

## CHAPTER THREE

# 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 Port Columbus International Airport (CMH). The noise analysis presents the noise exposure for the existing conditions base year – 2006. Aircraft-related noise exposure is defined through noise contours prepared using the Federal Aviation Administration (FAA) Integrated Noise Model (INM). This noise exposure is presented using the Day-Night Average Sound Level (DNL) metric.

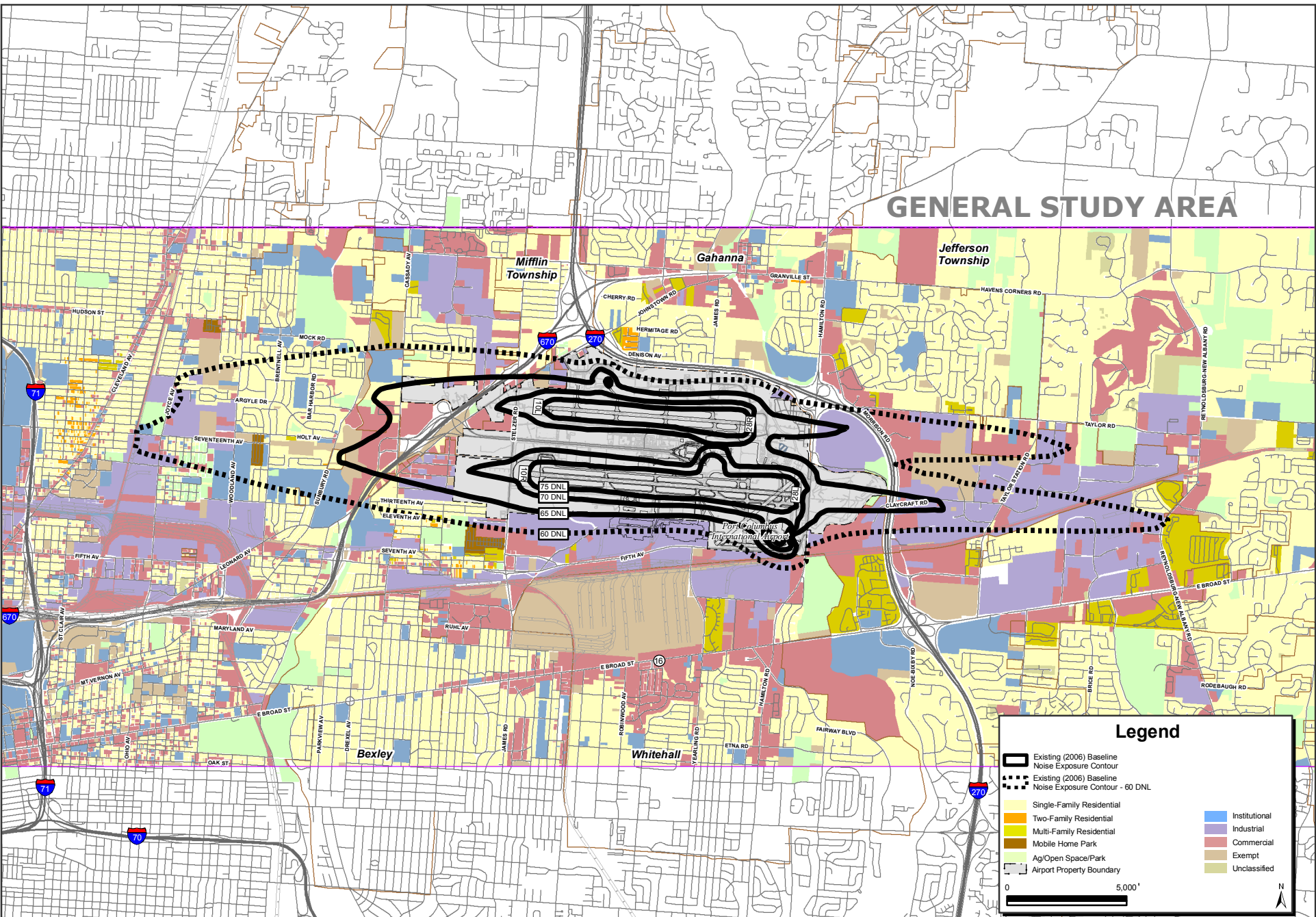
In addition to the Existing (2006) Baseline Noise conditions, this chapter provides information about the current and potential noise levels in 2012 if no action is taken to change the noise exposure pattern through abatement. The noise patterns are presented on exhibits, and the numbers of persons and housing units that fall within them are quantified. The 2012 condition does include the proposed relocation of Runway 10R/28L, 702 feet to the south of the existing location. The relocation of Runway 10R/28L is the subject of an Environmental Impact Statement (EIS) that is being prepared by the FAA. The EIS is expected to be complete in April 2009.

