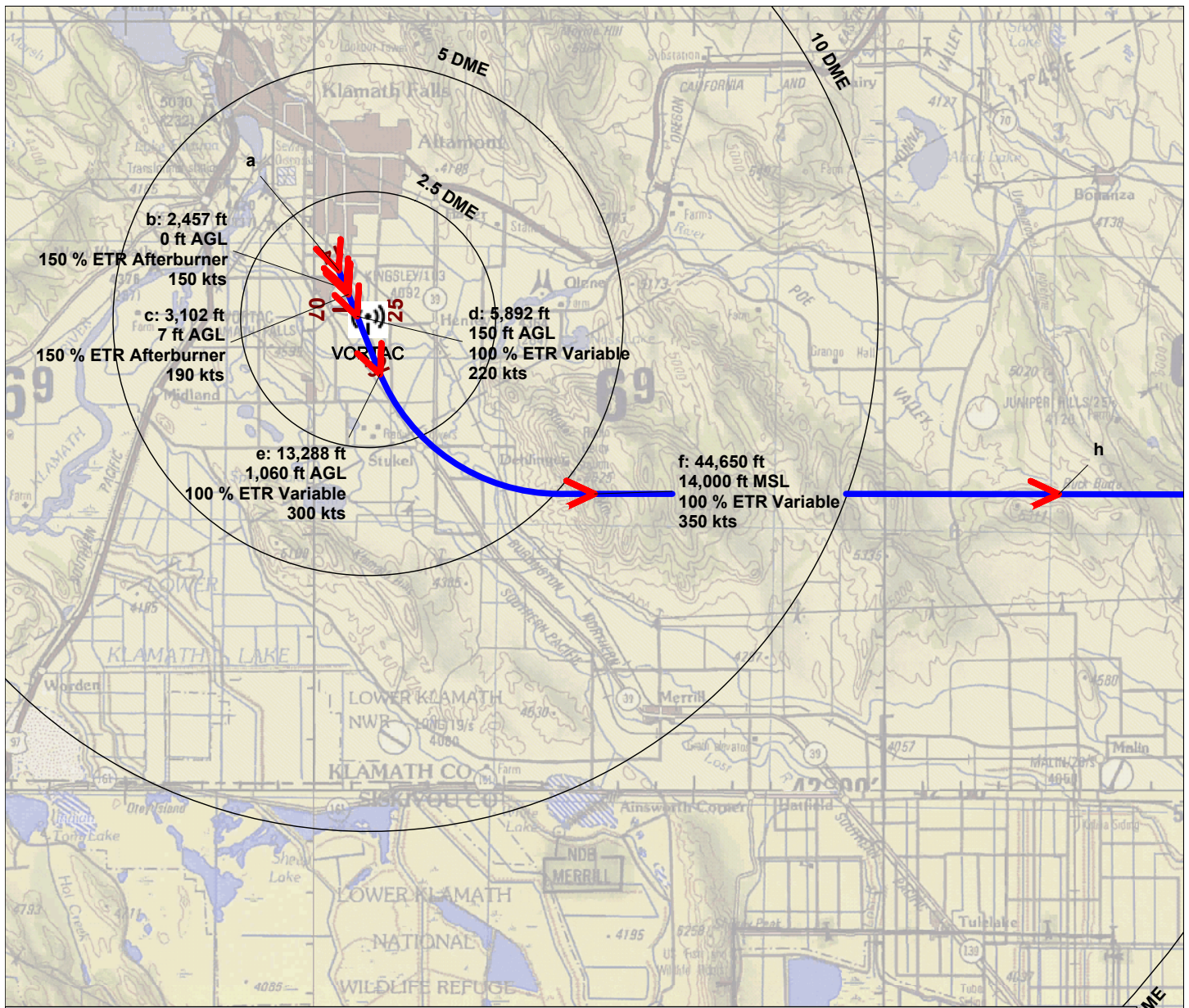


Scale in Feet 1:116,000 (1 inch = 9,700 feet)





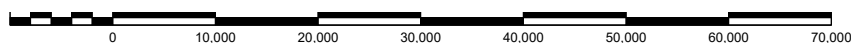




Flight Profile F35-D1A

| Point | Distance<br>ft | Height<br>ft | Power<br>% ETR  | Speed<br>kts | Climb<br>Angle<br>° | Climb<br>Rate<br>fpm | Duration<br>sec | Notes                                         |
|-------|----------------|--------------|-----------------|--------------|---------------------|----------------------|-----------------|-----------------------------------------------|
| a     | 0              | 0 AGL        | 50 Variable     | 0            | 0.0                 | 0                    | 19              | Assume 1 second @ 50%ETR before brake release |
| b     | 2,457          | 0 AGL        | 150 Afterburner | 150          | 0.6                 | 200                  | 2               | Rotate                                        |
| c     | 3,102          | 7 AGL        | 150 Afterburner | 190          | 2.9                 | 1100                 | 8               | Mil power                                     |
| d     | 5,892          | 150 AGL      | 100 Variable    | 220          | 7.0                 | 3200                 | 17              | Gear up                                       |
| e     | 13,288         | 1,060 AGL    | 100 Variable    | 300          | 15.8                | 9300                 | 57              |                                               |
| f     | 44,650         | 14,000 MSL   | 100 Variable    | 350          | 0.0                 | 0                    | 94              |                                               |
| g     | 100,000        | 14,000 MSL   | 40 Variable     | 350          |                     |                      |                 |                                               |

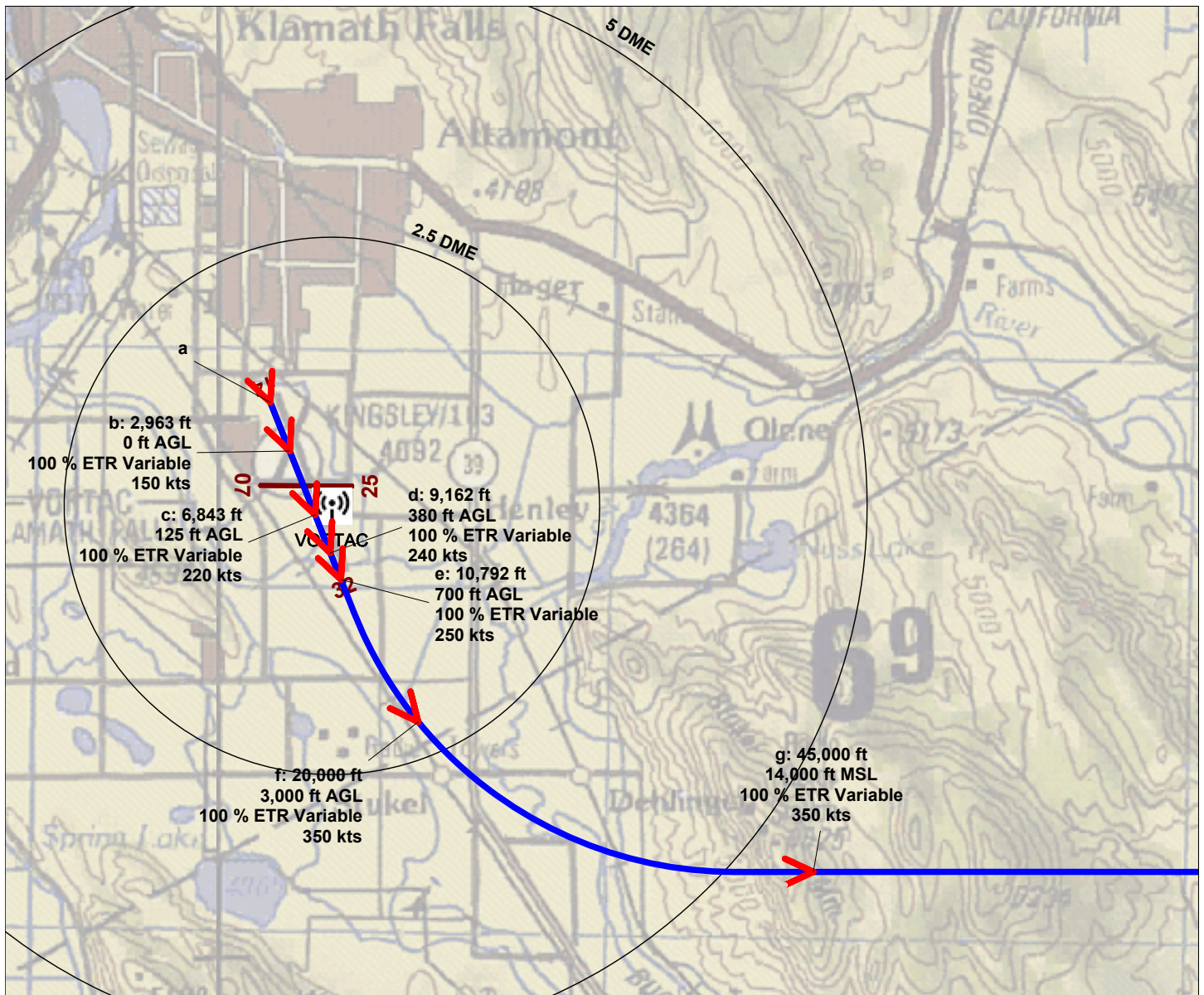
**Based F-35A Flight Profile F35-D1A**  
AB takeoff, Mil Climb



Scale in Feet 1:224,000 (1 inch = 18,700 feet)







Flight Profile F35-D1M

| Point | Distance<br>ft | Height<br>ft | Power<br>% ETR | Speed<br>kts | Climb<br>Angle<br>° | Climb<br>Rate<br>fpm | Duration<br>sec | Notes                                          |
|-------|----------------|--------------|----------------|--------------|---------------------|----------------------|-----------------|------------------------------------------------|
| a     | 0              | 0 AGL        | 50 Variable    | 0            | 0.0                 | 0                    | 23              | Assume 1 second @ 50% ETR before brake release |
| b     | 2,963          | 0 AGL        | 100 Variable   | 150          | 1.8                 | 600                  | 12              | Rotate                                         |
| c     | 6,843          | 125 AGL      | 100 Variable   | 220          | 6.3                 | 2600                 | 6               | Gear up                                        |
| d     | 9,162          | 380 AGL      | 100 Variable   | 240          | 11.1                | 4900                 | 4               | Speed slope change                             |
| e     | 10,792         | 700 AGL      | 100 Variable   | 250          | 14.0                | 7600                 | 18              | approx 7k fpm climb                            |
| f     | 20,000         | 3,000 AGL    | 100 Variable   | 350          | 15.4                | 9800                 | 42              |                                                |
| g     | 45,000         | 14,000 MSL   | 100 Variable   | 350          | 0.0                 | 0                    | 93              |                                                |
| h     | 100,000        | 14,000 MSL   | 40 Variable    | 350          |                     |                      |                 |                                                |

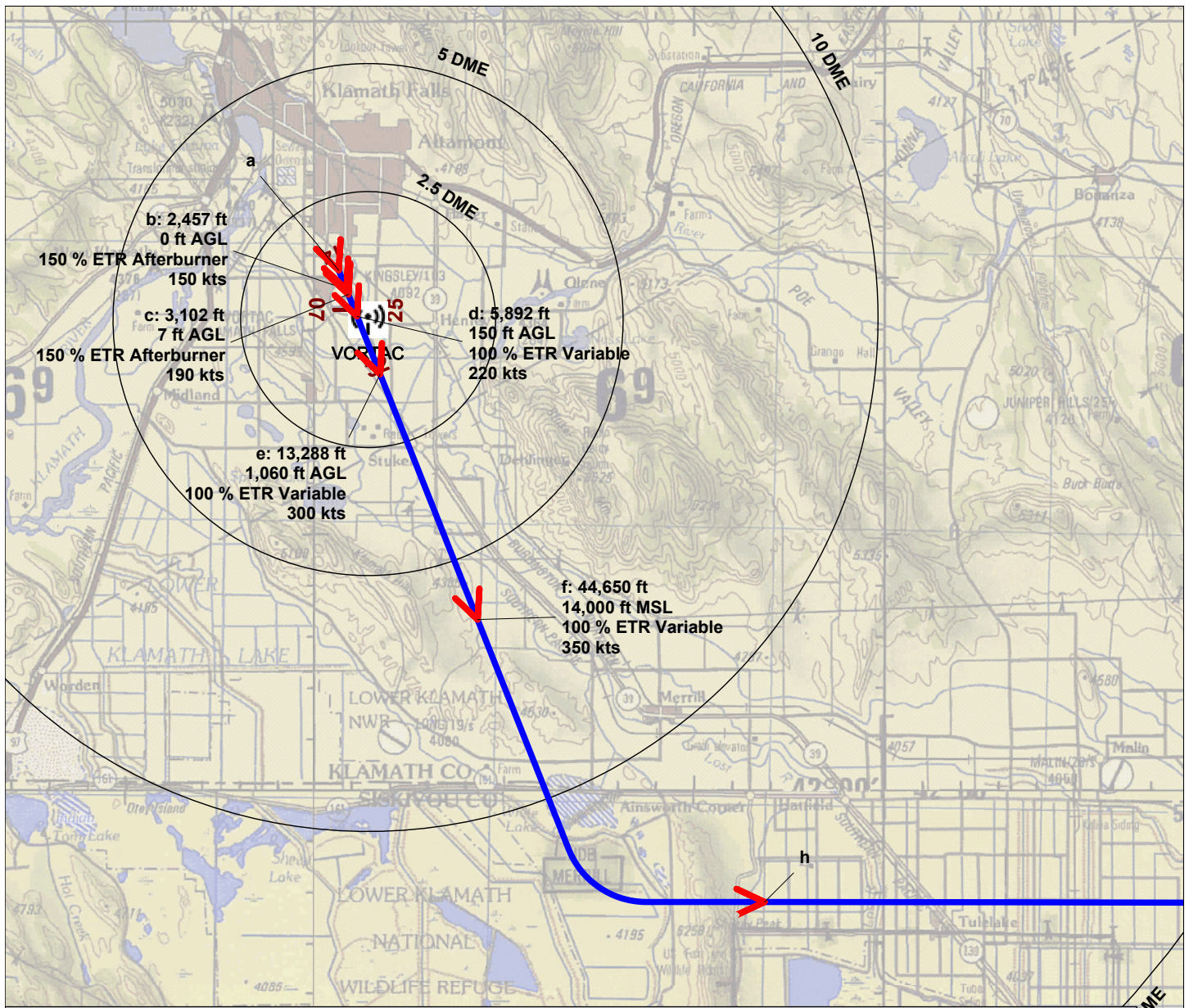
**Based F-35A Flight Profile F35-D1M**  
Mil Takeoff, Mil Climb



Scale in Feet 1:108,000 (1 inch = 9,020 feet)



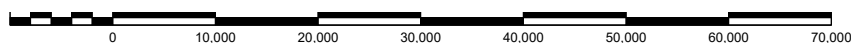




Flight Profile F35-D3A

| Point | Distance<br>ft | Height<br>ft | Power<br>% ETR  | Speed<br>kts | Climb<br>Angle<br>° | Climb<br>Rate<br>fpm | Duration<br>sec | Notes                                         |
|-------|----------------|--------------|-----------------|--------------|---------------------|----------------------|-----------------|-----------------------------------------------|
| a     | 0              | 0 AGL        | 50 Variable     | 0            | 0.0                 | 0                    | 19              | Assume 1 second @ 50%ETR before brake release |
| b     | 2,457          | 0 AGL        | 150 Afterburner | 150          | 0.6                 | 200                  | 2               | Rotate                                        |
| c     | 3,102          | 7 AGL        | 150 Afterburner | 190          | 2.9                 | 1100                 | 8               | Mil power                                     |
| d     | 5,892          | 150 AGL      | 100 Variable    | 220          | 7.0                 | 3200                 | 17              | Gear up                                       |
| e     | 13,288         | 1,060 AGL    | 100 Variable    | 300          | 15.8                | 9300                 | 57              |                                               |
| f     | 44,650         | 14,000 MSL   | 100 Variable    | 350          | 0.0                 | 0                    | 94              |                                               |
| g     | 100,000        | 14,000 MSL   | 40 Variable     | 350          |                     |                      |                 |                                               |

**Based F-35A Flight Profile F35-D3A**  
AB takeoff, Mil Climb

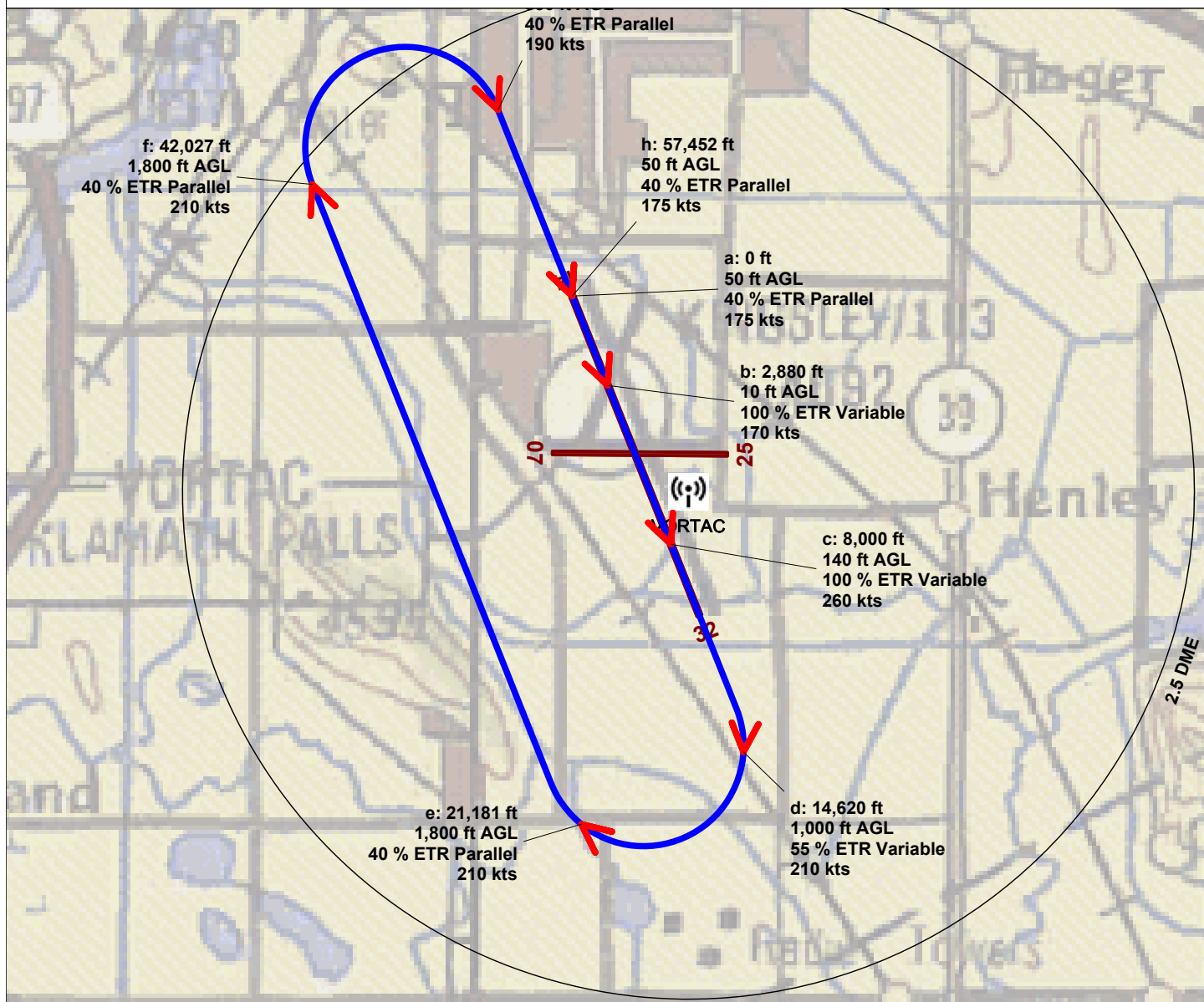


Scale in Feet 1:224,000 (1 inch = 18,700 feet)

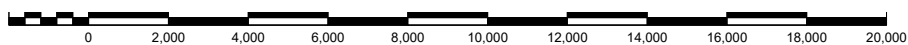


## Flight Profile F35-C2

| Point | Distance<br>ft | Height<br>ft | Power<br>% ETR | Speed<br>kts | Climb<br>Angle<br>° | Climb<br>Rate<br>fpm | Duration<br>sec | Notes                                                              |
|-------|----------------|--------------|----------------|--------------|---------------------|----------------------|-----------------|--------------------------------------------------------------------|
| a     | 0              | 50 AGL       | 40 Parallel    | 175          | -0.8                | -200                 | 10              | Assume cross threshold at 50 ft AGL                                |
| b     | 2,880          | 10 AGL       | 100 Variable   | 170          | 1.5                 | 600                  | 14              | low approach; no touch; use Variable due to limited gear-down data |
| c     | 8,000          | 140 AGL      | 100 Variable   | 260          | 7.4                 | 3100                 | 17              | gear up; reduce power                                              |
| d     | 14,620         | 1,000 AGL    | 55 Variable    | 210          | 7.0                 | 2600                 | 19              | reach pattern altitude and speed                                   |
| e     | 21,181         | 1,800 AGL    | 40 Parallel    | 210          | 0.0                 | 0                    | 59              | gear down                                                          |
| f     | 42,027         | 1,800 AGL    | 40 Parallel    | 210          | -8.7                | -3100                | 28              | begin descent                                                      |
| g     | 51,452         | 350 AGL      | 40 Parallel    | 190          | -2.9                | -900                 | 19              | wings level; 1nm final                                             |
| h     | 57,452         | 50 AGL       | 40 Parallel    | 175          |                     |                      |                 | Assume cross threshold at 50 ft AGL                                |



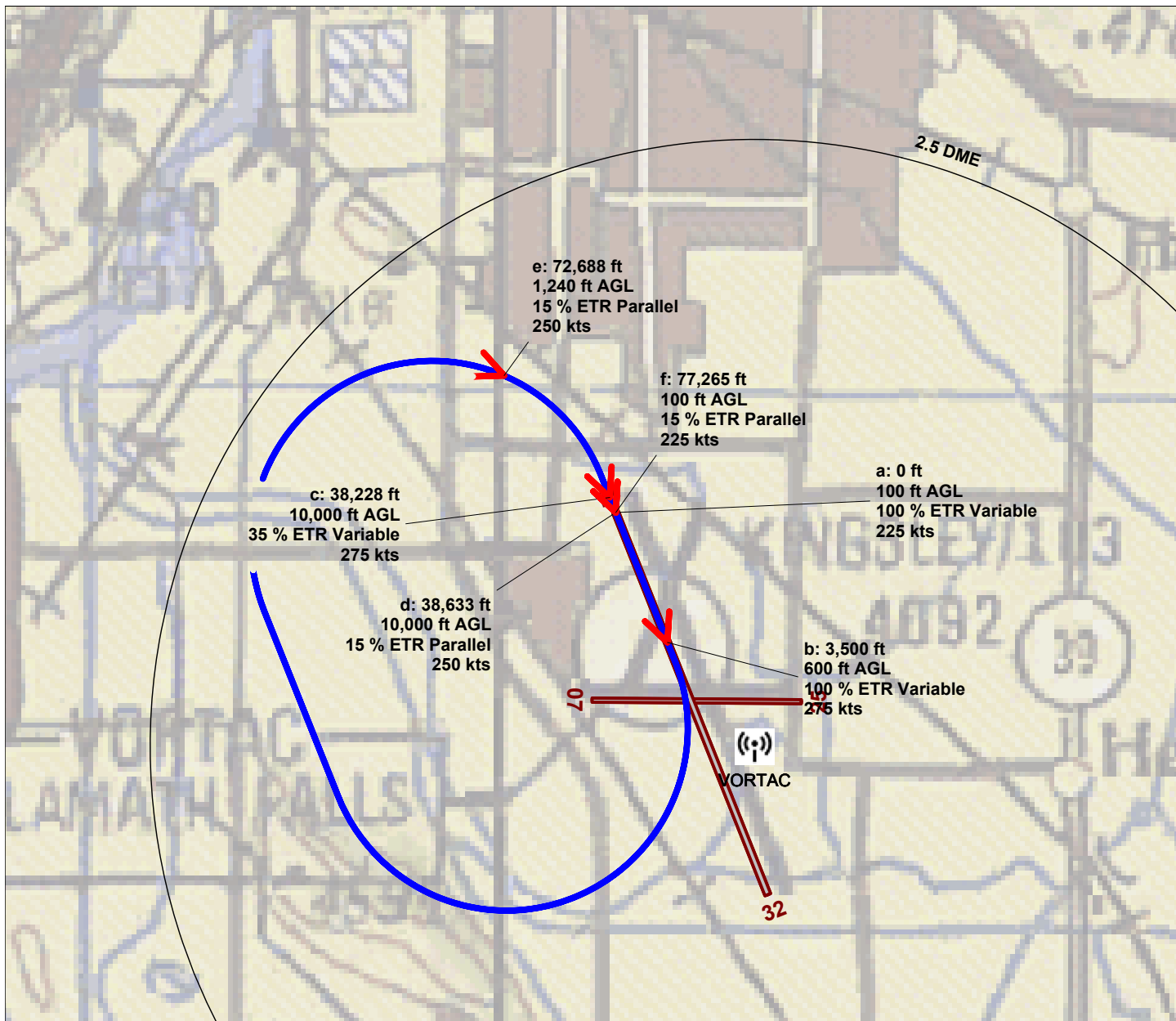
**Based F-35A Flight Profile F35-C2**  
touch and go



