Appendix H

Noise Technical Memorandum

APPENDIX H

Noise Modeling Technical Report

Appendix H describes the noise modeling input parameters of the No Action Alternative as well as the Proposed Action Alternatives.

The No Action Alternative reflects current operations. The 2028 and 2033 Proposed Action Alternatives reflect anticipated Airport operations in those years subsequent to the completion of the North Cargo Area. The North Cargo Area is expected to result in one additional Boeing 767-300 operation per day in the 2028 Proposed Action Alternative, and two additional Boeing 767-300 operations in the 2033 Proposed Action Alternative. With the exception of the additional traffic generated by implementation of the Proposed Action, the 2028 and 2033 Proposed Action Alternatives maintain the same runway usage as the No Action Alternative.

The 2028 and 2033 Proposed Action Alternatives also reflect additional roadway operations associated with the intersection that will serve as an access point to the North Cargo Area from the landside during those years. The intersection is in close proximity to two residences, which are considered receptors sensitive to additional noise for the purposes of this study. The noise analysis is done by evaluating the current roadway traffic characteristics of the modeled intersection and adding traffic anticipated to occur there during the timeframes represented by the Proposed Action Alternatives. The roadway noise is also combined with airborne noise at the sensitive receptors to provide an estimate of total change in noise exposure at these receptors attributable to the Proposed Action Alternatives. This method provides a means to evaluate the Proposed Action Alternatives as the sole cause of any modeled impacts for both airborne and roadway noise.

Section H.1 reviews the methodology used to conduct the noise analysis, **Section H.2** describes the development of input data and the sources for the No Action Alternative, and **Section H.3** describes input data development for the 2028 and 2033 Proposed Action Alternatives.

H.1 Methodology

H.1.1 – Aircraft Noise Analysis

The methodology used in the noise analysis of the proposed changes to aircraft operations resulting from the construction and operation of the North Cargo Area follows established Federal Aviation Administration (FAA) guidelines in both the construction of a representative data model and the evaluation of noise impacts. Model construction and execution relied heavily on guidance provided in the FAA document titled "*Guidance on Using the Aviation Environmental Design Tool (AEDT) to Conduct*

Environmental Modeling for FAA Actions Subject to NEPA" updated 10/27/2017.[1] AEDT is the FAA's approved model for assessing noise and emissions at civilian airports. AEDT has been used for environmental review of aviation noise and emissions impacts since 2012 and is used for 14 CFR Part 150 studies, National Environmental Policy Act (NEPA) EAs and Environmental Impact Statements (EISs). For this EA, AEDT was used as an integrated model to estimate the total noise impact of all modeled aircraft flights. This included noise effects associated with aircraft taxi operations on the ground as well as noise effects associated with takeoff, landing, and airborne operation in the vicinity of the airport. While AEDT does not natively model noise associated with the operation of aircraft on taxiways, this can optionally be done via the modification of overflight tracks to mimic the movement and engine settings of aircraft taxiing at the Airport. This methodology, approved by the FAA Office of Environment and Energy (AEE) is described in detail in the attached **Appendix H-2 – Memorandum Detailing Non-default Taxiway Modeling Methodology**.

AEDT model settings such as weather, terrain, and atmospheric absorption were chosen based on the guidance provided in this document. In particular, the average annual weather at the Airport during the baseline timeframe was used, as was National Elevation Dataset (NED) GridFloat terrain, and the SAE-ARP-5534 setting for atmospheric absorption.

As per the guidance, model input data suitable for AEDT modeling was collected and aggregated into an operationally representative form known as an Annual Average Day (AAD) indicating the expected mix of aircraft operations over the course of a representative "average" day. The model inputs, which consist of flight tracks and specific aircraft operations utilizing these tracks, were imported into the AEDT model and evaluated for noise exposure by using AEDT settings required by FAA guidance as described above. Key attributes of an aircraft operation relevant to noise modeling are the aircraft type, the operation type (arrival or departure), the runway used, the ground track used, the time of day (day or night), and the stage length. Stage length is an indication of aircraft weight and is typically inferred by knowing the aircraft type and the trip distance.

In the noise analysis AEDT version 3e was used to calculate No Action and Proposed Action noise exposure levels at population centroids within the General Study Area (GSA). As there were no Section 4(f) or Historic Properties found within the GSA, the evaluation of impacts to these properties was not required.

H.1.2 – Roadway Noise Analysis

As the construction of the North Cargo Area will result in the extension of Willow Brook Road southward to serve this new facility, additional traffic associated with the new facility was required to be evaluated for the potential to cause significant noise impacts to neighboring communities. The FHWA Traffic Noise Model (TNM) version 3.1 was utilized for the purposes of this task due to its capability of evaluating traffic noise at specific receptors using the FAA DNL noise metric.

This analysis was completed by collecting peak hour turning lane data for the modeled intersection of East Race Street and Willow Brook Road. This data reflected the AM and PM peak hours, and was extrapolated to represent an AAD of roadway traffic (AADT). The peak hour turning lane data also

[1] https://aedt.faa.gov/Documents/guidance_aedt_nepa.pdf

included the traffic mix reflecting the types of vehicles utilizing the roadways at the modeled intersection. A representation of the intersection was then created in TNM, with key parameters such as number of lanes, lane width, and lane type set to reflect the characteristics of the real-life intersection.

The AADT values associated with each lane (right turn lane, left turn lane, and through lane) at the modeled intersection were then input into TNM. Additional data, including traffic speed, the day/night traffic split, and the presence of any control devices such as traffic signals or stop signs were included in the model. The only known sensitive receptors in the vicinity of the modeled intersection, at 1555 East Race Street and 1565 East Race Street, were evaluated for noise impacts potentially resulting from additional roadway traffic. At these sensitive receptors, roadway traffic noise was logarithmically combined with aircraft-derived noise to create a single noise exposure value, which was then tested against the FAA criteria for significance for the 2028 and 2033 Proposed Action Alternatives.

H.2 No Action Alternative Noise Model Input

The No Action Alternative represents the annualized aircraft operations at the Airport as well as annualized ground traffic associated with the modeled intersection during the baseline timeframe. It is treated as the baseline against which noise exposure changes associated with the 2028 and 2033 Proposed Action Alternatives are measured. The baseline timeframe was chosen as it is representative of a typical recent year at the Airport, is free of major air traffic disruptions, and reflects current ground traffic volume and traffic mix. This section details the noise model design for the No Action Alternative.

H.2.1 No Action Alternative Aircraft Operations and Runway Use

FAA National Offload Program (NOP) radar data for the baseline timeframe was obtained to develop operations data for noise modeling. The FAA OpsNet database identifies a count of 50,409 Instrument Flight Rules (IFR) itinerant (non-local) operations during the baseline timeframe, as well as 33,351 local operations that both arrive and depart from the Airport, totaling 83,760 operations. Of these, 31,721 operations were identified as tracks in the NOP radar data. These operations identified in the radar data were scaled appropriately (by runway) to bring the total number of operations to the OpsNet count of 83,760. Helicopter operations are not identified in the OpsNet count, but 73 operations that were identified as helicopters in the radar data were included in the model, bringing the total number of modeled fixed wing and helicopter operations to 83,833. The total number of annual operations at the Airport was divided by the number of days in the year to determine the AAD, which was then used as input to AEDT.

The Airport operates in two primary configurations based on prevailing surface wind direction. When wind is from the north and east, traffic at the Airport primarily uses Runway 6 for departures and arrivals. Conversely, when wind is from the south and west, traffic at the Airport primarily uses Runway 24 for departures and arrivals. Runway 13-31 is the secondary runway at the airport and is generally only used during times of heavy crosswinds affecting Runway 6-24. There is no preferential runway use program at the Airport, and Runway 6-24 is generally used for both day and night-time departures and arrivals regardless of meteorological conditions.

Boeing 767-300 operations were specifically identified and annualized separately from the remainder of traffic at the Airport because additional operations associated with the 2028 and 2033 Proposed Action Alternatives are limited to this aircraft type.

Table H.1 shows the weighting used in AEDT to model the number of OpsNet arrivals by runway for all non-Boeing 767-300 traffic. **Table H.2** shows the same data for departures.

TABLE H.1
IFR ITINERANT ARRIVAL OPERATIONAL STATISTICS BY RUNWAY (NON B767-300)

Runway	NOP	OpsNet	Percentage	AEDT Weighting
6	6,532	12,744	30.5%	1.951
13	707	1,461	3.5%	2.067
24	12,361	23,638	56.5%	1.912
31	1,558	3,893	9.3%	2.498
Helicopters (all routes)	202	202	0.4%	1.000
Totals	**21,223**	**41,801**	**100.0%**	**1.970**

Note: All percentages may not equal 100% due to rounding.

Source: RoVolus, 2023.

TABLE H.2
IFR ITINERANT DEPARTURE OPERATIONS WEIGHTING BY RUNWAY (NON B767-300)

Runway	NOP	OpsNet	Percentage	AEDT Weighting
6	4,375	13,039	32.4%	2.980
13	94	701	1.7%	7.460
24	5,451	23,673	58.9%	4.343
31	570	2,787	6.9%	4.889
Helicopters (all routes)	8	8	<0.1%	1.000
Totals	**10,498**	**40,208**	**100.0%**	**3.830**

Note: All percentages may not equal 100% due to rounding.

