

## Chapter 3 Baseline Noise Exposure

### 3.1 Overview

The discussion of the affected environment for noise and compatible land uses describes the existing noise exposure on communities surrounding John Glenn Columbus International Airport (CMH or Airport). The noise analysis presents the noise exposure for the existing conditions base year – 2020. Aircraft-related noise exposure is defined through noise contours prepared using the Federal Aviation Administration (FAA) Aviation Environmental Design Tool (AEDT) Version 3b. This noise exposure is presented using the Day-Night Average Sound Level (DNL) metric.

In addition to the Existing (2020) Baseline Noise conditions, this chapter provides information about the current and potential noise levels in 2025 if no action is taken to change the noise exposure pattern through abatement. The noise patterns are presented on exhibits, and the numbers of persons and housing units that fall within them are quantified.

An explanation of the AEDT and the DNL metric, along with a review of the physics of noise, noise impacts on humans, social impacts of noise, and the data required to develop noise exposure contours, is summarized in **Appendix C, Noise Methodology**. This information details the operating characteristics in use at the Airport, the number of operations, and the use of flight paths to and from the airport both now and as they are expected to be in 2025.

### 3.2 Existing (2020) Baseline Noise Contour

The number of operations, runway use, flight track, and trip length data presented in Appendix C, *Noise Methodology*, are used as input to the AEDT computer model for calculation of noise exposure in the airport environs. **Exhibit 3-1, Existing (2020) Baseline Noise Contour**, reflects the average annual noise exposure pattern present at the airport during the existing baseline period and **Table 3-1** summarizes the area within each noise contour level. Noise contours are presented for the 60, 65, 70, and 75 DNL. The FAA uses the 65 DNL as the noise level in which noise-sensitive land uses (residences, churches, schools, libraries, and nursing homes) become significantly impacted. Below the 65 DNL, all land uses are determined to be compatible. However, the Columbus Regional Airport Authority (CRAA) has chosen to show the 60 DNL because it indicates marginal noise impacts and is useful for land use planning purposes.

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**Legend**

- Existing (2020) Baseline Noise Exposure Contour - 60 DNL
- Existing (2020) Baseline Noise Exposure Contour - 65+ DNL
- Single-Family Residential
- Two-Family Residential
- Multi-Family Residential
- Mobile Home Park
- Agriculture / Open Space
- Park / Recreation
- Institutional
- Industrial
- Commercial
- Exempt / Unclassified
- Airport Property Boundary
- General Study Area
- Municipal Boundary
- Township Boundary
- County Boundary

Note: In accordance with 14 CFR Part 150 Land Use Compatibility Guidelines, all land uses are compatible with noise levels below 65 DNL. The 60 DNL noise contour is shown for informational purposes only.



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**Table 3-1 Areas Within Existing (2020) Noise Exposure Contour (in Square Miles)**

Contour Range	Existing (2020) Baseline
60-65 DNL*	5.0
65-70 DNL	1.8
70-75 DNL	0.5
75 + DNL	0.4
65 + DNL	2.7

\*Note: In accordance with 14 CFR Part 150 Land Use Compatibility Guidelines, all land uses are compatible with noise levels below 65 DNL. The 60-65 DNL noise contour is shown for informational purposes only.

Source: Landrum & Brown, 2020.

A DNL noise contour does not represent the noise levels present on any specific day, but, represents the energy-average of all 365 days of operation during the year. Noise contour patterns extend from an airport along each extended runway centerline, reflective of the flight tracks used by all aircraft. The relative distance of a contour from the Airport along each route is a function of the frequency of use of each runway end for total arrivals and departures, as well as use at night, and the type of aircraft assigned to each runway end.

The size and shape of the noise contours for CMH are a function of the combination of flight tracks and runway use. During the existing baseline period, the airport operated approximately 75 percent of the time in west flow (arriving to and departing from Runways 28L/28R) and approximately 25 percent of the time in east flow (arriving to and departing from Runways 10L/10R). Typically, noise contours from departure operations are typically wider due to the wider distribution of flight corridors and higher engine thrust settings on departure compared to arrivals. As a result, the Existing (2020) Baseline noise contour is longer and wider to the west of the Airport than to the east.

The south runway (Runway 10R/28L) is the most heavily used runway because it is the longer of the two runways on the airfield. For this reason, the Existing (2020) Baseline noise contour extends farther out in both directions along the extended centerline of this runway as compared to the north runway.