Scale in Feet 1:57,700 (1 inch = 4,810 feet)







Flight Profile F35-PFO5

| Point | Distance<br>ft | Height<br>ft | Power<br>% ETR | Speed<br>kts | Climb<br>Angle<br>° | Climb<br>Rate<br>fpm | Duration<br>sec | Notes                                                       |
|-------|----------------|--------------|----------------|--------------|---------------------|----------------------|-----------------|-------------------------------------------------------------|
| a     | 0              | 100 AGL      | 100 Variable   | 225          | 8.1                 | 3600                 | 8               | Climbing                                                    |
| b     | 3,500          | 600 AGL      | 100 Variable   | 275          | 15.1                | 7500                 | 75              |                                                             |
| c     | 38,228         | 10,000 AGL   | 35 Variable    | 275          | 0.0                 | 0                    | 1               |                                                             |
| d     | 38,633         | 10,000 AGL   | 15 Parallel    | 250          | -14.4               | -6500                | 81              | High Key. Flight Idle at end of first loop, Gear Down       |
| e     | 72,688         | 1,240 AGL    | 15 Parallel    | 250          | -14.0               | -6000                | 11              |                                                             |
| f     | 77,265         | 100 AGL      | 15 Parallel    | 225          |                     |                      |                 | End of second loop; Mil power applied later for a go-around |

**Based F-35A Flight Profile F35-PFO5**  
Go-Around to an Overhead Precautionary Flame-out (PFO)



Scale in Feet 1:47,200 (1 inch = 3,940 feet)

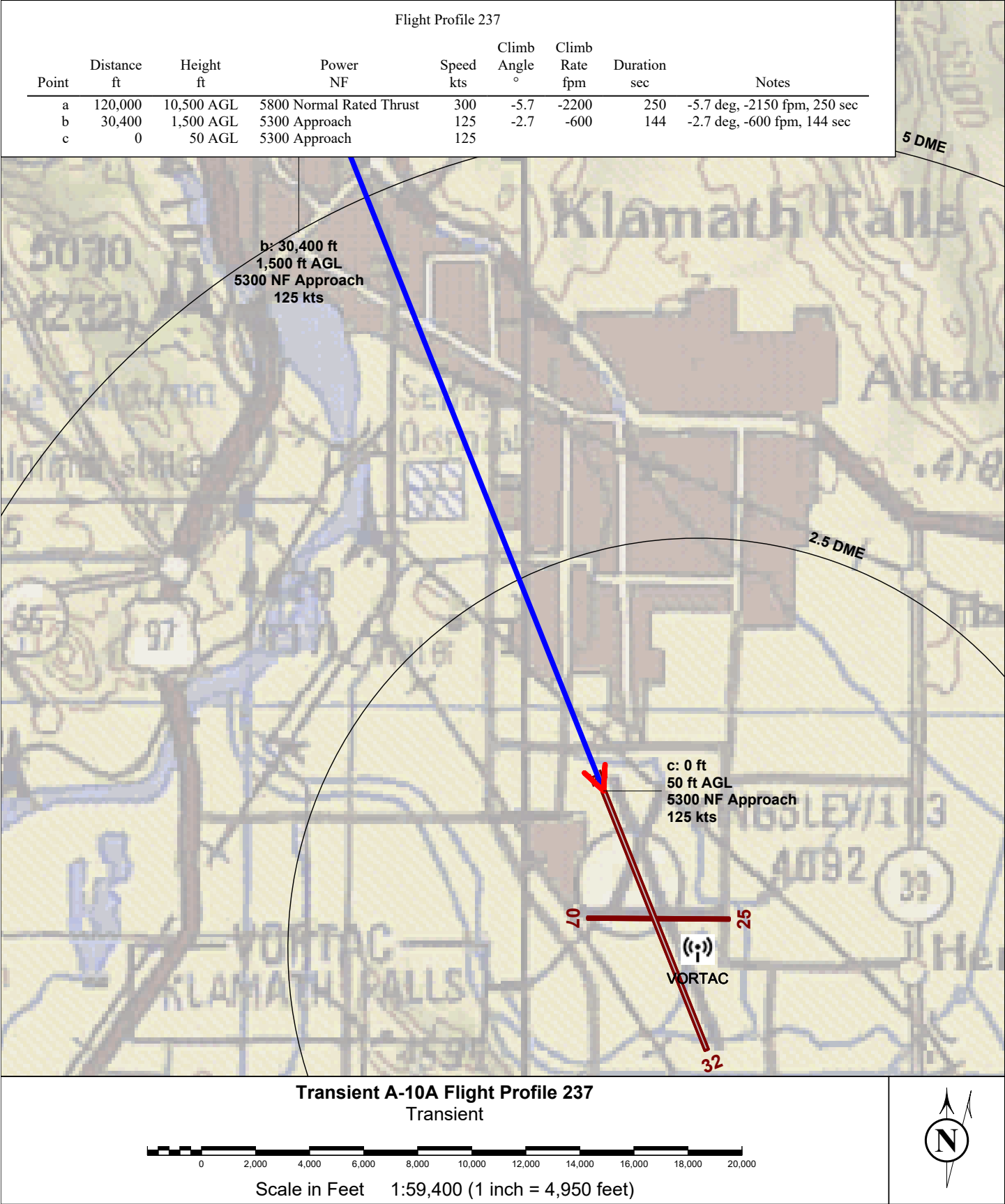


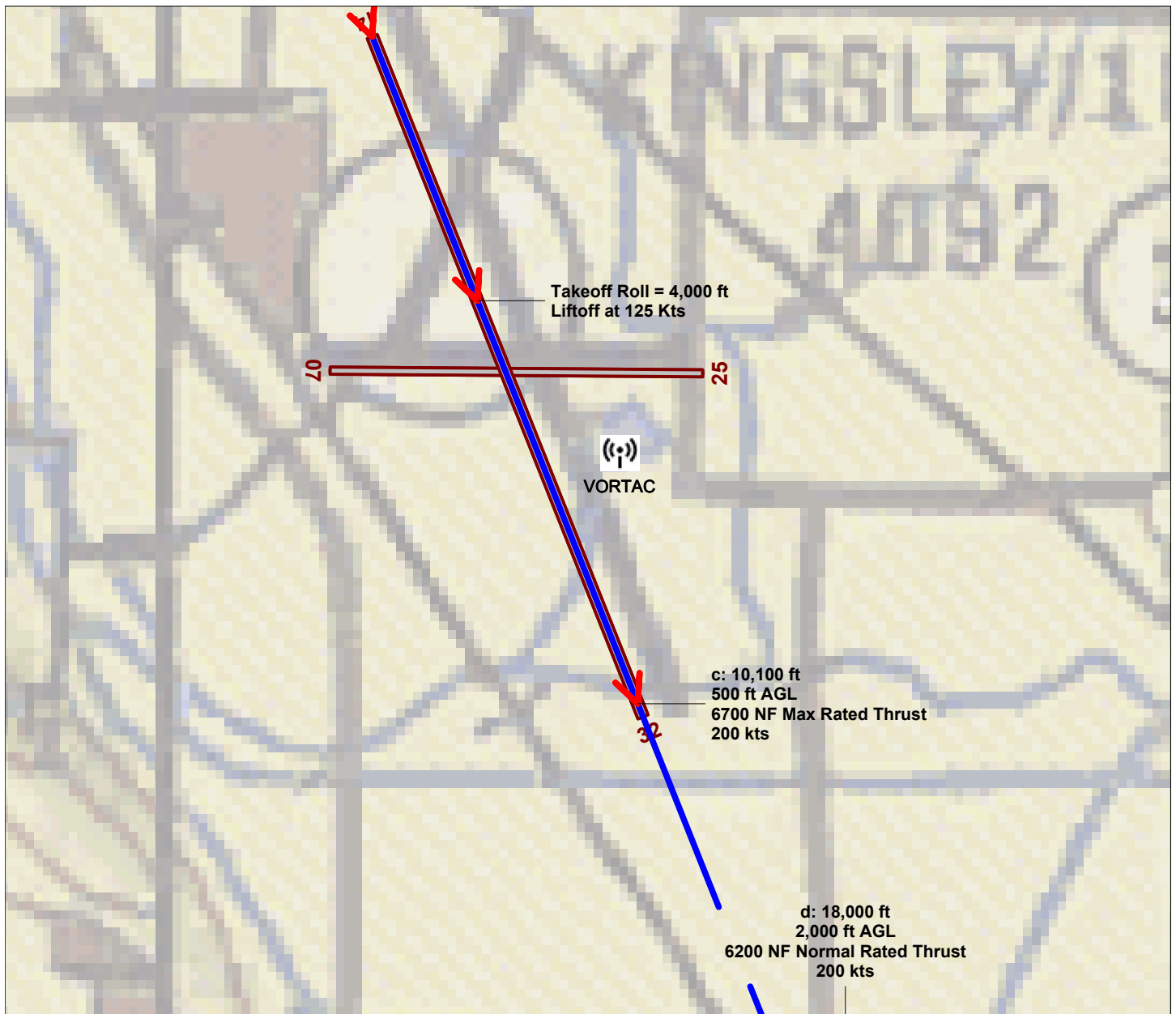
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# Maps of Flight Profiles

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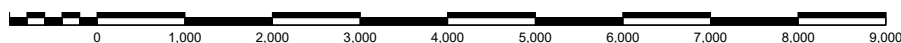




Flight Profile 235

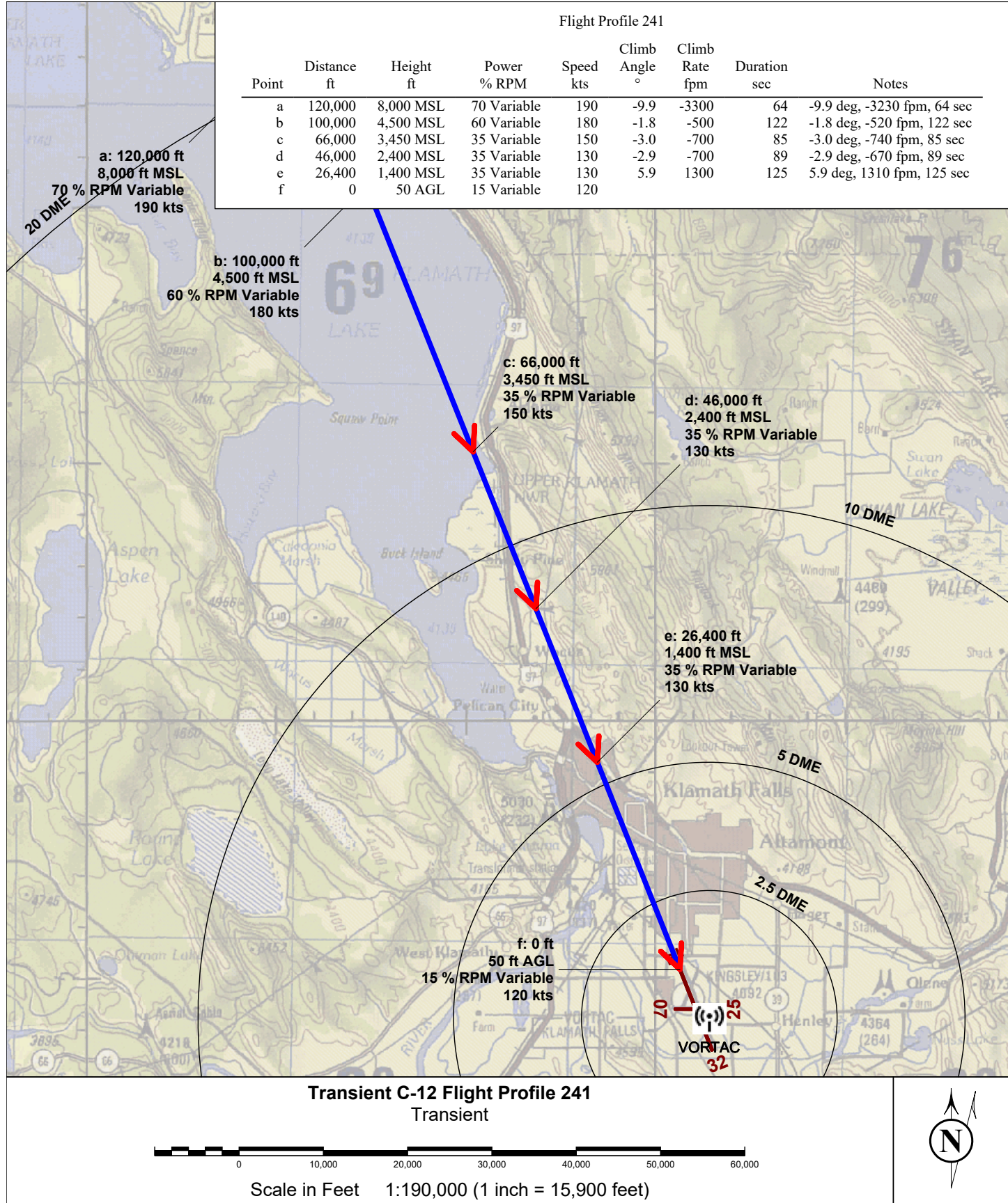
| Point | Distance<br>ft | Height<br>ft | Power<br>NF              | Speed<br>kts | Climb<br>Angle<br>° | Climb<br>Rate<br>fpm | Duration<br>sec | Notes                      |
|-------|----------------|--------------|--------------------------|--------------|---------------------|----------------------|-----------------|----------------------------|
| a     | 0              | 0 AGL        | 5970 Takeoff             | 0            | 0.0                 | 0                    | 38              | 0.0 deg, 0 fpm, 38 sec     |
| b     | 4,000          | 0 AGL        | 6700 Max Rated Thrust    | 125          | 4.7                 | 1300                 | 22              | 4.7 deg, 1340 fpm, 22 sec  |
| c     | 10,100         | 500 AGL      | 6700 Max Rated Thrust    | 200          | 10.8                | 3800                 | 23              | 10.8 deg, 3780 fpm, 23 sec |
| d     | 18,000         | 2,000 AGL    | 6200 Normal Rated Thrust | 200          | 8.7                 | 3500                 | 131             | 8.7 deg, 3440 fpm, 131 sec |
| e     | 67,720         | 9,600 AGL    | 6200 Normal Rated Thrust | 250          | 5.9                 | 2900                 | 113             | 5.9 deg, 2860 fpm, 113 sec |
| f     | 120,000        | 15,000 AGL   | 6200 Normal Rated Thrust | 300          |                     |                      |                 |                            |

**Transient A-10A Flight Profile 235**  
Transient

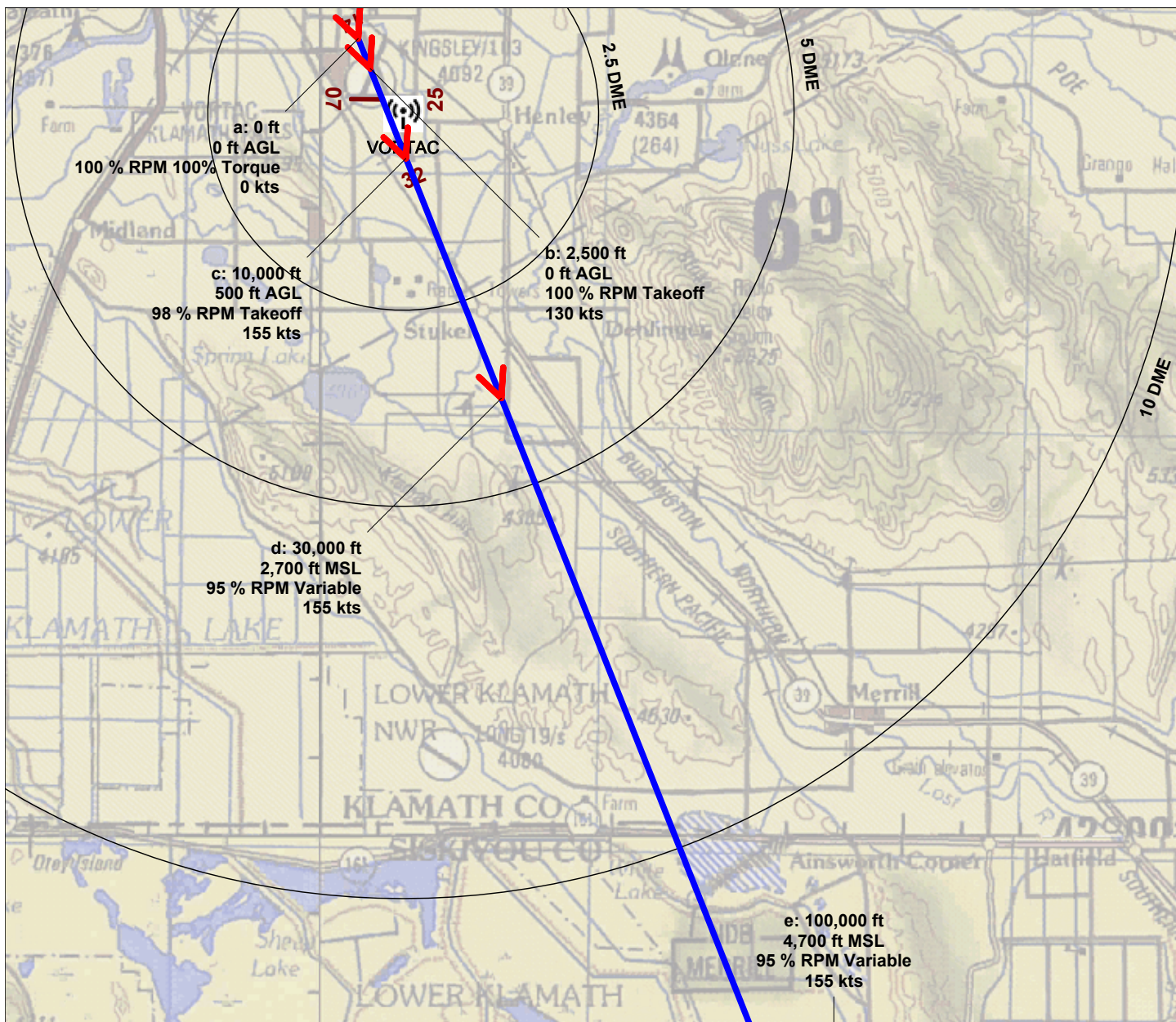


Scale in Feet 1:26,300 (1 inch = 2,190 feet)





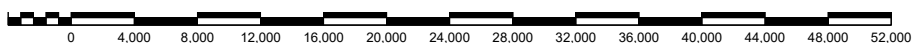




Flight Profile 239

| Point | Distance<br>ft | Height<br>ft | Power<br>% RPM  | Speed<br>kts | Climb<br>Angle<br>° | Climb<br>Rate<br>fpm | Duration<br>sec | Notes                       |
|-------|----------------|--------------|-----------------|--------------|---------------------|----------------------|-----------------|-----------------------------|
| a     | 0              | 0 AGL        | 100 100% Torque | 0            | 0.0                 | 0                    | 23              | 0.0 deg, 0 fpm, 23 sec      |
| b     | 2,500          | 0 AGL        | 100 Takeoff     | 130          | 3.8                 | 1000                 | 31              | 3.8 deg, 960 fpm, 31 sec    |
| c     | 10,000         | 500 AGL      | 98 Takeoff      | 155          | -5.4                | -1500                | 76              | -5.4 deg, -1480 fpm, 76 sec |
| d     | 30,000         | 2,700 MSL    | 95 Variable     | 155          | 1.6                 | 400                  | 268             | 1.6 deg, 450 fpm, 268 sec   |
| e     | 100,000        | 4,700 MSL    | 95 Variable     | 155          | 14.8                | 4200                 | 76              | 14.8 deg, 4020 fpm, 76 sec  |
| f     | 120,000        | 10,000 MSL   | 95 Variable     | 155          |                     |                      |                 |                             |

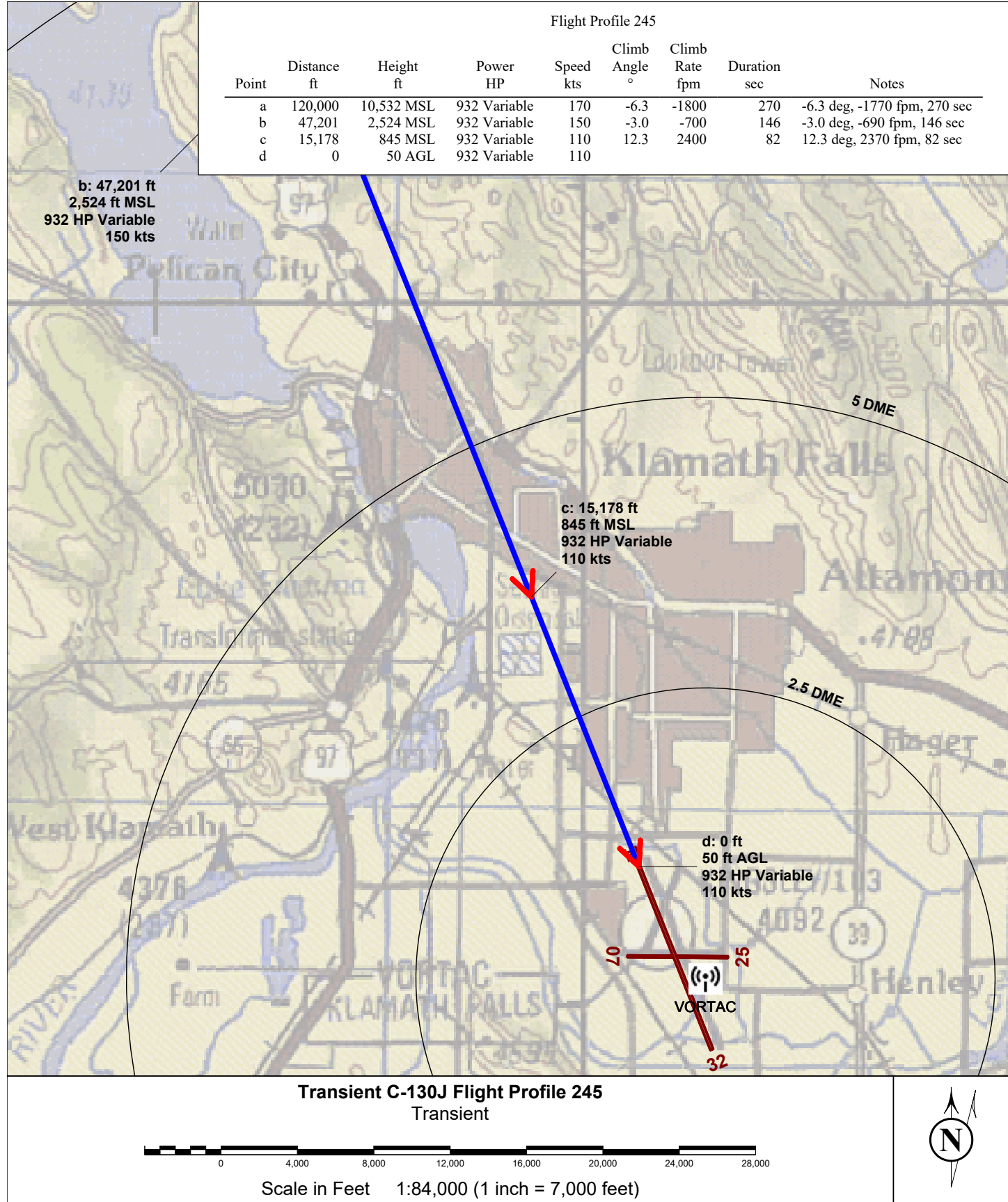
**Transient C-12 Flight Profile 239**  
Transient