An explanation of the INM 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 2012.

### 3.2 EXISTING (2006) BASELINE NOISE CONTOUR

The number of operations, runway use, flight track, and trip length data presented in Appendix C, *Noise Modeling Methodology*, are used as input to the INM computer model for calculation of noise exposure in the airport environs. **Exhibit 3-1, Existing (2006) Baseline Noise Exposure 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.

# GENERAL STUDY AREA



### Legend

- Existing (2006) Baseline Noise Exposure Contour
- Existing (2006) Baseline Noise Exposure Contour - 60 DNL
- Single-Family Residential
- Two-Family Residential
- Multi-Family Residential
- Mobile Home Park
- Ag/Open Space/Park
- Airport Property Boundary
- Institutional
- Industrial
- Commercial
- Exempt
- Unclassified

0 5,000'

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**Table 3-1  
AREAS WITHIN EXISTING  
NOISE EXPOSURE CONTOUR (IN SQUARE MILES)  
Port Columbus International Airport**

<b>CONTOUR RANGE</b>	<b>EXISTING (2006) BASELINE</b>
60-65 DNL	4.3
65-70 DNL	2.1
70-75 DNL	0.7
75 + DNL	0.8
65 + DNL	3.6

Contour: 2006\_Baseline-rev7

Source: Landrum & Brown, 2007.

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 its use at night, and the type of aircraft assigned to it.

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 75 percent of the time in west flow (arriving to and departing from Runways 28L/28R) and 25 percent of the time in east flow (arriving to and departing from Runways 10L/10R). As a result, the Existing (2006) 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 (2006) 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 noise contour extends approximately 1.6 miles beyond the west end of Runway 10R/28L and extends approximately 1.4 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 noise contour extends approximately 3.2 miles beyond the west end of Runway 10R/28L and extends approximately 3.0 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 noise contour extends approximately 1.3 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 noise contour extends approximately 3.0 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 contours remain over airport property.

### **3.3 FUTURE (2012) BASELINE NOISE CONTOUR**

The baseline noise exposure contour projected for 2012 is presented in **Exhibit 3-2, Future (2012) Baseline Noise Contour**. This projected contour assumes growth as forecasted in the *Aviation Activity Forecast, Port Columbus International Airport* (See Appendix J). This forecast was approved by the FAA on January 9, 2007. The Future (2012) Baseline noise contour is larger than the Existing (2006) Baseline noise contour due to a projected increase in the number of operations and the proposed relocation of Runway 10R/28L. **Table 3-2** provides a comparison of the areas within the Existing (2006) Baseline and Future (2012) Baseline noise contours.

**Table 3-2  
COMPARISON OF AREAS WITHIN FUTURE (2012) AND EXISTING (2006)  
NOISE EXPOSURE CONTOUR (IN SQUARE MILES)  
Port Columbus International Airport**

