CALENDAR YEAR 2021 CNEL NOISE CONTOURS

May 2022

Santa Monica Municipal Airport

Calendar Year 2021
CNEL Noise Contours

May 2022

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1 INTRODUCTION

Community Noise Equivalent Level (CNEL) noise contours for calendar year 2021 were developed using the calendar year 2021 noise monitoring and operations data for Santa Monica Municipal Airport (SMO). The methodology used for the calendar year 2021 CNEL noise contours has been updated to reflect current noise monitoring data and the use of the Federal Aviation Administration's (FAA) Aviation Environmental Design Tool (AEDT) noise model.

This report contains four major sections including this introduction. Section 2 describes the methodology used for the generation of the CNEL noise contours and report. Section 3 describes the existing airport noise exposure in the vicinity of SMO, including the calendar year 2021 CNEL noise contours. Section 4 presents historical noise monitoring data.

2 METHODOLOGY

2.1 BACKGROUND

The methodology used here for describing the existing airport noise exposure in terms of CNEL rely heavily on noise monitoring made by the airport's permanent Noise and Operations Monitoring System (NOMS) and noise modeling. The airport noise exposure is commonly depicted in terms of lines of equal noise levels, or noise contours. The noise contours are supplemented in this report with specific noise monitoring data at the six permanent Noise Monitoring Terminals (NMTs) on the ground. The noise model used to generate the noise contours is described in the following section below.

2.2 NOISE MODELING

Noise modeling is a very key element of generating noise contours. Generating accurate noise contours is largely dependent on the use of a reliable, validated, and updated noise model. It is imperative that the noise contours be accurate for the meaningful analysis of airport noise. The noise contours as part of this report were generated using the FAA's AEDT Version 3d.[1, 2]

FAA's AEDT is a software system that models aircraft performance in space and time to estimate fuel consumption, emissions, noise, and air quality consequences. AEDT has an extensive

[1] U.S. Department of Transportation, Federal Aviation Administration. AEDT Website. Available: https://aedt.faa.gov/3c_information.aspx, Accessed on May 13, 2022.
[2] The original AEDT (Version 2a) was released for use on February 15, 2014. AEDT Version 3d was released for use on March 29, 2021.

database of civilian and military aircraft noise characteristics and incorporates advanced plotting features. AEDT requires the input of the following types of data:

- Physical description of the airport layout
- Aircraft operations
- Aircraft noise and performance characteristics
- Runway utilization
- Flight tracks
- Meteorological
- Terrain

3 EXISTING AIRPORT NOISE EXPOSURE

3.1 BACKGROUND

SMO serves as a General Aviation (GA) airport. The use of the Airport is heavily regulated as a result of its limited area and facilities, environmental sensitivity of the local area, and because of a long history of airport related litigation extending back at least to the 1960's. The operation of SMO is regulated by Federal, State, and local laws and regulations including the 2017 Consent Decree.

The Airport has a long history of noise analyses and was one of the very early airports to install a permanent NOMS. Extensive data from its NOMS enables accurate noise modeling and prediction of noise levels. Noise data in terms of CNEL is collected at each of the six permanent NMTs, which are presented in Figure 3-1.

The emphasis of the Airport noise abatement program is on regulating and limiting single event noise. This is in response to resident's concerns about high noise levels associated with some aircraft operations at the Airport. SMO is one of the very few airports that limit aircraft single event noise.

Other local airports that limit single event noise include John Wayne Airport, Orange County (SNA), Long Beach Airport (LGB), Torrance Municipal Airport – Zamperini Field (TOA), and Hayward Executive Airport (HWD). The noise limits vary at each of these airports and are difficult to compare; the location of the enforcement NMTs are not located in similar positions to NMTs located at SMO. Estimating the noise limits at all these airports using a common NMT location indicates that SNA and LGB are much less stringent than SMO (both include jet air carrier operations), HWD is about 3 decibels (dB) less stringent than SMO and TOA noise limits are about the same as SMO.

