Hawthorne Municipal Airport

Chapter Two
Aviation Noise

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Aviation Noise

As part of the voluntary Part 150 noise compatibility study process, the Federal Aviation Administration (FAA) requires that the prevailing noise conditions at an airport be defined using a computer noise simulation model. FAA has approved the use of the Airport Environmental Design Tool (AEDT) for use in noise compatibility studies. This software replaces the Integrated Noise Model (INM) used to prepare the noise contours for the 2014 Noise Exposure Maps for Hawthorne Municipal Airport. The current version used for the purposes of this study is AEDT, Version 3c. AEDT is designed to predict annual average aircraft noise conditions at a given geographic location. The purpose of the noise model is to produce noise exposure contours which are overlain on a map of the airport and vicinity to graphically represent aircraft noise conditions. With the use of existing land use, zoning, and general plan maps presented in Chapter One, the noise exposure contours are used to identify areas that currently are, or have the potential to be, exposed to significant aircraft noise levels per FAA guidance.

To achieve an accurate representation of an airport's noise conditions, the AEDT incorporates a combination of industry standard information and user-supplied inputs specific to the airport.[1] The software provides noise characteristics, standard flight profiles, and manufacturer-supplied flight procedures for aircraft within the U.S. civil and military fleets, including those which commonly operate at Hawthorne Municipal Airport. As each aircraft has different design and operating characteristics (number and type of engines, weight, and thrust levels), each aircraft emits different noise levels. The most common way to spatially represent the noise levels emitted by an aircraft is with a noise exposure contour.

[1] The AEDT accepts user-provided input for aircraft profiles and aircraft characteristics, although the FAA reserves the right to accept or deny the use of such data depending on its statistical validity. Any user characteristics must be approved by FAA prior to completion of the analysis.

Based on AEDT-provided and user inputs, the 24-hour aircraft sound exposure within a grid covering the airport and surrounding areas is calculated. The grid values, represented with the community noise equivalent level metric or CNEL, at each intersection point on the grid represent a noise level for that geographic location. To create the noise contours, a line linking equal values, similar to those on a topographic map, is drawn which connects points of the same CNEL noise value. In the same way that a topographic contour represents the same elevation, the noise contour identifies equal noise exposure. For more information regarding the CNEL noise metric, consult the **Resource Library**, located in the appendices.

Airport specific information, including runway configuration, flight paths, aircraft fleet mix, runway use distribution, elevation, atmospheric conditions, and numbers of daytime, evening, and nighttime operations are also used as modeling inputs. **Exhibit 2A** depicts the various AEDT input categories for developing noise exposure contours. Specific modeling assumptions for Hawthorne Municipal Airport are discussed in the following sections.

AIRCRAFT NOISE MODELING ASSUMPTIONS

AIRPORT INFORMATION

Airport-specific information is needed to model noise exposure conditions. **Table 2A** summarizes modeling assumptions for runways, temperature, relative humidity, and airport elevation. As discussed in Chapter One, Hawthorne Municipal Airport has one runway, Runway 7-25, which is 4,884 feet long and is not anticipated to change during the time horizon for this study; therefore, this condition was used for both the 2020 and 2025 conditions. The elevations of the runway ends (65 feet for Mean Sea Level (MSL) for Runway 7 and 61 feet MSL for Runway 25) were input to indicate the altitude at which the flight tracks originate and terminate. AEDT adjusts noise calculations based on atmospheric conditions specific to the airport's location and elevation. As outlined in the AEDT User Guide, local temperature, relative humidity, and atmospheric pressure values, which affect atmospheric absorption of noise, are adjusted according to the methods specified in the Society of Automotive Engineers' "Application of Pure-Tone Atmospheric Absorption Losses to One-Third Octave Band Data," SAE-ARP-5534.