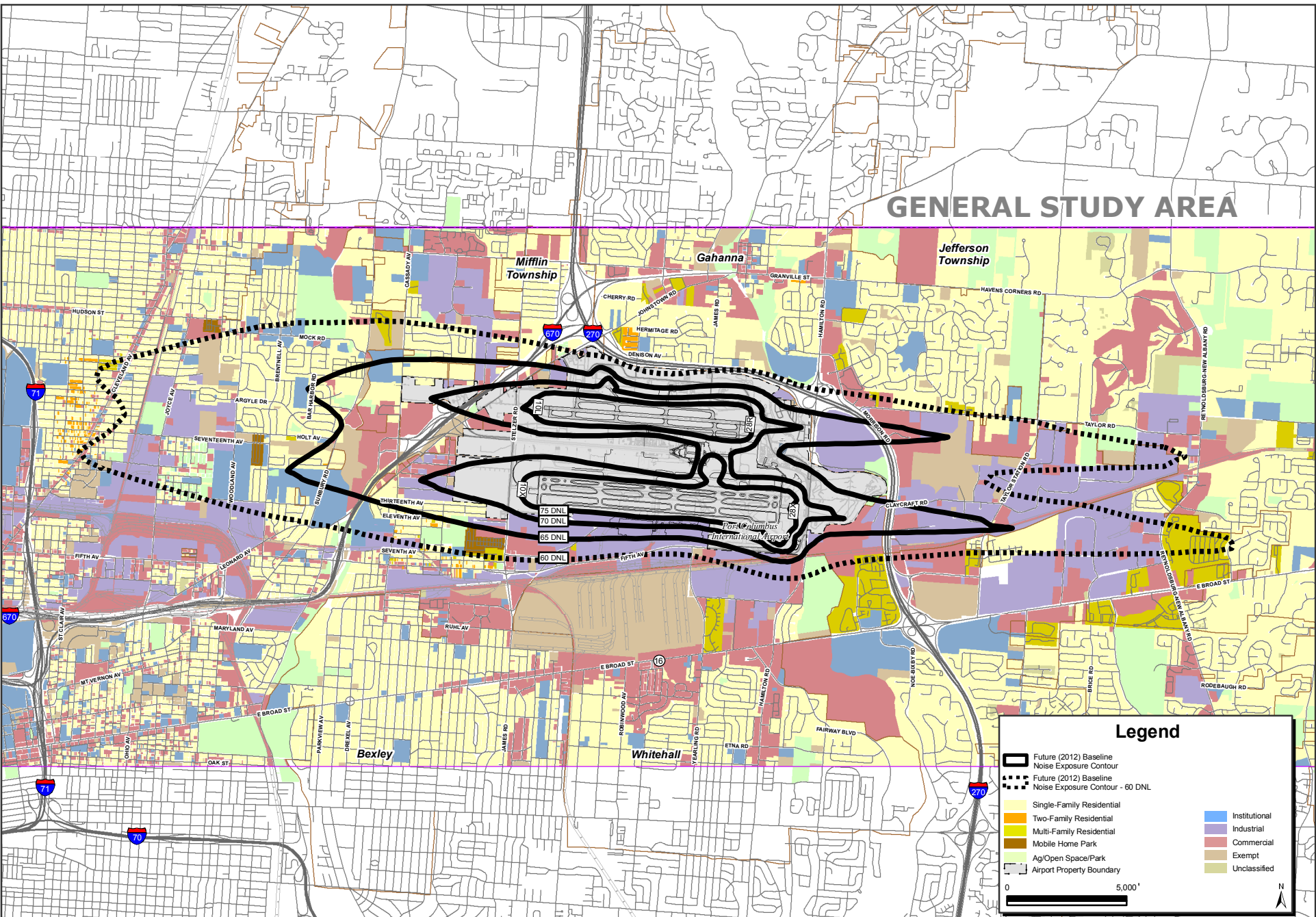
<b>CONTOUR RANGE</b>	<b>EXISTING (2006) BASELINE</b>	<b>FUTURE (2012) BASELINE</b>	<b>DIFFERENCE</b>
60-65 DNL	4.3	6.0	1.7
65-70 DNL	2.1	3.0	0.9
70-75 DNL	0.7	1.1	0.4
75 + DNL	0.8	1.1	0.3
65 + DNL	3.6	5.2	1.6

Contour: 2006\_Baseline-rev5/ 2012\_WP\_rev7

Source: Landrum & Brown, 2007.

For the Future (2012) Baseline conditions, operating levels are expected to increase from 540 average annual day operations to 662 average annual day operations. The proposed relocated runway would shift operations farther south. The flight paths that aircraft would use when arriving to and departing from the proposed relocated runway would shift south by approximately 702 feet. Current arrival and departure procedures would remain the same for the proposed relocated runway. However, because the location of the flight paths shift, new areas would be directly overflown.

# GENERAL STUDY AREA



### Legend

- Future (2012) Baseline Noise Exposure Contour
- Future (2012) Baseline Noise Exposure Contour - 60 DNL
- Single-Family Residential
- Two-Family Residential
- Multi-Family Residential
- Mobile Home Park
- Ag/Open Space/Park
- Airport Property Boundary
- Institutional
- Industrial
- Commercial
- Exempt
- Unclassified

0 5,000'

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The Future (2012) Baseline noise contour increases in size compared to the Existing (2006) Baseline noise contour due to the increase in operations projected for 2012. The Future (2012) Baseline noise contour extends farther south than the Existing (2006) Baseline noise contour due to the proposed relocation of Runway 10R/28L. The shape of the Future (2012) Baseline noise contour remains similar to the Existing (2006) noise contour because there would be no change in runway use or flight tracks, with the exception of the 702 foot shift.