West of the Airport, the noise contour primarily reflects usage by aircraft departing to the west and to a lesser degree aircraft arriving from the west. The 65 DNL of the Existing (2020) Noise Contour extends approximately 1.1 miles beyond the west end of Runway 10R/28L and extends approximately 0.9 miles beyond the west end of Runway 10L/28R. This area is comprised of a mix of medium-density residential, commercial, and industrial uses located in the City of Columbus and Mifflin Township. The 60 DNL of the Existing (2020) Noise Contour extends approximately 2.9 miles beyond the west end of Runway 10R/28L and extends approximately 2.4 miles beyond the west end of Runway 10L/28R. The area between the 60 and 65 DNL is comprised of medium density residential, commercial, and industrial uses located in the City of Columbus.

To the east of the Airport, the noise contour primarily reflects usage by aircraft arriving from the east and to a lesser degree aircraft departing to the east. The 65 DNL of the Existing (2020) Noise Contour extends approximately 1.7 miles east from the end of Runway 10R/28L and extends approximately 0.8 miles east from the end of Runway 10L/28R. The area east of the airport within the 65 DNL is comprised of commercial and industrial land uses, and undeveloped land within the cities of Columbus and Gahanna. The 60 DNL of the Existing (2020) Noise Contour extends approximately 3.8 miles beyond the east end of Runway 10R/28L and extends approximately 2.6 miles beyond Runway 10L/28R. The area between the 60 and 65 DNL is comprised of a mix of low to medium density residential, commercial, and industrial land uses and

undeveloped property located in the cities of Columbus and Gahanna and Jefferson Township. The 70 and 75 DNL of the Existing (2020) Noise Contour remain over airport property.

### 3.3 Future (2025) Baseline Noise Contour

The baseline noise exposure contour projected for 2025 is presented in **Exhibit 3-2, Future (2025) Baseline Noise Contour**. This projected contour assumes growth as forecasted in the *Aviation Activity Forecast, John Glenn Columbus International Airport* (See Appendix H). This forecast was approved by the FAA on March 3, 2020. The Future (2025) Baseline noise contour is larger than the Existing (2020) Baseline noise contour due to a projected increase in the number of operations. **Table 3-2** provides a comparison of the areas within the Existing (2020) Baseline and Future (2025) Baseline noise contours.

**Table 3-2 Comparison of Areas Within Existing (2020) and Future (2025) Noise Exposure Contour (in Square Miles)**

Contour Range	Existing (2020) Baseline	Future (2025) Baseline	Difference
60-65 DNL*	5.0	5.6	0.6
65-70 DNL	1.8	2.2	0.4
70-75 DNL	0.5	0.6	0.1
75 + DNL	0.4	0.4	0.0
65 + DNL	2.7	3.2	0.5

\*Note: In accordance with 14 CFR Part 150 Land Use Compatibility Guidelines, all land uses are compatible with noise levels below 65 DNL. The 60-65 DNL noise contour is shown for informational purposes only.

Source: Landrum & Brown, 2020.