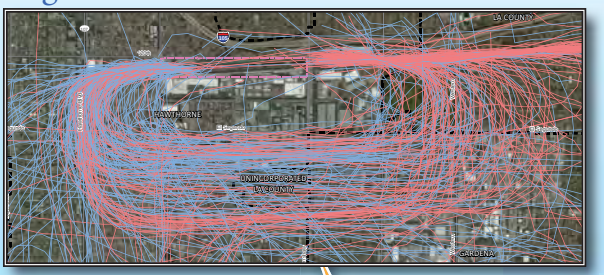
TABLE 2A
AEDT Input Assumptions
Hawthorne Municipal Airport

AEDT Input	Model Value
Runway 7-25	4,884 feet x 100 feet
Average Annual Temperature	64.2°F
Relative Humidity	61.6
Runway End Elevations	Runway 7 – 65 feet, Runway 25 – 61 feet

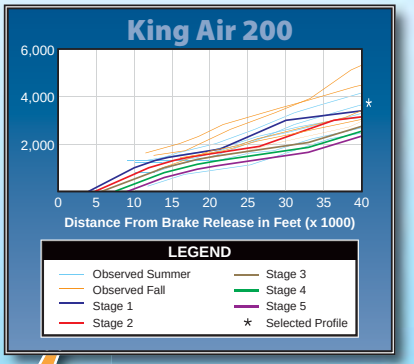
AEDT: Airport Environmental Design Tool
MSL: Mean sea level
Source: Aviation Environmental Design Tool, Version 3c Airport Database, 722956- KHHR

AEDT PROCESS

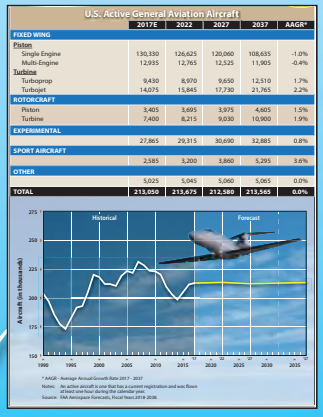
Flight Tracks



Profile Analysis



Existing & Forecast Operations/Fleet Mix

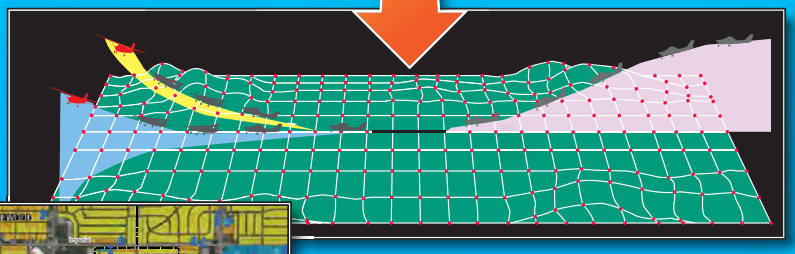


Time of Day

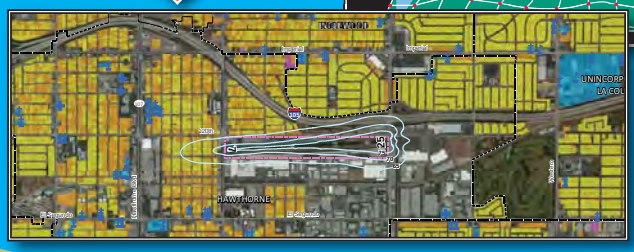
Terrain Data

AIRPORT ENVIRONMENTAL DESIGN TOOL (AEDT)

Grid Point Analysis



Noise Contours



OPERATIONAL FLEET MIX AND DATABASE SELECTION

The Hawthorne Municipal Airport Noise Exposure Maps (NEMs) were prepared for two study periods: existing condition (2020) and at least a five-year forecast (2025) in accordance with Title 14, Code of Federal Regulations (CFR), Part 150 (14 CFR Part 150 or Part 150). Operations totals used in the modeling are presented in **Table 2B**. As indicated in the table, existing condition (2020) operations are based on FAA's Traffic Flow Management System Counts for Hawthorne Municipal Airport Traffic Control Tower (ATCT) reports from January 2019 through December 2019. The 2025 operations are based on the FAA-approved forecasts from the *2019 Hawthorne Municipal Airport Layout Plan Update and Narrative Report*.[1] See **Appendix E**.