### **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.

Summaries of the residential population, housing units, and noise-sensitive facilities affected by noise levels exceeding 60 DNL for the Existing (2006) and Future (2012) Baseline noise contours are provided in **Table 3-3** and **Table 3-4**. A summary of the impacts for the Existing (2006) and Future (2012) Baseline is provided in **Table 3-5**.

There are 12 housing units and an estimated 30 residents located within the 65 DNL of the Existing (2006) Baseline noise contour. All 12 of those housing units have received sound insulation, and are therefore considered mitigated. There are no churches, schools, libraries, hospitals, or nursing homes located within the 65 DNL of the Existing (2006) Baseline noise contour. There are approximately 2,640 housing units; an estimated 6,510 residents; 18 churches; and two schools within the 60-65 DNL of the Existing (2006) Baseline noise contour.

Approximately 700 homes and an estimated 1,729 residents will be located within the 65 DNL of the Future (2012) Baseline noise contour. Of those 700 housing units, 642 are within the City of Columbus and 58 are within Mifflin Township. A total of 337 have received sound insulation (301 in Columbus and 36 in Mifflin Township). Of the remaining 363 unmitigated housing units, 98 were offered sound insulation but chose not to participate in the sound insulation program and 265 are newly impacted.

There are no churches, schools, libraries, hospitals, or nursing homes located within the 65 DNL of the Future (2012) Baseline noise contour. There will be 5,584 housing units; an estimated 13,736 residents; 37 churches; and eight schools located within the 60-65 DNL of the Future (2012) Baseline noise contour.

All of the homes located within the 60-65 DNL of both the Existing (2006) and Future (2012) Baseline noise contours are located in the cities of Columbus and Gahanna and Jefferson and Mifflin Townships in Franklin County.

**Table 3-3**  
**EXISTING (2006) BASELINE HOUSING, POPULATION, AND**  
**NOISE-SENSITIVE FACILITY INCOMPATIBILITIES**  
**Port Columbus International Airport**

	60-65 DNL	65-70 DNL	70-75 DNL	75+ DNL	65+ DNL
<b>Housing Units</b>					
<b>Columbus</b>	<b>2,579</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
Mitigated	672	0	0	0	0
Sound Insulated	652	0	0	0	0
Easement	20	0	0	0	0
Unmitigated	1,907	0	0	0	0
Eligible for Sound Insulation but not Insulated	160	0	0	0	0
Not Previously Mitigated	1,747	0	0	0	0
<b>Mifflin Township</b>	<b>50</b>	<b>12</b>	<b>0</b>	<b>0</b>	<b>12</b>
Mitigated	24	12	0	0	12
Sound Insulated	24	12	0	0	12
Easement	0	0	0	0	0
Unmitigated	26	0	0	0	0
Eligible for Sound Insulation but not Insulated	19	0	0	0	0
Not Previously Mitigated	7	0	0	0	0
<b>Gahanna</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
Mitigated	2	0	0	0	0
Sound Insulated	2	0	0	0	0
Easement	0	0	0	0	0
Unmitigated	0	0	0	0	0
Eligible for Sound Insulation but not Insulated	0	0	0	0	0
Not Previously Mitigated	0	0	0	0	0
<b>Jefferson Township</b>	<b>5</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	5	0	0	0	0
Eligible for Sound Insulation but not Insulated	0	0	0	0	0
Not Previously Mitigated	5	0	0	0	0
<b>Total Housing Units</b>	<b>2,636</b>	<b>12</b>	<b>0</b>	<b>0</b>	<b>12</b>
<b>Population</b>					
<b>Total Population</b>	<b>6,511</b>	<b>30</b>	<b>0</b>	<b>0</b>	<b>30</b>
<b>Noise-Sensitive Facilities</b>					
Churches	18	0	0	0	0
Schools	2	0	0	0	0
Libraries	0	0	0	0	0
Hospitals	0	0	0	0	0
Nursing Homes	0	0	0	0	0

Notes:

- \* FAA Part 150 Land Use Compatibility Guidelines indicate that residential land uses are compatible with noise levels below 65 DNL.
- Noise contours were generated using the Integrated FAA's Noise Model, Version 6.2 computer model.
- Housing counts are based on field verification.
- Population numbers are approximate based on the housing counts multiplied by the 2000 Census housing to population ratio.