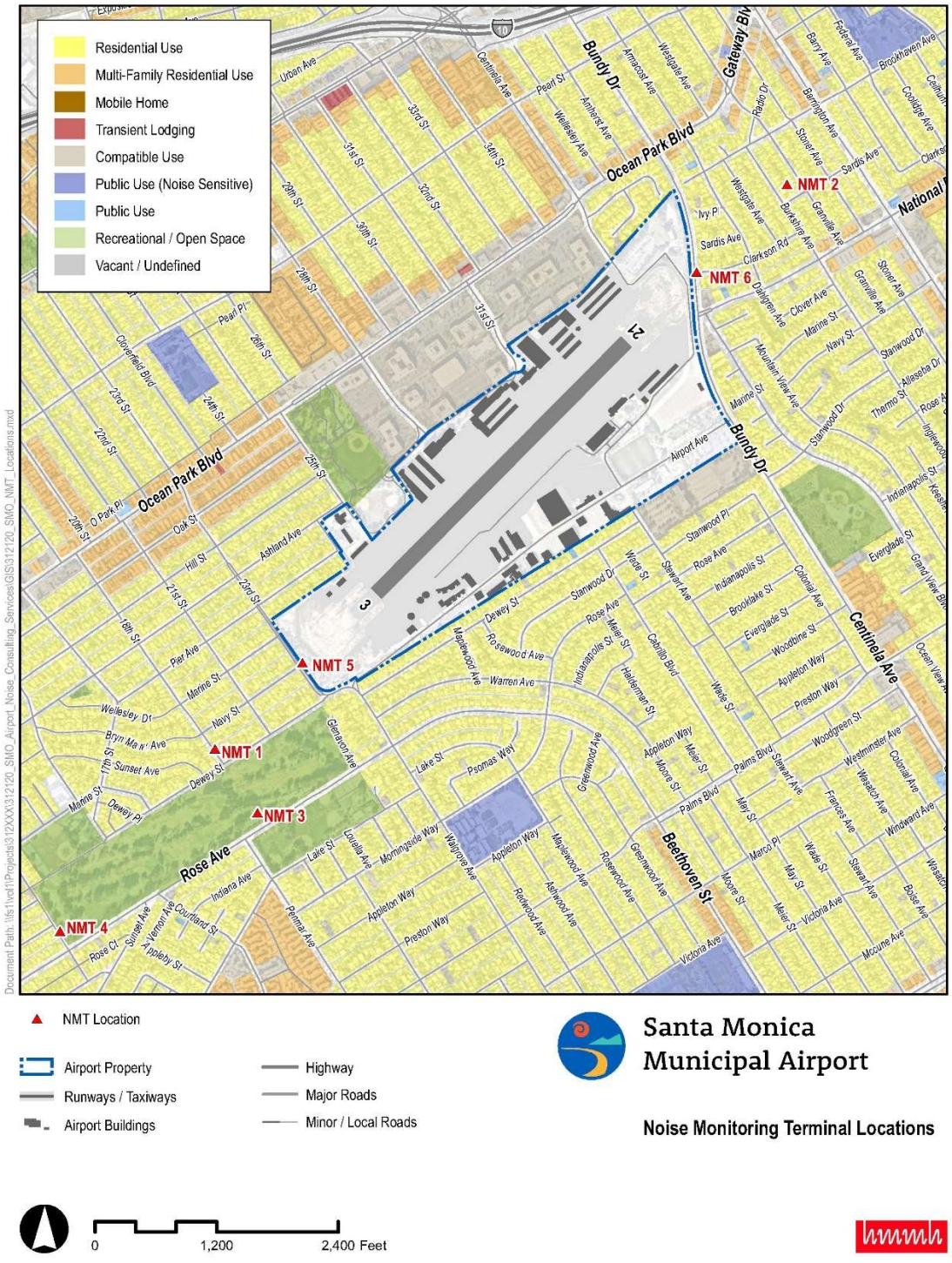


Figure 3-1. Noise Monitor Terminal (NMT) Locations

Source: SMO and HMMH, 2022.

3.2 OPERATIONS DATA

Calendar year 2021 aircraft operations at SMO totaled 67,986; 2,725 were jet aircraft operations, 63,510 were propeller aircraft operations, and 1,751 were helicopter operations. This data was obtained from traffic counts kept by the FAA's Air Traffic Control Tower (ATCT).

Note that an operation is defined as a departure or arrival. Therefore, 67,986 operations translate into 33,993 departures and arrivals during the calendar year. The total operations represent an increase in operations from the calendar year 2020 of approximately 16.9%. (See Figures 3-2 and 3-3)

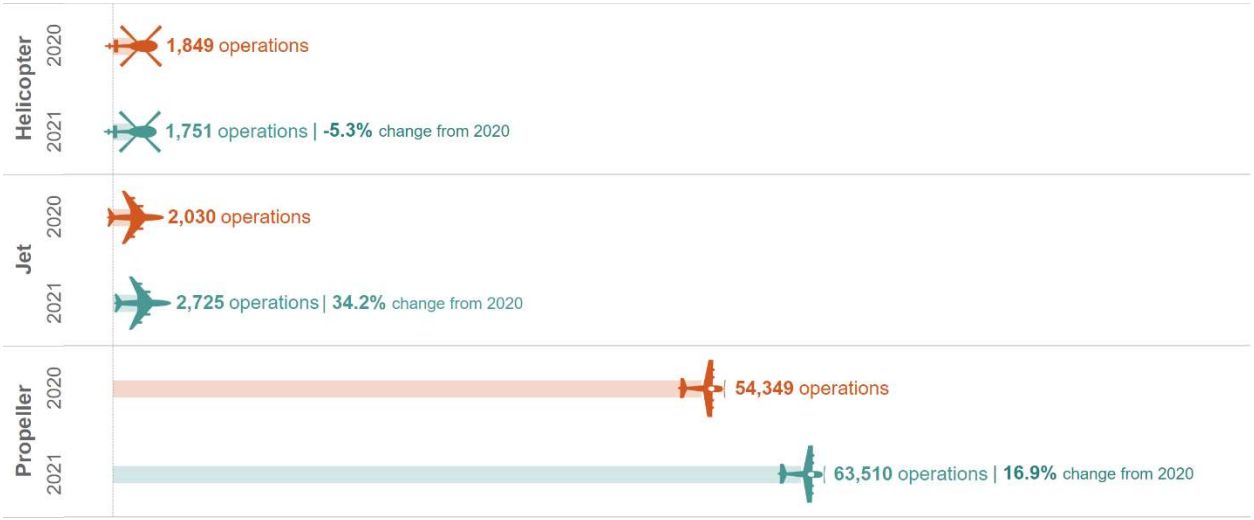


Figure 3-2. Calendar Year 2021 Versus 2020 Operations by Aircraft Category

Source: SMO and HMMH, 2022.