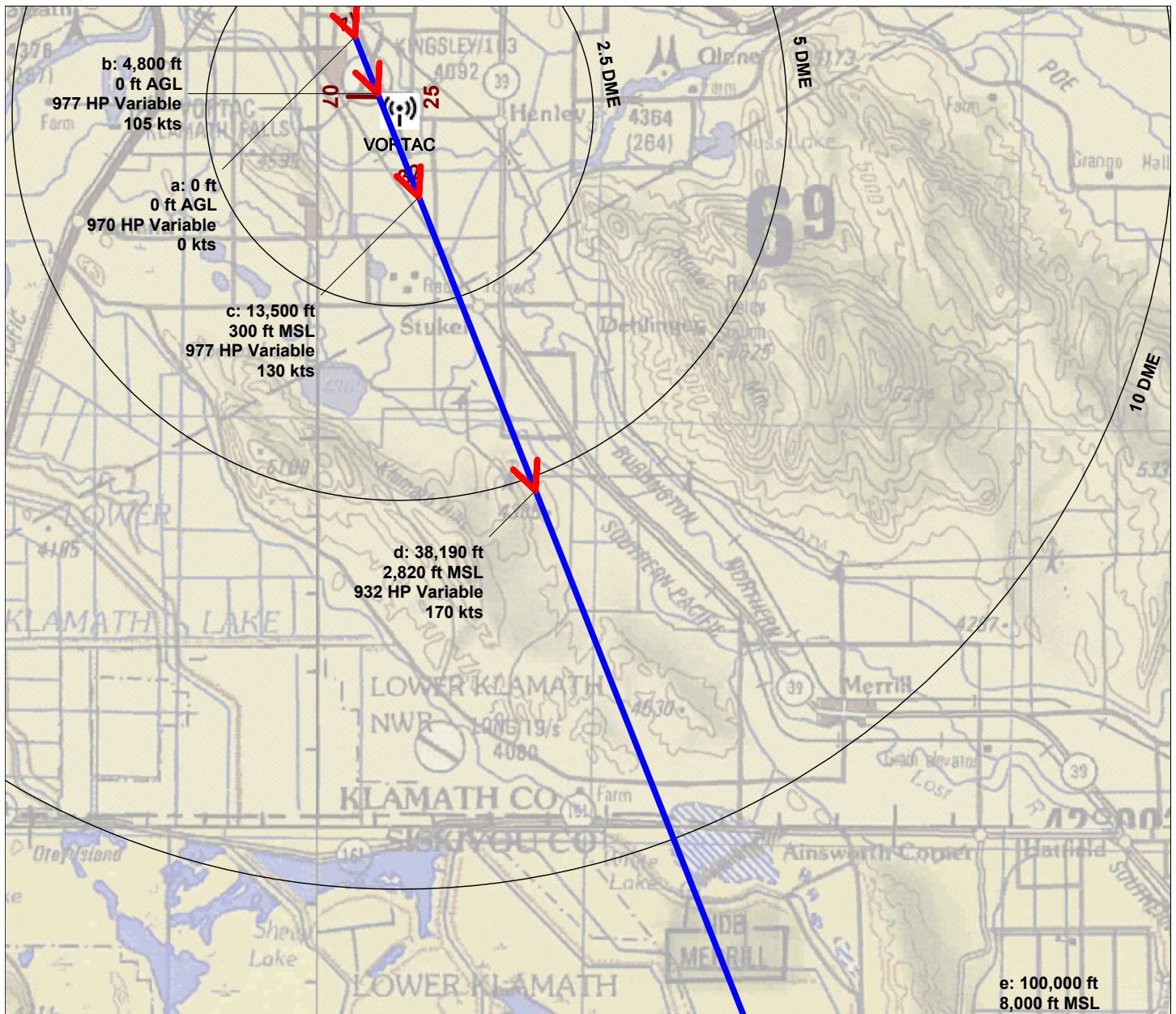


Scale in Feet 1:146,000 (1 inch = 12,200 feet)





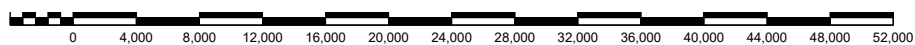




Flight Profile 243

| Point | Distance<br>ft | Height<br>ft | Power<br>HP  | Speed<br>kts | Climb<br>Angle<br>° | Climb<br>Rate<br>fpm | Duration<br>sec | Notes                        |
|-------|----------------|--------------|--------------|--------------|---------------------|----------------------|-----------------|------------------------------|
| a     | 0              | 0 AGL        | 970 Variable | 0            | 0.0                 | 0                    | 54              | 0.0 deg, 0 fpm, 54 sec       |
| b     | 4,800          | 0 AGL        | 977 Variable | 105          | -23.6               | -5200                | 44              | -23.6 deg, -4760 fpm, 44 sec |
| c     | 13,500         | 300 MSL      | 977 Variable | 130          | 5.8                 | 1600                 | 98              | 5.8 deg, 1540 fpm, 98 sec    |
| d     | 38,190         | 2,820 MSL    | 932 Variable | 170          | 4.8                 | 1400                 | 215             | 4.8 deg, 1440 fpm, 215 sec   |
| e     | 100,000        | 8,000 MSL    | 932 Variable | 170          | 5.7                 | 1700                 | 70              | 5.7 deg, 1710 fpm, 70 sec    |
| f     | 120,000        | 10,000 MSL   | 932 Variable | 170          |                     |                      |                 |                              |

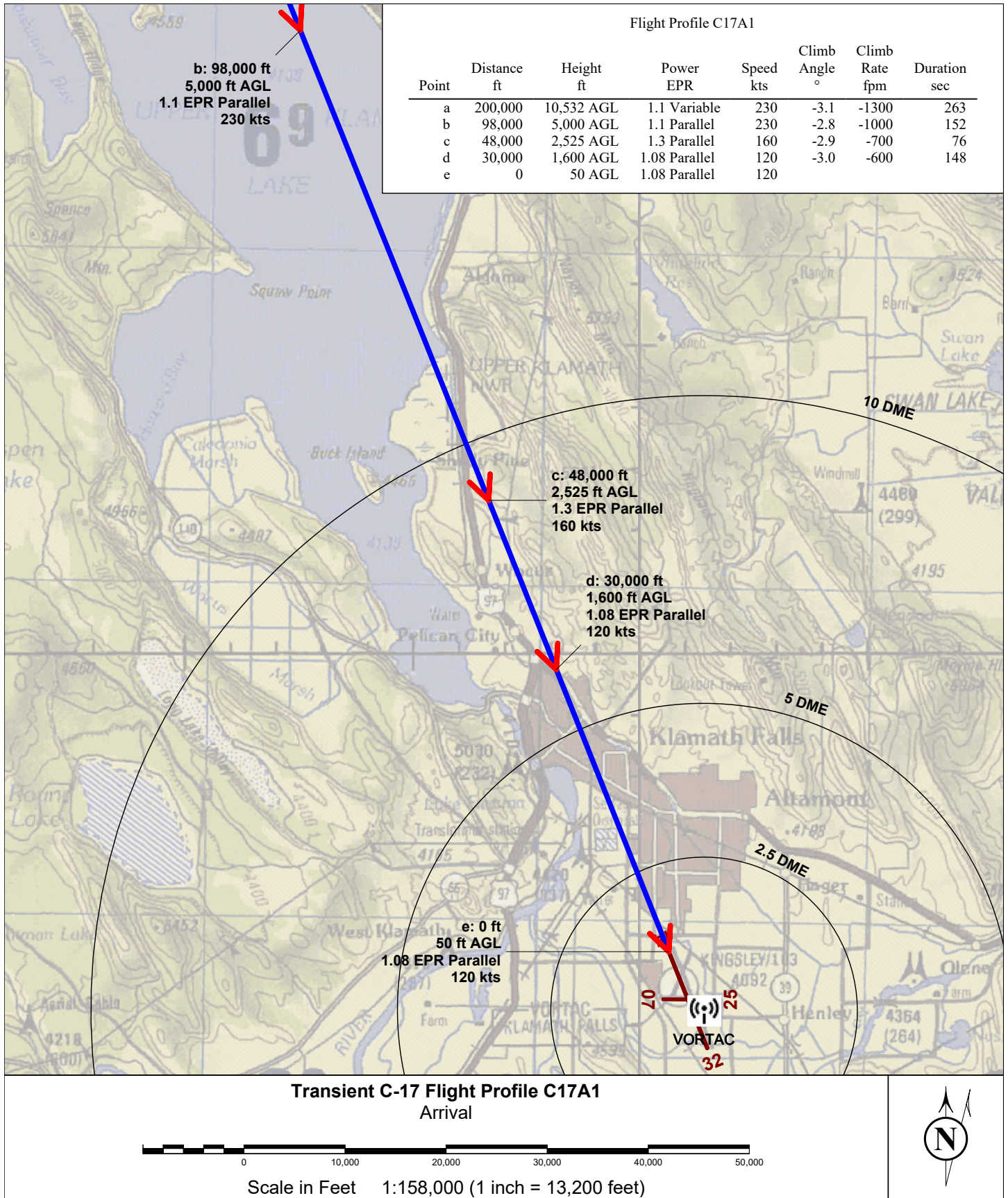
**Transient C-130J Flight Profile 243**  
Transient

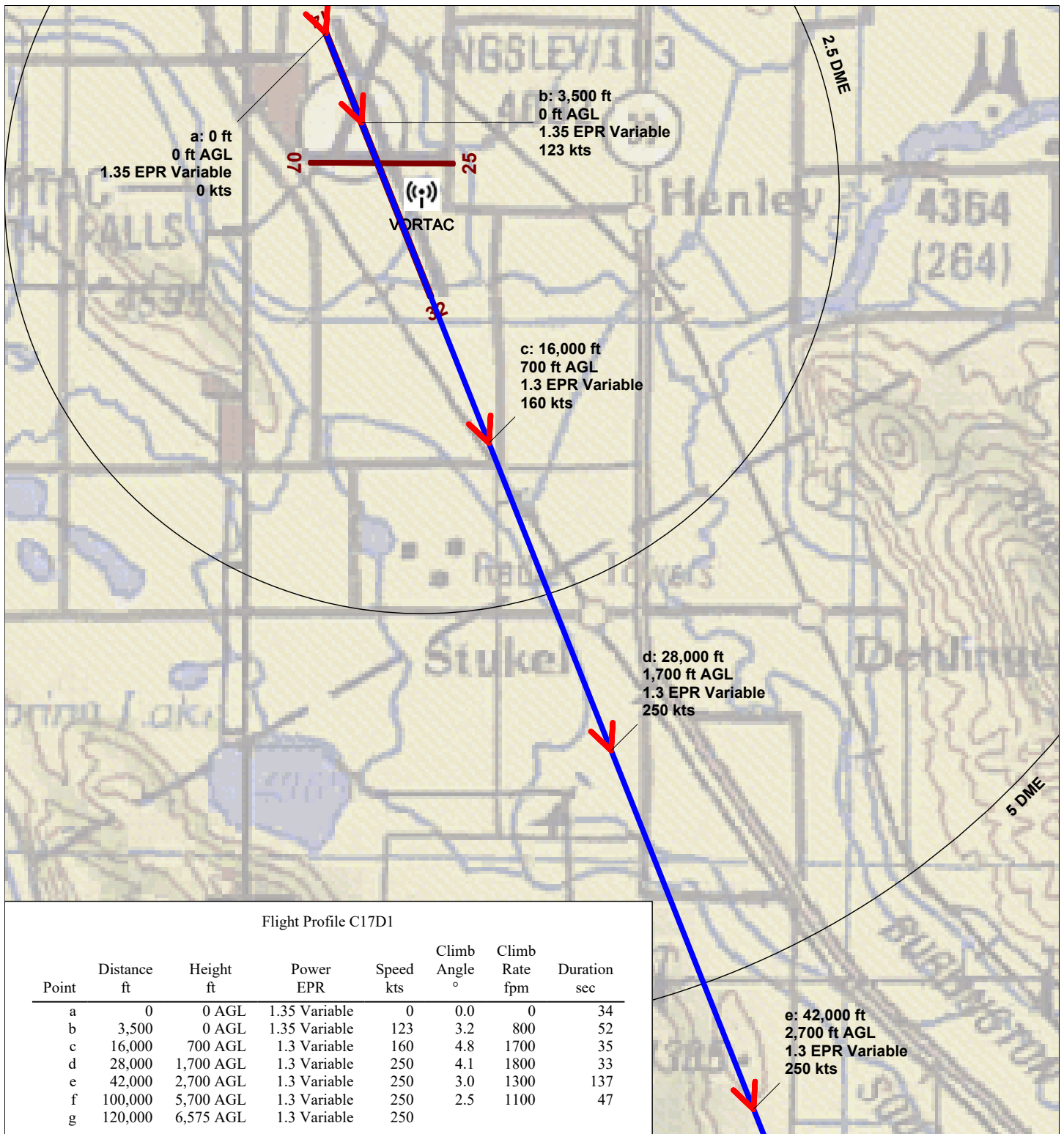


Scale in Feet 1:146,000 (1 inch = 12,200 feet)

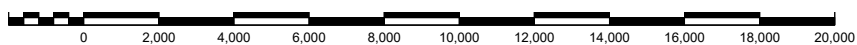








**Transient C-17 Flight Profile C17D1  
DEPARTURE**



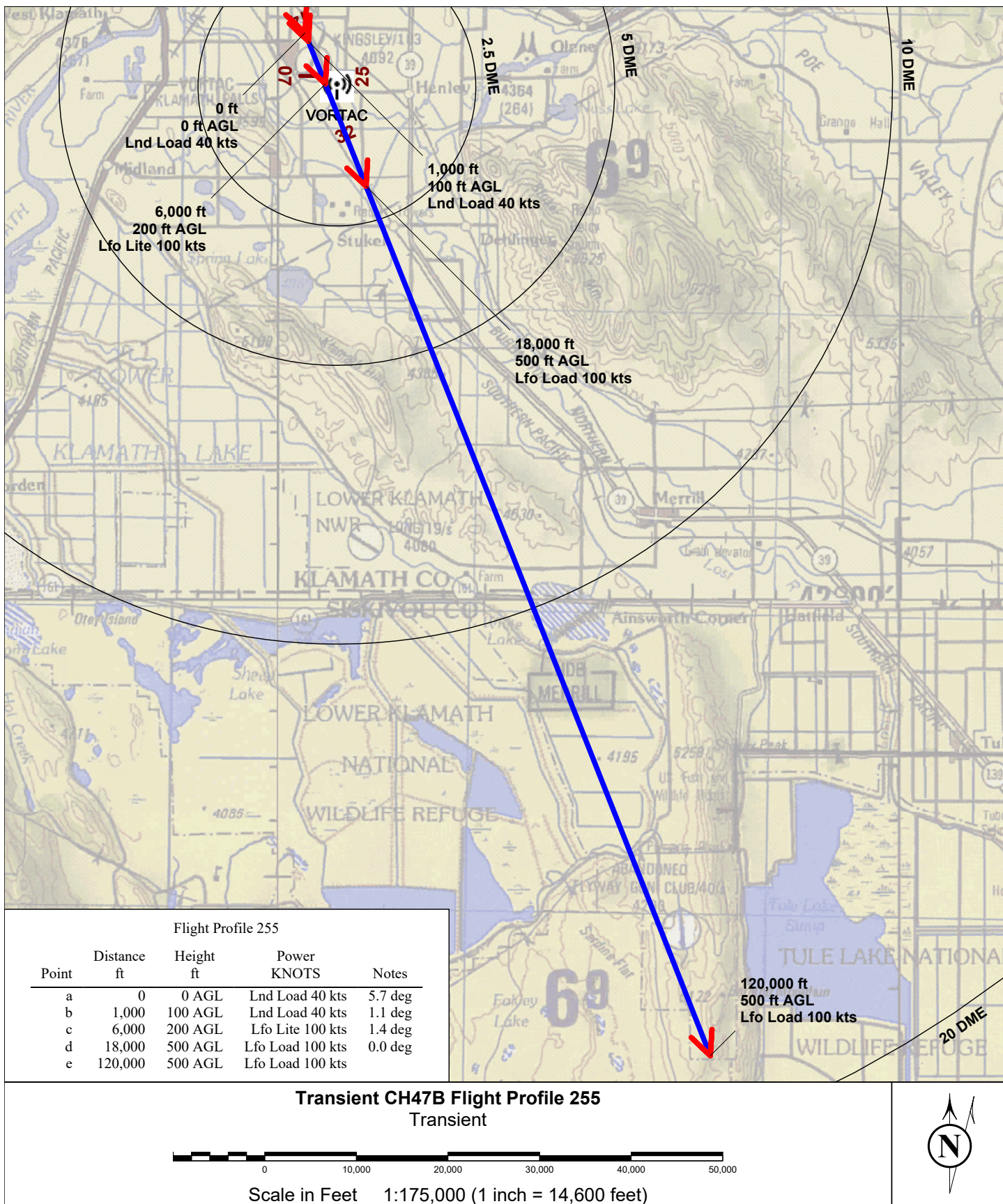
Scale in Feet 1:61,300 (1 inch = 5,110 feet)

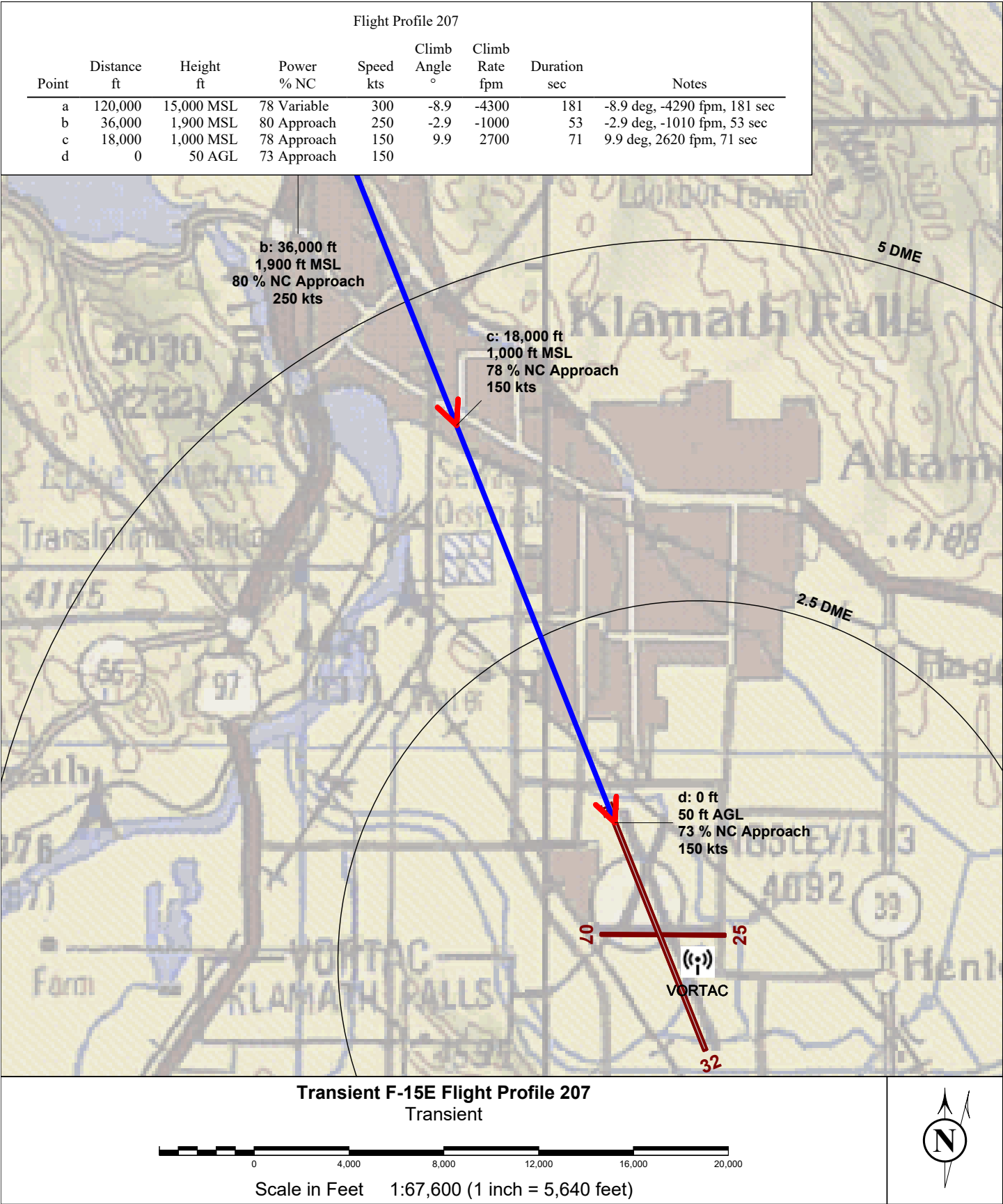


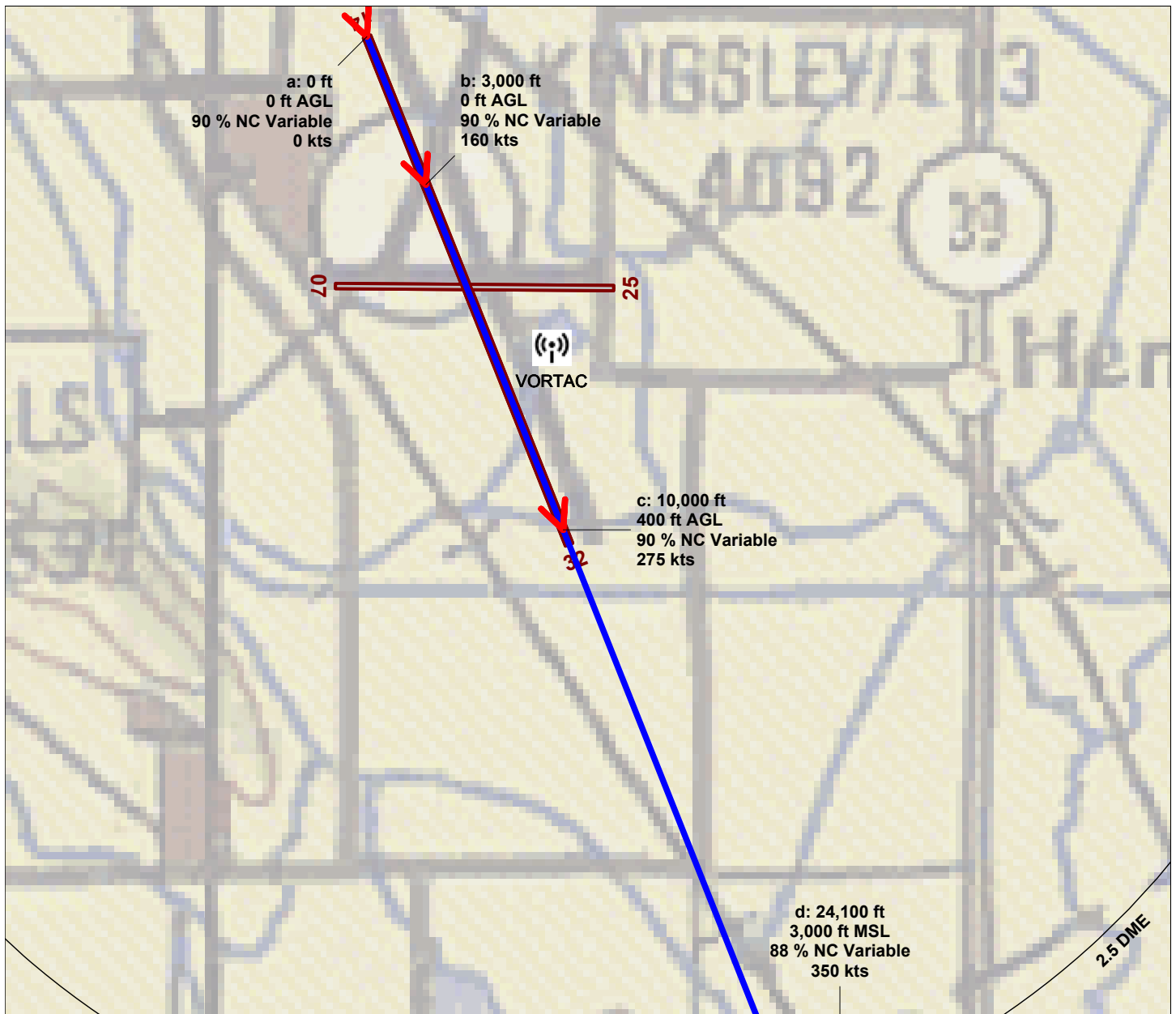








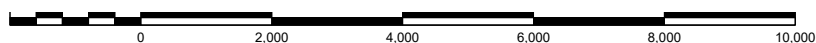




Flight Profile 205

| Point | Distance<br>ft | Height<br>ft | Power<br>% NC | Speed<br>kts | Climb<br>Angle<br>° | Climb<br>Rate<br>fpm | Duration<br>sec | Notes                       |
|-------|----------------|--------------|---------------|--------------|---------------------|----------------------|-----------------|-----------------------------|
| a     | 0              | 0 AGL        | 90 Variable   | 0            | 0.0                 | 0                    | 22              | 0.0 deg, 0 fpm, 22 sec      |
| b     | 3,000          | 0 AGL        | 90 Variable   | 160          | 3.3                 | 1300                 | 19              | 3.3 deg, 1260 fpm, 19 sec   |
| c     | 10,000         | 400 AGL      | 90 Variable   | 275          | -6.1                | -3400                | 27              | -6.1 deg, -3350 fpm, 27 sec |
| d     | 24,100         | 3,000 MSL    | 88 Variable   | 350          | 5.9                 | 3700                 | 112             | 5.9 deg, 3660 fpm, 112 sec  |
| e     | 90,000         | 9,850 MSL    | 81 Variable   | 350          | 9.7                 | 6100                 | 51              | 9.7 deg, 6000 fpm, 51 sec   |
| f     | 120,000        | 15,000 MSL   | 76 Variable   | 350          |                     |                      |                 |                             |