Source: RoVolus, 2023.

Table H.3 shows the weighting used in AEDT to model the number of OpsNet arrivals by runway for Boeing 767-300 traffic only. **Table H.4** shows the same data for departures.

TABLE H.3
IFR ITINERANT ARRIVAL OPERATIONAL STATISTICS BY RUNWAY (B767-300 ONLY)

Runway	NOP	OpsNet	Percentage	AEDT Weighting
6	291	297	32.6%	1.021
13	66	73	8.0%	1.106
24	444	446	49.0%	1.005
31	94	95	10.4%	1.011
Totals	**895**	**911**	**100.0%**	**1.018**

Note: All percentages may not equal 100% due to rounding.

Source: RoVolus, 2023.

TABLE H.4
IFR ITINERANT DEPARTURE OPERATIONS WEIGHTING BY RUNWAY (B767-300 ONLY)

Runway	NOP	OpsNet	Percentage	AEDT Weighting
6	357	363	39.8%	1.017
13	1	1	0.1%	1.000
24	433	546	59.8%	1.261
31	3	3	0.3%	1.000
Totals	**794**	**913**	**100.0%**	**1.150**

Note: All percentages may not equal 100% due to rounding.

Source: RoVolus, 2023.

H.2.2 No Action Alternative Flight Tracks, Profiles, and Flight Track Use

As none of the Proposed Action Alternatives will result in changes in flight tracks over the ground when compared to the No Action Alternative, all flights were modeled using existing tracks at the weights given in **Tables H.1** through **H.4**. As a result, no representative backbones were required to be created for this model.

AEDT includes a series of “standard” arrival and departure profiles with variability in the altitude over the initial portion of departure trajectories determined by trip length or stage length. Depending on the aircraft type, AEDT’s “standard” departure profiles are provided for different stage lengths ranging from one to nine – with higher numbers indicating heavier takeoff weights. The chosen “standard” profile effectively serves as a surrogate for aircraft weight and models heavier aircraft of a given aircraft type at a lower altitude on departures. As mentioned in **Section H.1** the stage length can be determined by the trip distance. For the No Action Alternative (as well as the Proposed Action Alternatives), the stage length for each modeled operation was determined by computing the trip distance between the origin and destination airports and translating the trip distance into a stage length and choosing the appropriate standard profile for that stage length. In addition, flights were modeled as day and night operations as per the distribution shown in **Table H.5** below.

TABLE H.5
AVERAGE ANNUAL DAY OPERATIONS MODELED IN AEDT

Aircraft Type	Category	Day (7:00:00 AM – 9:59:59 PM)		Night (10:00:00 PM – 6:59:59 AM)	
		Arrivals	Departures	Arrivals	Departures
1900D	TURBOPROP	0.011	0.016	0.000	0.000
737300	JET	0.021	0.032	0.000	0.012
737400	JET	0.005	0.000	0.000	0.000
737700	JET	0.244	0.415	0.000	0.008
737800	JET	0.005	0.020	0.000	0.012
757RR	JET	0.026	0.032	0.000	0.000
767300	JET	3.012	6.407	0.669	1.028
7673ER	JET	0.974	1.849	1.522	0.650
767400	JET	0.310	0.473	0.006	0.028
757RR	JET	0.026	0.032	0.000	0.000
A300-622R	JET	1.277	2.545	1.085	1.088
A319-131	JET	0.199	0.209	0.033	0.059
A320-232	JET	5.252	8.078	1.256	1.459
A321-232	JET	0.000	0.000	0.000	0.012
B206L	HELICOPTER	0.003	0.000	0.000	0.000
B429	HELICOPTER	0.005	0.003	0.000	0.000
BD-700-1A10	JET	0.323	0.625	0.048	0.038
BD-700-1A11	JET	0.032	0.052	0.000	0.012
BEC58P	PISTON	4.466	2.982	0.082	0.201
C130AD	TURBOPROP	0.103	0.260	0.000	0.000
CIT3	JET	0.069	0.056	0.000	0.000
CL600	JET	4.355	5.740	0.290	2.616
CL601	JET	0.082	0.168	0.000	0.000
CNA172	PISTON	20.743	3.163	0.426	0.074
CNA182	PISTON	2.116	0.947	0.038	0.032
CNA206	PISTON	0.266	0.284	0.000	0.000

Aircraft Type	Category	Day (7:00:00 AM – 9:59:59 PM)		Night (10:00:00 PM – 6:59:59 AM)	
		Arrivals	Departures	Arrivals	Departures
CNA208	PISTON	1.124	1.690	0.048	0.112
CNA20T	PISTON	0.053	0.080	0.005	0.000
CNA441	TURBOPROP	1.018	1.613	0.102	0.293
CNA500	JET	0.047	0.092	0.000	0.000
CNA510	JET	0.269	0.446	0.010	0.000
CNA525C	JET	1.260	2.157	0.096	0.254
CNA55B	JET	1.138	2.066	0.016	0.047
CNA560E	JET	0.563	1.022	0.039	0.028
CNA560U	JET	0.819	1.385	0.036	0.097
CNA560XL	JET	1.062	1.369	0.005	0.038
CNA680	JET	0.498	0.932	0.010	0.024
CNA750	JET	0.937	1.821	0.065	0.109
COMJET	JET	0.198	0.353	0.000	0.000
COMSEP	PISTON	5.806	2.681	0.034	0.044
CRJ9-ER	JET	7.950	11.870	4.274	5.789
CVR580	TURBOPROP	0.000	0.000	0.005	0.000
DC3	PISTON	0.010	0.000	0.000	0.000
DC910	JET	0.005	0.008	0.000	0.000
DC930	JET	0.000	0.000	0.005	0.012
DHC6	TURBOPROP	2.437	3.956	0.129	0.244
EC130	HELICOPTER	0.162	0.005	0.005	0.005
ECLIPSE500	JET	0.175	0.214	0.016	0.008
EMB120	TURBOPROP	0.005	0.000	0.007	0.016
EMB145	JET	0.031	0.064	0.000	0.012
EMB14L	JET	1.758	4.272	0.854	0.760
EMB170	JET	0.307	0.850	0.107	0.000
EMB175	JET	0.578	0.763	0.010	0.481
EMB190	JET	0.000	0.012	0.005	0.000
FAL20	JET	0.036	0.048	0.016	0.022
FAL900EX	JET	0.298	0.567	0.015	0.008
G650ER	JET	0.249	0.492	0.052	0.044

Aircraft Type	Category	Day (7:00:00 AM – 9:59:59 PM)		Night (10:00:00 PM – 6:59:59 AM)	
		Arrivals	**Departures**	**Arrivals**	**Departures**
GASEPF	PISTON	1.264	0.426	0.027	0.024
GASEPV	PISTON	6.892	4.111	0.057	0.096
GIIB	JET	0.005	0.000	0.000	0.012
GIV	JET	1.209	2.414	0.144	0.130
GV	JET	0.767	1.477	0.086	0.090
IA1125	JET	0.081	0.156	0.005	0.008
LEAR35	JET	5.234	8.544	0.580	1.133
MD83	JET	0.016	0.024	0.000	0.000
MU3001	JET	0.124	0.191	0.005	0.012
PA28	PISTON	15.977	2.606	0.371	0.094
PA30	PISTON	0.025	0.127	0.000	0.000
PA42	TURBOPROP	0.019	0.012	0.000	0.000
R44	HELICOPTER	0.003	0.000	0.000	0.000
S76	HELICOPTER	0.011	0.008	0.000	0.000
		104.320	**95.284**	**12.700**	**17.374**
Source: Prepared by RoVolus, 2023					

H.2.3 No Action Alternative Roadway Noise Inputs

Ground-based noise associated with roadway traffic was modeled in TNM based on the estimated number and distribution of current roadway operations at the modeled intersection. The number of roadway operations is based on the peak hour data captured at the modeled intersection of East Race Street and Willow Brook Road (described in **Section H.1.2**) while the distribution of operations is derived by averaging the AM and PM peak traffic values given in the 2022 Transportation Impact Assessment for the North Cargo Area Development. **Table H.6** shows the automobile traffic distribution provided in that assessment and derived values used in the TNM model, while **Table H.7** shows the truck traffic distribution provided in the same assessment. All truck traffic is assumed to be entering or exiting the North Cargo Area from U.S. Route 22, which is the lone route compatible with trucks to and from the modeled intersection.

TABLE H.6
AUTOMOBILE TRAFFIC DISTRIBUTION USED IN TNM ROADWAY MODELING

Direction	East via East Race Street	West via East Race Street	North via Willow Brook Road
AM Peak – Entering North Cargo Area	66%	11%	23%
PM Peak – Entering North Cargo Area	80%	8%	12%
Entering Traffic Average	**73%**	**9.5%**	**17.5%**
AM Peak – Exiting North Cargo Area	81%	7%	12%
PM Peak – Exiting North Cargo Area	68%	11%	21%
Exiting Traffic Average	**74.5%**	**9%**	**16.5%**
Source: 2022 Transportation Impact Assessment for the North Cargo Area Development, Pidcock, 2022, and RoVolus, 2023.			