Of the total operations, 39,858 were itinerant operations and 28,128 were local operations. "Local traffic" is defined as an aircraft that stayed within the Airport's Class D controlled airspace, generally within 5 nautical miles of the Airport or within the Airport's traffic pattern. When counting local operations, the departure part of the touch and go is counted as one operation and the landing part is counted as another operation.

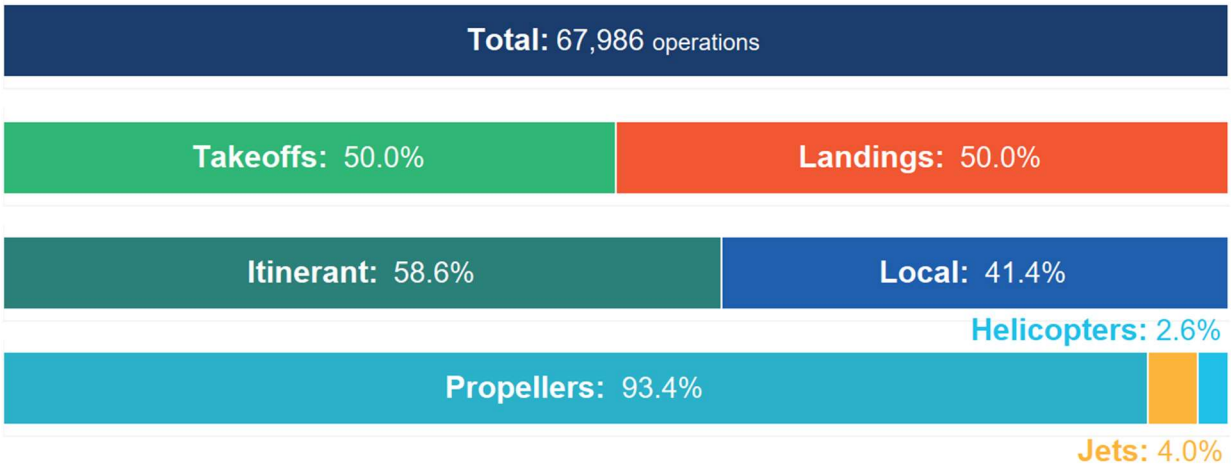


Figure 3-3. Breakdown of Operations

Source: SMO and HMMH, 2022.

3.3 FLEET MIX DATA

The types of aircraft operating at SMO were determined using the calendar year 2021 flight information data from the Airports NOMS. All aircraft noise events for the calendar year 2021 were downloaded and analyzed by aircraft type. Aircraft types were divided into the following aircraft categories: jets, piston propellers, turbo propellers, and helicopters. Figure 3-4 lists the top five aircraft types from the Airports NOMS per aircraft category and the corresponding number of operations per aircraft type.