TABLE 2B
Annual Operations Summary
Hawthorne Municipal Airport

Operations	Existing 2020[1]	Forecast 2025[2]
Itinerant		
Air Taxi	4,030	13,000
Military	239	500
General Aviation	37,167	42,200
Total Itinerant	*41,436*	*55,700*
Local		
General Aviation	33,969	35,000
Total Local	*33,969*	*35,000*
TOTAL OPERATIONS	**75,405**	**90,700**

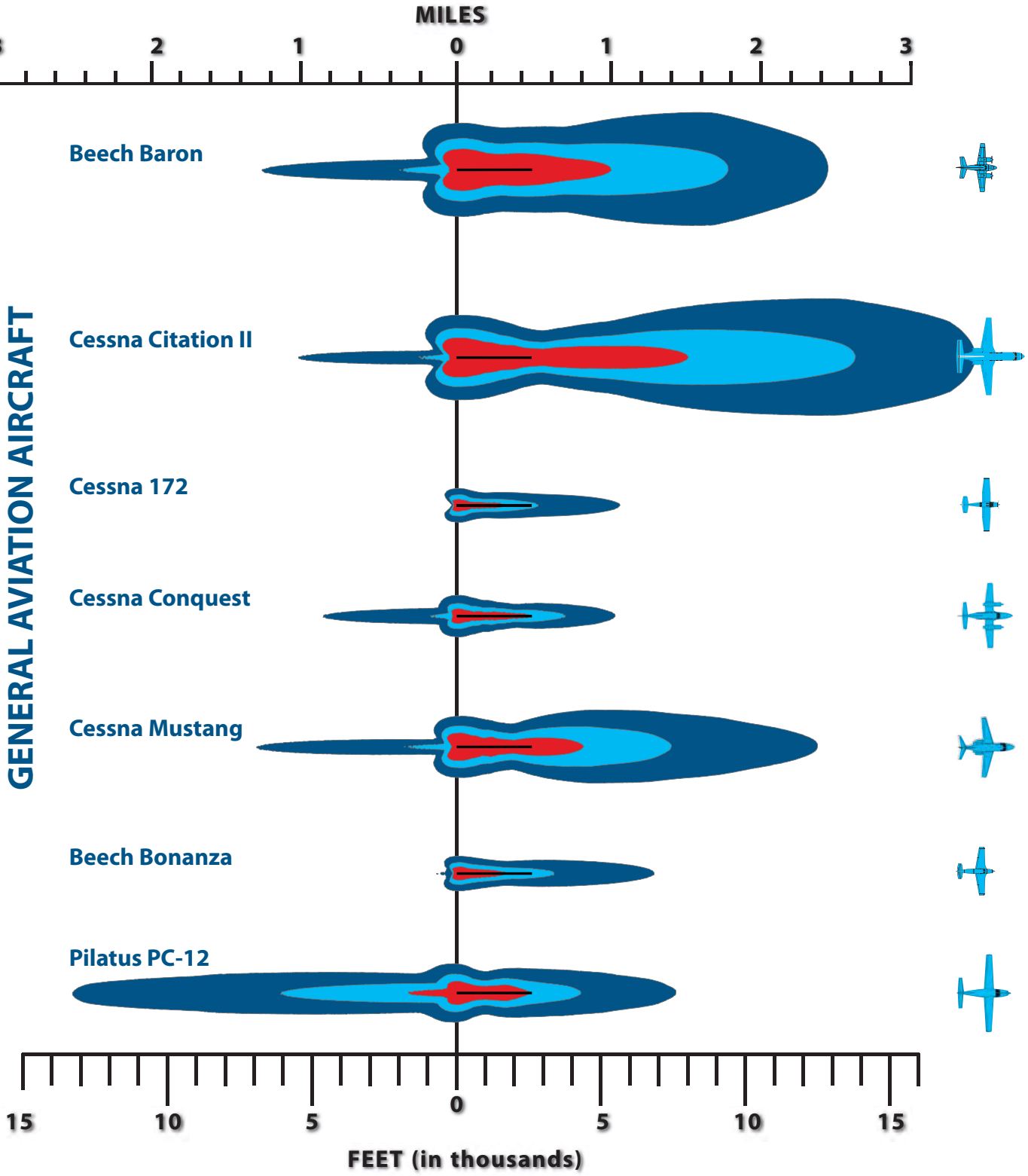
[1] FAA Traffic Flow Management System Counts (TFMSC) Hawthorne Municipal Airport, Calendar Year 2019 with an adjustment factor of 5.0 percent added to general aviation itinerant operations to account for when the ATCT is closed.
[2] *2019 Hawthorne Municipal Airport Layout Plan Narrative Report.* FAA determined the forecasts are consistent with the FAA's Terminal Area Forecast (TAF). See Appendix E.