TABLE H.7
TRUCK TRAFFIC DISTRIBUTION USED IN TNM ROADWAY MODELING

Direction	Entering	Exiting
To/from Route 22	100%	100%
Source: 2022 Transportation Impact Assessment for the North Cargo Area Development, Pidcock, 2022, and RoVolus, 2023.		

A series of roadway segments associated with the modeled intersection of East Race Street and Willow Brook Road were built in TNM, as shown in **Table H.8.** Note that as TNM does not allow roadway segments to intersect, many segments representing specific lanes or ramps associated with either East Race Street or Willow Brook Road are included, along with the main traffic lanes of both East Race Street and Willow Brook Road. As there are no barriers currently present at the modeled intersection, no barriers were used in the TNM analysis. All roadway segments use a standard width of twelve feet for all lanes. Through traffic is modeled with a standard speed of 35 mph, while turning traffic is modeled at 25 mph.

TABLE H.8
ROADWAY SEGMENTS AND OPERATIONS MODELED IN TNM – EAST RACE STREET AND WILLOW BROOK ROAD INTERSECTION (NO ACTION ALTERNATIVE)

Roadway Segment	Road Type	AADT Range	Passenger Cars	Trucks	Buses
E. Race Street Eastbound	Through lanes	**2,810-5,780**	2,771 – 5,462	31-301	8-20
E. Race Street Westbound	Through lanes	**5,350-10,260**	5,291-9,603	56-646	0-12
E. Race Street Eastbound Left-turn lane	Turning lane	**1,140**	1,070	60	10
E. Race Street Westbound Left-turn lane	Turning lane	**20**	20	0	0
Willow Brook Road Southbound Left-turn lane	Turning lane	**2,970**	2,691	270	9
Willow Brook Road Southbound Right-turn traffic	Shared lane	**810**	800	0	10
Willow Brook Road Southbound to North Cargo Area	Through lane	**40**	40	0	0
Willow Brook Road Northbound from North Cargo Area Left-turn/through traffic	Shared lane	**10**	10	0	0
Willow Brook Road Northbound from North Cargo Area Right-turn lane	Turning lane	**20**	20	0	0
Source: RoVolus, 2023.					

The captured turning lane data was analyzed to determine proper roadway loading for each modeled segment of the East Race Street/Willow Brook Road intersection. In the case of the East Race Street through lanes, each segment is modeled to account for different streams of traffic accessing the through lanes during their matriculation of the intersection, resulting in AADT ranges (as opposed to a static number of vehicles) for these segments. For example, the East Race Street Eastbound roadway segment includes different amounts of traffic at different points of the segment – in this case encompassing values of 3,950 vehicles west of the modeled intersection, 2,810 vehicles per day at the middle of the intersection (accounting for traffic departing East Race Street Eastbound for Willow Brook Road), and 5,780 vehicles per day east of the intersection, which accounts for traffic entering East Race Street Eastbound from Willow Brook Road.

TNM requires that truck traffic is segmented into medium trucks and heavy trucks. As the turning lane data did not categorize truck traffic by size, medium and heavy trucks were each assumed to comprise 50% of the total truck traffic in this analysis. Additionally, as the turning lane data was not captured over a 24-hour period, the day/night split was estimated at 80% daytime operations and 20% nighttime operations. DNL exposure levels were evaluated for the two identified sensitive receptors, 1555 East Race Street and 1565 East Race Street.

H.3 FAA Proposed Action Noise Model Input

The FAA Proposed Action Alternative represents the annualized aircraft operations at the Airport as well as annualized roadway traffic associated with the modeled intersection during two future timeframes, 2028 and 2033. The 2028 Proposed Action Alternative assumes that all operations are the same as the No Action Alternative, with two exceptions:

- The North Cargo Area is assumed to generate one additional Boeing 767-300 flight per day, consisting of one takeoff and one landing.
- The North Cargo Area is assumed to generate additional roadway traffic consisting of 325 cars and 255 trucks that traverse the modeled intersection of East Race Street and Willow Brook Road.

Likewise, the 2033 Proposed Action Alternative assumes that all operations are the same as the No Action Alternative, with two similar exceptions:

- The North Cargo Area is assumed to generate two additional Boeing 767-300 flights per day, consisting of two takeoffs and two landings.
- The North Cargo Area is assumed to generate additional roadway traffic consisting of 650 cars and 510 trucks that traverse the modeled intersection of East Race Street and Willow Brook Road.

This section details the noise model design for the 2028 and 2033 Proposed Action Alternatives.

H.3.1 Proposed Action Alternative Aircraft Operations and Noise Model Inputs

The Proposed Action Alternatives include the 83,833 operations of the No Action Alternative, but includes the additional Boeing 767-300 operations expected to be enabled by the construction of the North Cargo Area. This includes an additional 365 landing/takeoff (LTO) operations for the 2028 Proposed Action Alternative, and an additional 730 LTO operations for the 2033 Proposed Action Alternative. This results in a total of 84,563 operations in the 2028 Proposed Action Alternative, and 85,293 operations in the 2033 Proposed Action Alternative. The distribution of night and day flights in each of the Proposed Action Alternatives is unchanged from the No Action Alternative.

In the No Action Alternative, a small amount of Boeing 767-300 operations utilize Runway 13-31 due to intermittent, unpredictable closures of Runway 6-24, usually at night. However, these intermittent closures are expected to end during 2024, and are not expected to be present by 2028. Therefore, all new Boeing 767-300 operations in the Proposed Action Alternatives will utilize Runway 6-24.

Taxiway modeling for new operations will reflect the expected change in the airport taxiway system due to the construction of the North Cargo Area. A detailed explanation of these changes, as well as the general taxiway modeling methodology for the Proposed Action Alternatives is shown in **Appendix H-2.**

The additional operations were included in two new AEDT scenarios reflecting the 2028 and 2033 Proposed Action Alternatives, and noise exposure from these models was compared to that of the No Action Scenario, to determine the existence of any significant noise impacts. Noise impacts were evaluated across two receptor sets – a closely-spaced noise grid, extending 3 nautical miles away from the airport in each direction, with points separated by 0.05 nmi (304 feet), and a receptor set representing only the two sensitive receptors at 1555 East Race Street and 1565 East Race Street. The former receptor set allows evaluation of the noise contour areas associated with the Proposed Action Alternatives, while the latter allows the airborne noise exposure to be combined with the roadway noise exposure at the same two points, and noise impacts to be evaluated against this combined noise exposure level.

H.3.2 Proposed Action Alternative Roadway Noise Inputs

Roadway noise is evaluated in the same manner described in **Section H.2.3**, with additional traffic inserted to traverse the modeled intersection of East Race Street and Willow Brook Road. As the basic geometry of the intersection is not expected to change as a result of the construction of the North Cargo Area and extension of Willow Brook to the south in order to serve it, the segments modeled in TNM are identical to those in the No Action Alternative. Key traffic assumptions associated with the roadway noise model in the No Action Alternative remain the same for the Proposed Action Alternatives, such as day/night traffic split (80%/20%) and medium/heavy truck split (50%/50%).

The key difference in the input data for the Proposed Action Alternatives reflects the amount of additional traffic traversing the modeled intersection. The amount of additional traffic inserted into the model and distribution of this traffic was determined by peak-hour data given in the 2022 Transportation Impact Assessment for the North Cargo Area Development, which evaluated the potential additional peak-hour traffic based on a 200,000 square foot cargo building. Because the actual size of the proposed cargo building is anticipated to be between 75,000 and 125,000 square feet, the additional traffic modeled in TNM for the 2028 Proposed Action Alternative was based on a 100,000 square foot building, or half of the value given in the 2022 Transportation Impact Assessment. The additional traffic modeled in TNM for the 2033 Proposed Action Alternative was based on a 200,000 square foot cargo building, or the entire value given in the 2022 Transportation Impact Assessment (shown in **Table H.9** below). This two-step method provided the ability to model an upper bound, worst-case scenario for the amount of additional traffic associated with the North Cargo Area (in the case of the 2033 Proposed Action Alternative) while providing a level of traffic more consistent with the anticipated size of the North Cargo Area in the 2028 Proposed Action Alternative. Total AADT was estimated as ten times the PM peak-hour count.

TABLE H.9
DEVELOPMENT TRIP GENERATION SUMMARY – PROPOSED ACTION SCENARIOS

Direction	Cars	Trucks
PM Peak – Entering North Cargo Area	36	21
PM Peak – Exiting North Cargo Area	29	30
Peak-hour Traffic Total	**65**	**51**
Estimated AADT – Entering North Cargo Area	360	210
Estimated AADT – Exiting North Cargo Area	290	300
Estimated 2033 AADT Total (peak x10)	**650**	**510**
Estimated 2028 AADT Total (50% of 2033 AADT)	**325**	**255**
Source: 2022 Transportation Impact Assessment for the North Cargo Area Development, Pidcock, 2022, and RoVolus, 2023.		

These additional operations were then distributed within the TNM roadway segments using the proportions given in **Table H.6** and **Table H.7**. The final number and distribution of operations modeled on these roadway segments for the 2033 Proposed Action Alternative is given in **Table H.10.** Note that some roadway segments are identical, as the roadway traffic accessing them is not expected to change under the Proposed Action Alternatives.