**Transient F-15E Flight Profile 205**  
Transient



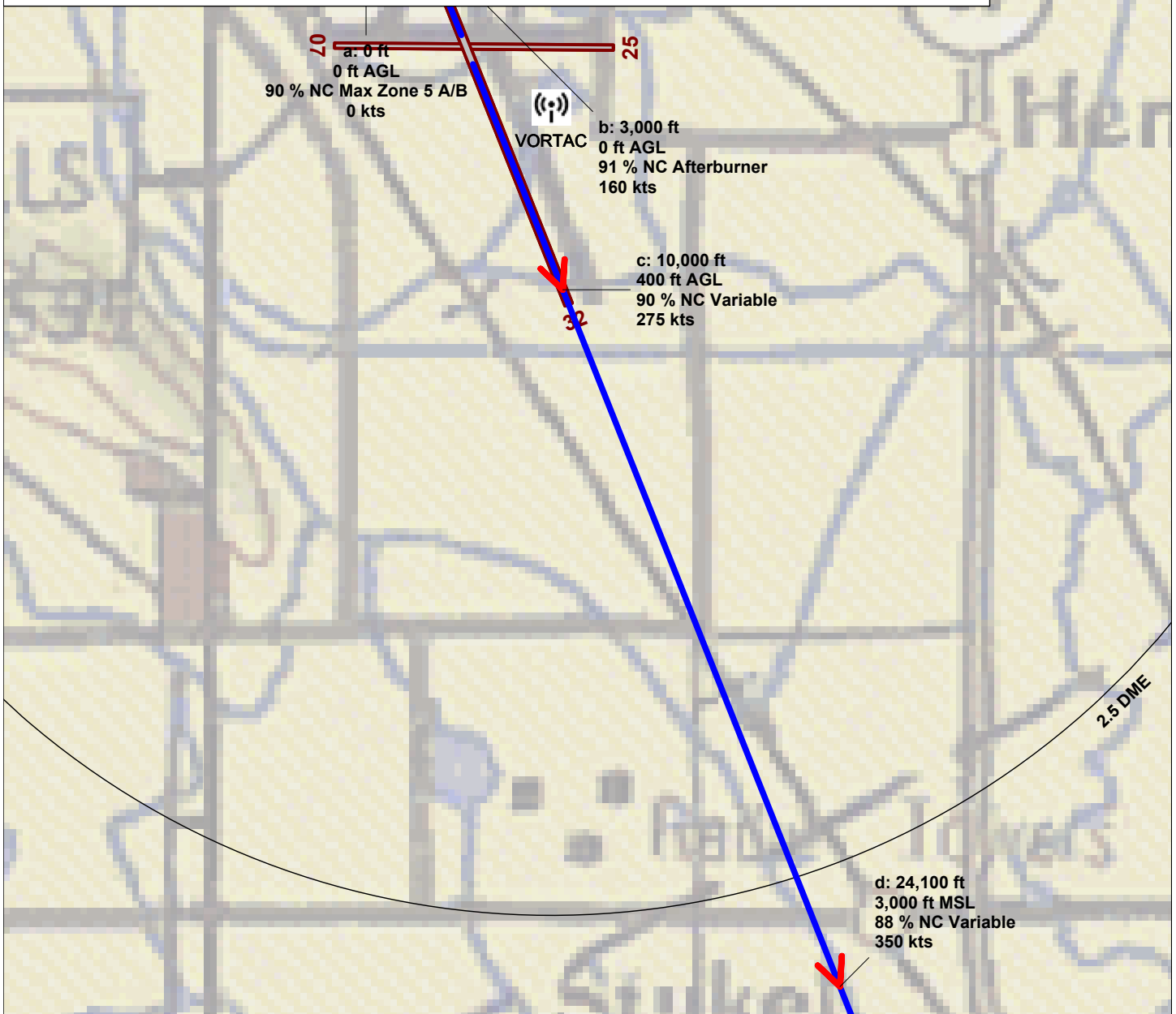
Scale in Feet 1:35,200 (1 inch = 2,930 feet)



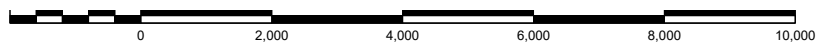


Flight Profile 263

| Point | Distance<br>ft | Height<br>ft | Power<br>% NC     | Speed<br>kts | Climb<br>Angle<br>° | Climb<br>Rate<br>fpm | Duration<br>sec | Notes                       |
|-------|----------------|--------------|-------------------|--------------|---------------------|----------------------|-----------------|-----------------------------|
| a     | 0              | 0 AGL        | 90 Max Zone 5 A/B | 0            | 0.0                 | 0                    | 22              | 0.0 deg, 0 fpm, 22 sec      |
| b     | 3,000          | 0 AGL        | 91 Afterburner    | 160          | 3.3                 | 1300                 | 19              | 3.3 deg, 1260 fpm, 19 sec   |
| c     | 10,000         | 400 AGL      | 90 Variable       | 275          | -6.1                | -3400                | 27              | -6.1 deg, -3350 fpm, 27 sec |
| d     | 24,100         | 3,000 MSL    | 88 Variable       | 350          | 5.9                 | 3700                 | 112             | 5.9 deg, 3660 fpm, 112 sec  |
| e     | 90,000         | 9,850 MSL    | 81 Variable       | 350          | 9.7                 | 6100                 | 51              | 9.7 deg, 6000 fpm, 51 sec   |
| f     | 120,000        | 15,000 MSL   | 76 Variable       | 350          |                     |                      |                 |                             |

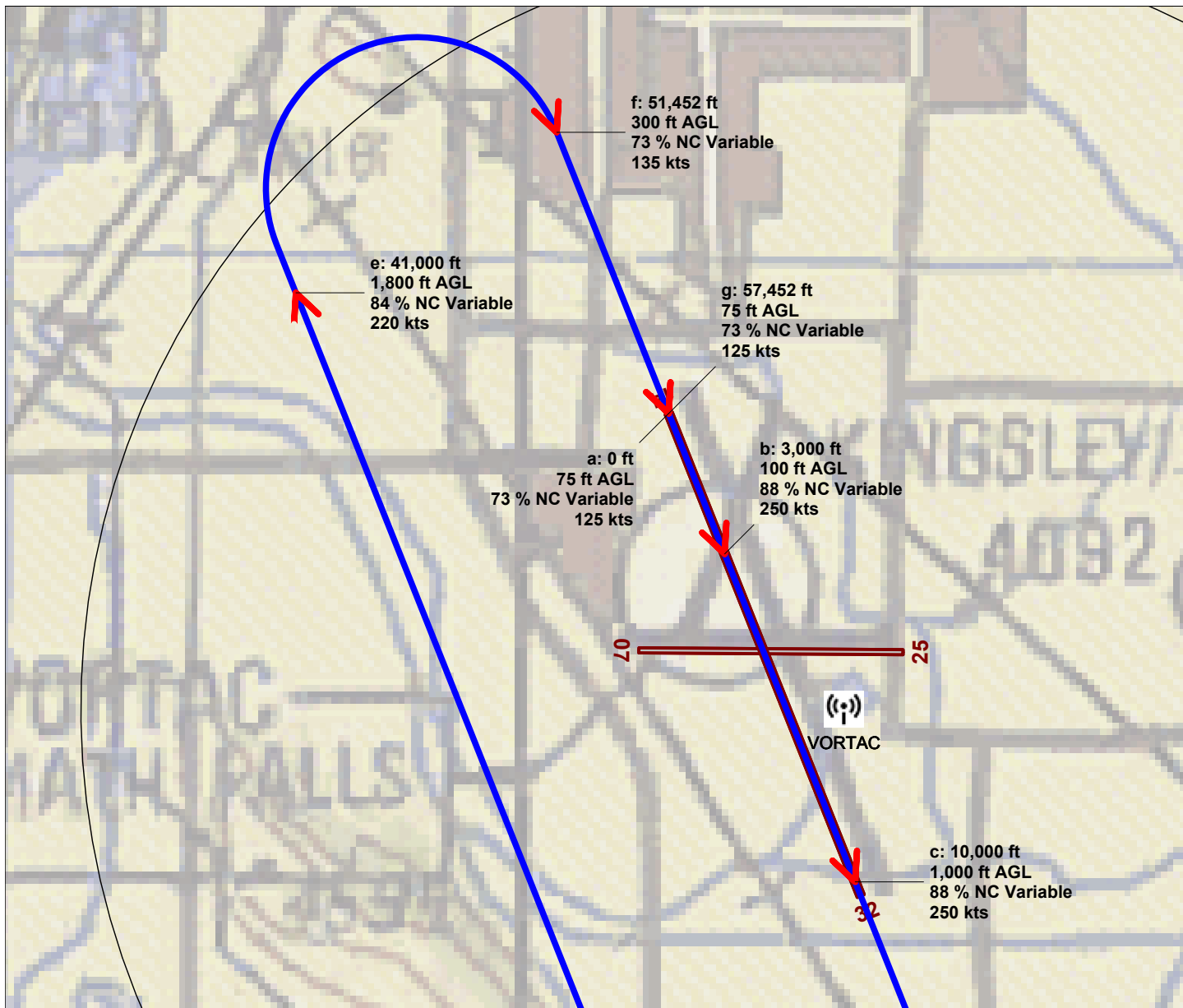


Transient F-15E Flight Profile 263  
Transient



Scale in Feet 1:35,200 (1 inch = 2,930 feet)





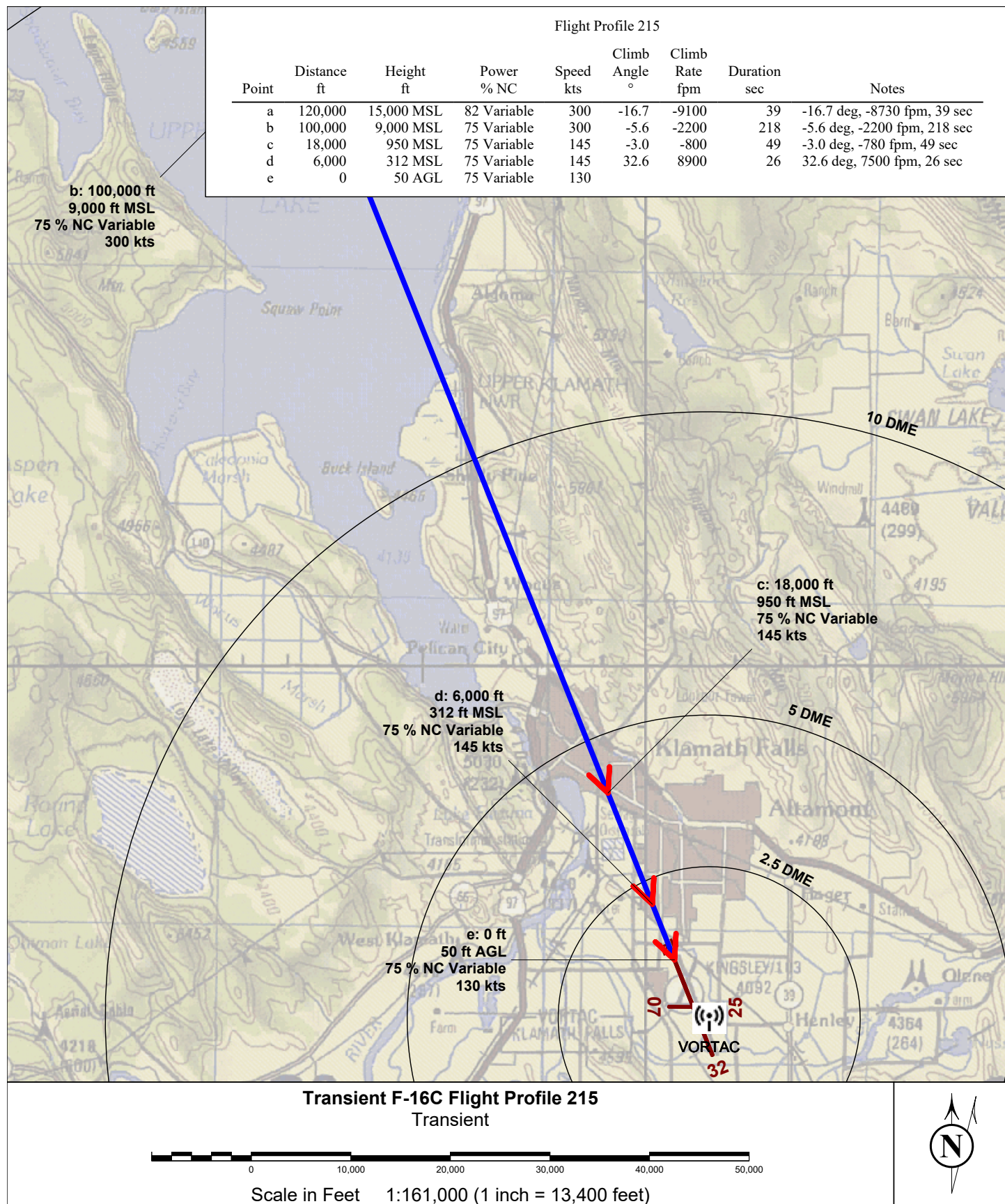
| Flight Profile 209 |                |              |               |              |                     |                      |                 |                             |
|--------------------|----------------|--------------|---------------|--------------|---------------------|----------------------|-----------------|-----------------------------|
| Point              | Distance<br>ft | Height<br>ft | Power<br>% NC | Speed<br>kts | Climb<br>Angle<br>° | Climb<br>Rate<br>fpm | Duration<br>sec | Notes                       |
| a                  | 0              | 75 AGL       | 73 Variable   | 125          | 0.5                 | 200                  | 9               | 0.5 deg, 160 fpm, 9 sec     |
| b                  | 3,000          | 100 AGL      | 88 Variable   | 250          | 7.3                 | 3300                 | 17              | 7.3 deg, 3230 fpm, 17 sec   |
| c                  | 10,000         | 1,000 AGL    | 88 Variable   | 250          | 3.3                 | 1400                 | 35              | 0.0 deg, 0 fpm, 35 sec      |
| d                  | 24,000         | 1,800 AGL    | 84 Variable   | 220          | 0.0                 | 0                    | 46              | 0.0 deg, 0 fpm, 46 sec      |
| e                  | 41,000         | 1,800 AGL    | 84 Variable   | 220          | -8.2                | -2600                | 35              | -3.8 deg, -1200 fpm, 35 sec |
| f                  | 51,452         | 300 AGL      | 73 Variable   | 135          | -2.1                | -500                 | 27              | -2.1 deg, -490 fpm, 27 sec  |
| g                  | 57,452         | 75 AGL       | 73 Variable   | 125          |                     |                      |                 |                             |

**Transient F-15E Flight Profile 209**  
Transient



Scale in Feet 1:37,600 (1 inch = 3,140 feet)





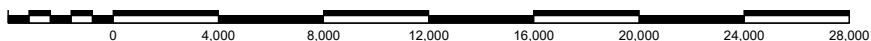


Flight Profile 211

| Point | Distance<br>ft | Height<br>ft | Power<br>% NC  | Speed<br>kts | Climb<br>Angle<br>° | Climb<br>Rate<br>fpm | Duration<br>sec | Notes                      |
|-------|----------------|--------------|----------------|--------------|---------------------|----------------------|-----------------|----------------------------|
| a     | 0              | 0 AGL        | 92 Max A/B     | 0            | 0.0                 | 0                    | 20              | 0.0 deg, 0 fpm, 20 sec     |
| b     | 2,700          | 0 AGL        | 92 Afterburner | 160          | 1.7                 | 600                  | 10              | 1.7 deg, 630 fpm, 10 sec   |
| c     | 6,000          | 100 AGL      | 92 Afterburner | 250          | 7.6                 | 3400                 | 7               | 7.6 deg, 3350 fpm, 7 sec   |
| d     | 9,000          | 500 AGL      | 90 Variable    | 250          | 1.1                 | 500                  | 50              | 1.1 deg, 480 fpm, 50 sec   |
| e     | 30,000         | 5,000 MSL    | 90 Variable    | 250          | 5.7                 | 2800                 | 65              | 5.7 deg, 2770 fpm, 65 sec  |
| f     | 60,000         | 8,000 MSL    | 85 Variable    | 300          | 6.7                 | 3800                 | 109             | 6.7 deg, 3810 fpm, 109 sec |
| g     | 120,000        | 15,000 MSL   | 85 Variable    | 350          |                     |                      |                 |                            |

**f: 60,000 ft**  
**8,000 ft MSL**  
**85 % NC Variable**  
**300 kts**

**Transient F-16C Flight Profile 211**  
 Transient



Scale in Feet 1:87,600 (1 inch = 7,300 feet)





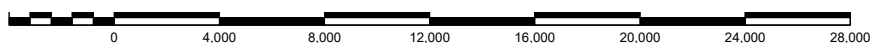


Flight Profile 213

| Point | Distance<br>ft | Height<br>ft | Power<br>% NC | Speed<br>kts | Climb<br>Angle<br>° | Climb<br>Rate<br>fpm | Duration<br>sec | Notes                      |
|-------|----------------|--------------|---------------|--------------|---------------------|----------------------|-----------------|----------------------------|
| a     | 0              | 0 AGL        | 90 Variable   | 0            | 0.0                 | 0                    | 20              | 0.0 deg, 0 fpm, 20 sec     |
| b     | 2,700          | 0 AGL        | 90 Variable   | 160          | 1.7                 | 600                  | 10              | 1.7 deg, 630 fpm, 10 sec   |
| c     | 6,000          | 100 AGL      | 90 Variable   | 250          | 7.6                 | 3400                 | 7               | 7.6 deg, 3350 fpm, 7 sec   |
| d     | 9,000          | 500 AGL      | 90 Variable   | 250          | 1.1                 | 500                  | 50              | 1.1 deg, 480 fpm, 50 sec   |
| e     | 30,000         | 5,000 MSL    | 90 Variable   | 250          | 5.7                 | 2800                 | 65              | 5.7 deg, 2770 fpm, 65 sec  |
| f     | 60,000         | 8,000 MSL    | 85 Variable   | 300          | 6.7                 | 3800                 | 109             | 6.7 deg, 3810 fpm, 109 sec |
| g     | 120,000        | 15,000 MSL   | 85 Variable   | 350          |                     |                      |                 |                            |

**f: 60,000 ft  
8,000 ft MSL  
85 % NC Variable  
300 kts**

**Transient F-16C Flight Profile 213**  
Transient



Scale in Feet 1:87,600 (1 inch = 7,300 feet)





| Flight Profile 217 |                |              |               |              |                     |                      |                 |                             |
|--------------------|----------------|--------------|---------------|--------------|---------------------|----------------------|-----------------|-----------------------------|
| Point              | Distance<br>ft | Height<br>ft | Power<br>% NC | Speed<br>kts | Climb<br>Angle<br>° | Climb<br>Rate<br>fpm | Duration<br>sec | Notes                       |
| a                  | 0              | 75 AGL       | 850 Variable  | 150          | 0.5                 | 100                  | 12              | 0.5 deg, 130 fpm, 12 sec    |
| b                  | 3,000          | 100 AGL      | 850 Variable  | 155          | 6.5                 | 2300                 | 20              | 6.5 deg, 2330 fpm, 20 sec   |
| c                  | 10,000         | 900 AGL      | 850 Variable  | 250          | 4.0                 | 1800                 | 30              | 0.3 deg, 150 fpm, 40 sec    |
| d                  | 22,726         | 1,800 AGL    | 600 Variable  | 250          | 0.0                 | 0                    | 53              | 0.0 deg, 0 fpm, 39 sec      |
| e                  | 42,027         | 1,800 AGL    | 600 Variable  | 180          | -9.0                | -2700                | 34              | -3.8 deg, -1120 fpm, 38 sec |
| f                  | 51,452         | 300 AGL      | 600 Variable  | 150          | -2.1                | -600                 | 24              | -2.1 deg, -570 fpm, 24 sec  |
| g                  | 57,452         | 75 AGL       | 600 Variable  | 150          |                     |                      |                 |                             |

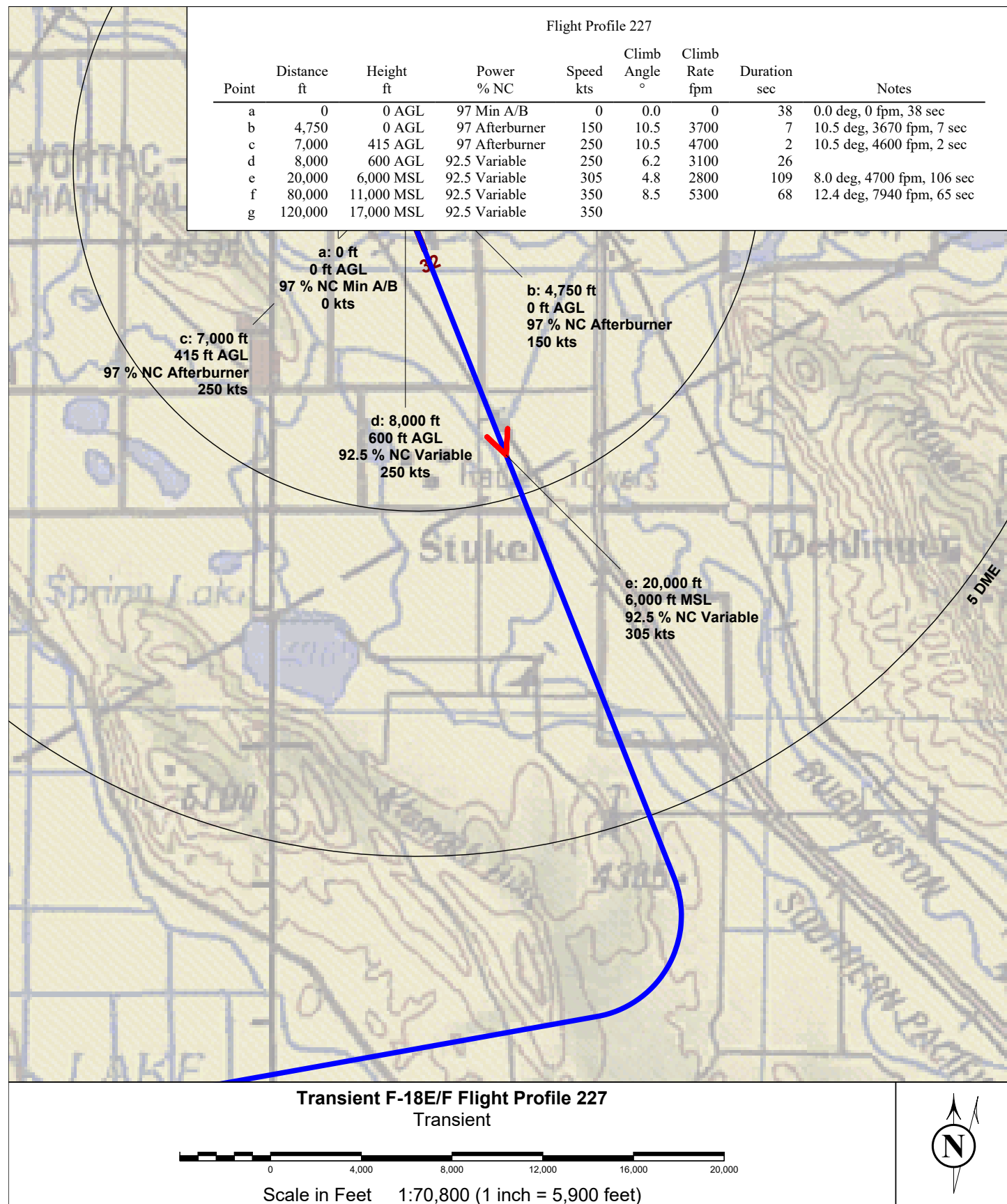
**Transient F-16C Flight Profile 217**  
Transient