Based on the annual operations levels presented in **Table 2B**, a detailed fleet mix, or summary of the types of aircraft operating at Hawthorne Municipal Airport, was prepared. The fleet mix presents the total number of operations by aircraft type for the existing condition and forecast years. For each aircraft, an AEDT noise designator was selected to provide representative noise exposure during the modeling process. The AEDT aircraft fleet database includes approximately 3,000 airframe and engine combinations.

A **fleet mix** is a summary of the types of aircraft that operate at an airport.

Each aircraft type in the AEDT has a unique noise footprint which can be depicted spatially. To illustrate this concept, single event noise contours generated by one departure and one arrival of a given aircraft type are present on **Exhibit 2B**. In contrast to the CNEL noise contours used for the Noise Exposure

[1] These forecasts were compared to the TAF in FAA's approval letter dated June 12, 2018 and were the basis for the five year (2025) forecast Noise Exposure Map. Please note that the table lists 2022 and 2027 as forecast horizons. The 2025 total was derived with the same methodology outlined in the ALP Narrative Report.



The contours represent sound exposure levels (SEL) of 85, 90 and 95 dB for one arrival and one departure of each aircraft type. The outer contour represents 85 dB SEL. The inner contour represents 95 dB SEL.

Source: Coffman Associates 2017

Maps, these contours depict the sound exposure level (SEL) for aircraft that operate at Hawthorne Municipal Airport. The sound exposure level is used when computing an aircraft's acoustical contribution to a cumulative noise metric such as CNEL. The noise footprint of an aircraft is influenced by a variety of factors, including the shape of the airframe, engine type, and aircraft weight. In addition to the amount of noise an aircraft generates, it is also important to note that not all aircraft sound alike. Although this information is not available from the AEDT and therefore not included in the noise contours, aircraft may have differing pitches (higher or lower) and the sound emitted from jet engines is typically a constant sound, whereas a propeller engine emits a series of rapid tones.

The types of aircraft operating at the airport were identified using FAA's Traffic Flow Management System Counts (TFMSC) and FAA's instrument flight rule database and were then grouped based on similar noise characteristics. In cases where a specific aircraft is not available within AEDT, designators were selected based on FAA's approved list of substitutes. No user-defined aircraft or profiles requiring FAA approval were used in the AEDT modeling. **Table 2C** summarizes the operational fleet mix assumptions.

As indicated in the table, single engine piston itinerant general aviation operations are divided into two categories based on the propeller type: variable pitch and fixed pitch. The GASEPV represents many single engine general aviation aircraft, including the Cessna 206, Piper PA-24 Comanche, and Piper PA-32 Cherokee Six. The general aviation single engine fixed pitch propeller model, the GASEPF, also represents several single engine general aviation aircraft. These include the Cessna 150 Series and the Piper PA-28 Cherokee Series.

The AEDT fleet database identifies the BEC58P, the Beech Baron light twin-engine aircraft, as a comparable aircraft to the Beech 55 Baron, Beech 58 Baron, Beech 60 Duke, Piper PA-34 Seneca, Cessna 310, Cessna 340, and Cessna 402, among others. The Piper PA-31 (PA31) designator was used to model this aircraft.

Itinerant general aviation twin-engine turboprop operations, including the Cessna 441 Conquest and Beech King Air, were modeled using the CNA441 (Cessna 441). Smaller single engine turboprop aircraft were modeled using CNA206 (Cessna 206). The AEDT fleet database includes the Cessna 208 airframe to model operations of the Cessna 208 Caravan and Socata TBM-7. Additionally, the Cessna 208 airframe, when combined with a Pratt and Whitney model PT6A-67 engine, specifically represents the Pilatus PC-12 aircraft in the AEDT. Larger twin engine turboprop aircraft, such as the Piaggio P-180 Avanti, were modeled using the SD330 identifier (Short 330).