TABLE H.10
ROADWAY SEGMENTS AND OPERATIONS MODELED IN TNM – EAST RACE STREET AND WILLOW BROOK ROAD INTERSECTION (2033 PROPOSED ACTION ALTERNATIVE)

Roadway Segment	Road Type	AADT Range	Passenger Cars	Trucks	Buses
E. Race Street Eastbound	Through lanes	**2,810-6,316**	2,771 – 5,679	31-600	8-20
E. Race Street Westbound	Through lanes	**5,350-10,733**	5,291-9,863	56-859	0-12
E. Race Street Eastbound Left-turn lane	Turning lane	**1,140**	1,070	60	10
E. Race Street Westbound Left-turn lane	Turning lane	**493**	283	210	0
Willow Brook Road Southbound Left-turn lane	Turning lane	**2,970**	2,691	270	9
Willow Brook Road Southbound Right-turn traffic	Shared lane	**810**	800	0	10
Willow Brook Road Southbound to North Cargo Area	Through lane	**590**	380	210	0
Willow Brook Road Northbound from North Cargo Area Left-turn/through traffic	Shared lane	**84**	84	0	0
Willow Brook Road Northbound from North Cargo Area Right-turn lane	Turning lane	**536**	236	300	0
Source: RoVolus, 2023.					

H.3.3 Methodology for Combined Noise Metrics

DNL metrics for airborne noise and roadway noise were combined at the two sensitive receptors at 1555 East Race Street and 1565 East Race Street using the following formula for combining noise exposure metrics:

$$\mathbf{PZ = 10log_{10} (10^{(P1Z/10)} + 10^{(P2Z/10)})}$$

where,

PZ = combined acoustics value (dB)

P1Z = acoustics value of the base point (dB)

P2Z = acoustics value of the alternate point (dB)

These combined noise metrics were then evaluated against one another for significant noise impacts, as was done separately in both AEDT and TNM for each of the component noise models.

APPENDIX H-2

Memorandum Detailing Non-default Taxiway Modeling Methodology

The following attachment to Appendix H (Appendix H-2) memorializes a memorandum that was sent to the Harrisburg ADO in August 2023 detailing the methodology used by RoVolus to determine taxiway noise levels associated with the operation of the North Cargo Area. As AEDT does not natively have the ability to model taxiway noise, proposals to do so much be evaluated by the FAA Office of Environment and Energy (AEE) via the local ADO. The Project team received approval to utilize this methodology in August 2023 and implemented it in the noise modeling methodology shown in Appendix H.

U.S. Department
of Transportation
**Federal Aviation
Administration**

Office of Environment and Energy

800 Independence Ave., S.W.
Washington, D.C. 20591

8/31/2023

Andrew Brooks
Regional Environmental Program Manager
Eastern Region
Federal Aviation Administration
1 Aviation Plaza
Jamaica, NY 11434

Dear Andrew Brooks,

The Office of Environment and Energy (AEE) has received the memo from RoVolus dated August 29th, 2023, referencing the Environmental Assessment (EA) for the construction of a new cargo facility at the Lehigh Valley International Airport (ABE). The memo requests approval of a methodology for modeling taxiway operations at ABE associated with the project in AEDT 3e.

AEE approves the aircraft taxiway modeling methodology outlined in the August 29th request memo but defers to APP-400, Eastern Region, and Harrisburg ADO for a justification of need for the utilization of this methodology.

Please understand that this approval is limited to this particular Environmental Assessment for the construction of a new cargo facility at Lehigh Valley International Airport and for use with AEDT 3e only. Further non-standard AEDT inputs for additional projects at this or any other site will require separate approval.

Sincerely,

Digitally signed
by David Senzig
Date: 2023.08.31
14:07:30 -04'00'

David Senzig
Acting Manager
AEE-100/Noise Division

cc: ARP Contacts (Susan Staehle, APP-400 and Heather Davis-Jenkins, AEA-HAR-ADO)

ROVOLUS

Date: August 29, 2023

To: Heather Davis-Jenkins, Harrisburg ADO

From: Donovan Johnson, RoVolus

CC: Darcy Zarubiak, RoVolus

Bryan Oscarson, AECOM

Contract Number:

Task Order:

Project: Lehigh Valley International Airport North Cargo Area Environmental Assessment (EA)

Subject: Proposed non-default taxiway modeling method for EA – revised to reflect Airport District Office (ADO) and AEE comments

INTRODUCTION

This memorandum is being provided to the Federal Aviation Administration (FAA) for evaluation of RoVolus' proposed methodology for determining taxiway noise levels associated with a proposal to build a new cargo facility on the north side of Lehigh Valley International Airport (ABE, or the Airport). This proposal to build a new cargo facility is subject to review under the National Environmental Protection Act (NEPA), and an Environmental Assessment (EA) is being prepared to assess potential impacts associated with this action. As there are no currently approved methods to evaluate taxiway noise impacts within the FAA's Aviation Environmental Design Tool (AEDT) version 3e for regulatory projects, RoVolus proposes to use the legacy methodology outlined in Section 9.8.7 of the Integrated Noise Model's (INM) 7.0 User's Guide that would allow a specific area of the Airport to be screened for taxiway noise levels.

The submittal of this memorandum serves as a second revision to a memorandum provided by the Lehigh Northampton Airport Authority (the Authority) to FAA on May 5, 2023 that served as the first step of an approval process for using non-default methods[1] in AEDT to evaluate environmental impacts for actions subject to National Environmental Protection Act (NEPA) review. The following updates were requested by the FAA ADO after agency review of the May 5 memorandum:

1. A generic input table for a sample taxiway profile showing how the profile was constructed using a sample aircraft (preferably a B-767) and including thrust settings (this will provide a data set example of the proposed methodology that can be reviewed and then applied to the remainder of the fleet mix following concurrence by the Office of Environment and Energy).

2. Clarification if thrust settings will differ on arrival versus departure during taxi.

3. Clarification of the extent of taxiways that would be modeled (C from the Apron to C/B intersection, B from C/B intersection to B/B7 intersection, and B7 or some combination thereof).

4. Assumptions for any stationary modeling at taxiway hold spots (if applicable).

5. A Single Event Level (SEL) contour of a single B-767 operation along the constructed profile.

[1] Guidance on using the Aviation Environmental Design Tool (AEDT) to Conduct Environmental Modeling for FAA Actions Subject to NEPA
https://www.faa.gov/about/office_org/headquarters_offices/apl/environ_policy_guidance/policy/faa_nepa_order/desk_ref/media/guidance_aedt_nepa.pdf

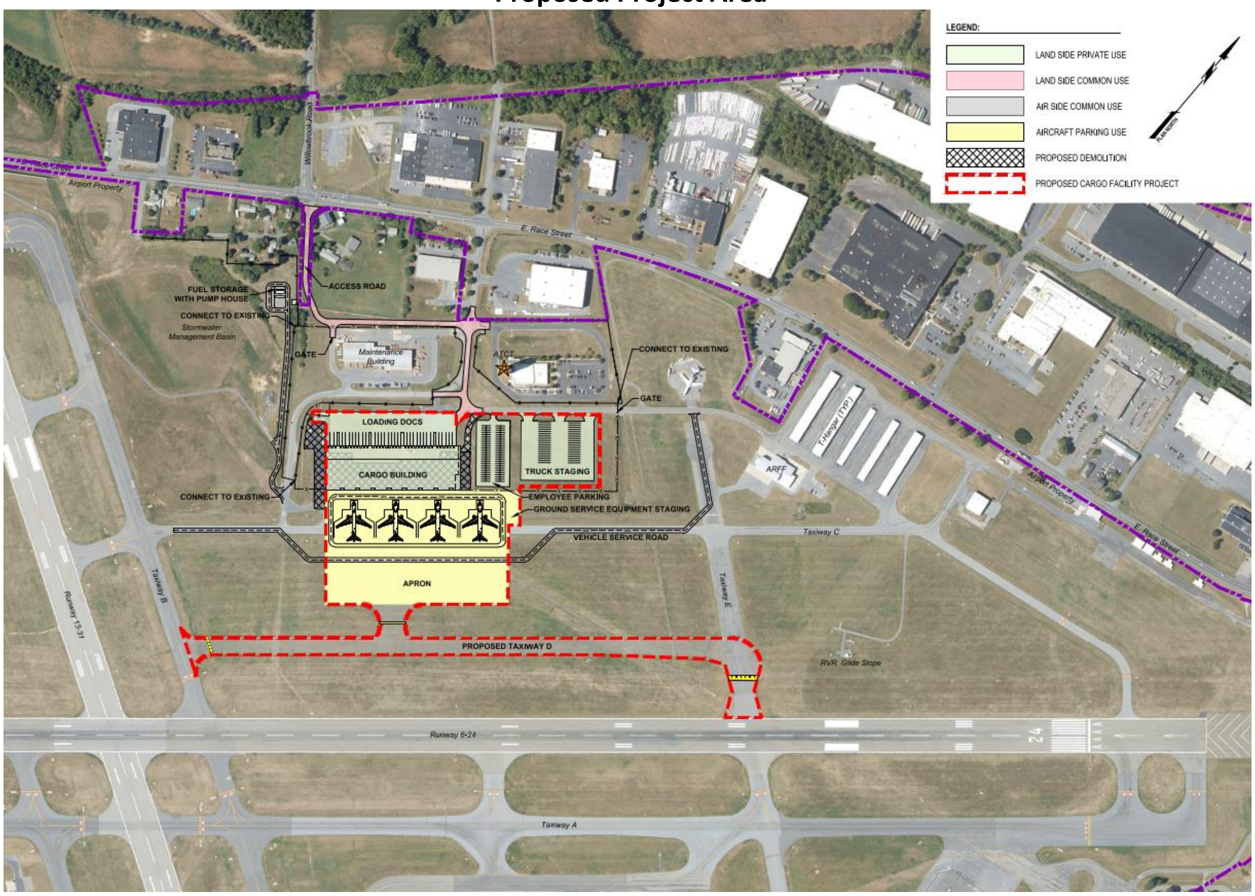
Several additional revisions and updates were requested by FAA in July and August 2023. This memorandum provides the requested information about the proposed taxiway modeling methodology after a follow-up with the FAA on August 22, 2023.