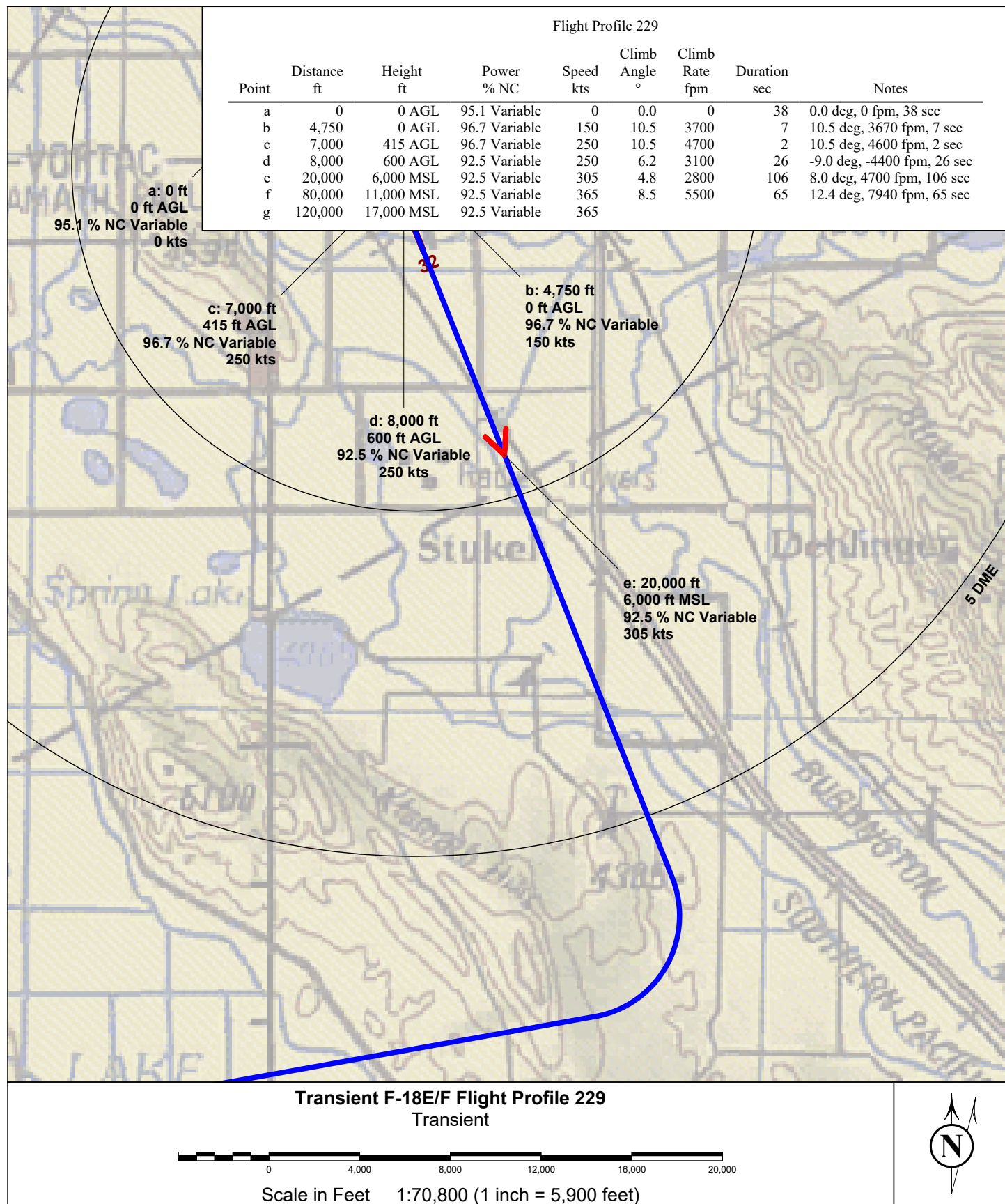
Scale in Feet 1:37,600 (1 inch = 3,140 feet)

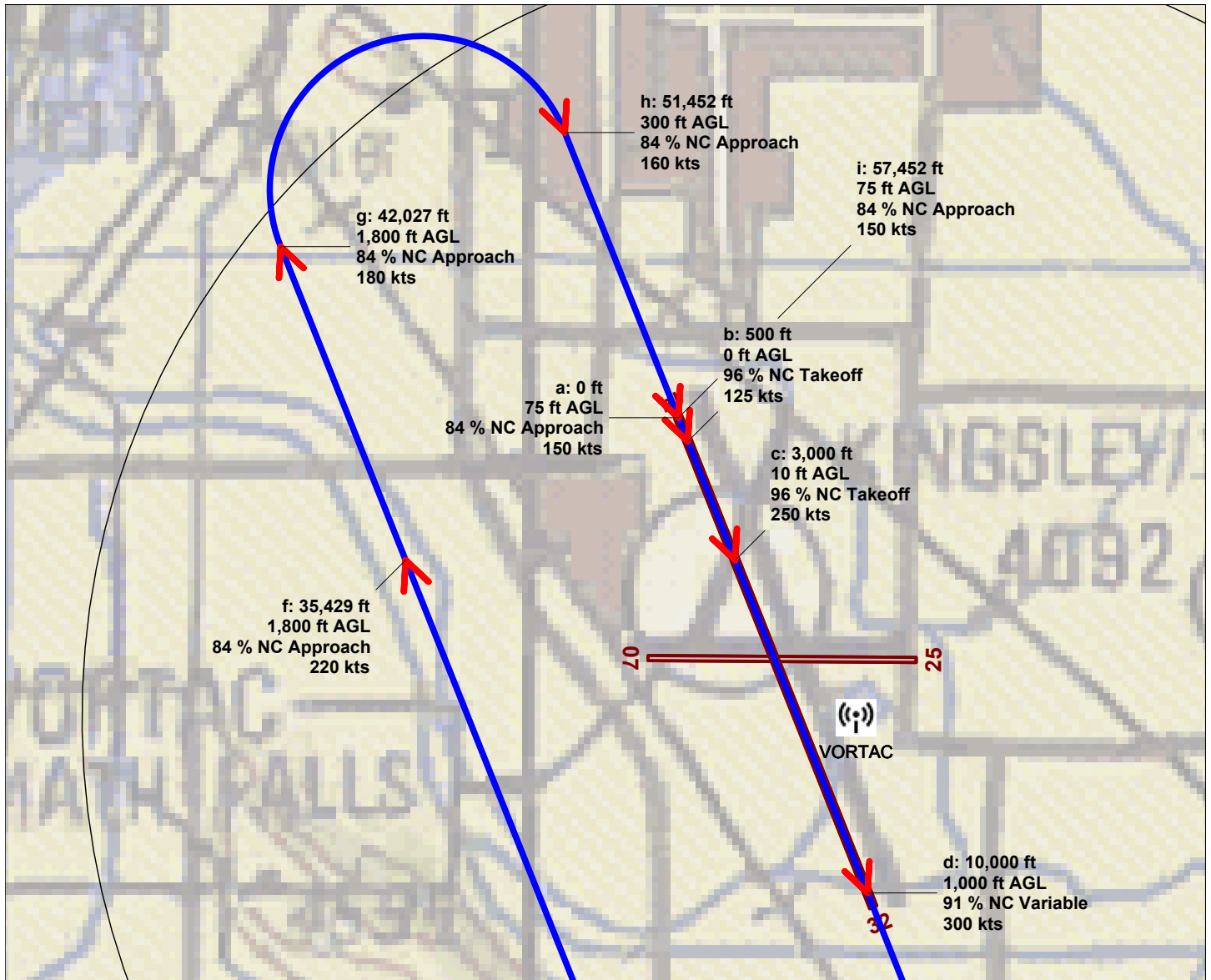












Flight Profile 233

| Point | Distance<br>ft | Height<br>ft | Power<br>% NC | Speed<br>kts | Climb<br>Angle<br>° | Climb<br>Rate<br>fpm | Duration<br>sec | Notes                       |
|-------|----------------|--------------|---------------|--------------|---------------------|----------------------|-----------------|-----------------------------|
| a     | 0              | 75 AGL       | 84 Approach   | 150          | -8.5                | -2100                | 2               | -8.5 deg, -2070 fpm, 2 sec  |
| b     | 500            | 0 AGL        | 96 Takeoff    | 125          | 0.2                 | 100                  | 8               | 0.2 deg, 80 fpm, 8 sec      |
| c     | 3,000          | 10 AGL       | 96 Takeoff    | 250          | 8.0                 | 3900                 | 15              | 8.0 deg, 3900 fpm, 15 sec   |
| d     | 10,000         | 1,000 AGL    | 91 Variable   | 300          | 3.6                 | 1600                 | 29              | 2.9 deg, 1320 fpm, 36 sec   |
| e     | 22,795         | 1,800 AGL    | 83 Variable   | 220          | 0.0                 | 0                    | 34              | 0.0 deg, 0 fpm, 26 sec      |
| f     | 35,429         | 1,800 AGL    | 84 Approach   | 220          | 0.0                 | 0                    | 20              | 0.0 deg, 0 fpm, 13 sec      |
| g     | 42,027         | 1,800 AGL    | 84 Approach   | 180          | -9.0                | -2700                | 33              | -7.5 deg, -2240 fpm, 40 sec |
| h     | 51,452         | 300 AGL      | 84 Approach   | 160          | -2.1                | -600                 | 23              | -2.1 deg, -590 fpm, 23 sec  |
| i     | 57,452         | 75 AGL       | 84 Approach   | 150          |                     |                      |                 | Cross Threshold             |

**Transient F-18E/F Flight Profile 233**  
Transient

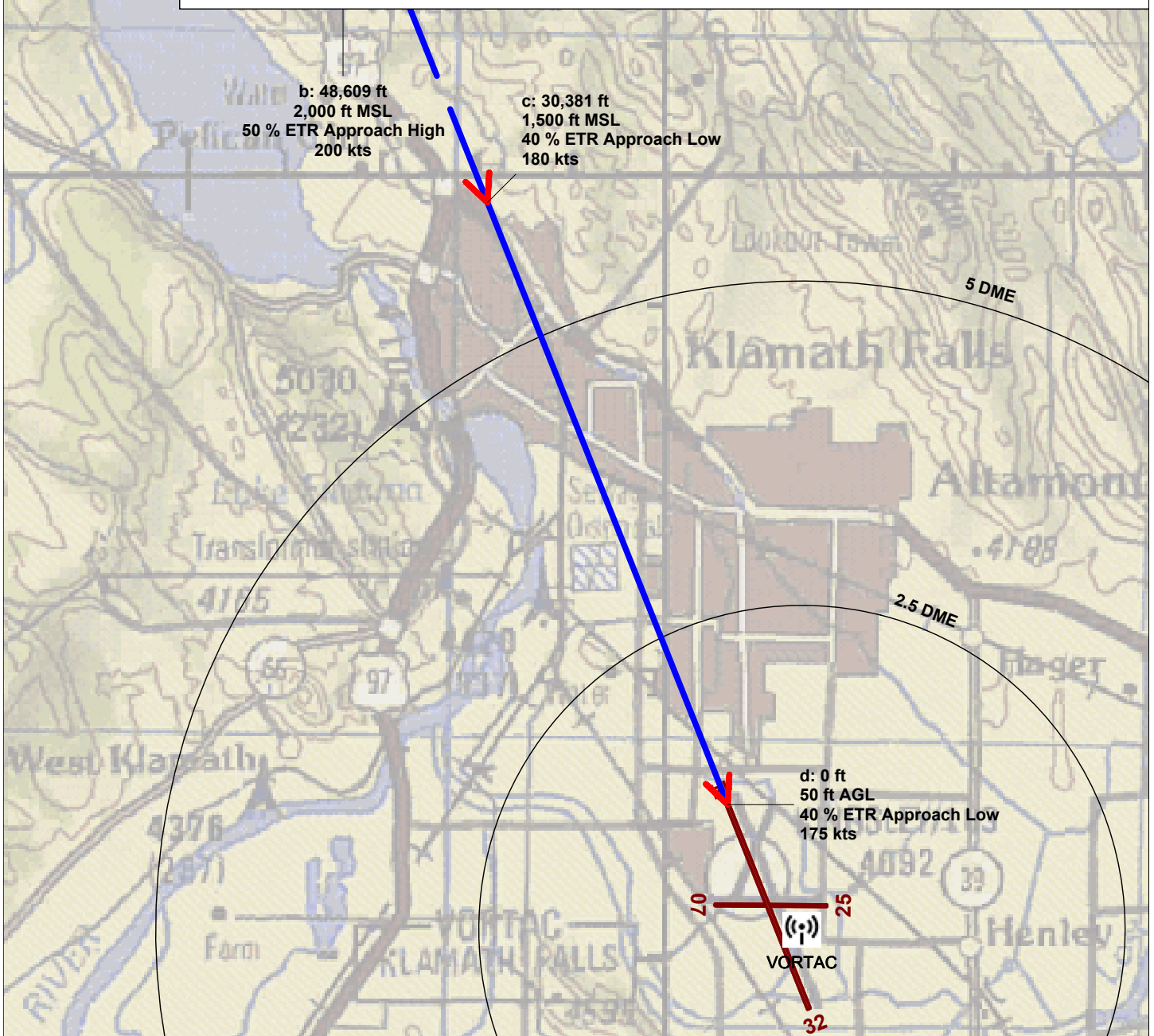


Scale in Feet 1:37,600 (1 inch = 3,140 feet)



# Flight Profile 223

| Point | Distance<br>ft | Height<br>ft | Power<br>% ETR   | Speed<br>kts | Climb<br>Angle<br>° | Climb<br>Rate<br>fpm | Duration<br>sec | Notes                        |
|-------|----------------|--------------|------------------|--------------|---------------------|----------------------|-----------------|------------------------------|
| a     | 120,000        | 14,000 MSL   | 15 Flight Idle   | 250          | -9.5                | -3800                | 188             | -9.5 deg, -3780 fpm, 188 sec |
| b     | 48,609         | 2,000 MSL    | 50 Approach High | 200          | -1.6                | -500                 | 57              | -1.6 deg, -530 fpm, 57 sec   |
| c     | 30,381         | 1,500 MSL    | 40 Approach Low  | 180          | 5.0                 | 1600                 | 101             | 5.0 deg, 1560 fpm, 101 sec   |
| d     | 0              | 50 AGL       | 40 Approach Low  | 175          |                     |                      |                 |                              |

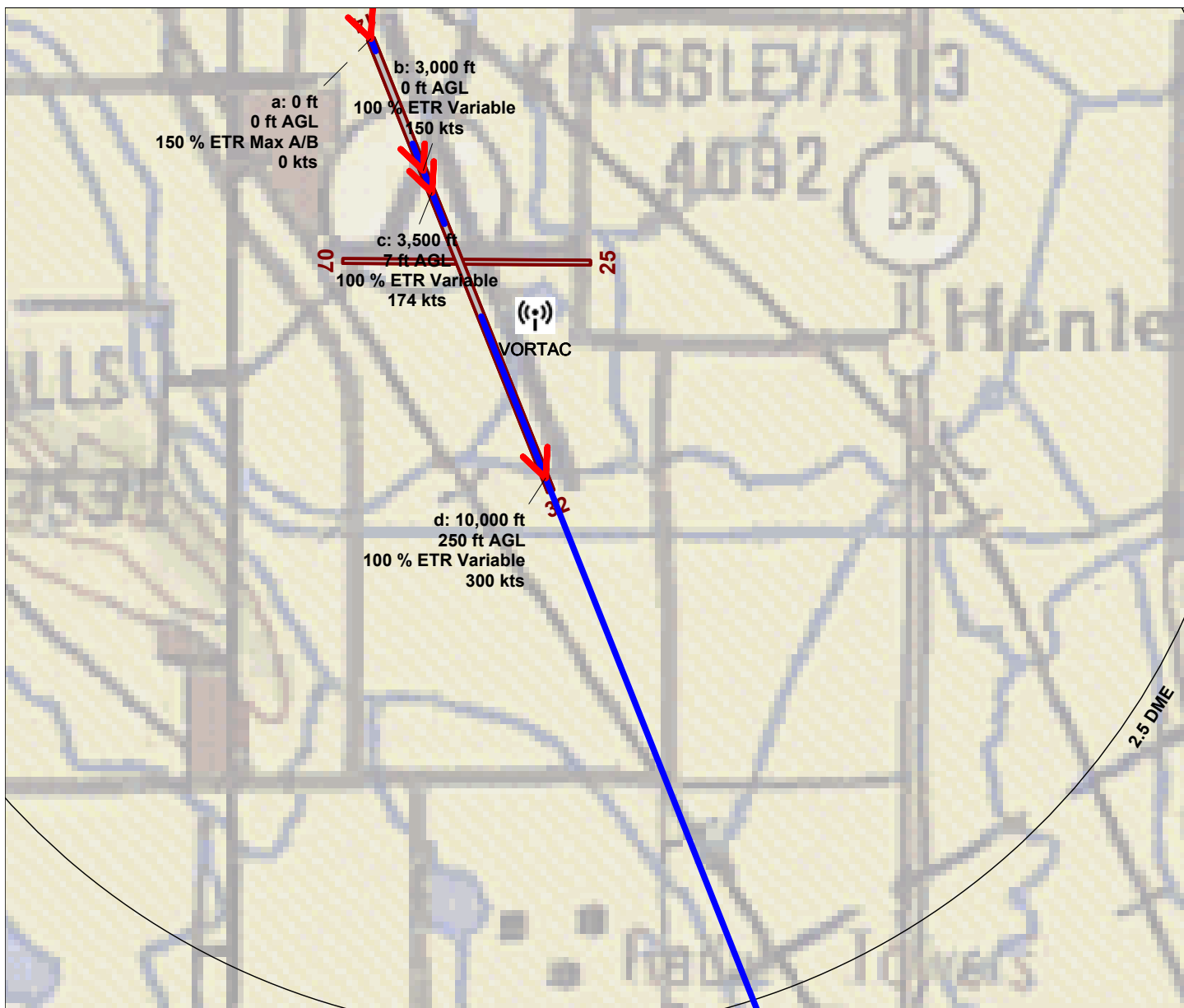


**Transient F-35A Flight Profile 223**  
Transient



Scale in Feet 1:86,000 (1 inch = 7,170 feet)

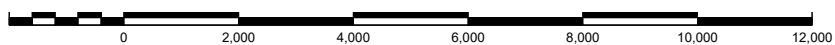




Flight Profile 219

| Point | Distance<br>ft | Height<br>ft | Power<br>% ETR | Speed<br>kts | Climb<br>Angle<br>° | Climb<br>Rate<br>fpm | Duration<br>sec | Notes                      |
|-------|----------------|--------------|----------------|--------------|---------------------|----------------------|-----------------|----------------------------|
| a     | 0              | 0 AGL        | 150 Max A/B    | 0            | 0.0                 | 0                    | 24              | 0.0 deg, 0 fpm, 24 sec     |
| b     | 3,000          | 0 AGL        | 100 Variable   | 150          | 0.8                 | 200                  | 2               | 0.8 deg, 230 fpm, 2 sec    |
| c     | 3,500          | 7 AGL        | 100 Variable   | 174          | 2.1                 | 900                  | 16              | 2.1 deg, 900 fpm, 16 sec   |
| d     | 10,000         | 250 AGL      | 100 Variable   | 300          | 8.9                 | 5200                 | 32              | 8.9 deg, 5110 fpm, 32 sec  |
| e     | 27,500         | 3,000 AGL    | 95 Variable    | 350          | 15.0                | 9500                 | 44              | 15.0 deg, 9170 fpm, 44 sec |
| f     | 53,624         | 10,000 AGL   | 35 Variable    | 350          | 0.0                 | 0                    | 112             | 0.0 deg, 0 fpm, 112 sec    |
| g     | 120,000        | 10,000 AGL   | 35 Variable    | 350          |                     |                      |                 |                            |

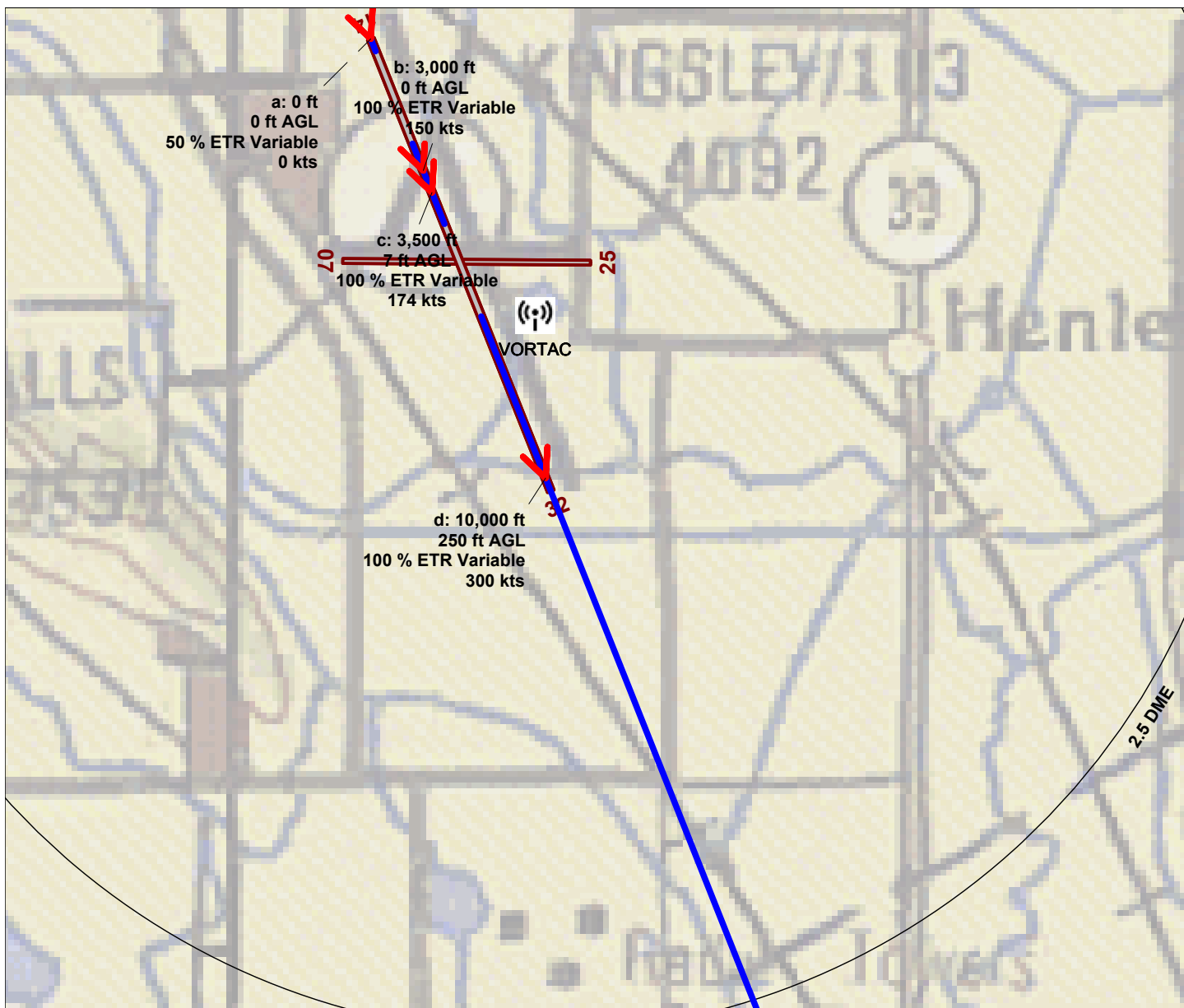
**Transient F-35A Flight Profile 219**  
Transient



Scale in Feet 1:40,200 (1 inch = 3,350 feet)







Flight Profile 221

| Point | Distance<br>ft | Height<br>ft | Power<br>% ETR | Speed<br>kts | Climb<br>Angle<br>° | Climb<br>Rate<br>fpm | Duration<br>sec | Notes                      |
|-------|----------------|--------------|----------------|--------------|---------------------|----------------------|-----------------|----------------------------|
| a     | 0              | 0 AGL        | 50 Variable    | 0            | 0.0                 | 0                    | 24              | 0.0 deg, 0 fpm, 24 sec     |
| b     | 3,000          | 0 AGL        | 100 Variable   | 150          | 0.8                 | 200                  | 2               | 0.8 deg, 230 fpm, 2 sec    |
| c     | 3,500          | 7 AGL        | 100 Variable   | 174          | 2.1                 | 900                  | 16              | 2.1 deg, 900 fpm, 16 sec   |
| d     | 10,000         | 250 AGL      | 100 Variable   | 300          | 8.9                 | 5200                 | 32              | 8.9 deg, 5110 fpm, 32 sec  |
| e     | 27,500         | 3,000 AGL    | 95 Variable    | 350          | 15.0                | 9500                 | 44              | 15.0 deg, 9170 fpm, 44 sec |
| f     | 53,624         | 10,000 AGL   | 35 Variable    | 350          | 0.0                 | 0                    | 112             | 0.0 deg, 0 fpm, 112 sec    |
| g     | 120,000        | 10,000 AGL   | 35 Variable    | 350          |                     |                      |                 |                            |