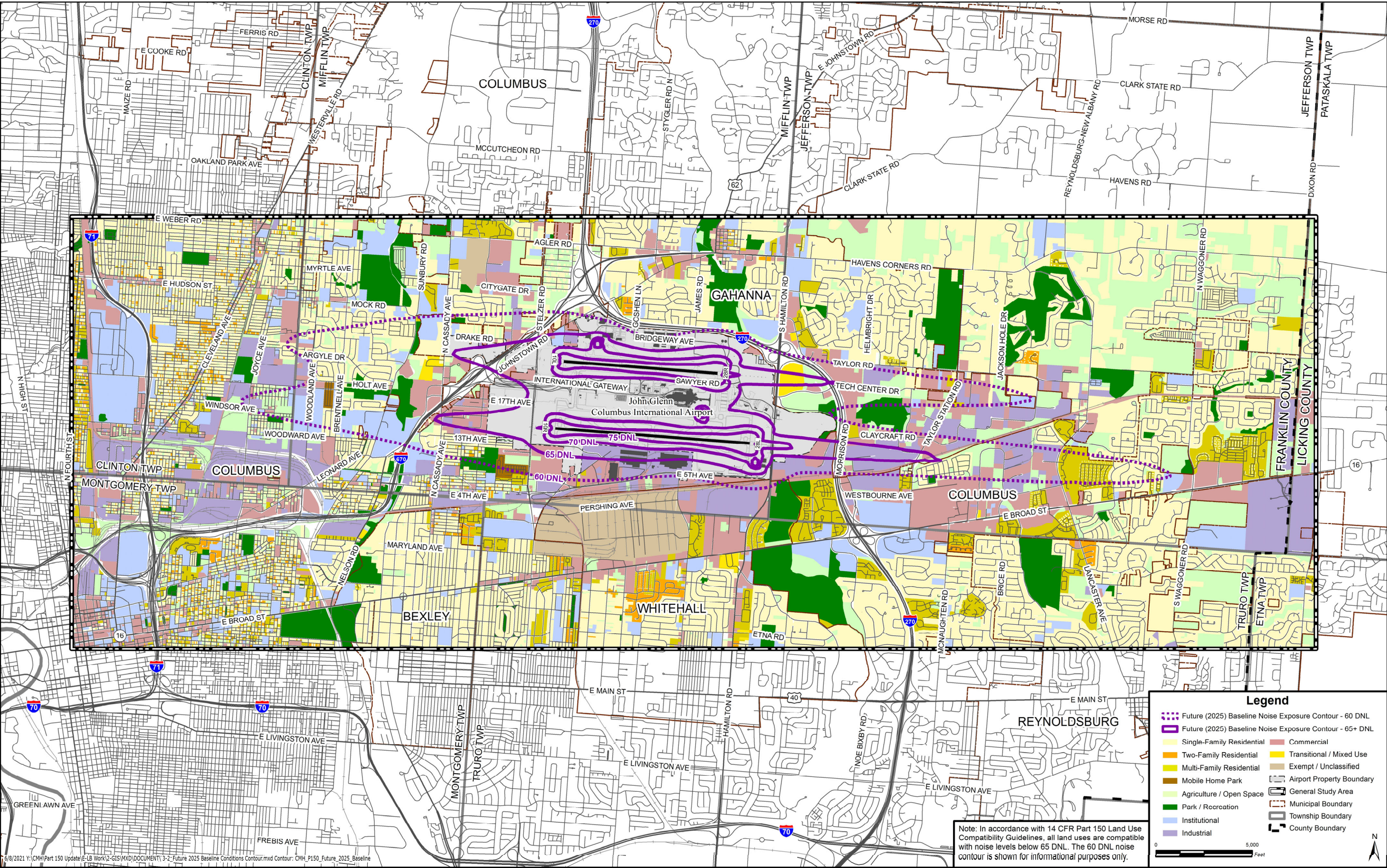
For the Future (2025) Baseline conditions, operating levels are expected to increase from 369.9 average annual day operations to 411.4 average annual day operations. The Future (2025) Baseline noise contour increases in size compared to the Existing (2020) Baseline noise contour due to the increase in operations projected for 2025. The shape of the Future (2025) Baseline noise contour remains similar to the Existing (2020) noise contour because runway use patterns and flight tracks would be expected to remain similar to Existing (2020) conditions with minor variations in runway use based on long-term wind and weather patterns.

The 65 DNL of the Future (2025) Noise Contour extends approximately 1.2 miles beyond the west end of Runway 10R/28L and extends approximately 1.1 miles beyond the west end of Runway 10L/28R. The 60 DNL of the Future (2025) Noise Contour extends approximately 3.1 miles beyond the west end of Runway 10R/28L and extends approximately 2.7 miles beyond the west end of Runway 10L/28R.

The 65 DNL of the Future (2025) Noise Contour extends approximately 1.9 miles east from the end of Runway 10R/28L and extends approximately 1.2 miles east from the end of Runway 10L/28R. The 60 DNL of the Future (2025) Noise Contour extends approximately 4.1 miles beyond the east end of Runway 10R/28L and extends approximately 3.1 miles beyond Runway 10L/28R. The 70 and 75 DNL of the Future (2025) Noise Contour remain over airport property.



Exhibit 3-2 Future (2025) Baseline Noise Contour





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### 3.4 Baseline Noise Contour Incompatibilities

Identifying and evaluating all land uses within the airport environs is necessary to quantify the number of residential and other noise-sensitive land uses that are impacted by aircraft noise. Chapter Two, *Affected Environment*, and **Appendix D, *Land Use Assessment Methodology***, summarize the land use data collection process. The FAA has created land use compatibility guidelines relating types of land use to airport sound levels. These guidelines are defined in 14 CFR Part 150, *Land Use Compatibility with Yearly Day-Night Average Sound Levels*. The compatibility table is reproduced in Appendix A, *FAA Policies, Guidance, and Regulations*, of this document (see Table A-1).