PROJECT DESCRIPTION AND RATIONALE FOR USING PROPOSED NON-DEFAULT METHODS

Project description

The Authority intends to build a new cargo handling facility (the new facility) on the north side of the Airport, north of Runway 6-24 and south of East Race Street, near its intersection with Willowbrook Road. Figure 1 shows the proposed project area.

Figure 1
Proposed Project Area

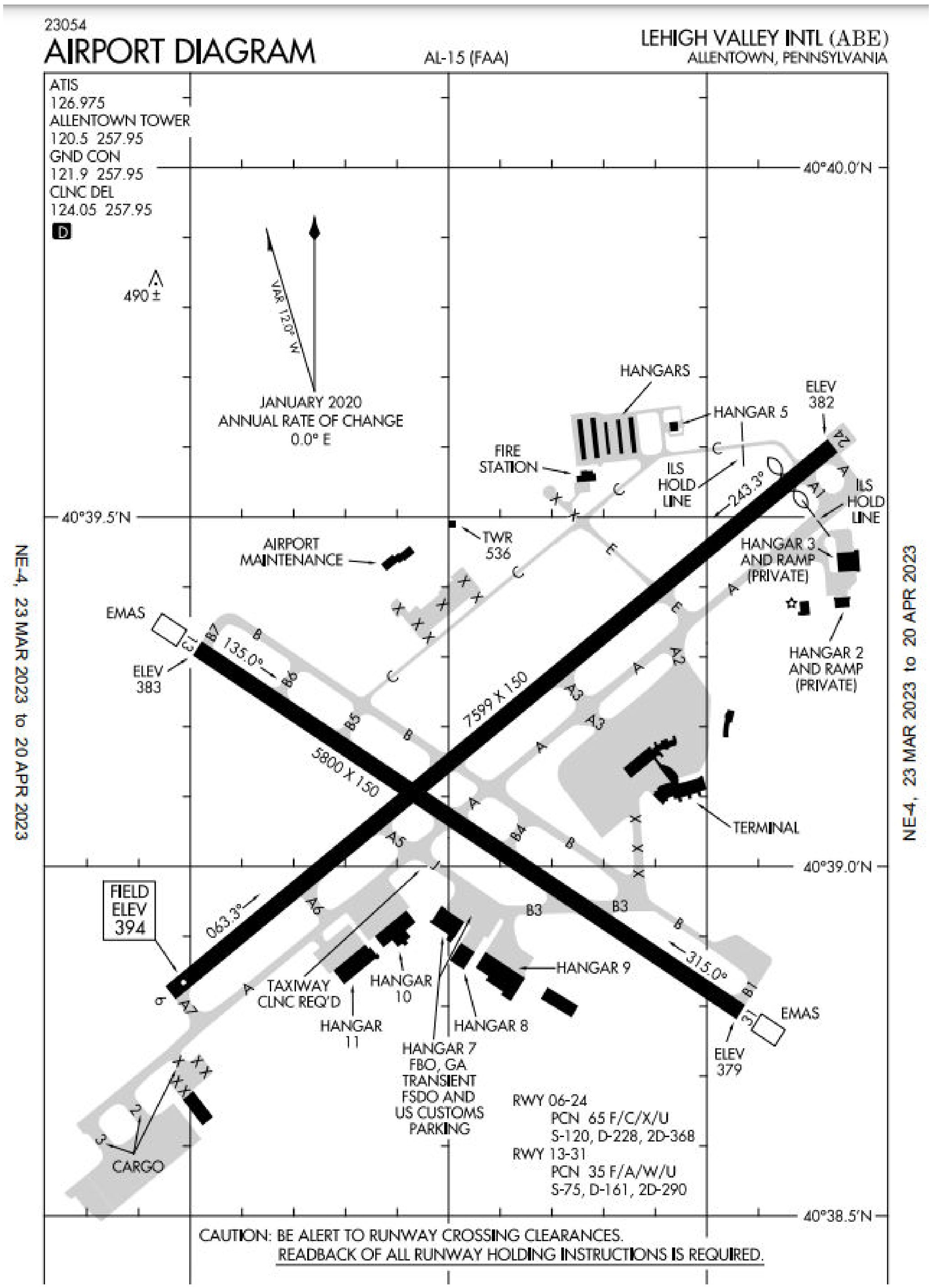


Source: Lehigh Northampton Airport Authority, 2023.

The new facility would allow cargo airline operators to seamlessly transfer cargo between widebody cargo aircraft and trucks that can access the facility via an entrance on East Race Street. Cargo aircraft will access the new facility via new Taxiway D, which, along with the apron to its north, will be expanded to satisfy additional parking and airside traffic movement requirements.

Figure 2 shows the current location of all runways and taxiways at the Airport.

Figure 2
ABE Airport Diagram



Source: Federal Aviation Administration, 2023.

All aircraft accessing the new facility are expected to use new Taxiway D after first traversing either Taxiway B or Taxiway E. The construction and operation of the new facility is expected to result in an extra two departures per day by Boeing 767-300 (B767-300) cargo aircraft by 2033. Taxiway B is expected to receive the bulk of new and relocated B767-300 operations, with Taxiway E receiving B767-300 operations that land on Runway 6 or depart Runway 24.

The vast majority of B767-300 operations utilize Runway 6-24 for takeoffs and landings. However, Runway 6-24 has been intermittently closed between April and November for maintenance activities and results in some B767-300 aircraft utilizing Runway 13-31 for arrivals and departures. By 2025, these runway closings are expected to have ceased and all B767-300 will land and take off on Runway 6-24.

Rationale for proposed non-default method

AEDT offers a variety of procedural and point profiles to model aircraft airborne movement in the project study area. For most NEPA reviews associated with large infrastructure projects at airports, project sponsors are interested in noise and emissions associated with aircraft airborne operations. However, in cases where the infrastructure project may result in potentially significant additional secondary noise and emissions sources (such as those associated with construction, roadway traffic, and taxiway movements), it may be desirable to evaluate those sources, especially if noise-sensitive areas exist in the vicinity of the project. In the case of the proposed cargo handling facility, two residences exist in the immediate vicinity of the project area near the intersection of Willowbrook Drive and East Race Street, the closest of which is adjacent to the Airport and approximately 650 feet from the closest project boundary. Incidental to project construction and operations associated with the project upon completion, these residences are expected to be exposed to noise from temporary construction activities, followed by additional widebody aircraft operations and additional heavy truck traffic. Since the number of additional noise sources will increase, it is important that these sources are taken into account in the EA's significance determination for noise and emissions impacts.

AEDT's database of flight profiles provides the analyst with the ability to choose three-dimensional directives for how each aircraft should fly takeoffs, landings, and touch-and-go operations. These profiles serve as the inputs to AEDT's flight performance modeler for computation of multi-state trajectories. The accompanying Noise-Power-Distance (NPD) curves allow the model to compute the noise impacts of each operation based on aircraft/engine performance at each point of the flight path. While AEDT does include the ability to provide detailed surface layouts for airports, the model does not, by default, include profiles for modeling taxiway noise, nor does an approved methodology exist for doing so for regulatory projects using AEDT.