Transient F-35A Flight Profile 221  
Transient

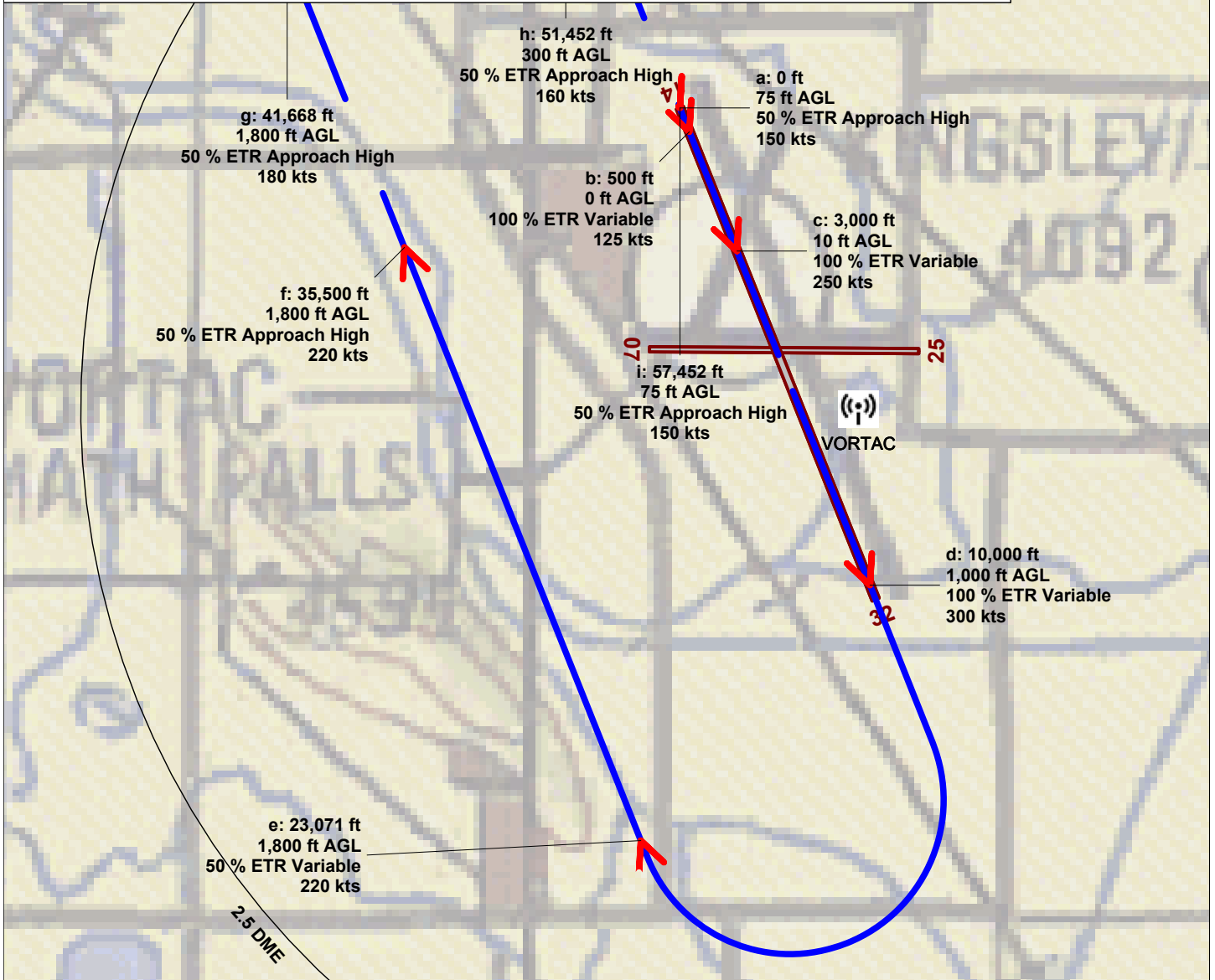


Scale in Feet 1:40,200 (1 inch = 3,350 feet)



Flight Profile 225

| Point | Distance<br>ft | Height<br>ft | Power<br>% ETR   | Speed<br>kts | Climb<br>Angle<br>° | Climb<br>Rate<br>fpm | Duration<br>sec | Notes                       |
|-------|----------------|--------------|------------------|--------------|---------------------|----------------------|-----------------|-----------------------------|
| a     | 0              | 75 AGL       | 50 Approach High | 150          | -8.5                | -2100                | 2               | -8.5 deg, -2070 fpm, 2 sec  |
| b     | 500            | 0 AGL        | 100 Variable     | 125          | 0.2                 | 100                  | 8               | 0.2 deg, 80 fpm, 8 sec      |
| c     | 3,000          | 10 AGL       | 100 Variable     | 250          | 8.0                 | 3900                 | 15              | 8.0 deg, 3900 fpm, 15 sec   |
| d     | 10,000         | 1,000 AGL    | 100 Variable     | 300          | 3.5                 | 1600                 | 30              | 2.9 deg, 1320 fpm, 36 sec   |
| e     | 23,071         | 1,800 AGL    | 50 Variable      | 220          | 0.0                 | 0                    | 33              | 0.0 deg, 0 fpm, 26 sec      |
| f     | 35,500         | 1,800 AGL    | 50 Approach High | 220          | 0.0                 | 0                    | 18              | 0.0 deg, 0 fpm, 13 sec      |
| g     | 41,668         | 1,800 AGL    | 50 Approach High | 180          | -8.7                | -2600                | 34              | -7.5 deg, -2240 fpm, 40 sec |
| h     | 51,452         | 300 AGL      | 50 Approach High | 160          | -2.1                | -600                 | 23              | -2.1 deg, -590 fpm, 23 sec  |
| i     | 57,452         | 75 AGL       | 50 Approach High | 150          |                     |                      |                 | Cross Threshold             |



Transient F-35A Flight Profile 225  
Transient

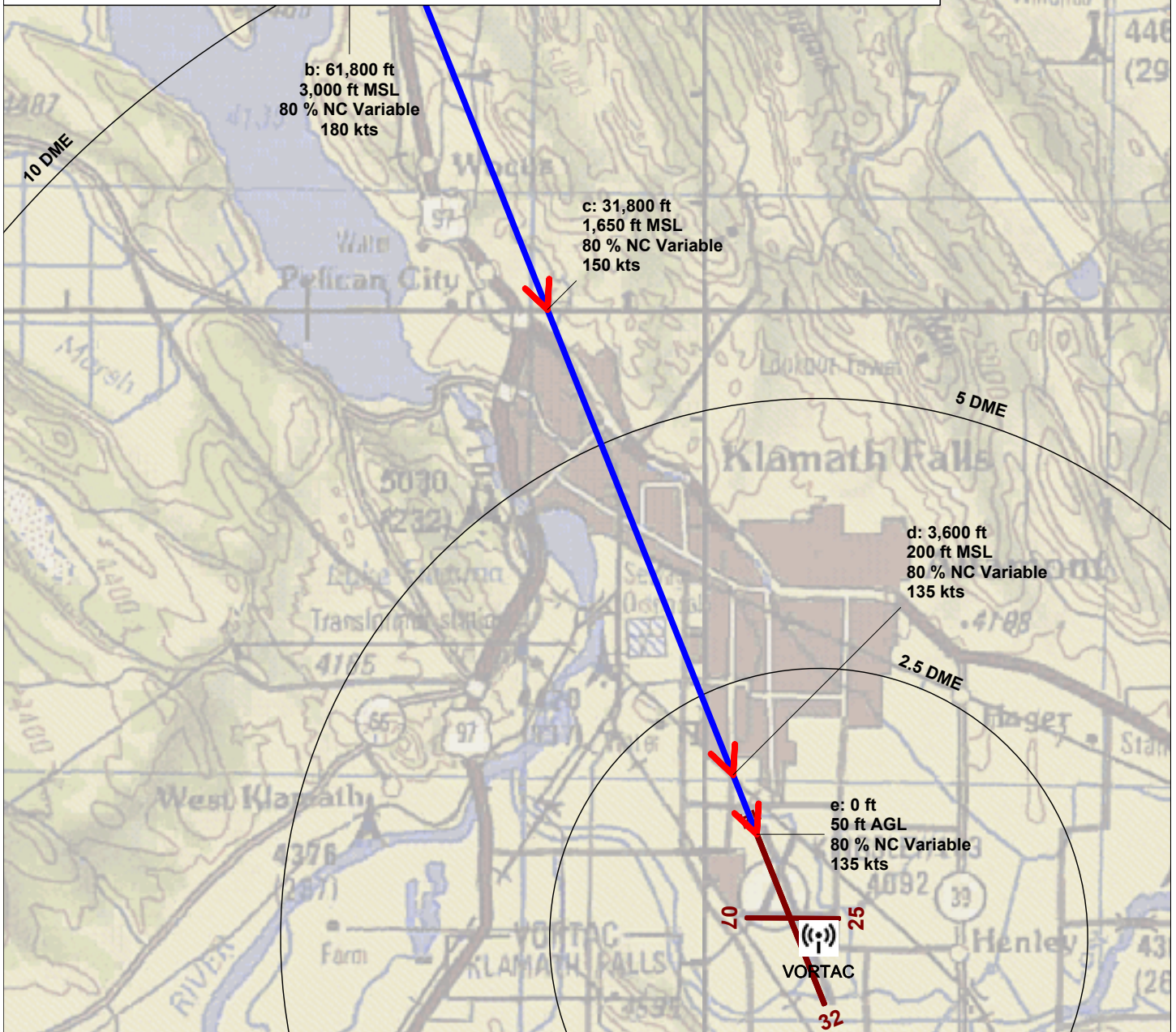


Scale in Feet 1:37,600 (1 inch = 3,140 feet)

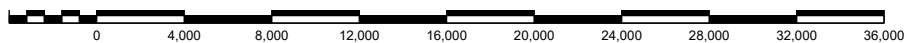


Flight Profile 203

| Point | Distance<br>ft | Height<br>ft | Power<br>% NC | Speed<br>kts | Climb<br>Angle<br>° | Climb<br>Rate<br>fpm | Duration<br>sec | Notes                        |
|-------|----------------|--------------|---------------|--------------|---------------------|----------------------|-----------------|------------------------------|
| a     | 120,000        | 10,000 MSL   | 80 Variable   | 170          | -6.9                | -2100                | 197             | -6.9 deg, -2120 fpm, 197 sec |
| b     | 61,800         | 3,000 MSL    | 80 Variable   | 180          | -2.6                | -800                 | 108             | -2.6 deg, -750 fpm, 108 sec  |
| c     | 31,800         | 1,650 MSL    | 80 Variable   | 150          | -2.9                | -700                 | 117             | -2.9 deg, -740 fpm, 117 sec  |
| d     | 3,600          | 200 MSL      | 80 Variable   | 135          | 47.6                | 15000                | 16              | 47.7 deg, 10100 fpm, 16 sec  |
| e     | 0              | 50 AGL       | 80 Variable   | 135          |                     |                      |                 |                              |

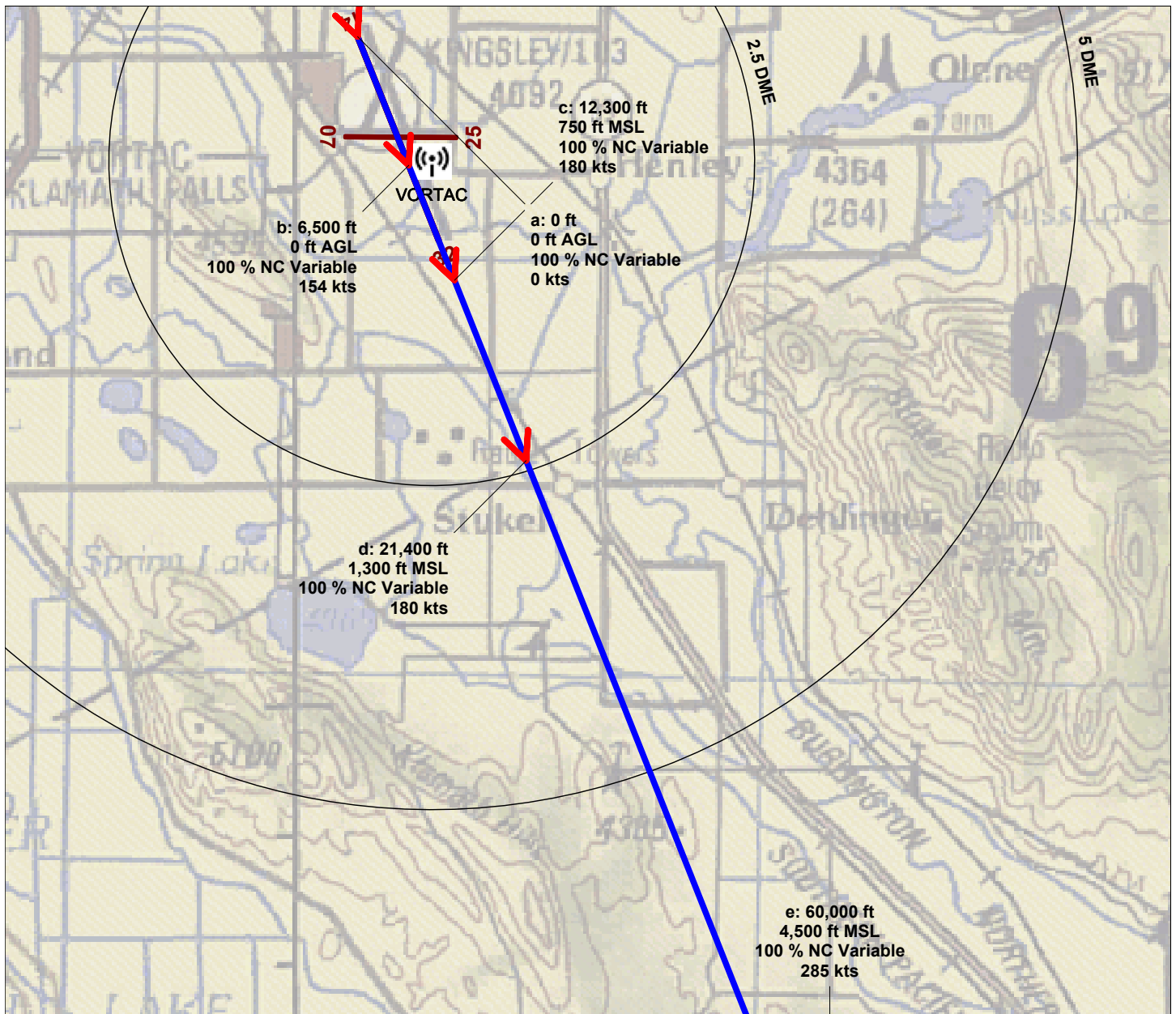


Transient KC-135R Flight Profile 203  
Transient



Scale in Feet 1:105,000 (1 inch = 8,780 feet)

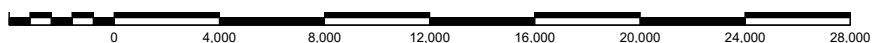




Flight Profile 201

| Point | Distance<br>ft | Height<br>ft | Power<br>% NC | Speed<br>kts | Climb<br>Angle<br>° | Climb<br>Rate<br>fpm | Duration<br>sec | Notes                        |
|-------|----------------|--------------|---------------|--------------|---------------------|----------------------|-----------------|------------------------------|
| a     | 0              | 0 AGL        | 100 Variable  | 0            | 0.0                 | 0                    | 50              | 0.0 deg, 0 fpm, 50 sec       |
| b     | 6,500          | 0 AGL        | 100 Variable  | 154          | -30.0               | -9800                | 21              | -30.0 deg, -8460 fpm, 21 sec |
| c     | 12,300         | 750 MSL      | 100 Variable  | 180          | 3.5                 | 1100                 | 30              | 3.5 deg, 1100 fpm, 30 sec    |
| d     | 21,400         | 1,300 MSL    | 100 Variable  | 180          | 4.7                 | 2000                 | 98              | 4.7 deg, 1940 fpm, 98 sec    |
| e     | 60,000         | 4,500 MSL    | 100 Variable  | 285          | 7.1                 | 3600                 | 125             | 7.1 deg, 3580 fpm, 125 sec   |
| f     | 120,000        | 12,000 MSL   | 100 Variable  | 285          |                     |                      |                 |                              |

Transient KC-135R Flight Profile 201  
Transient



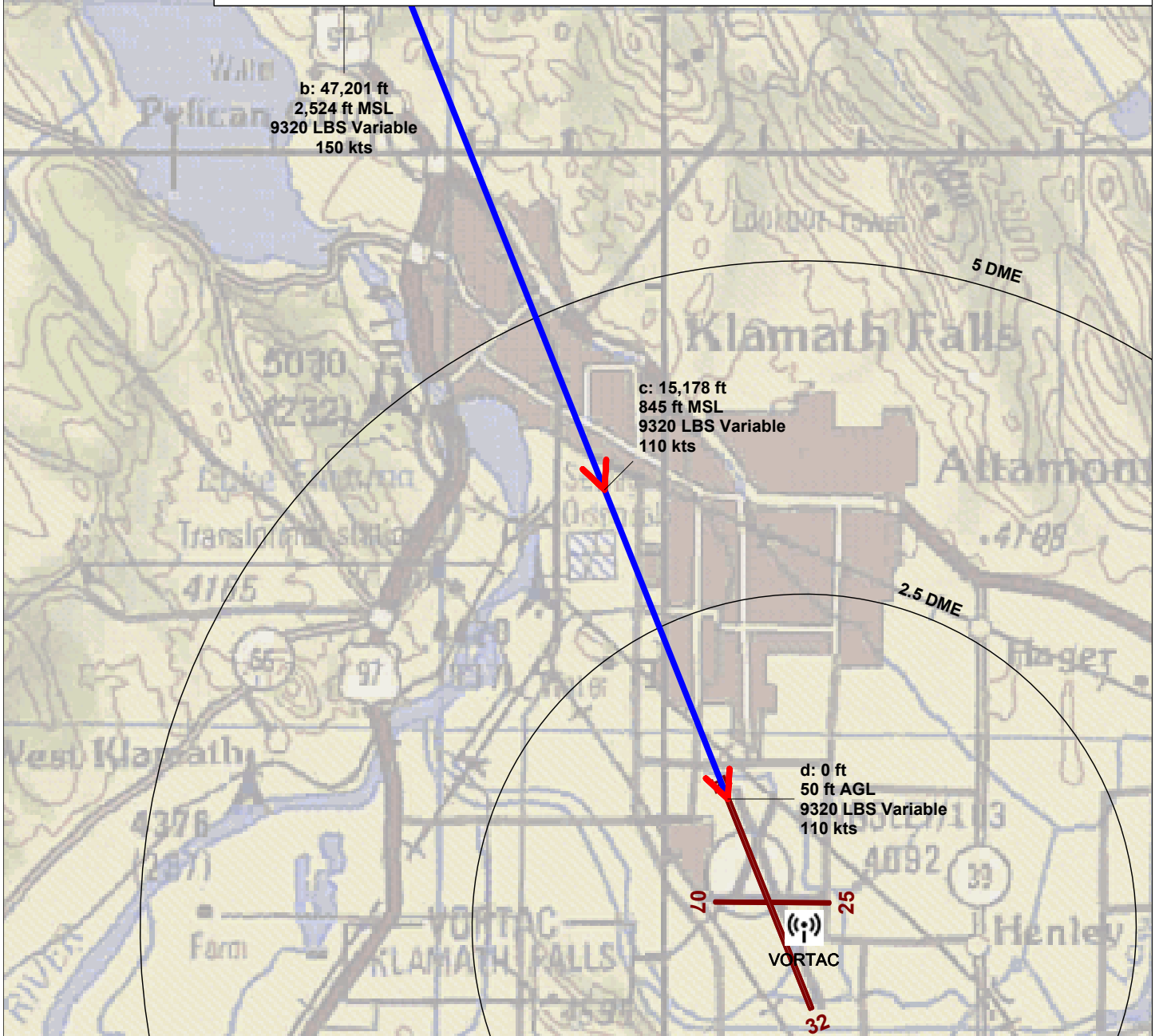
Scale in Feet 1:87,600 (1 inch = 7,300 feet)





# Flight Profile 261

| Point | Distance<br>ft | Height<br>ft | Power<br>LBS  | Speed<br>kts | Climb<br>Angle<br>° | Climb<br>Rate<br>fpm | Duration<br>sec | Notes                        |
|-------|----------------|--------------|---------------|--------------|---------------------|----------------------|-----------------|------------------------------|
| a     | 120,000        | 10,532 MSL   | 9320 Variable | 170          | -6.3                | -1800                | 270             | -6.3 deg, -1770 fpm, 270 sec |
| b     | 47,201         | 2,524 MSL    | 9320 Variable | 150          | -3.0                | -700                 | 146             | -3.0 deg, -690 fpm, 146 sec  |
| c     | 15,178         | 845 MSL      | 9320 Variable | 110          | 12.3                | 2400                 | 82              | 12.3 deg, 2370 fpm, 82 sec   |
| d     | 0              | 50 AGL       | 9320 Variable | 110          |                     |                      |                 |                              |

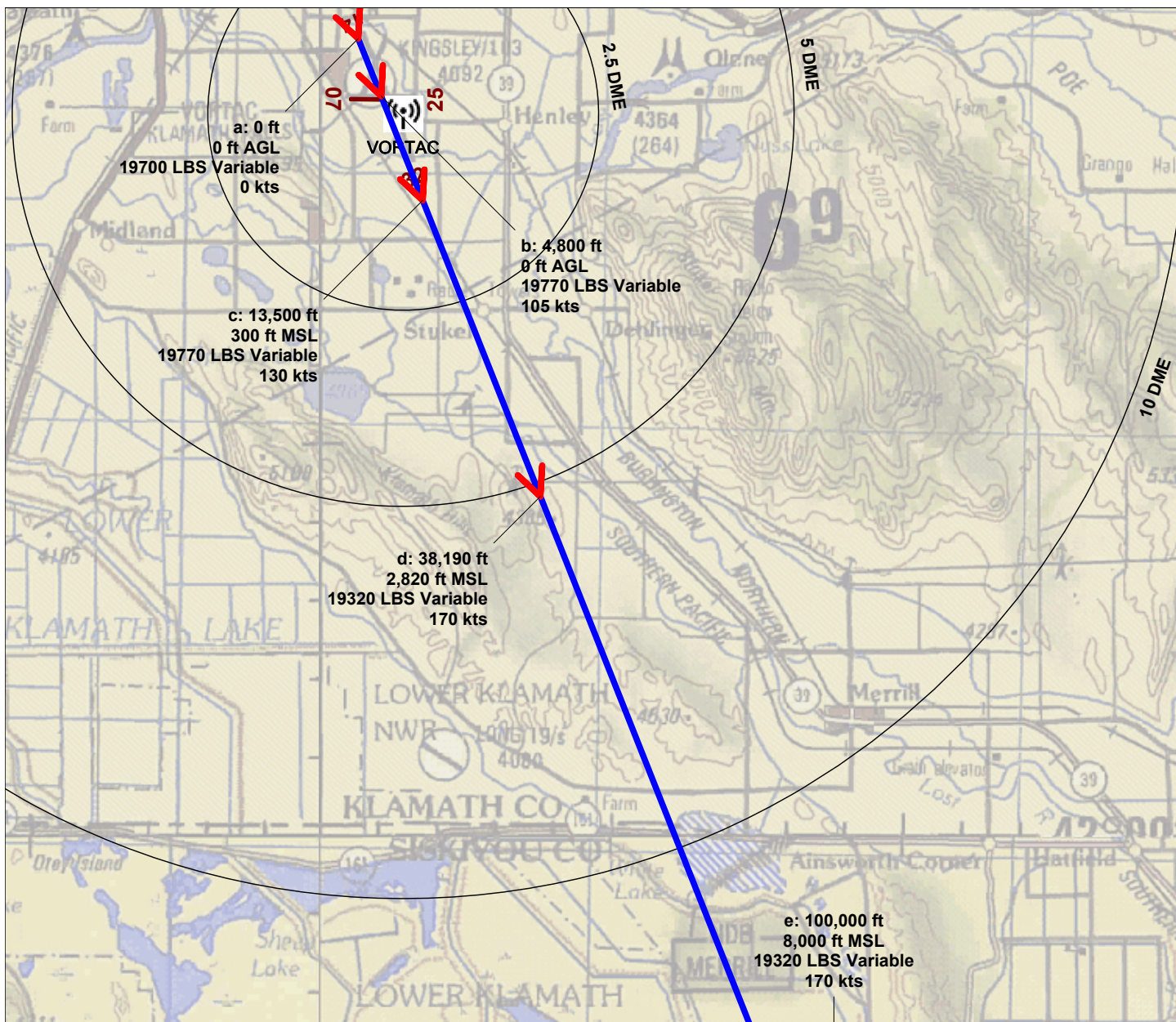


**Transient MD-83 Flight Profile 261**  
Transient



Scale in Feet 1:84,000 (1 inch = 7,000 feet)



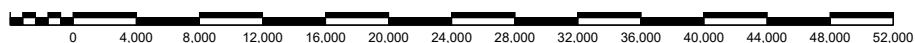


Flight Profile 259

| Point | Distance<br>ft | Height<br>ft | Power<br>LBS   | Speed<br>kts | Climb<br>Angle<br>° | Climb<br>Rate<br>fpm | Duration<br>sec | Notes                        |
|-------|----------------|--------------|----------------|--------------|---------------------|----------------------|-----------------|------------------------------|
| a     | 0              | 0 AGL        | 19700 Variable | 0            | 0.0                 | 0                    | 54              | 0.0 deg, 0 fpm, 54 sec       |
| b     | 4,800          | 0 AGL        | 19770 Variable | 105          | -23.6               | -5200                | 44              | -23.6 deg, -4760 fpm, 44 sec |
| c     | 13,500         | 300 MSL      | 19770 Variable | 130          | 5.8                 | 1600                 | 98              | 5.8 deg, 1540 fpm, 98 sec    |
| d     | 38,190         | 2,820 MSL    | 19320 Variable | 170          | 4.8                 | 1400                 | 215             | 4.8 deg, 1440 fpm, 215 sec   |
| e     | 100,000        | 8,000 MSL    | 19320 Variable | 170          | 5.7                 | 1700                 | 70              | 5.7 deg, 1710 fpm, 70 sec    |
| f     | 120,000        | 10,000 MSL   | 19320 Variable | 170          |                     |                      |                 |                              |