Source: Landrum & Brown, 2007.

**Table 3-4  
 FUTURE (2012) BASELINE HOUSING, POPULATION, AND  
 NOISE-SENSITIVE FACILITY INCOMPATIBILITIES  
 Port Columbus International Airport**

	60-65 DNL	65-70 DNL	70-75 DNL	75+ DNL	65+ DNL
<b>Housing Units</b>					
<b>Columbus</b>	<b>5,526</b>	<b>642</b>	<b>0</b>	<b>0</b>	<b>642</b>
Mitigated	695	301	0	0	301
Sound Insulated	357	301	0	0	301
Easement	338	0	0	0	0
Unmitigated	4,831	341	0	0	341
Eligible for Sound Insulation but not Insulated	81	80	0	0	80
Not Previously Mitigated	4,750	261	0	0	261
<b>Mifflin Township</b>	<b>12</b>	<b>58</b>	<b>0</b>	<b>0</b>	<b>58</b>
Mitigated	0	36	0	0	36
Sound Insulated	0	36	0	0	36
Easement	0	0	0	0	0
Unmitigated	12	22	0	0	22
Eligible for Sound Insulation but not Insulated	1	18	0	0	18
Not Previously Mitigated	11	4	0	0	4
<b>Gahanna</b>	<b>31</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
Mitigated	2	0	0	0	0
Sound Insulated	2	0	0	0	0
Easement	0	0	0	0	0
Unmitigated	29	0	0	0	0
Eligible for Sound Insulation but not Insulated	0	0	0	0	0
Not Previously Mitigated	29	0	0	0	0
<b>Jefferson Township</b>	<b>15</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	15	0	0	0	0
Eligible for Sound Insulation but not Insulated	0	0	0	0	0
Not Previously Mitigated	15	0	0	0	0
<b>Total Housing Units</b>	<b>5,584</b>	<b>700</b>	<b>0</b>	<b>0</b>	<b>700</b>
<b>Population</b>					
<b>Total Population</b>	<b>13,792</b>	<b>1,729</b>	<b>0</b>	<b>0</b>	<b>1,729</b>
<b>Noise-Sensitive Facilities</b>					
Churches	37	0	0	0	0
Schools	8	0	0	0	0
Libraries	0	0	0	0	0
Hospitals	0	0	0	0	0
Nursing Homes	0	0	0	0	0

Notes:

- \* FAA Part 150 Land Use Compatibility Guidelines indicate that residential land uses are compatible with noise levels below 65 DNL.
- Noise contours were generated using the Integrated FAA's Noise Model, Version 6.2 computer model.
- Housing counts are based on field verification.
- Population numbers are approximate based on the housing counts multiplied by the 2000 Census housing to population ratio.
- Baseline conditions assume the continuation of the existing operating procedures without modification.

Source: Landrum & Brown, 2007.

**Table 3-5  
EXISTING (2006) BASELINE VERSUS FUTURE (2012) BASELINE HOUSING,  
POPULATION, AND NOISE-SENSITIVE FACILITY INCOMPATIBILITIES  
Port Columbus International Airport**

<b>CATEGORY</b>	<b>EXISTING (2006) BASELINE</b>	<b>FUTURE (2012) BASELINE</b>
<b>Housing Units</b>		
60-65 DNL*	2,636	5,584
65-70 DNL	12	700
70-75 DNL	0	0
75+ DNL	0	0
65+ DNL	12	700
<b>Population</b>		
60-65 DNL*	6,511	13,792
65-70 DNL	30	1,729
70-75 DNL	0	0
75+ DNL	0	0
65+ DNL	30	1,729
<b>Noise Sensitive Facilities (Churches, Schools, Libraries and Nursing Homes)</b>		
60-65 DNL*	20	45
65-70 DNL	0	0
70-75 DNL	0	0
75+ DNL	0	0
65+ DNL	0	0

Notes:

- \* FAA Part 150 Land Use Compatibility Guidelines indicate that residential land uses are compatible with noise levels below 65 DNL.
- Noise contours were generated using the Integrated FAA's Noise Model, Version 6.2 computer model.
- Housing counts are based on field verification.
- Population numbers are approximate based on the housing counts multiplied by the 2000 Census housing to population ratio.
- Baseline conditions assume the continuation of the existing operating procedures without modification.

Source: Landrum & Brown, 2007.