PROPOSED TAXIWAY MODELING METHOD

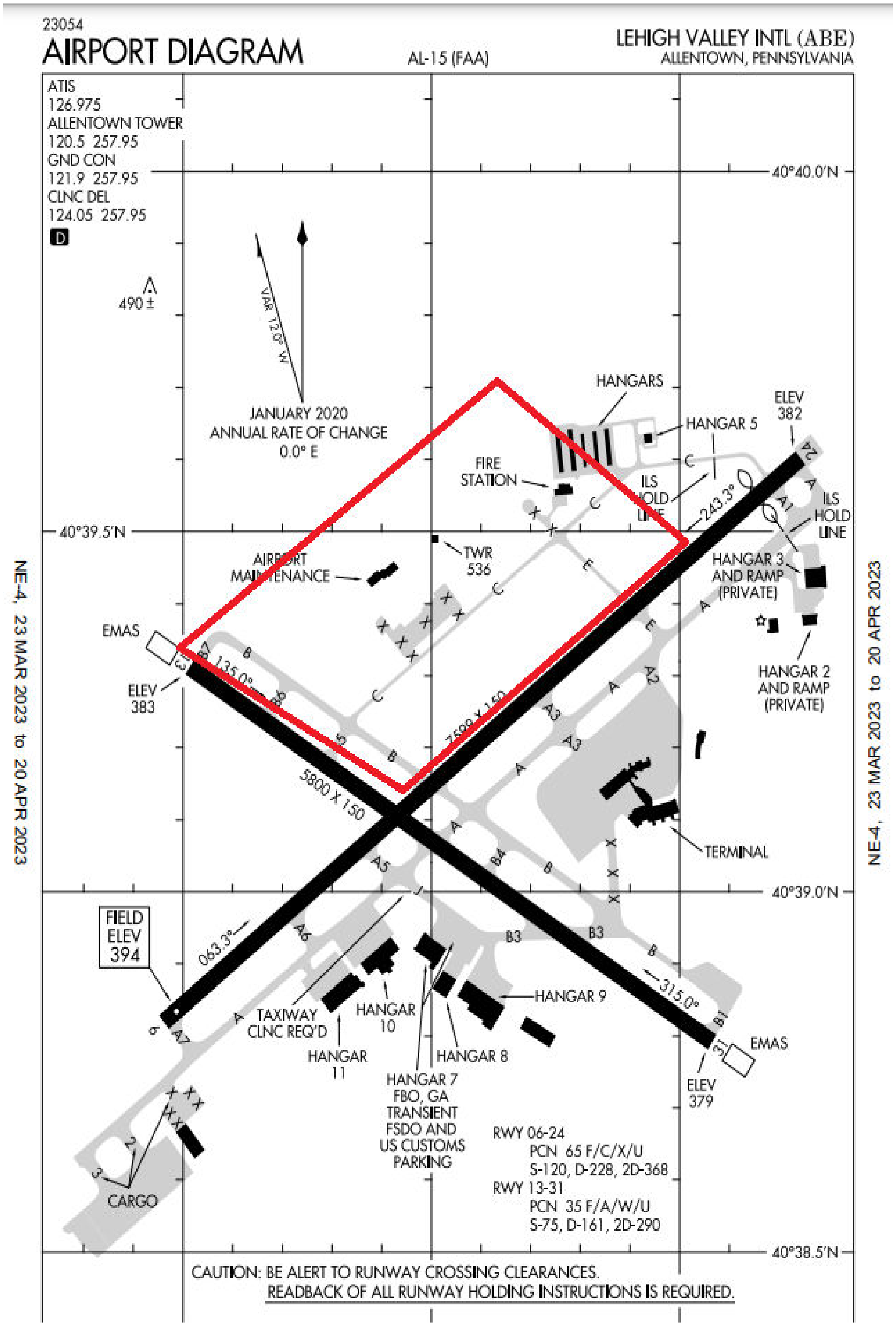
The proposed methodology to model taxiway noise follows the legacy guidance outlined in Section 9.8.7 of the INM 7.0 User's Guide and creates custom, low-altitude, low-speed, overflight profiles representing taxi segments and overflight tracks overlaid on the physical location of the taxiway segments. These profiles will have to be created for each unique combination of Aircraft Navigation Performance (ANP) aircraft and taxiway segment being evaluated. While the AEDT graphical user interface (GUI) does not permit the input of custom profiles into a model directly, they can be imported into the model database via Structured Query Language (SQL) direct injection. While this is not something that an average AEDT user could accomplish, RoVolus has expert AEDT users who are capable of creating custom profiles and using SQL to import those profiles.

The core technical steps are as follows:

1. Identify each of the physical taxi paths being modeled and define all segments of each taxi path as a series of points.
2. Create custom overflight tracks for each physical taxi path.
3. Create a new overflight profile entry in the FLT_ANP_AIRPLANE_PROFILES table for the ANP aircraft.
4. For each new overflight profile, add the appropriate series of profile points to the FLT_ANP_AIRPLANE_PROFILE_POINTS table with the following characteristics:
    a. OP_TYPE is 'V'.
    b. Altitude (nominal height of engines above ground) is 10 feet above field elevation (AFE).
        i. Note that prior analysis has shown that there are minimal auditory effects for changes in engine elevation above field elevation. Therefore, the analysis has been simplified to assume that all engines are at an altitude of 10 feet AFE.
    c. Speed is 13 knots (average taxi speed on the airfield).
    d. Thrust values for each point are defined as either idle thrust (10% of maximum static thrust) or acceleration thrust (30% of maximum static thrust)
        i. deceleration is assumed to be handled by braking, and is modeled using idle thrust
        ii. single-engine taxi operations are not modeled; all taxi operations are assumed to be conducted using all available engines
        iii. thrust settings are determined based on estimated engine setting at each profile point regardless of whether operation is an arrival or a departure
        iv. For piston-powered aircraft that have thrust settings defined in units other than pounds of thrust, such as in revolutions per minute (RPM), the maximum value in the noise-power-distance (NPD) curve for a standard departure operation will be multiplied by 20% for each point defined as idle thrust and 40% for each point defined as acceleration thrust.
    e. OP_MODE is 'A'.
    f. Distance for the first point is 0 and distance for each subsequent point is the cumulative length of taxiway segments (in feet) up to that point.
5. Create and model aircraft operations that use the appropriate combinations of the custom overflight tracks and the customized (overflight) taxiway profiles.

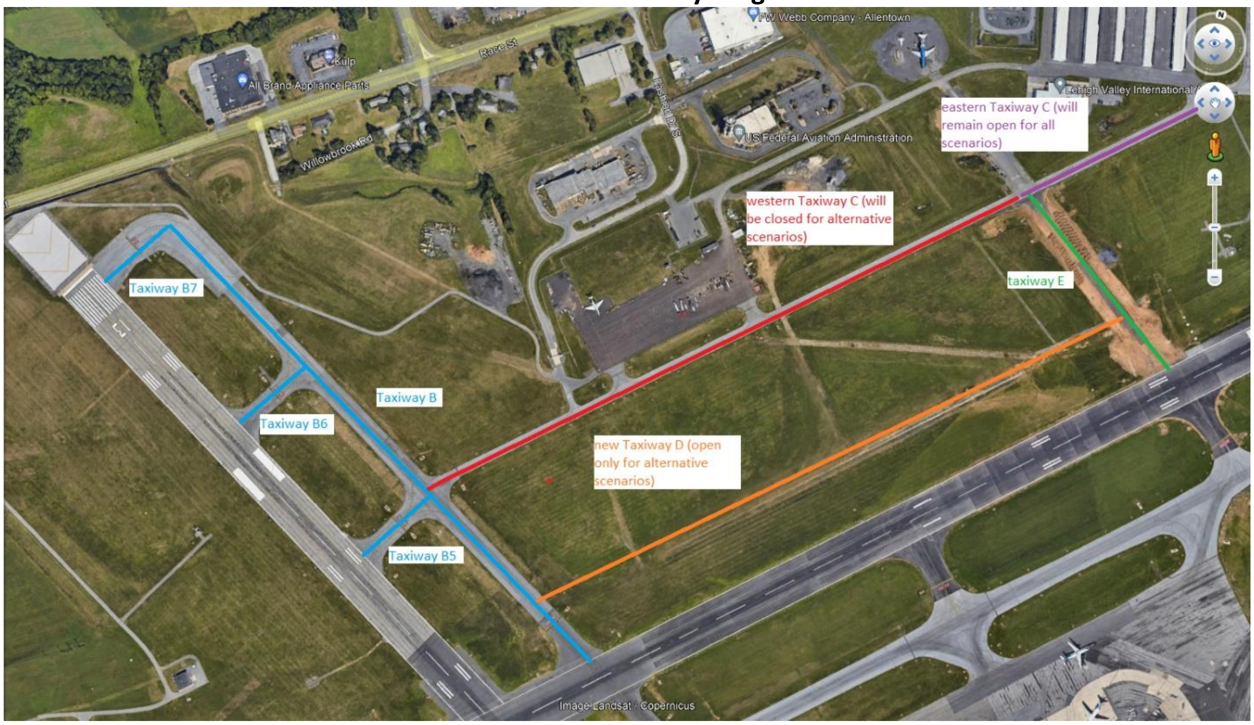
All assumptions have been developed based on expert professional opinion and via consultation with airport personnel. RoVolus proposes to use SQL to create custom taxiway profiles to model taxiway noise for all aircraft using a subset of the Airport taxiway system. This taxiway subset is identified in red in Figure 3 and detailed in Figure 4. It consists of two segments of Taxiway B (including taxiway access stubs to Runway 13-31), Taxiway C, new Taxiway D west of its intersection with Taxiway E, and Taxiway E north of Runway 6-24. These taxiways were selected for analysis because all new operations associated with the project are expected to transit them in order to reach their takeoff runway (departures) or parking spot (arrivals). Corresponding overflight tracks will be created to represent taxi paths that encompass these taxiway segments.