These guidelines show the compatibility parameters for residential, public (schools, churches, nursing homes, hospitals, libraries), commercial, manufacturing and production, and recreational land uses. All land uses exposed to noise levels below the 65 DNL noise contour are generally considered compatible with airport operations. Information about land uses within the 60-65 DNL noise contour band is shown for informational purposes only.

Summaries of the residential population, housing units, and noise-sensitive facilities affected by noise level for the Existing (2020) and Future (2025) Baseline noise contours are provided in **Table 3-3** and **Table 3-4**. A summary of the impacts for the Existing (2020) and Future (2025) Baseline is provided in **Table 3-5**. These tables show the number of housing units within each noise contour band (e.g. 60-65 DNL, 65-70 DNL) by jurisdiction. The tables also present the current mitigation status of each housing unit. Some housing units have been previously sound insulated, or the owner granted an aviation easement for the property, in which cases the housing unit is considered to be mitigated. Unmitigated housing units include those that are not within the sound insulation program boundary and are not previously mitigated, and housing units that were potentially eligible but not sound insulated. Housing units that were potentially eligible but not sound insulated include those in which the owners declined or did not respond to an offer to sound insulate the housing unit, or housing units that were tested and determined to already achieve the acceptable level of sound attenuation.

There are no housing units located within the 65+ DNL of the Existing (2020) Baseline noise contour. There is one school / educational facility, the Franklin County Board of Developmental Disabilities (FCBDD) Early Childhood Education Center, within the 65+ DNL of the Existing (2020) Baseline noise contour. There are no places of worship, libraries, hospitals, or nursing homes located within the 65+ DNL of the Existing (2020) Baseline noise contour. There are approximately 3,282 housing units; an estimated 7,020 residents, 11 churches / places of worship, and six schools / educational facilities within the 60-65 DNL of the Existing (2020) Baseline noise contour. All land uses below 65 DNL are considered compatible for Part 150 purposes and are presented here for informational purposes only.

There are two homes and an estimated five residents that would be located within the 65+ DNL of the Future (2025) Baseline noise contour. There is one school / educational facility, the FCBDD Early Childhood Education Center, within the 65+ DNL of the Future (2025) Baseline noise contour. There are no places of worship, libraries, hospitals, or nursing homes located within the 65+ DNL of the Future (2025) Baseline noise contour.

There are approximately 4,550 housing units; an estimated 9,920 residents, 20 churches / places of worship, eight schools / educational facilities, and one nursing home within the 60-65 DNL of the Future (2025) Baseline noise contour. All land uses below 65 DNL are considered compatible for Part 150 purposes and are presented here for informational purposes only.

**Table 3-3 Existing (2020) Baseline Housing, Population, and Noise-Sensitive Facility Incompatibilities**

	60-65 DNL*	65-70 DNL	70-75 DNL	75+ DNL	65+ DNL
<b>Housing Units</b>					
<b>Columbus</b>	<b>3,037</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
Mitigated	718	0	0	0	0
Sound Insulated	680	0	0	0	0
Easement	38	0	0	0	0
Unmitigated	2,319	0	0	0	0
Potentially Eligible but not Sound Insulated	140	0	0	0	0
Not Previously Mitigated	2,179	0	0	0	0
<b>Mifflin Township</b>	<b>49</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
Mitigated	35	0	0	0	0
Sound Insulated	35	0	0	0	0
Easement	0	0	0	0	0
Unmitigated	14	0	0	0	0
Potentially Eligible but not Sound Insulated	11	0	0	0	0
Not Previously Mitigated	3	0	0	0	0
<b>Gahanna</b>	<b>155</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
Mitigated	0	0	0	0	0
Sound Insulated	0	0	0	0	0
Easement	0	0	0	0	0
Unmitigated	155	0	0	0	0
Potentially Eligible but not Sound Insulated	1	0	0	0	0
Not Previously Mitigated	154	0	0	0	0
<b>Jefferson Township</b>	<b>41</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
Mitigated	0	0	0	0	0
Sound Insulated	0	0	0	0	0
Easement	0	0	0	0	0
Unmitigated	41	0	0	0	0
Potentially Eligible but not Sound Insulated	0	0	0	0	0
Not Previously Mitigated	41	0	0	0	0
<b>Total Housing Units</b>	<b>3,282</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Population</b>					
<b>Total Population</b>	<b>7,020</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Noise-Sensitive Facilities</b>					
Churches / Places of Worship	11	0	0	0	0
Schools / Educational Facilities	6	1	0	0	0
Libraries	0	0	0	0	0
Hospitals	0	0	0	0	0
Nursing Homes	0	0	0	0	0

Notes:

\* In accordance with 14 CFR Part 150 Land Use Compatibility Guidelines, all land uses are compatible with noise levels below 65 DNL. The counts of land uses within the 60-65 DNL noise contour are shown for informational purposes only.