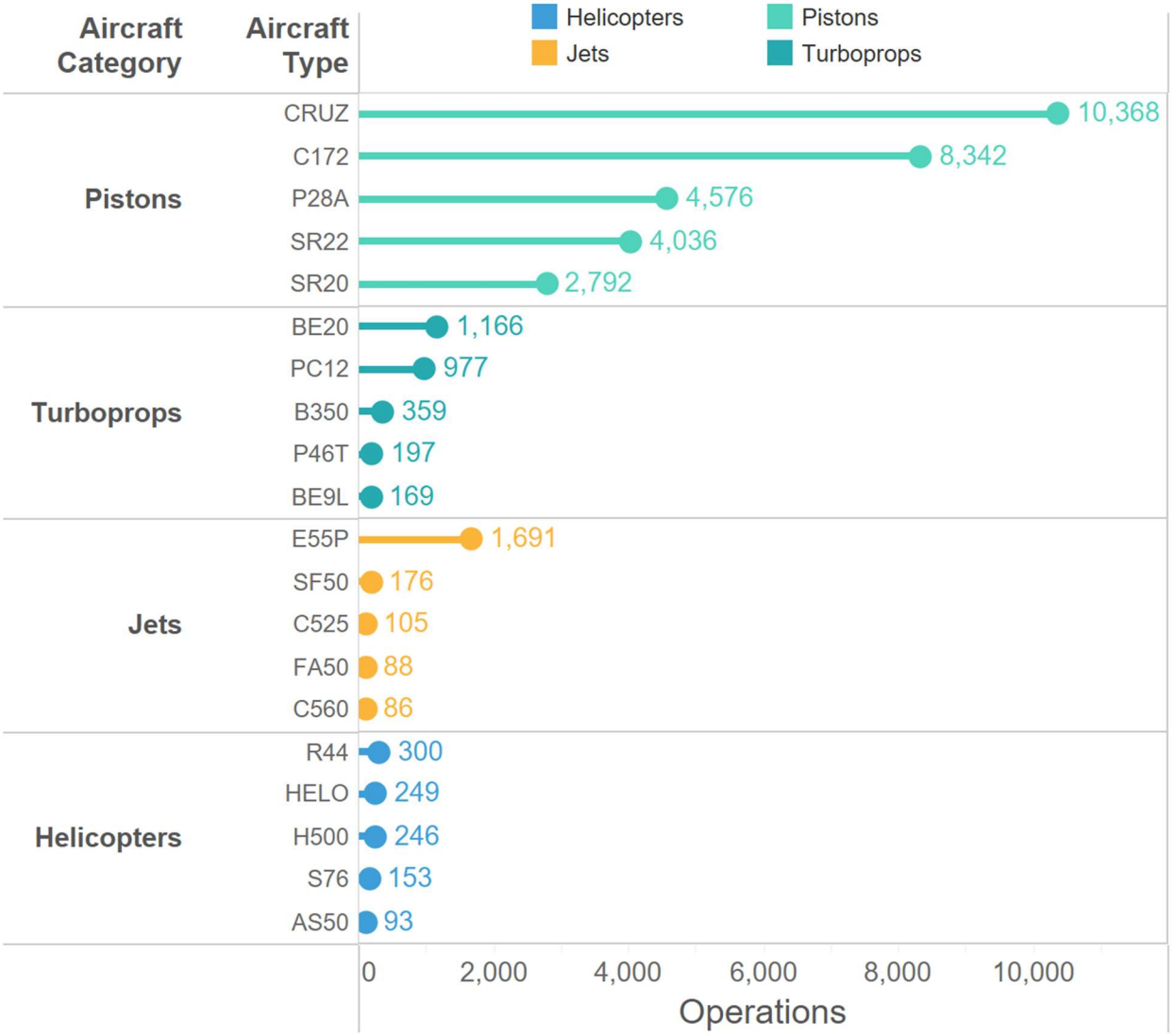


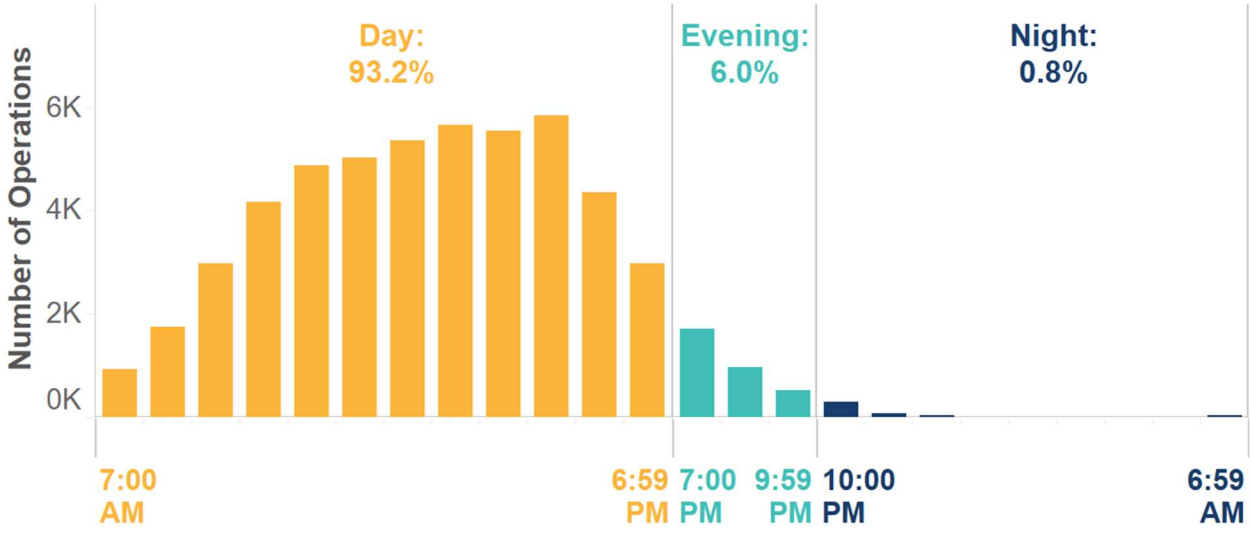
Figure 3-4. Operations for Top 5 Aircraft Types Per Aircraft Category

Source: SMO and HMMH, 2022.

3.4 RUNWAY AND FLIGHT TRACK UTILIZATION

The flight tracks at SMO are well established to take advantage of the runway configuration and prevailing wind conditions. Runway 3/21 is approximately 3,500 feet long and is the only runway at the Airport. With winds predominantly coming from the ocean, aircraft typically depart to the west and arrive from the east on Runway 21. Only during Santa Ana wind conditions or other winds that move toward the ocean does the flow reverse with departures to the east and arrivals from the west. On average, east flow occurs approximately five percent of the time.

The day/evening/night distribution of aircraft operations, derived from the Airports NOMS data for the calendar year 2021, is displayed in Figure 3-5. The data logs show 93.2 percent of the operations during daytime hours (7:00 am to 6:59 pm), 6.0 percent during the evening hours (7:00 pm to 9:59 pm), and 0.8 percent of the operations during the night hours (10:00 pm to 6:59 am).