Figure 3
ABE Taxiway Subset to be Modeled
(outlined in red)



Source: RoVolus, July 2023

Figure 4
ABE Detailed Taxiway Diagram



Source: RoVolus, July 2023

Baseline Scenario

For the Baseline Scenario, all Runway 31 arrivals and all Runway 13 departures will be modeled for taxiway noise, as these operations, regardless of where they arrive to or depart from on the airport, must utilize Taxiway B when accessing the runway. A group of hangars north of Taxiway C (a narrow taxiway that is currently restricted to use by light aircraft of 12,500 pounds or less) is known as the Hangar 5 area, and is currently the only aircraft-serving facility located north of Runway 6-24. All other aircraft-serving facilities, including the passenger terminal, various cargo facilities, a fixed-base operator and a flight school—the latter two traditionally serving as the primary drivers of light aircraft traffic—are located south of Runway 6-24.

Since detailed surface movement data is not available at the airport, and non-light aircraft (other than those using Taxiway B to access Runway 13/31) are essentially restricted to the area of the airport south of Runway 6-24, the operational split of light aircraft allocated to different taxiway paths is estimated based on the location of airside facilities. This resulted in an estimate of 75% of light aircraft operating to/from the facilities south of Runway 6/24, while 25% operate to/from the facilities in the Hangar 5 area. This estimate was corroborated and approved by airport personnel.

Table 1 below shows all traffic modeled in the baseline scenario. It is important to note that other than the aforementioned full set of arrivals to Runway 31 and departures from Runway 13, only light aircraft operations are modeled for other runways. Non-light aircraft operations for these runways are not modeled because they do not transit the airfield within the boundaries of the study area.

Table 1
Proposed Baseline Scenario Taxiway Paths

Runway	Arrival/Departure	Type and On-Airport Origin/Destination	Taxiway Path
6	Arrivals	Light aircraft - Hangar 5 area	25% B-C, 75% E-C
6	Departures	Light aircraft - Hangar 5 area	100% C-B
13	Arrivals	Light aircraft - Hangar 5 area	50% B-C, 50% E-C
13	Departures	Light aircraft - Hangar 5 area	100% C-B-B7
13	Departures	All aircraft originating south of Runway 6/24	100% B-B7
24	Arrivals	Light aircraft - Hangar 5 area	100% B-C
24	Departures	Light aircraft - Hangar 5 area	None (aircraft not routed through study area)
31	Arrivals	Light aircraft - Hangar 5 area	40% B7-B-C, 40% B6-B-C, 20% B5-C
31	Arrivals	Light aircraft arriving/parking south of Runway 6/24	40% B7-B, 40% B6-B, 20% B5-B
31	Arrivals	All other aircraft arriving/parking south of Runway 6/24	100% B7-B
31	Departures	Light aircraft - Hangar 5 area	50% C-B, 50% C-E

Source: RoVolus, July 2023

Table 2 shows the AEDT fleet database data for the specific light aircraft (Piper PA-28 Cherokee) that has been modeled to represent a typical operation in the Baseline Scenario.

Table 2
AEDT Aircraft Data for Modeled PA-28

EQUIP_ID	3178
AIRFRAME	Piper PA-28 Cherokee Series
ANP_AIRPLANE_ID	PA28
ENGINE_CODE	IO320
ENGINE_MOD_CODE	O-320-D3G

Source: AEDT, July 2023

A generic input table for a sample PA28 taxiway profile representing a departure originating in the Hangar 5 area is shown in Table 3 below.

Table 3
Sample PA-28 Departure Operation Taxiway Profile (Hangar 5-C-B-B7)

ACFT_ID	OP_TYPE	PROF_ID1	PROF_ID2	PT_NUM	DISTANCE	ALTITUDE	SPEED	THR_SET	OP_MODE
PA28	V	PA28_dep	1	1	0	10	0.1	520	A
PA28	V	PA28_dep	1	2	50	10	6	1040	A
PA28	V	PA28_dep	1	3	100	10	13	1040	A
PA28	V	PA28_dep	1	4	150	10	13	520	A
PA28	V	PA28_dep	1	5	2541	10	13	520	A
PA28	V	PA28_dep	1	6	2665	10	13	520	A
PA28	V	PA28_dep	1	7	3954	10	13	520	A
PA28	V	PA28_dep	1	8	4124	10	13	520	A
PA28	V	PA28_dep	1	9	4290	10	13	520	A

Source: RoVolus, July 2023

In this sample taxiway profile, the aircraft is departing the Hangar 5 area which is represented by the first data point. The two following points represent the acceleration of the aircraft over the first 110 feet of the taxiway, while the subsequent thrust reduction reflects the continuation of the taxi at idle thrust to the runway threshold at Taxiway B7.

Stationary segments are not expected to be necessary for taxiway modeling at ABE for the following reasons:

- There is no evidence of significant taxiway delay at the Airport during regular operations and no expectation that the new facility will result in additional taxiway delay.
- There is only one runway crossing adjacent to the study area and aircraft will always cross it at idle power, which would not change with a stationary segment (idle power with braking)
- The majority of the time, the Airport is operated using a single runway and the other (crosswind) runway is not used.
    - In the case of Runway 13-31 operations, this would preclude most delay at the intersection of Taxiway B and Runway 6-24 as the latter runway would not be active.
    - In the case of Runway 6-24 operations, most Airport traffic originates from the south of the runway in both the Baseline and Alternative Scenarios and neither departures nor arrivals are required to cross north of Runway 6-24.

The selected taxiway profile was used to generate an SEL noise contour for a single PA-28 departure, as shown in Figure 5.

Figure 5
PA-28 Sound Exposure Level Noise Contour, Departure Operation (Hangar 5-C-B-B7)

Source: RoVolus, July 2023

Arrivals are modeled in much the same manner, except some steps are reversed. Table 4 below shows a generic input table for a sample PA-28 taxiway profile representing an arrival terminating in the Hangar 5 area. The arrival begins at Taxiway B7 at the end of Runway 31 and proceeds to the Hangar 5 area via Taxiway B and Taxiway C at 13 knots and idle thrust.

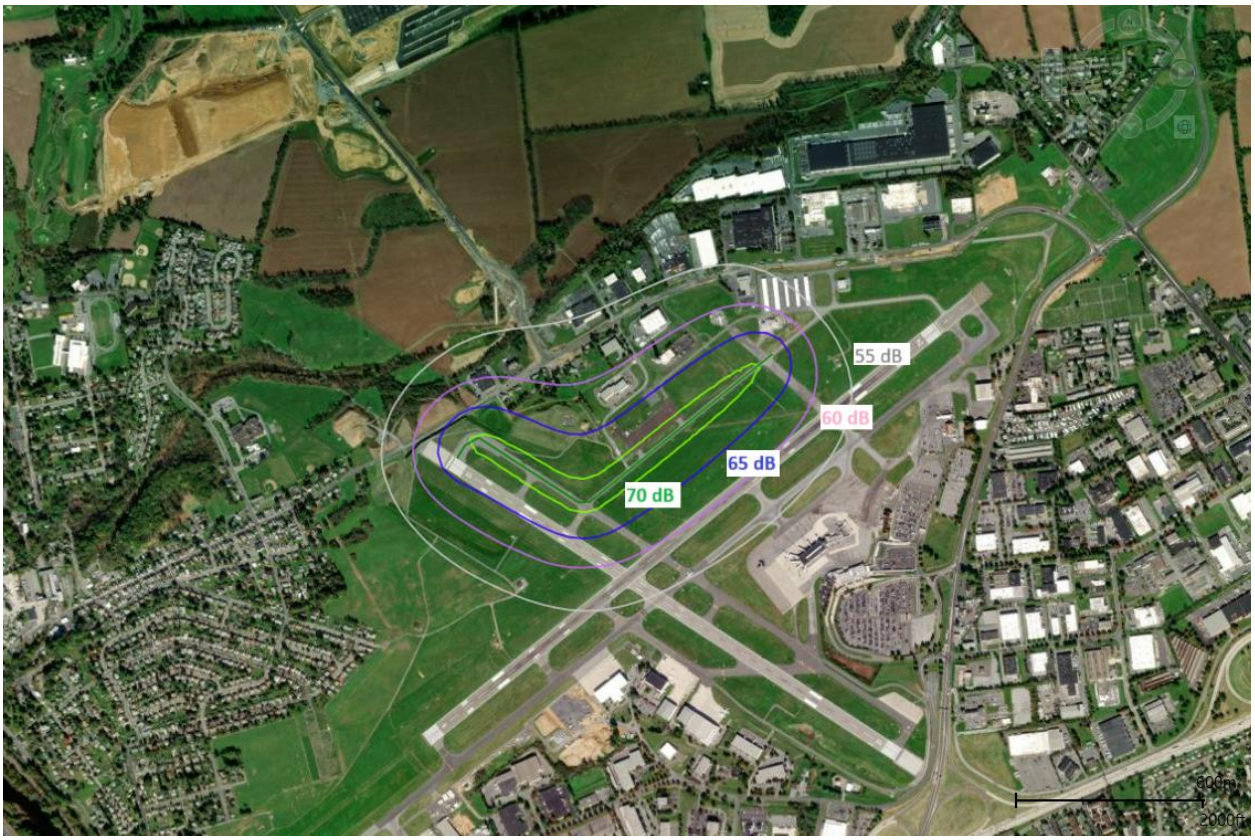
Table 4
Sample PA-28 Arrival Operation Taxiway Profile (B7-B-C-Hangar 5)

ACFT_ID	OP_TYPE	PROF_ID1	PROF_ID2	PT_NUM	DISTANCE	ALTITUDE	SPEED	THR_SET	OP_MODE
PA28	V	PA28-arr	1	1	0	10	13	520	A
PA28	V	PA28-arr	1	2	166	10	13	520	A
PA28	V	PA28-arr	1	3	336	10	13	520	A
PA28	V	PA28-arr	1	4	1625	10	13	520	A
PA28	V	PA28-arr	1	5	1749	10	13	520	A
PA28	V	PA28-arr	1	6	4180	10	13	520	A
PA28	V	PA28-arr	1	7	4230	10	13	520	A
PA28	V	PA28-arr	1	8	4290	10	13	520	A

Source: RoVolus, August 2023

Figure 6 shows the corresponding arrival profile and arrival profile noise contour for this PA-28 operation. Note that as the arrival profile hits the same taxiway points as the departure (only in reverse), the two noise contours are not identical, as there are differences in thrust settings and speeds at some points. The difference between the two noise contours is very small because the noise output of the PA-28 differs minimally between 20% thrust and 40% thrust.