Noise contours were generated using the FAA's AEDT, Version 3b computer model.

Housing counts are based on field verification.

Population numbers are estimated based on the housing counts multiplied by the average household size from the 2000 Census.

Source: Landrum & Brown, 2020.



**Table 3-4 Future (2025) Baseline Housing, Population, and Noise-Sensitive Facility Incompatibilities**

	60-65 DNL*	65-70 DNL	70-75 DNL	75+ DNL	65+ DNL
<b>Housing Units</b>					
<b>Columbus</b>	<b>4,034</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>1</b>
Mitigated	720	0	0	0	0
Sound Insulated	682	0	0	0	0
Easement	38	0	0	0	0
Unmitigated	3,314	1	0	0	1
Eligible for Sound Insulation but not Insulated	141	0	0	0	0
Not Previously Mitigated	3,173	1	0	0	1
<b>Mifflin Township</b>	<b>57</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
Mitigated	35	0	0	0	0
Sound Insulated	35	0	0	0	0
Easement	0	0	0	0	0
Unmitigated	22	0	0	0	0
Eligible for Sound Insulation but not Insulated	11	0	0	0	0
Not Previously Mitigated	11	0	0	0	0
<b>Gahanna</b>	<b>313</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>1</b>
Mitigated	0	0	0	0	0
Sound Insulated	0	0	0	0	0
Easement	0	0	0	0	0
Unmitigated	313	1	0	0	1
Eligible for Sound Insulation but not Insulated	0	1	0	0	1
Not Previously Mitigated	313	0	0	0	0
<b>Jefferson Township</b>	<b>146</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
Mitigated	12	0	0	0	0
Sound Insulated	0	0	0	0	0
Easement	12	0	0	0	0
Unmitigated	134	0	0	0	0
Eligible for Sound Insulation but not Insulated	0	0	0	0	0
Not Previously Mitigated	134	0	0	0	0
<b>Total Housing Units</b>	<b>4,550</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>2</b>
<b>Population</b>					
<b>Total Population</b>	<b>9,920</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>5</b>
<b>Noise-Sensitive Facilities</b>					
Churches / Places of Worship	20	0	0	0	0
Schools / Educational Facilities	8	1	0	0	1
Libraries	0	0	0	0	0
Hospitals	0	0	0	0	0
Nursing Homes	1	0	0	0	0

Notes:

\* In accordance with 14 CFR Part 150 Land Use Compatibility Guidelines, all land uses are compatible with noise levels below 65 DNL. The counts of land uses within the 60-65 DNL noise contour are shown for informational purposes only.

Noise contours were generated using the FAA's AEDT, Version 3b computer model.

Housing counts are based on field verification.

Population numbers are estimated based on the housing counts multiplied by the average household size from the 2000 Census.

Source: Landrum & Brown, 2020.

**Table 3-5 Existing (2020) Baseline versus Future (2025) Baseline Housing, Population, and Noise-Sensitive Facility Incompatibilities**

Category	Existing (2020) Baseline	Future (2025) Baseline
<b>Housing Units</b>		
60 – 65 DNL *	3,282	4,550
65 – 70 DNL	0	2
70 – 75 DNL	0	0
75+ DNL	0	0
65+ DNL	0	2
<b>Population</b>		
60 – 65 DNL *	7,020	9,920
65 – 70 DNL	0	5
70 – 75 DNL	0	0
75+ DNL	0	0
65+ DNL	0	5
<b>Noise-Sensitive Facilities (Churches, Schools, Libraries, and Nursing Homes)</b>		
60 – 65 DNL *	17	29
65 – 70 DNL	1	1
70 – 75 DNL	0	0
75+ DNL	0	0
65+ DNL	1	1

## Notes:

\* In accordance with 14 CFR Part 150 Land Use Compatibility Guidelines, all land uses are compatible with noise levels below 65 DNL. The counts of land uses within the 60-65 DNL noise contour are shown for informational purposes only.

Noise contours were generated using the FAA's AEDT, Version 3b computer model.

Housing counts are based on field verification.

Population numbers are estimated based on the housing counts multiplied by the average household size from the 2000 Census.

Source: Landrum & Brown, 2020.