Note: Due to rounding, percentages may not precisely reflect the absolute figures

Figure 3-5. Operations by Hour of Day, Evening, and Night

Source: HMMH and SMO, 2022

The entire calendar year 2021 flight tracks from the Airports NOMS were input into the FAA's AEDT. Figure 3-6 shows a flight track density plot for all departures; Figure 3-7 shows a flight track density plot for all arrivals; and Figure 3-8 shows a flight track density plot for all circuit operations in calendar year 2021.

3.5 NOISE MONITORING DATA

The permanent NMT's were shown in Figure 3-1. The monitored aircraft noise levels in terms of CNEL at each of the NMTs during calendar year 2021 are shown in Table 3-1.

Table 3-1. Monitored CNEL Noise Levels at Each NMT

Source: SMO and HMMH, 2022.

NMT	Monitored CNEL Noise Level
1	56.2
2	51.2
3	54.7
4	54.0
5	58.2
6	59.1

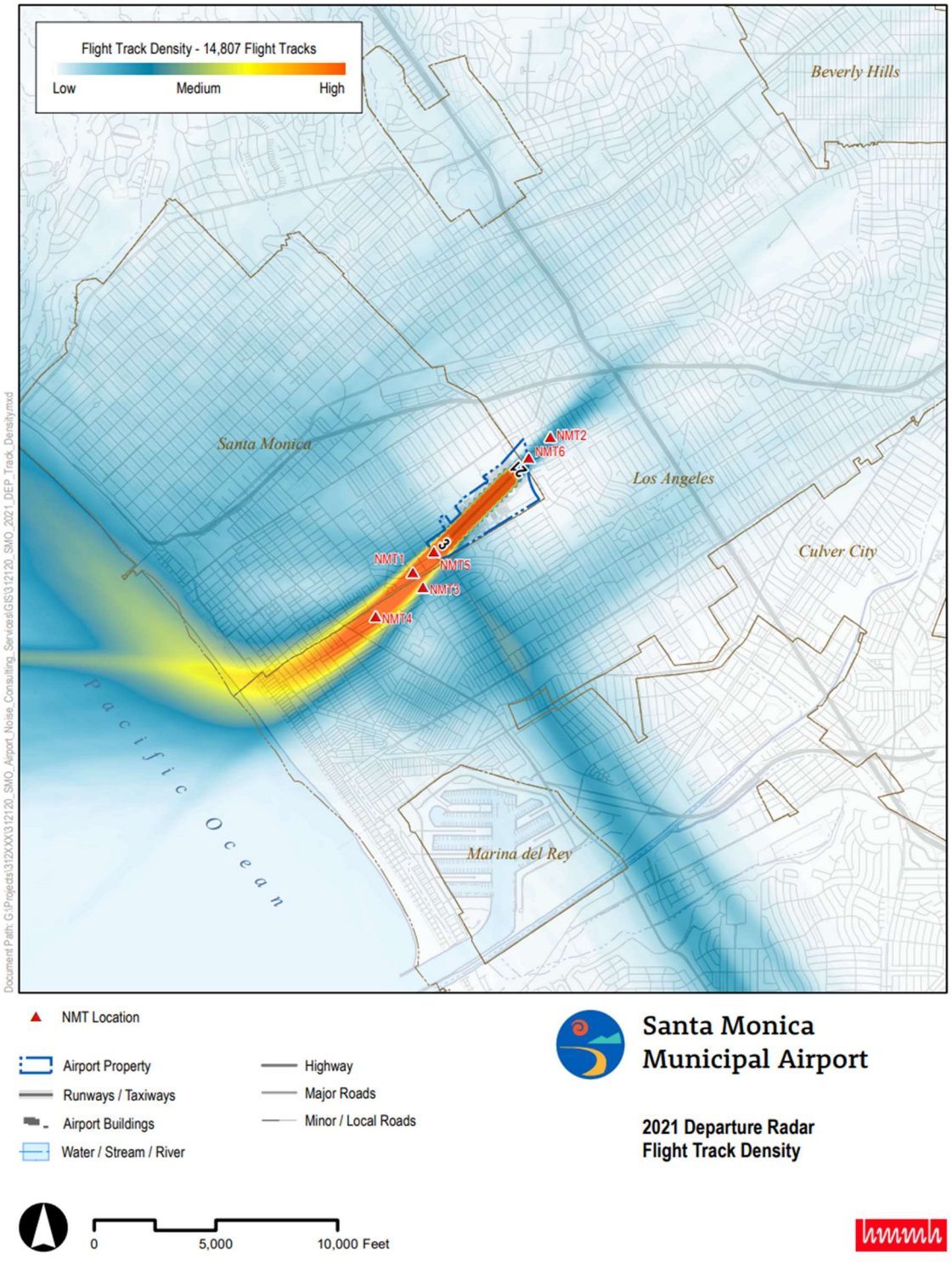


Figure 3-6. Departure Flight Track Density Plot

Source: SMO and HMMH, 2022.