### Transient MD-83 Flight Profile 259

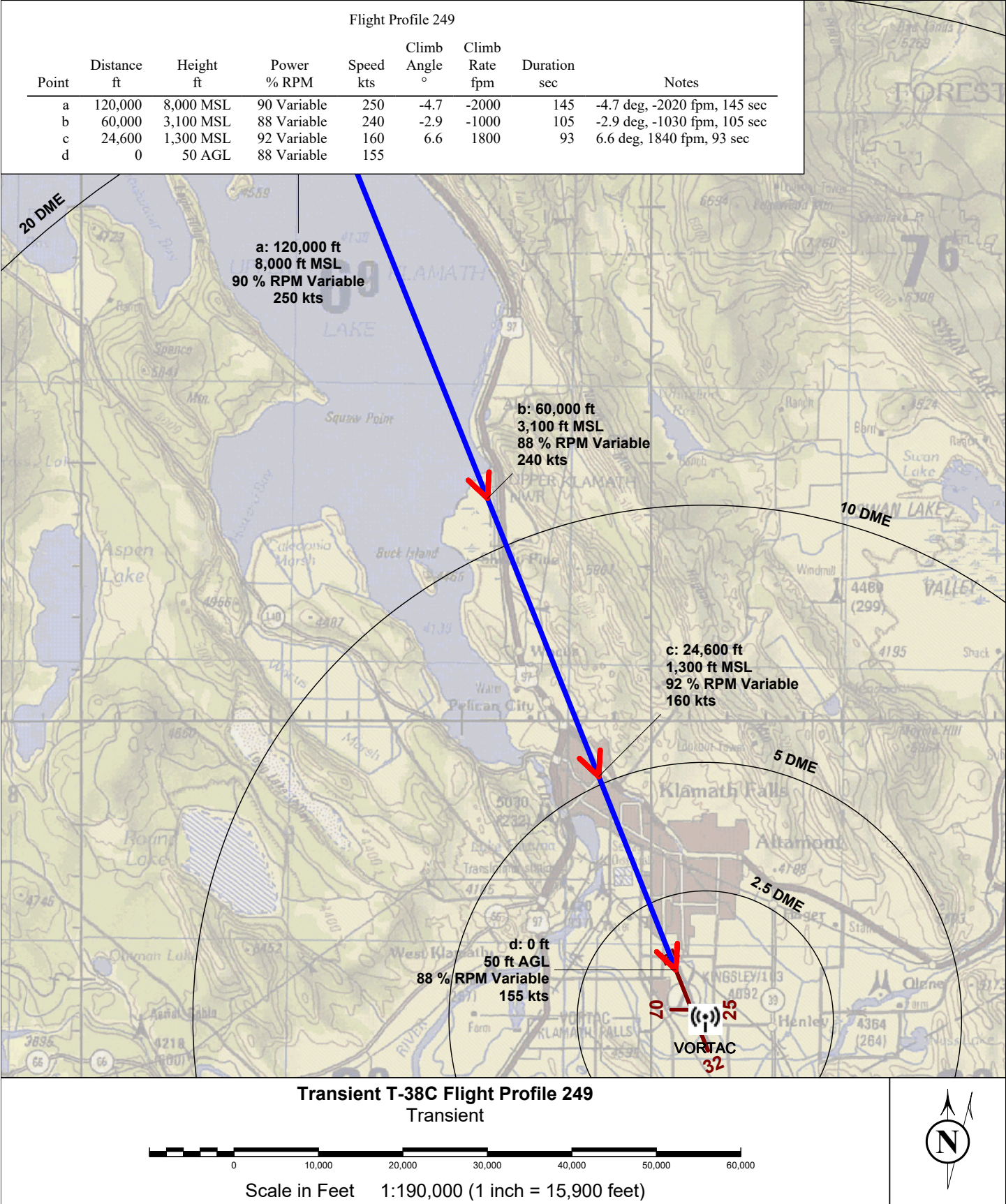
Transient



Scale in Feet 1:146,000 (1 inch = 12,200 feet)









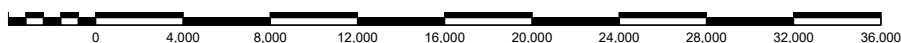


Flight Profile 247

| Point | Distance<br>ft | Height<br>ft | Power<br>% RPM  | Speed<br>kts | Climb<br>Angle<br>° | Climb<br>Rate<br>fpm | Duration<br>sec | Notes                         |
|-------|----------------|--------------|-----------------|--------------|---------------------|----------------------|-----------------|-------------------------------|
| a     | 0              | 0 AGL        | 100 Max A/B     | 0            | 0.0                 | 0                    | 26              | 0.0 deg, 0 fpm, 26 sec        |
| b     | 3,500          | 0 AGL        | 100 Afterburner | 160          | 5.7                 | 2100                 | 19              | 5.7 deg, 2070 fpm, 19 sec     |
| c     | 10,000         | 650 AGL      | 99 Variable     | 250          | -28.4               | -15100               | 13              | -28.4 deg, -13260 fpm, 13 sec |
| d     | 16,000         | 1,500 MSL    | 99 Variable     | 300          | 7.1                 | 3800                 | 24              | 7.1 deg, 3770 fpm, 24 sec     |
| e     | 28,000         | 3,000 MSL    | 99 Variable     | 300          | 7.8                 | 4100                 | 58              | 7.8 deg, 4110 fpm, 58 sec     |
| f     | 57,300         | 7,000 MSL    | 99 Variable     | 300          | 7.6                 | 4100                 | 30              | 7.6 deg, 4020 fpm, 30 sec     |
| g     | 72,300         | 9,000 MSL    | 99 Variable     | 300          | 8.2                 | 4400                 | 55              | 8.2 deg, 4340 fpm, 55 sec     |
| h     | 100,000        | 13,000 MSL   | 99 Variable     | 300          | 19.3                | 10600                | 39              | 19.3 deg, 10040 fpm, 39 sec   |
| i     | 120,000        | 20,000 MSL   | 96 Variable     | 300          |                     |                      |                 |                               |

72,300 ft  
9,000 ft MSL  
99% RPM Variable  
300 kts

Transient T-38C Flight Profile 247  
Transient



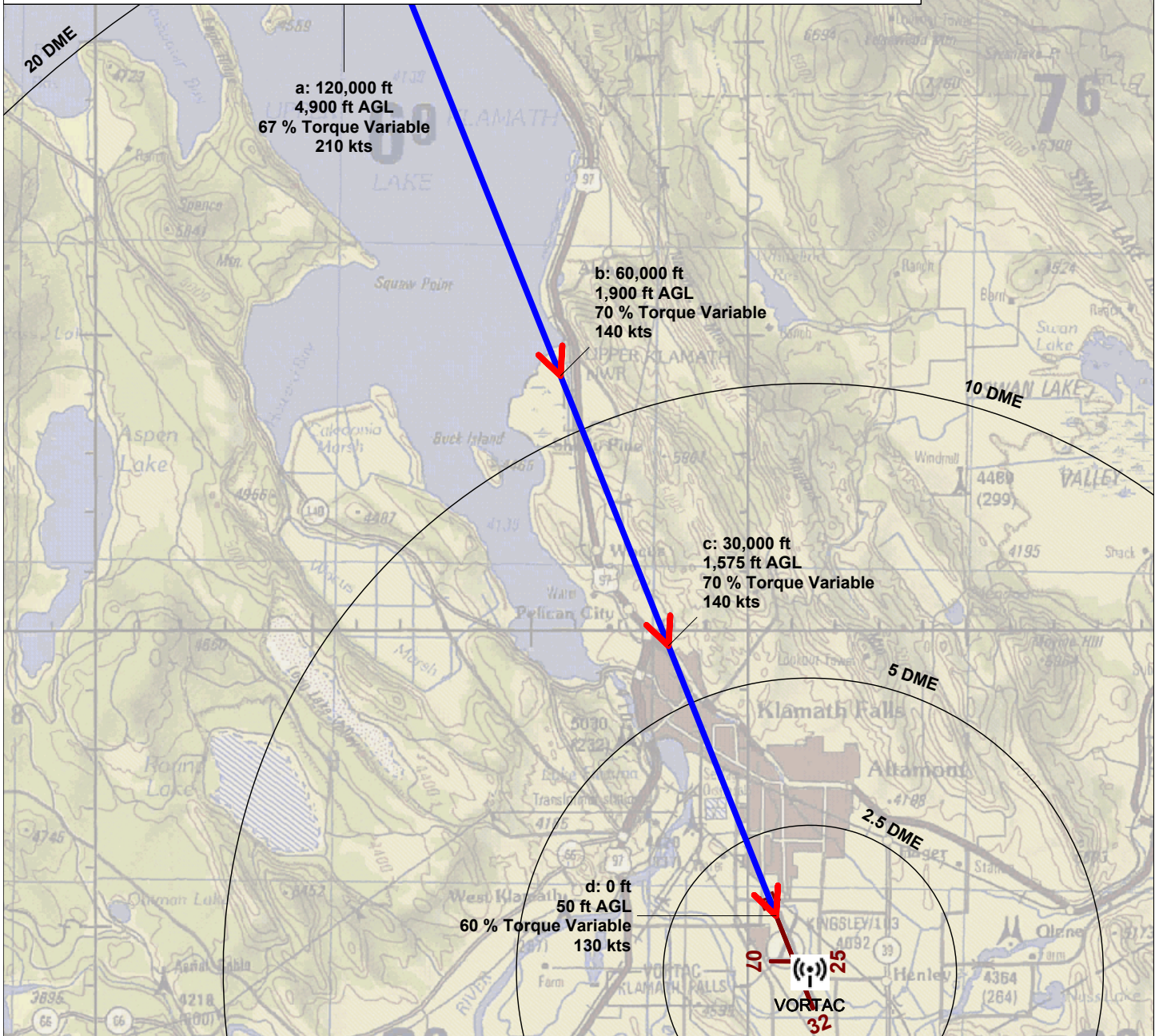
Scale in Feet 1:106,000 (1 inch = 8,800 feet)





# Flight Profile 253

| Point | Distance<br>ft | Height<br>ft | Power<br>% Torque | Speed<br>kts | Climb<br>Angle<br>° | Climb<br>Rate<br>fpm | Duration<br>sec | Notes                       |
|-------|----------------|--------------|-------------------|--------------|---------------------|----------------------|-----------------|-----------------------------|
| a     | 120,000        | 4,900 AGL    | 67 Variable       | 210          | -2.9                | -900                 | 203             | -2.9 deg, -880 fpm, 203 sec |
| b     | 60,000         | 1,900 AGL    | 70 Variable       | 140          | -0.6                | -200                 | 127             | -0.6 deg, -150 fpm, 127 sec |
| c     | 30,000         | 1,575 AGL    | 70 Variable       | 140          | -2.9                | -700                 | 132             | -2.9 deg, -690 fpm, 132 sec |
| d     | 0              | 50 AGL       | 60 Variable       | 130          |                     |                      |                 |                             |

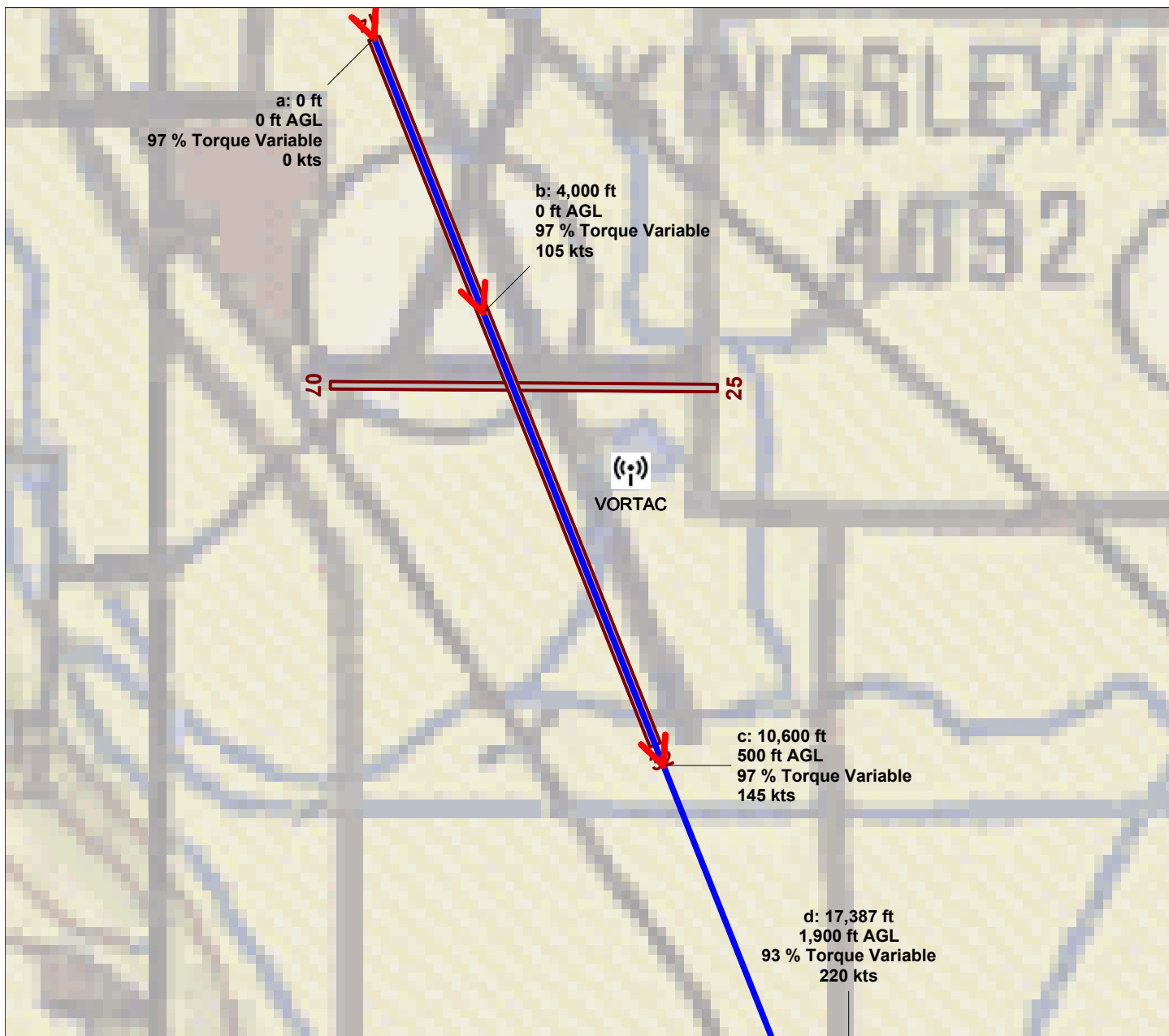


Transient T-6 Flight Profile 253  
Transient



Scale in Feet 1:190,000 (1 inch = 15,900 feet)





Flight Profile 251

| Point | Distance<br>ft | Height<br>ft | Power<br>% Torque | Speed<br>kts | Climb<br>Angle<br>° | Climb<br>Rate<br>fpm | Duration<br>sec | Notes                      |
|-------|----------------|--------------|-------------------|--------------|---------------------|----------------------|-----------------|----------------------------|
| a     | 0              | 0 AGL        | 97 Variable       | 0            | 0.0                 | 0                    | 45              | 0.0 deg, 0 fpm, 45 sec     |
| b     | 4,000          | 0 AGL        | 97 Variable       | 105          | 4.3                 | 1000                 | 31              | 4.3 deg, 960 fpm, 31 sec   |
| c     | 10,600         | 500 AGL      | 97 Variable       | 145          | 11.7                | 3800                 | 22              | 11.7 deg, 3730 fpm, 22 sec |
| d     | 17,387         | 1,900 AGL    | 93 Variable       | 220          | 4.0                 | 1600                 | 270             | 4.0 deg, 1570 fpm, 270 sec |
| e     | 120,000        | 9,000 AGL    | 90 Variable       | 230          |                     |                      |                 |                            |

Transient T-6 Flight Profile 251  
Transient



Scale in Feet 1:25,400 (1 inch = 2,120 feet)





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**Table A-1. Civilian Fleet Mix from FAA CY 2022 National Inventory by AEDT Equipment Type**

| AEDT<br>Equipment ID | AEDT ANP<br>Type | Representative Aircraft                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Departures |       |       | Arrivals |       |       | Local |       |       |
|----------------------|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-------|-------|----------|-------|-------|-------|-------|-------|
|                      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Day        | Night | Total | Day      | Night | Total | Day   | Night | Total |
| 36                   | 1900D            | Raytheon Beech 1900-C, Raytheon Beech 1900-D, BAE Jetstream 1, BAE Jetstream 200 Series                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 10.8%      | 0.0%  | 10.8% | 10.8%    | 0.0%  | 10.8% | 12.8% | 0.0%  | 12.8% |
| 1193                 | BEC58P           | Cessna 421 Piston, Britten-Norman BN-2 Islander, Britten-Norman BN-2A Series Mk III Trislander, Piper PA-31 Navajo, Rockwell Twin Commander 700, Cessna 337 Skymaster, Aerostar PA-60, Piper PA-23 Apache/Aztec, Piper PA-27 Aztec, Raytheon Beech Baron 58, Raytheon Beech 60 Duke, Cessna 310, Rockwell Twin Commander 500, Piper PA-34 Seneca, Rockwell Twin Commander 680, Cessna 340, Cessna 402, Cessna 404 Titan II, Cessna 414, Raytheon Beech 55 Baron, Beech 75 (FAS), Beech 95 (FAS), Beech E-55 (FAS), Beechcraft 56TC Baron (FAS), Beechcraft 76 Duchess, Beechcraft Queen Air 65/70/80 (FAS), Beechcraft Twin Bonanza (FAS), Cessna T303 Crusader (FAS), Cessna 320 (FAS), Cessna 335/340 (FAS), Tecnam P2012 Traveller, Cessna 401 (FAS), Cessna 401A (FAS), Cessna 401B (FAS), Cessna 411 (FAS), Cessna 411A (FAS), Beechcraft A56TC Baron (FAS), Rockwell Twin Commander 685, Rockwell Twin Commander 520, Rockwell Twin Commander 560 | 4.8%       | 0.1%  | 4.9%  | 4.8%     | 0.1%  | 4.9%  | 5.8%  | 0.0%  | 5.8%  |
| 1235                 | CIT3             | Cessna 650 Citation III                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 0.3%       | 0.0%  | 0.3%  | 0.3%     | 0.0%  | 0.3%  | 0.0%  | 0.0%  | 0.0%  |
| 4284                 | CL600            | Bombardier Challenger 600, Bombardier Challenger 300, Fokker (VFW) 614, Bombardier CRJ-100, Bombardier CRJ-200, Bombardier Challenger 604, Gulfstream G200, Bombardier CRJ-400, Bombardier CRJ-200-LR, Bombardier CRJ-200-ER, Bombardier CRJ-400-LR, Bombardier Challenger 605, Bombardier Challenger 850, Bombardier Challenger 601, Bombardier Challenger 350, Bombardier Challenger 650, Bombardier (Canadair) Challenger 800, Bombardier (Canadair) CRJ100PF Bulk Freighter, Bombardier (Canadair) CRJ200PF Bulk Freighter                                                                                                                                                                                                                                                                                                                                                                                                                          | 0.3%       | 0.0%  | 0.3%  | 0.2%     | 0.0%  | 0.2%  | 0.0%  | 0.0%  | 0.0%  |
| 1242                 | CL601            | Bombardier Challenger 601, Bombardier Challenger 602, Gulfstream G280, Bombardier Challenger 600, Bombardier (Canadair) CRJ200 ExecLiner, Bombardier (Canadair) CRJ200 328 Designs, Embraer Praetor 600                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 0.2%       | 0.0%  | 0.2%  | 0.2%     | 0.0%  | 0.2%  | 0.0%  | 0.0%  | 0.0%  |
| 1265                 | CNA172           | Lancair 360, Aviat Husky A1B, Cessna 172 Skyhawk, Raytheon Beech D175 Staggerwing, Rans S7S, American Champion Cibrata (FAS), American Champion Scout (FAS), Cessna 170 (FAS), Cessna 175 (FAS), Cessna 177 (FAS), Piper PA-22-150 (FAS), Piper Pacer (FAS)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 6.7%       | 0.4%  | 7.1%  | 6.9%     | 0.2%  | 7.1%  | 8.5%  | 0.0%  | 8.5%  |
| 1262                 | CNA182           | Cessna 182, Cessna Aircraft Company 180F, Cessna 182 R (FAS), Cessna 185 Skywagon                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 2.9%       | 0.2%  | 3.0%  | 3.2%     | 0.0%  | 3.2%  | 3.6%  | 0.0%  | 3.6%  |
| 3172                 | CNA206           | Cessna 206, Comp Air Aviation Comp Air 10, Comp Air Aviation Comp Air 10 XLT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 0.5%       | 0.0%  | 0.5%  | 0.5%     | 0.0%  | 0.5%  | 0.6%  | 0.0%  | 0.6%  |
| 4677                 | CNA208           | Pilatus PC-6 Porter, Piper PA46-TP Meridian, Pilatus PC-12, EADS Socata TBM-700, Cessna 208 Caravan, SOCATA TBM 850, DeHavilland DHC-3 Turbo Otter, EPIC LT/Dynasty, Extra EA-500, Quest Kodiak 100, Myasishchev M-101T, Pacific Aerospace P-750 XSTOL, DAHER TBM 900/930, DeHavilland DHC-2 Turbo Beaver, EMBRAER EMB-314 (FAS), Beechcraft T-6 Texan 2 (FAS), Socata TBM-9 (FAS), SCF Technoavia SM-92T                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 27.4%      | 4.6%  | 32.0% | 26.9%    | 4.8%  | 31.7% | 38.1% | 0.0%  | 38.1% |
| 1282                 | CNA441           | Cessna 441 Conquest II, Piper PA-31T Cheyenne, Cessna 425 Conquest I, COMMANDER980/1000, Piaggio Aerospace P.180 Avanti, Cessna 421 Turboprop                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 0.1%       | 0.0%  | 0.1%  | 0.2%     | 0.0%  | 0.2%  | 0.1%  | 0.0%  | 0.1%  |
| 1289                 | CNA500           | Cessna 500 Citation I, Cessna 501 Citation ISP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 0.1%       | 0.0%  | 0.1%  | 0.2%     | 0.0%  | 0.2%  | 0.0%  | 0.0%  | 0.0%  |
| 6071                 | CNA510           | Honda HA-420 Hondajet, CESSNA CITATION 510, Embraer Phenom 100 (EMB-500), EPIC Victory, Cirrus Vision SF50 (FAS), Embraer Legacy 450 (EMB-545)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1.5%       | 0.0%  | 1.5%  | 1.5%     | 0.0%  | 1.5%  | 0.0%  | 0.0%  | 0.0%  |
| 6061                 | CNA525C          | Cessna CitationJet CJ3 (Cessna 525B), Cessna CitationJet CJ4 (Cessna 525C), Cessna CitationJet CJ2 (Cessna 525A), Cessna CitationJet CJ/CJ1 (Cessna 525)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2.6%       | 0.2%  | 2.8%  | 2.6%     | 0.2%  | 2.8%  | 0.0%  | 0.0%  | 0.0%  |
| 1294                 | CNA55B           | Cessna 550 Citation II, Cessna S550 Citation S/II, Cessna 551 Citation IISP, Cessna 552 T-47A, Raytheon Premier I, Aerospatiale SN 601 Corvette, Cessna 550 Citation Bravo, Embraer Phenom 300 (EMB-505), Embraer Legacy 650, Pilatus PC-24, Embraer Legacy 500 (EMB-550)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1.2%       | 0.0%  | 1.2%  | 1.1%     | 0.0%  | 1.1%  | 0.0%  | 0.0%  | 0.0%  |
| 3045                 | CNA560E          | Cessna 560 Citation Encore, Hawker Beechcraft Corp Beechjet 400A, Hawker Beechcraft Corp Beechjet 400T T-1A Jayhawk, Hawker Beechcraft Corp Nextant Aerospace 400NXT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0.2%       | 0.0%  | 0.2%  | 0.2%     | 0.0%  | 0.2%  | 0.0%  | 0.0%  | 0.0%  |
| 1298                 | CNA560U          | Cessna 560 Citation V, Cessna 560 Citation Ultra                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 2.6%       | 0.2%  | 2.8%  | 2.4%     | 0.3%  | 2.7%  | 0.0%  | 0.0%  | 0.0%  |
| 6065                 | CNA560XL         | Cessna 560 Citation Excel, Cessna 560 Citation XLS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 0.8%       | 0.0%  | 0.8%  | 0.9%     | 0.0%  | 0.9%  | 0.0%  | 0.0%  | 0.0%  |
| 6386                 | CNA680           | Cessna 680 Citation Sovereign, Cessna Citation Hemisphere, Cessna 680-A Citation Latitude, Cessna 700 Citation Longitude                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 0.4%       | 0.0%  | 0.4%  | 0.4%     | 0.0%  | 0.4%  | 0.0%  | 0.0%  | 0.0%  |
| 4766                 | CNA750           | Cessna 750 Citation X, Dornier 328 Jet, Raytheon Hawker 4000 Horizon, Bombardier Learjet 60, CX 750 Citation X+, Dassault Falcon 2000-EX, Dassault Falcon 2000, Dassault Falcon 2000-LX, Embraer Praetor 500, Dassault Falcon 2000-DX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0.3%       | 0.0%  | 0.3%  | 0.2%     | 0.0%  | 0.2%  | 0.0%  | 0.0%  | 0.0%  |
| 1324                 | COMSEP           | Cirrus SR20, 1985 1-ENG COMP, Cirrus SR22 Turbo (FAS), Cirrus SR22 (FAS)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2.5%       | 0.0%  | 2.6%  | 2.5%     | 0.0%  | 2.5%  | 3.0%  | 0.0%  | 3.0%  |
| 1349                 | DC1030           | Boeing DC-10-30 Series, Boeing DC-10-30ER, Boeing MD-10-30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 0.4%       | 0.0%  | 0.4%  | 0.4%     | 0.0%  | 0.4%  | 0.0%  | 0.0%  | 0.0%  |

