

Gulf Shores International Airport (KJKA) Noise Exposure Maps

1. INTRODUCTION

14 Code of Federal Regulations (CFR) Part 150 – *Airport Noise Compatibility Planning*, details the procedures and standards of measuring airport noise exposure and determining incompatible land uses within certain levels of noise created by airport operations. The Part 150 process requires airport sponsors to develop two noise exposure maps; an existing noise exposure and a proposed noise exposure, at least five years in the future. The following technical documentation provides the assumptions and methods used to measure noise exposure in an existing and proposed scenario for Gulf Shores International Airport in Gulf Shores, Alabama.

3.1.1. Definitions

AC	Advisory Circular	Documents that provide guidance for compliance with FARs
AEDT	Aviation Environmental Design Tool	Software that models aircraft performance in space and time to estimate fuel consumption, emissions, noise, and air quality consequences.
dBA	A-weight decibel	Expression of the relative loudness of sounds in air as perceived by the human ear
DNL FAA	Day-Night Sound Level Federal Aviation Administration	Average dBA noise level over a 24-hour period
FAR	Federal Aviation Regulations	Rules governing all aviation activities in the US

2. ASSUMPTIONS

In order to accurately model noise contours at airports, it is imperative to understand the operational fleet mix and runway utilization that is unique to that specific airport. It is necessary to review all available sources of data to accurately depict a typical year of operations grouped by aircraft type, duration of flight, frequency, time, and location (runway end).

JKA airport management provided detailed operations data that included aircraft type, aircraft make and model, operation type (arrival/departure), runway end utilization, and operation time. This data provided the assumptions used for the noise model inputs and are summarized below:

- Total annual operations: ~90,000 operations
- Operational fleet mix
 - o ~68% single-engine piston
 - o ~15% multi-engine piston and turboprop
 - o ~11% jet
 - o ~5% helicopter

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- Runway utilization
 - o Runway 9-27
 - Runway 9: 45.4%
 - Runway 27: 33.1%
 - o Runway 17-35
 - Runway 17: 7.9%
 - Runway 35: 13.6%
- Operational timeframe
 - o Day: ~90.75%

- o Night: ~9.25%
- Operation type
 - o Arrivals: 50%
 - o Departures: 50%

For the purposes of this study, future noise contours were developed with assumptions provided by airport management of the proposed commercial service operations expected at the airport. These assumptions included expected operations counts for an ultra-low-cost carrier, a jet charter service, and a legacy carrier. This included 1,510 ultra-low-cost carrier A320-200 operations, 48 charter 737-800 operations, and 1,440 legacy CRJ-700 operations. It is assumed that these operations will take place entirely on Runway 9-27, with 70 percent of those operations happening on Runway 27.

3. AEDT

Using the assumptions listed above, daily average operation counts by aircraft type (using a representative aircraft), runway end, and operation time was developed. For each aircraft type, a daily average operation count was created for all four runway ends, both daytime and nighttime, and both arrivals and departures. This means that for each aircraft type, 16 daily average operations counts were developed. This data was entered into AEDT to develop the noise contours.

With the operational data inputted into AEDT, the existing noise model was developed by annualizing the data and creating receptor sets. The annualization process takes the daily operations and converts them into an annual average, and the receptor sets allow the data to be mapped on the airport. The annualized data is converted into a DNL and mapped on the airport based on the data inputs.

4. EXISTING VS. PROPOSED

The addition of the ultra-low-cost, charter, and legacy carriers constitute the difference between the existing and proposed contours. The proposed commercial service as an addition to the existing number of annual aircraft operations at the airport may impact land uses outside of airport property. Two separate noise exposure maps were created for the purpose of this study, an existing and proposed noise exposure. The existing noise exposure maps used the data and assumptions provided by airport management, while the proposed noise exposure maps used this data and assumptions as well as the proposed commercial service operations. A breakdown of acreage within each DNL contour for both the existing and proposed scenario is shown in **Table 1**.





Table 1: Acreage by DNL					
DNL (dBA)	Existing (acres)	Proposed (acres)	Difference (acres)	% Change	
65	8.7	10	1.3	14.94%	
70	2.2	3.9	1.7	77.27%	
75	0.2	0.3	0.1	50%	
Total	48.5	63.5	15	30.93%	

Source: McFarland Johnson analysis, 2022.

According to FAA Draft AC 150/5020-1A, Noise Control and Compatibility Planning for Airports, the "65 DNL contour is the threshold above which the FAA considers aircraft noise to be incompatible with residential areas." Neither the existing nor the proposed noise exposure maps show the 65 DNL contour exist beyond airport property. The proposed commercial aircraft activity will not constitute a need for land use review surrounding the airport and beyond the ends of Runway 9-27.





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