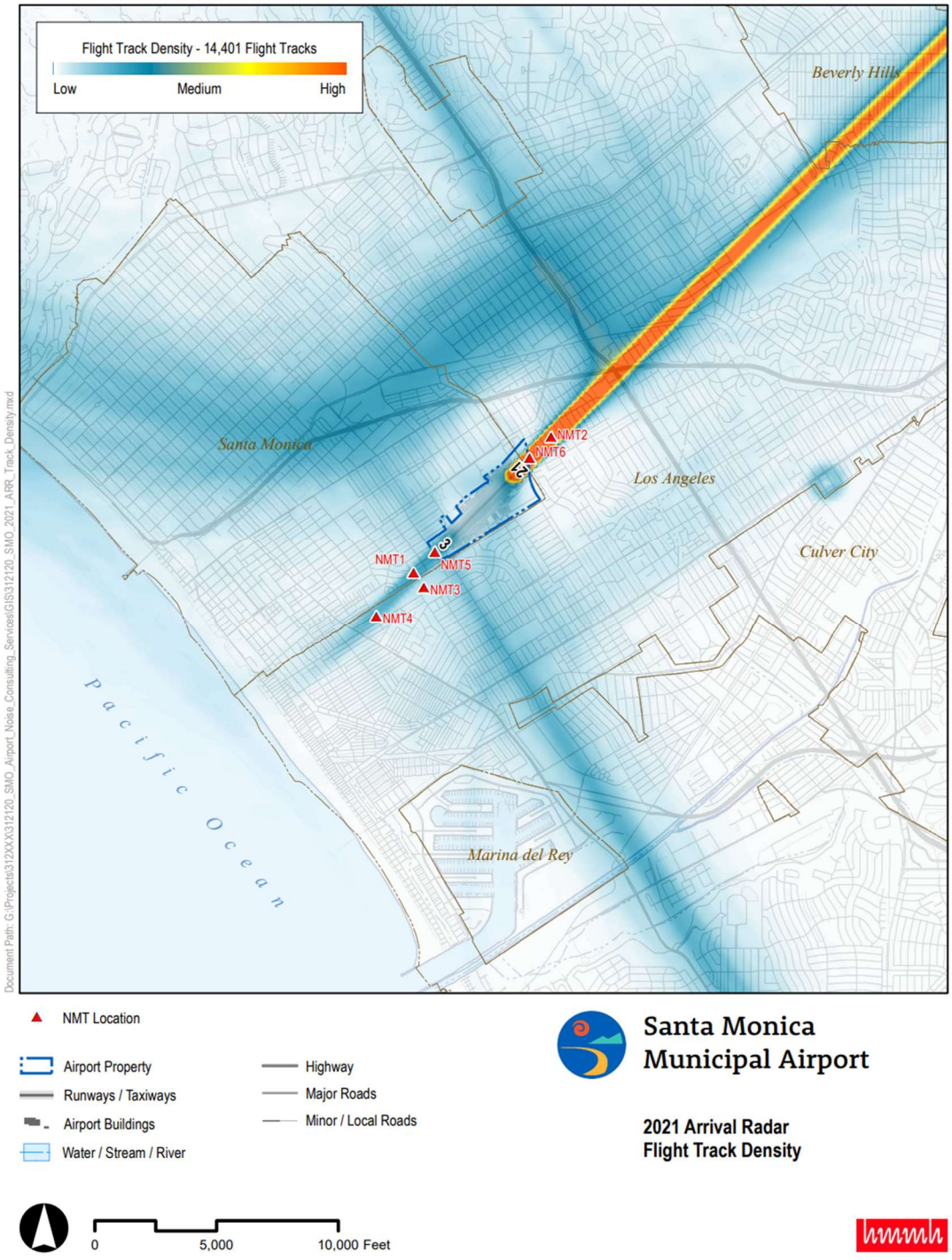


Figure 3-7. Arrival Flight Track Density Plot

Source: SMO and HMMH, 2022.