| AEDT<br>Equipment ID | AEDT ANP<br>Type | Representative Aircraft                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Departures |       |        | Arrivals |       |        | Local  |       |        |
|----------------------|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-------|--------|----------|-------|--------|--------|-------|--------|
|                      |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Day        | Night | Total  | Day      | Night | Total  | Day    | Night | Total  |
| 1495                 | DHC6             | BAE Jetstream 31, BAE Jetstream 32, BAE Jetstream 32-EP, Australlia GAF N22/24 Nomad, SIAI-Marchetti SF-600 Canguro, CASA 212-200 Series, Raytheon Beech 18, Bombardier CL-415, Fairchild SA-227-AC Metro III, Xian Yunshuji Y-7, Embraer 312 Tucano, Grumman C-1 Trader, Fairchild Metro IVC, Embraer EMB110 Bandeirante, Israel IAI-201 Arava, Israel IAI-101 Arava, Neiva NE-821 Caraja, Harbin Y-12, Raytheon King Air 100, Raytheon King Air 90, Raytheon Beech 99, CASA 212-100 Series, Dornier 228-100 Series, Raytheon Super King Air 200, American Jet Hustler 400 A, DeHavilland DHC-6-300 Twin Otter, Reims-Cessna 406 Caravan II, DeHavilland DHC-6-100 Twin Otter, DeHavilland DHC-6-200 Twin Otter, Equator P-550 Turbo, Raytheon Super King Air 300, Ayres Turbo Thrush T-65, Dornier 128 Skyservant, Piaggio P-166, Raytheon Starship 2000, Rockwell Twin Commander 690, CASA 212-300 Series, Let 410, Let 410-UVP, Let 420 Tubolet, Mitsubishi MU-2, Fairchild SA-226-TC Metro II, Fairchild SA-227-AT Expeditor, Piaggio P.180 Avanti, Fairchild SA-26-T Merlin II, Grumman S-2E Tracker, Grumman G-21G Goose, C-26A, CASA 212-400 Series, Fairchild SA-226-T Merlin III, Shorts Skyvan SC7-3-1, Shorts Skyvan SC7-3-2, Shorts Skyvan SC7-3A-1, Antonov AN28 Cash, PZL M-28 Skytruck, Embraer EMB-121 Xingu, Evektor EV-55, Dornier Seastar CD-1/CD-2, Antonov An-2 MS, Antonov An-2 MS Freighter, Viking Air DHC-6-400 Guardian, CAIC China Aviation Industry Corp MA-60, CAIC China Aviation Industry Corp MA-600, SHERPA Sherpa K-650T, Grumman G-73 Mallard, Aero Commander 680 Turbo Commander, Gulfstream Gulfstream 5-2T Marsh Airtanker | 12.3%      | 1.3%  | 13.7%  | 12.4%    | 1.1%  | 13.5%  | 16.3%  | 0.0%  | 16.3%  |
| 6082                 | DHC8             | ATR 42-400, ATR 42-500, Antonov 32 Cline, ATR 42-200, ATR 42-300, DeHavilland DHC-8-100, Bombardier de Havilland Dash 8 Q100, ATR 42-320, CASA 295, Antonov 24 Coke, Antonov 26 Curl, Antonov 30 Clank, Conqair CV-440, Antonov 38-100, Antonov 38-110, Antonov 38-120, Beriev Be-12/Be-14, Alenia C-27J, Curtiss-Wright C-46, Conqair CV-240/T-29, ATR 42-600                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0.2%       | 0.0%  | 0.2%   | 0.2%     | 0.0%  | 0.2%   | 0.2%   | 0.0%  | 0.2%   |
| 3802                 | ECLIPSE500       | Eclipse 500 / PW610F, Hawker Beechcraft Corp Beechjet 400A, SJ-30-1/-2/-2+, CIRRUS SF-50 Vision                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0.6%       | 0.0%  | 0.6%   | 0.6%     | 0.0%  | 0.6%   | 0.0%   | 0.0%  | 0.0%   |
| 1708                 | EMB120           | Embraer EMB120 Brasilia                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 0.2%       | 0.0%  | 0.2%   | 0.1%     | 0.1%  | 0.2%   | 0.2%   | 0.0%  | 0.2%   |
| 1320                 | FAL900EX         | Dassault Falcon 50, Dassault Falcon 50-EX, Dassault Falcon 900, Dassault Falcon 900-B, Dassault Falcon 900-C, Dassault Falcon 900-EX, Falcon 900DX, Dassault Falcon 900-LX, Yakovlev 40 Codling                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 2.4%       | 0.3%  | 2.7%   | 2.2%     | 0.5%  | 2.7%   | 0.0%   | 0.0%  | 0.0%   |
| 6246                 | GASEPF           | Robin DR 400, Robin R 2160 Alpha Sport, Robin R 3000, EADS Socata TB-9 Tampico, Cessna 150 Series, Piper PA-28 Cherokee Series, Aero Commander (Single engine) (FAS), Aeronca 15 Sedan (FAS), Beech 23 Musketeer Sundowner (FAS), Beech 24 Musketeer Super Sierra (FAS), Beech 77 Skipper (FAS), Beechcraft Musketeer Model 19 (FAS), Cessna 140 (FAS), Cessna 152 (FAS), Cessna 162 (FAS), Cozy (FAS), Diamond DV-20 Katana (FAS), Diamond HK36 Super Dimona (FAS), GC1 Globe Swift (FAS), Grob G115A/B/C/D/E Bavarian (FAS), Grumman AA-5A/B (FAS), Gulfstream American GA-7 Cougar (FAS), Lancair 320 (FAS), Piper J-3 Cub (FAS), Piper PA-18-150 (FAS), Piper PA-38 Tomahawk (FAS), Sequoia Falco (FAS), Stinson (FAS), Vans RV12 (FAS), Vans RV3 (FAS), Vans RV4 (FAS), Velocity (FAS), Zenair CH-100/150/250 (FAS)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 3.1%       | 0.2%  | 3.3%   | 3.4%     | 0.0%  | 3.4%   | 3.9%   | 0.0%  | 3.9%   |
| 1276                 | GASEPV           | Maule MT-7-235, Ryan Navion B, Ryan Navion F, Piper PA-32 Cherokee Six, Boeing Stearman PT-17 / A75N1, Ryan ST3KR, Raytheon Beech Bonanza 36, Cessna 210 Centurion, ATI AT-802, ATI AT-502, ATI AT-502A, ATI AT-602, Helio U-10 Super Courier, Ayres S2R-T34 Turbo-Thrush, ATI AT-502B, Mooney M20-K, EADS Socata TB-10 Tobago, Spencer S-12 Air Car, Piper PA-24 Comanche, EADS Socata TB-20 Trinidad, DeHavilland DHC-2 Beaver, DeHavilland DHC-3 Otter, Piper PA46 (Piston), Beechcraft Bonanza 33 (FAS), Beechcraft Bonanza 35 (FAS), Beechcraft T-34 Mentor (FAS), Bellanca 8 Scout Super Decathlon (FAS), Bellanca Viking (FAS), Cessna 177 Cardinal RG (FAS), Cessna 180 (FAS), Cessna 190 (FAS), Cessna 195 (FAS), Cessna 205 (FAS), Cessna 207 (Turbo) Stationair (FAS), Cessna 210 Turbo (FAS), Cessna 400 (FAS), Columbia Aircraft Lancair (COL3/4 All Types) (FAS), Commander 114/115 (FAS), Diamond DA40, EAGLE DW-1 Eagle (FAS), Express 2000 (FAS), EXTRA EA-300 (FAS), GippsAero GA8 Airvan (FAS), Glasair (FAS), Lancair ES (FAS), Lancair Evolution (FAS), Lancair Legacy 2000 (FAS), Meyers Aero Commander 200 (FAS), Model 35 Bonanza (FAS), North American T-6 Texan (FAS), Piper PA-36 Pawnee Brave (FAS), Piper PA46 Malibu (FAS), Pitts Special S-1 (FAS), Vans RV10 (FAS), Vans RV6 (FAS), Vans RV-7, Vans RV8 (FAS), Vans RV9 (FAS), Zlin Aircraft Z 143 L                                                                                                                                                                                                                                                                              | 5.4%       | 0.1%  | 5.6%   | 5.7%     | 0.0%  | 5.7%   | 6.6%   | 0.0%  | 6.6%   |
| 5273                 | GIV              | Gulfstream G300, Gulfstream G350, Gulfstream G400, Gulfstream G450, Gulfstream IV-SP, Falcon 7X, Dassault Falcon 8X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 0.2%       | 0.0%  | 0.2%   | 0.2%     | 0.0%  | 0.2%   | 0.0%   | 0.0%  | 0.0%   |
| 1925                 | GV               | Gulfstream G-5 Gulfstream 5 / G-5SP Gulfstream G500, Gulfstream G550, Gulfstream V-SP, Gulfstream Aerospace Gulfstream G500 (G-7), Gulfstream G600                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 0.1%       | 0.0%  | 0.1%   | 0.1%     | 0.0%  | 0.1%   | 0.0%   | 0.0%  | 0.0%   |
| 2014                 | LEAR35           | Rockwell Sabreliner 65, Lockheed L-1329 Jetstar I, Lockheed L-1329 Jetstar II, Hawker HS-125 Series 1, Raytheon Hawker 1000, Hawker HS-125 Series 3, Hawker HS-125 Series 400, Hawker HS-125 Series 700, Raytheon Hawker 800, Dassault Falcon 100, Dassault Falcon 10, Hawker HS-125 Series 600, Bombardier Learjet 55, Bombardier Learjet 60, Bombardier Learjet 31, Bombardier Learjet 35, Bombardier Learjet 36, Bombardier Learjet 40, Bombardier Learjet 45, Bombardier Learjet 45-XR, Raytheon Hawker 900, Raytheon Hawker C-29A, Bombardier Learjet 35A/36A (C-21A), Hawker 900XP, Bombardier Learjet 70, Bombardier Learjet 75                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 1.0%       | 0.0%  | 1.0%   | 1.0%     | 0.0%  | 1.0%   | 0.0%   | 0.0%  | 0.0%   |
| 2104                 | PA30             | Vulcanair P.68, Piper PA-30 Twin Comanche, Diamond DA42 Twin Star, Diamond DA62, Piper PA44 (FAS), Piper PA-44-180 (FAS), Tecnam P2006T (FAS), Piper PA-44-180T (FAS)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.2%       | 0.0%  | 0.2%   | 0.2%     | 0.0%  | 0.3%   | 0.2%   | 0.0%  | 0.2%   |
| 20                   | S70              | Sikorsky SH-60 Sea Hawk, Sikorsky UH-60 Black Hawk, Sikorsky S-92                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 0.2%       | 0.0%  | 0.2%   | 0.2%     | 0.0%  | 0.2%   | 0.0%   | 0.0%  | 0.0%   |
| Total                |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 92.3%      | 7.7%  | 100.0% | 92.4%    | 7.6%  | 100.0% | 100.0% | 0.0%  | 100.0% |

**Table A-2. Departure Stagelength Distribution from FAA CY 2022 National Inventory by AEDT Equipment Type**

| AEDT<br>Equipment<br>ID | AEDT<br>ANP Type | Stagelength Distribution |       |      |       |      |       |       |       |      |       |      |       |      |       |        |
|-------------------------|------------------|--------------------------|-------|------|-------|------|-------|-------|-------|------|-------|------|-------|------|-------|--------|
|                         |                  | 1                        |       | 2    |       | 3    |       | 4     |       | 5    |       | 6    |       | 7    |       | Total  |
|                         |                  | Day                      | Night | Day  | Night | Day  | Night | Day   | Night | Day  | Night | Day  | Night | Day  | Night |        |
| 36                      | 1900D            | 100.0%                   | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0%  | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 100.0% |
| 1193                    | BEC58P           | 98.3%                    | 1.7%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0%  | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 100.0% |
| 1235                    | CIT3             | 100.0%                   | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0%  | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 100.0% |
| 4284                    | CL600            | 100.0%                   | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0%  | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 100.0% |
| 1242                    | CL601            | 80.0%                    | 20.0% | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0%  | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 100.0% |
| 1265                    | CNA172           | 94.0%                    | 6.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0%  | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 100.0% |
| 1262                    | CNA182           | 94.9%                    | 5.1%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0%  | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 100.0% |
| 3172                    | CNA206           | 100.0%                   | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0%  | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 100.0% |
| 4677                    | CNA208           | 85.6%                    | 14.4% | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0%  | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 100.0% |
| 1282                    | CNA441           | 100.0%                   | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0%  | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 100.0% |
| 1289                    | CNA500           | 100.0%                   | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0%  | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 100.0% |
| 6071                    | CNA510           | 100.0%                   | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0%  | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 100.0% |
| 6061                    | CNA525C          | 92.5%                    | 7.5%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0%  | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 100.0% |
| 1294                    | CNA55B           | 100.0%                   | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0%  | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 100.0% |
| 3045                    | CNA560E          | 100.0%                   | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0%  | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 100.0% |
| 1298                    | CNA560U          | 94.0%                    | 6.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0%  | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 100.0% |
| 6065                    | CNA560XL         | 100.0%                   | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0%  | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 100.0% |
| 6386                    | CNA680           | 100.0%                   | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0%  | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 100.0% |
| 4766                    | CNA750           | 100.0%                   | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0%  | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 100.0% |
| 1324                    | COMSEP           | 98.1%                    | 1.9%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0%  | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 100.0% |
| 1349                    | DC1030           | 100.0%                   | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0%  | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 100.0% |
| 1495                    | DHC6             | 90.3%                    | 9.7%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0%  | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 100.0% |
| 6082                    | DHC8             | 100.0%                   | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0%  | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 100.0% |
| 3802                    | ECLIPSE50        | 100.0%                   | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0%  | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 100.0% |
| 1708                    | EMB120           | 100.0%                   | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0%  | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 100.0% |
| 1320                    | FAL900EX         | 46.8%                    | 1.5%  | 7.8% | 0.0%  | 3.2% | 1.5%  | 29.7% | 9.4%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 100.0% |
| 6246                    | GASEPF           | 94.1%                    | 5.9%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0%  | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 100.0% |
| 1276                    | GASEPV           | 97.8%                    | 2.2%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0%  | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 100.0% |
| 5273                    | GIV              | 100.0%                   | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0%  | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 100.0% |
| 1925                    | GV               | 100.0%                   | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0%  | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 100.0% |
| 2014                    | LEAR35           | 100.0%                   | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0%  | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 100.0% |
| 2104                    | PA30             | 100.0%                   | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0%  | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 100.0% |
| 20                      | S70              | 100.0%                   | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0%  | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 0.0% | 0.0%  | 100.0% |

**Table A-3. Civilian and Military Runway Utilization (All Scenarios)**

| <i>Op Type</i> | <i>Runway<sup>1</sup></i> | <i>Utilization</i>          |                  |                      |                                      |                                            |
|----------------|---------------------------|-----------------------------|------------------|----------------------|--------------------------------------|--------------------------------------------|
|                |                           | <i>Based F-15C/D, F-35A</i> | <i>ADAIR F-5</i> | <i>Transient Mil</i> | <i>Civilian (Small Propeller GA)</i> | <i>Civilian (AC, AT, and all other GA)</i> |
| Departures     | 14                        | 50%                         | 50%              | 50%                  | 40%                                  | 50%                                        |
|                | 32                        | 50%                         | 50%              | 50%                  | 40%                                  | 50%                                        |
|                | 7                         | 0%                          | 0%               | 0%                   | 10%                                  | 0%                                         |
|                | 25                        | 0%                          | 0%               | 0%                   | 10%                                  | 0%                                         |
| SI Arrival     | 14                        | 50%                         | 35%              | 50%                  | 40%                                  | 50%                                        |
|                | 32                        | 50%                         | 65%              | 50%                  | 40%                                  | 50%                                        |
|                | 7                         | 0%                          | 0%               | 0%                   | 10%                                  | 0%                                         |
|                | 25                        | 0%                          | 0%               | 0%                   | 10%                                  | 0%                                         |
| Break Arrival  | 14                        | 50%                         | 50%              | 50%                  | N/A                                  | N/A                                        |
|                | 32                        | 50%                         | 50%              | 50%                  | N/A                                  | N/A                                        |
|                | 7                         | 0%                          | 0%               | 0%                   | N/A                                  | N/A                                        |
|                | 25                        | 0%                          | 0%               | 0%                   | N/A                                  | N/A                                        |
| T&G            | 14                        | 50%                         | 50%              | 50%                  | 40%                                  | N/A                                        |
|                | 32                        | 50%                         | 50%              | 50%                  | 40%                                  | N/A                                        |
|                | 7                         | 0%                          | 0%               | 0%                   | 10%                                  | N/A                                        |
|                | 25                        | 0%                          | 0%               | 0%                   | 10%                                  | N/A                                        |
| GCA Box        | 14                        | N/A                         | N/A              | N/A                  | N/A                                  | N/A                                        |
|                | 32                        | N/A                         | N/A              | N/A                  | N/A                                  | N/A                                        |
|                | 7                         | N/A                         | N/A              | N/A                  | N/A                                  | N/A                                        |
|                | 25                        | N/A                         | N/A              | N/A                  | N/A                                  | N/A                                        |

*Note:* <sup>1</sup>Runway 07 and 25 are planned to be renamed to 08 and 26 when the surfaces are repaved.

<sup>2</sup>Small Propeller GA includes ANP Modeled Types: CNA172, COMSEP, PA30, BEC58P, CNA182, CNA206, GASEPF, GASEPV.

*Legend:* ADAIR = Adversary Air; ANGB = Air National Guard Base; GASEPF/V = general aviation single-engine fixed pitch propeller, general aviation single-engine variable pitch propeller; GCA = ground-controlled approach; Mil = military; Op = operations; SI = Straight-In; T&G = Touch and Go.



**Table A-4. Modeled Military Flight Track Utilization**

| <i>Rwy</i>             | <i>Track IDs</i> | <i>Descriptions</i>             | <i>F-15C/D</i> | <i>F-5E/F</i> | <i>F-35A</i> |
|------------------------|------------------|---------------------------------|----------------|---------------|--------------|
| <b>Departures</b>      |                  |                                 |                |               |              |
| 14                     | 14D1A            | First turn                      | 38%            | 38%           | 38%          |
|                        | 14D1B            | Second turn                     | 38%            | 38%           | 38%          |
|                        | 14D2             | LATER TURN TO 090 DEG HEAD      | 19%            | 19%           | 19%          |
|                        | 14D3             | TURN TO 260 DEG TO OCEAN RANGES | 5%             | 5%            | 5%           |
| 32                     | 32D1A            | First turn                      | 38%            | 38%           | 38%          |
|                        | 32D1B            | Second turn                     | 38%            | 38%           | 38%          |
|                        | 32D2             | LATER TURN TO 090 DEG HEAD      | 19%            | 19%           | 19%          |
|                        | 32D3             | TURN TO 260 DEG TO OCEAN RANGES | 5%             | 5%            | 5%           |
| <b>Arrivals</b>        |                  |                                 |                |               |              |
| 14                     | 14A1OHE          | RWY 14 1 OVERHEAD WEST          | 5%             | 5%            | 4%           |
|                        | 14A1OHW          | RWY 14-1 OVERHEAD EAST          | 21%            | 21%           | 17%          |
|                        | 14A4TC90EL       | TAC 90 EAST LEAD                | 7%             | 7%            | 6%           |
|                        | 14A4TC90EW       | TAC 90 EAST WING                | 3%             | 3%            | 2%           |
|                        | 14A4TC90WL       | TAC 90 WEST LEAD                | 29%            | 29%           | 24%          |
|                        | 14A4TC90WW       | TAC 90 WEST WING                | 10%            | 10%           | 8%           |
|                        | 14A2             | ILS (includes PFO for F-35)     | 20%            | 20%           | 26%          |
|                        | 14A3             | TACAN or VOR                    | 5%             | 5%            | 4%           |
|                        | 14AWPFO          | PFO overhead break track        | 0%             | 0%            | 9%           |
| 32                     | 32A1OHE          | RWY 32 1 OVERHEAD EAST          | 5%             | 5%            | 4%           |
|                        | 32A1OHW          | RWY 32 1 OVERHEAD WEST          | 21%            | 21%           | 17%          |
|                        | 32A4TC90EL       | TAC 90 EAST LEAD                | 7%             | 7%            | 6%           |
|                        | 32A4TC90EW       | TAC 90 EAST WING                | 3%             | 3%            | 2%           |
|                        | 32A4TC90WL       | TAC 90 WEST LEAD                | 29%            | 29%           | 24%          |
|                        | 32A4TC90WW       | TAC 90 WEST WING                | 10%            | 10%           | 8%           |
|                        | 32A2             | ILS (includes PFO for F-35)     | 13%            | 13%           | 19%          |
|                        | 32A3             | TACAN or VOR                    | 12%            | 12%           | 10%          |
|                        | 32AWPFO          | PFO overhead break track        | 0%             | 0%            | 9%           |
| <b>Closed Patterns</b> |                  |                                 |                |               |              |
| 14                     | 14C1E            | RWY 14 EAST                     | 20%            | 20%           | 20%          |
|                        | 14C1W            | RWY 14 WEST                     | 80%            | 80%           | 78%          |
|                        | 14PFO            | PFO closed pattern              | 0%             | 0%            | 2%           |
| 32                     | 32C1E            | RWY 32 EAST                     | 20%            | 20%           | 20%          |
|                        | 32C1W            | RWY 32 WEST                     | 80%            | 80%           | 78%          |
|                        | 32PFO            | PFO closed pattern              | 0%             | 0%            | 2%           |

*Legend:* DEG = degrees; ILS = Instrument Landing System; PFO = Precautionary Flameout; RWY = Runway; TACAN = Tactical Air Navigation System; VOR = Very High Frequency Omnidirectional Range.

**Table A-5. Modeled Civil Flight Track Utilization**

| <i>Rwy</i>             | <i>Track IDs</i> | <i>Descriptions</i>       | <i>Small Prop GA<sup>1</sup></i> | <i>AC, AT, and other GA</i> |
|------------------------|------------------|---------------------------|----------------------------------|-----------------------------|
| <b>Departures</b>      |                  |                           |                                  |                             |
| 14                     | 14D4             | Straight Departure        | 56%                              | 100%                        |
|                        | 14D11            | Dep to Practice Area      | 44%                              | 0%                          |
| 32                     | 32D4             | Straight Departure        | 56%                              | 100%                        |
|                        | 32D11            | Dep to Practice Area      | 44%                              | 0%                          |
| 7                      | 07D1             | Straight Departure        | 100%                             | 100%                        |
| 25                     | 25D1             | Straight Departure        | 100%                             | 100%                        |
| <b>Arrivals</b>        |                  |                           |                                  |                             |
| 14                     | 14A2             | Straight Arrival          | 56%                              | 100%                        |
|                        | 14A11            | Arrive from Practice Area | 44%                              | 0%                          |
| 32                     | 32A2             | Straight Arrival          | 56%                              | 100%                        |
|                        | 32A11            | Arrive from Practice Area | 44%                              | 0%                          |
| 7                      | 07A1             | Straight Arrival          | 100%                             | 100%                        |
| 25                     | 25A1             | Straight Arrival          | 100%                             | 100%                        |
| <b>Closed Patterns</b> |                  |                           |                                  |                             |
| 14                     | 14C1             | Touch and Go              | 100%                             | 100%                        |
| 32                     | 32C1             | Touch and Go              | 100%                             | 100%                        |
| 7                      | 07C1             | Touch and Go              | 100%                             | 100%                        |
| 25                     | 25C1             | Touch and Go              | 100%                             | 100%                        |

*Note:* <sup>1</sup>Small Propeller GA includes ANP Modeled Types: CNA172, COMSEP, PA30, BEC58P, CNA182, CNA206, GASEPF, GASEPV.

*Legend:* AC = Air Carrier; AT = Air Taxi; GA = General Aviation; ID = Identification; Rwy = Runway.