Figure 6
PA-28 Sound Exposure Level Noise Contour, Arrival Operation (B7-B-C-Hangar 5)



Source: RoVolus, July 2023

Alternative Scenarios

The Alternative Scenarios will feature two primary changes that affect aircraft operations at the Airport. First, all aircraft that previously utilized Taxiway C to travel between Taxiway B and Taxiway E will use new Taxiway D in the Alternative Scenarios. Secondly, up to six B767-300 flights are expected to be added per day to reflect operations at the new cargo facility. Four of these flights represent operations that currently take place at the West Cargo area located southwest of the Runway 6 threshold, while one additional flight is modeled for the 2028 Alternative Scenario and two additional flights are modeled for the 2033 Alternative Scenario.

Taxiway E will not change dimensions in the Alternative Scenarios, but will be strengthened to reflect the increased weight requirements of the B767-300 aircraft that will use Taxiway E to connect to the new Taxiway D. Since the new Taxiway D will completely replace Taxiway C west of Taxiway E, the proportion of operations that are not affected by the proposed Project (e.g., all operations using the targeted taxiways other than the six B767-300s) will continue to use the same taxiways, with the new Taxiway D accommodating operations that were previously accommodated by Taxiway C.

Additionally, in the Alternative Scenarios, Runway 6-24 will no longer be experiencing intermittent closures as it does today. As a result, B767-300 operations at the airport are no longer expected to use Runway 13-31 and taxi path usage for B767-300 operations will reflect the sole use of Runway 6-24 for these operations. B767-300 departures from Runway 24 will be modeled in the Alternative Scenario as transiting Taxiway D to Taxiway E, while B767-300 arrivals to Runway 6 will be modeled as transiting Taxiway E to Taxiway D.

All B767-300 operations departing from and arriving to the new cargo facility will be modeled with a static engine warmup and shutdown phase. As all other operations are assumed to already be taxiing prior to entering the study area, only these operations will be modeled with the static engine warmup and shutdown phase and this phase will not be applied to other operations at the airport.

All other operations will be modeled identically to the Baseline Scenario. The proposed taxiway paths for the Alternative Scenarios are shown in Table 5 below.

Table 5
Proposed Taxiway Paths – Alternative Scenarios

Runway	Arrival/Departure	Type and On-Airport Origin/Destination	Taxiway Path
6	Arrivals	Light aircraft - Hangar 5 area	25% B-D-E-C, 75% E-C
6	Arrivals	B767-300	100% E-D-North Cargo Apron (NCA)
6	Departures	Light aircraft - Hangar 5 area	100% C-E-D-B
6	Departures	B767-300	100% NCA-D-B
13	Arrivals	Light aircraft - Hangar 5 area	50% B-D-E-C, 50% E-C
13	Departures	Light aircraft - Hangar 5 area	100% C-E-D-B-B7
13	Departures	All aircraft originating south of Runway 6/24	100% B-B7
24	Arrivals	Light aircraft - Hangar 5 area	100% B-D-E-C
24	Arrivals	B767-300	100% B-D-NCA
24	Departures	Light aircraft - Hangar 5 area	None (aircraft not routed through study area)
24	Departures	B767-300	100% NCA-D-E
31	Arrivals	Light aircraft - Hangar 5 area	40% B7-B-D-E-C, 40% B6-B-D-E-C, 20% B5-B-D-E-C
31	Arrivals	Light aircraft arriving/parking south of Runway 6/24	40% B7-B, 40% B6-B, 20% B5-B
31	Arrivals	All other aircraft arriving/parking south of Runway 6/24	100% B7-B
31	Departures	Light aircraft - Hangar 5 area	50% C-E-D-B, 50% C-E

Source: RoVolus, July 2023

Table 6 shows the AEDT fleet database data for the specific B767-300 that is modeled.

Table 6
AEDT Aircraft Data for Modeled B767-300

EQUIP_ID	397
AIRFRAME	Boeing 767-300 Series
ANP_AIRPLANE_ID	767300
ENGINE_CODE	1RR011
ENGINE_MOD_CODE	NONE

Source: AEDT, July 2023

A generic input table for a sample B767-300 taxiway profile representing a departure originating in the new cargo area is shown in Table 7 below.

Table 7
Sample B767-300 Departure Operation Taxiway Profile (NCA-D-B)

ACFT_ID	OP_TYPE	PROF_ID1	PROF_ID2	PT_NUM	DISTANCE	ALTITUDE	SPEED	THR_SET	OP_MODE
767300	V	767-dep	1	1	0	10	0.1	6000	A
767300	V	767-dep	1	2	10	10	0.1	6000	A
767300	V	767-dep	1	3	60	10	6	18000	A
767300	V	767-dep	1	4	110	10	13	18000	A
767300	V	767-dep	1	5	160	10	13	6000	A
767300	V	767-dep	1	6	359	10	13	6000	A
767300	V	767-dep	1	7	396	10	13	6000	A
767300	V	767-dep	1	8	1229	10	13	6000	A
767300	V	767-dep	1	9	1269	10	13	6000	A
767300	V	767-dep	1	10	1478	10	13	6000	A

Source: RoVolus, August 2023

In this sample taxiway profile, a static engine warmup phase is assumed, and represented by the first and second data points. Since AEDT cannot model zero-velocity points, this assumes a slow speed of 0.1 knots over a distance of 10 feet to model the engine warmup phase. The third and fourth points represent the use of acceleration thrust to begin movement from the new facility apron area. The fifth point reflects a power cutback to idle for the remainder of the taxi operation, i.e., to Taxiway B at the intersection with Runway 6-24. The thrust setting is given on a per-engine basis, and AEDT applies this setting to all engines present on an individual airframe.

The selected taxiway profile was used to generate an SEL noise contour for a single B767-300 operation, as shown in Figure 7. (Please note that contours for B767-300 operations are defined between SEL 65 dB and SEL 85 dB due to the far greater level of noise they propogate compared to the PA-28. PA-28 contours are defined between SEL 55 dB and SEL 75 dB.)

Figure 7
B767-300 Sound Exposure Level Noise Contour, Departure Operation (NCA-D-B)

Source: RoVolus, August 2023

As with PA-28 operations in the Baseline Scenario, B767-300 arrivals are modeled in much the same manner, except some steps are reversed. Table 8 below shows a generic input table for a sample B767-300 taxiway profile representing an arrival terminating in the new cargo area. The arrival enters the study area at the intersection of Taxiway B and Runway 6/24 at 13 knots and idle thrust and continues to the new cargo facility apron area at idle thrust. The sixth point of the profile represents the beginning of the deceleration phase, which uses braking and does not involve a change of thrust. The seventh point represents the beginning of the static engine shutdown phase, which is executed in the reverse order of the static engine startup phase described above, and assumes a speed of 0.1 knots over 10 feet to complete.

Table 8
Sample B767-300 Arrival Operation Taxiway Profile (B-D-NCA)

ACFT_ID	OP_TYPE	PROF_ID1	PROF_ID2	PT_NUM	DISTANCE	ALTITUDE	SPEED	THR_SET	OP_MODE
767300	V	767-arr	1	1	0	10	13	6000	A
767300	V	767-arr	1	2	209	10	13	6000	A
767300	V	767-arr	1	3	249	10	13	6000	A
767300	V	767-arr	1	4	1082	10	13	6000	A
767300	V	767-arr	1	5	1119	10	13	6000	A
767300	V	767-arr	1	6	1368	10	13	6000	A
767300	V	767-arr	1	7	1418	10	13	6000	A
767300	V	767-arr	1	8	1468	10	0.1	6000	A
767300	V	767-arr	1	9	1478	10	0.1	6000	A

Source: RoVolus, July 2023

Figure 8 shows the corresponding arrival profile noise contour for this B767-300 operation.

Figure 8
B767-300 Sound Exposure Level Noise Contour, Arrival Operation (B-D-NCA)

Source: RoVolus, August 2023