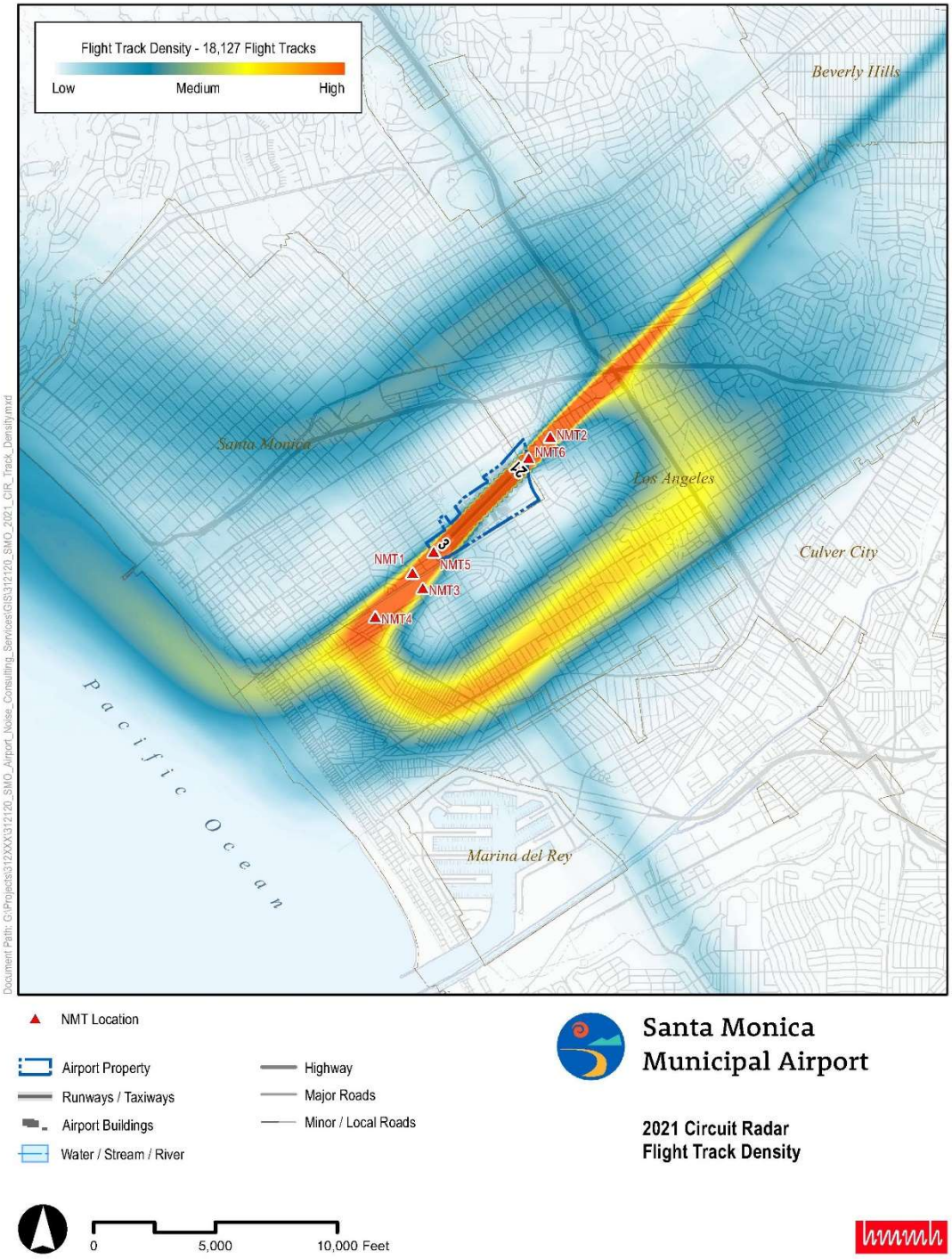


Figure 3-8. Circuit Flight Track Density Plot

Source: SMO and HMMH, 2022.

3.6 CNEL NOISE CONTOURS

The CNEL noise contours used to depict existing noise exposure at SMO were generated using AEDT Version 3d. The 60, 65, and 70 dB CNEL noise contours are presented in Figure 3-8. The noise monitored aircraft CNEL noise levels for calendar year 2021 were utilized to validate the modeled CNEL noise levels at each NMT.

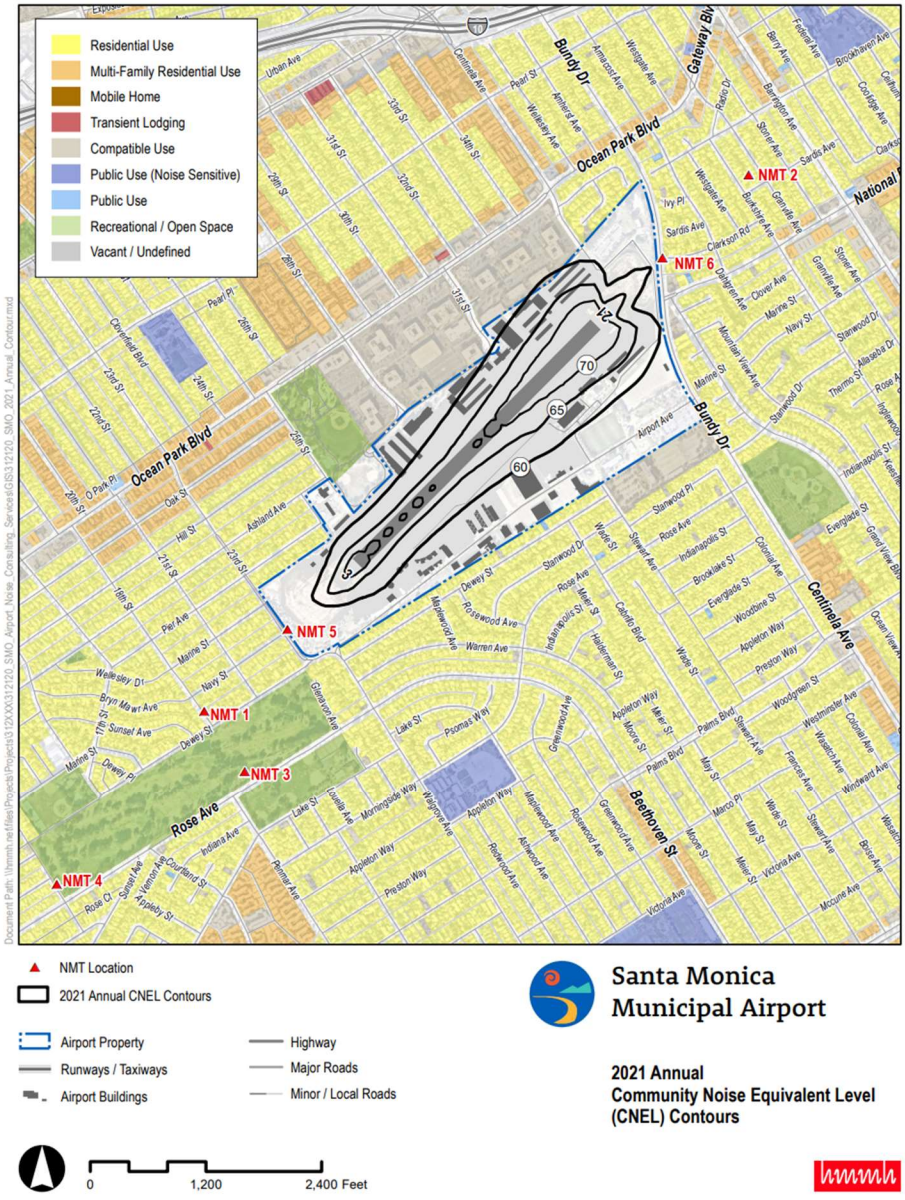


Figure 3-9. Calendar Year 2021 CNEL Noise Contours

Source: SMO and HMMH, 2022.

4 HISTORICAL NOISE MONITORING DATA

The original NOMS was installed in the 1970's and upgraded in 1988 and then again in 2017. The historical average CNEL monitored noise data from the NOMS are plotted in Figure 4-1. The increase in noise level in 2011 is due to both an increase in jet and propeller operations from the year 2010 to 2011 as well as retuning of the noise event detection filter in the NOMS. Since 2018, the noise levels have decreased as a result of reduced operations. CNEL noise monitoring recorded prior to 1989 were reported occasionally and therefore are not included in Figure 4-1.

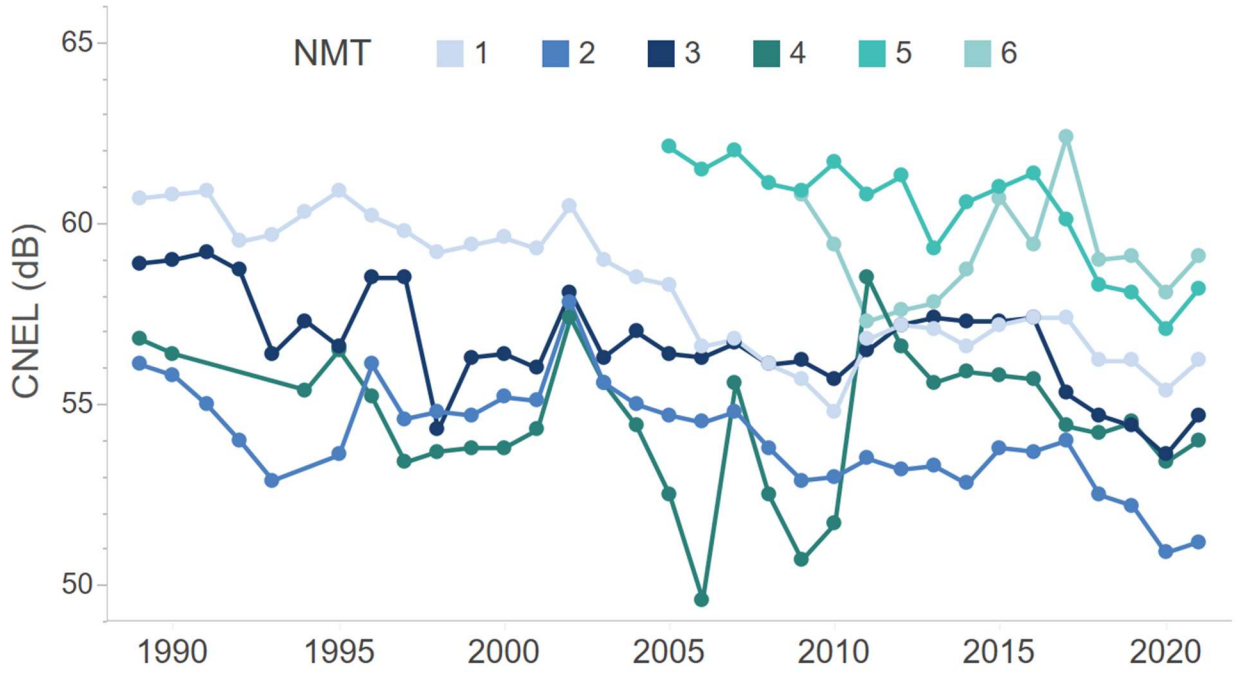


Figure 4-1. History of Monitored CNEL Noise Levels (1989 – 2021)

Source: SMO and HMMH, 2022.

5 REFERENCES

U.S. Department of Transportation, Federal Aviation Administration, "Aviation Environmental Design Tool (AEDT), Version 3d User Manual," March 2021.