Business jet operations are based on FAA's TFMSC reports and were modeled as follows: Eclipse 500 (ECLIPSE500), Cessna Citation I and II (CNA500), Cessna Excel (CNA55B), Cessna Citation III (CIT3), Lear 31, 35, 45, 75, Raytheon Premier (LEAR35), Bombardier Challenger 600 (CL600), Bombardier Challenger 601 (CL601), Cessna Citation X (CNA750), and Gulfstream V and Gulfstream 650 (GV).

Additionally, itinerant helicopters were modeled using the Robinson R22 (R22) and Robinson R44 (R44). The Coast Guard also conducts operations at the airport using the HH-65 Dolphin, which is represented in the model as the SA365N.

Local operations were modeled with the previously discussed GASEPF, GASEPV, R22, and R44 aircraft.

TABLE 2C
Operational Fleet Mix
Hawthorne Municipal Airport

Aircraft Type[1]	AEDT Designator[2]	2020 Operations[3]	2025 Operations[4]
GA Itinerant Operations			
Single Engine Piston – fixed	GASEPF	8,261	11,070
Single Engine Piston – variable	GASEPV	8,261	11,070
Multi-Engine Piston	BEC58P	3,091	4,140
Helicopter (Small)	R22	10,740	14,390
Helicopter (Medium)	R44	1,193	1,599
Single Engine Turboprop, Small	CNA206	108	145
Single Engine Turboprop, Small	CNA208	291	390
Turboprop Multi-Engine, Small	CNA441	2,350	3,149
Single Engine Turboprop Large	CNA208/Pilatus PC-12	2,497	3,346
Turboprop Multi-Engine, Large	SD330	106	142
Turbojet, Small	ECLIPSE500	461	617
Turbojet, Small	CNA500	505	676
Turbojet, Medium	CNA560U	144	193
Turbojet, Medium	CIT3	445	597
Turbojet, Medium	LEAR35	880	1,179
Turbojet, Medium	CNA55B	837	1,121
Turbojet, Large	CL600	376	504
Turbojet, Large	CL601	252	338
Turbojet, Large	CNA750	263	352
Turbojet, Large	GV	136	182
GA Itinerant Total Operations		41,197	55,200
Military Itinerant Operations			
Helicopter	SA365N	239	500
Total Military Operations		239	500
GA Local Operations			
Single Engine Piston – fixed	GASEPF	15,965	16,450
Single Engine Piston – variable	GASEPV	15,965	16,450
Multi-Engine Piston	BEC58P	1,020	1,050
Helicopter (Small)	R22	679	700
Helicopter (Medium)	R44	340	350
GA Local Total Operations		33,969	35,000
Total Operations		**75,405**	**90,700**

[1] *Coffman Associates' analysis. No user-defined aircraft or profiles requiring FAA approval were used in the AEDT modeling.*
[2] *FAA Traffic Flow Management System Counts (TFMSC), Hawthorne Municipal Airport, Calendar Year 2019 with an adjustment factor of 5.0 percent added to general aviation itinerant operations to account for when the ATCT is closed.*
[3] *2019 Hawthorne Municipal Airport Layout Plan Narrative Report. FAA determined the forecasts are consistent with the FAA's Terminal Area Forecast (TAF). See Appendix E.*
[4] *Coffman Associates' analysis.*

TIME-OF-DAY

The CNEL noise metric, which is required for Part 150 studies in the State of California, weighs operations occurring during the evening hours (7:00 p.m. to 10:00 p.m.) and nighttime hours (10:00 p.m. to 7:00 a.m.) more heavily. In calculating aircraft noise exposure, the AEDT increases the noise levels for evening operations by 4.77 decibels and nighttime operations by 10 decibels. For the purposes of this study, time-of-day assumptions for activity are based on interviews with ATCT staff, and a review of tower records. **Table 2D** summarizes the time-of-day percentages for all operation types assumed for this study. The evening and nighttime percentages were also applied to the 2025 scenario.

TABLE 2D
Time-of-Day Operations Percentages
Hawthorne Municipal Airport

	2020			2025		
Aircraft Category	Day	Evening	Night	Day	Evening	Night
Air Taxi and Business Jet	91%	6%	3%	91%	6%	3%
Itinerant General Aviation	91%	6%	3%	91%	6%	3%
Itinerant Military	91%	6%	3%	91%	6%	3%
Local	97%	2%	1%	97%	2%	1%

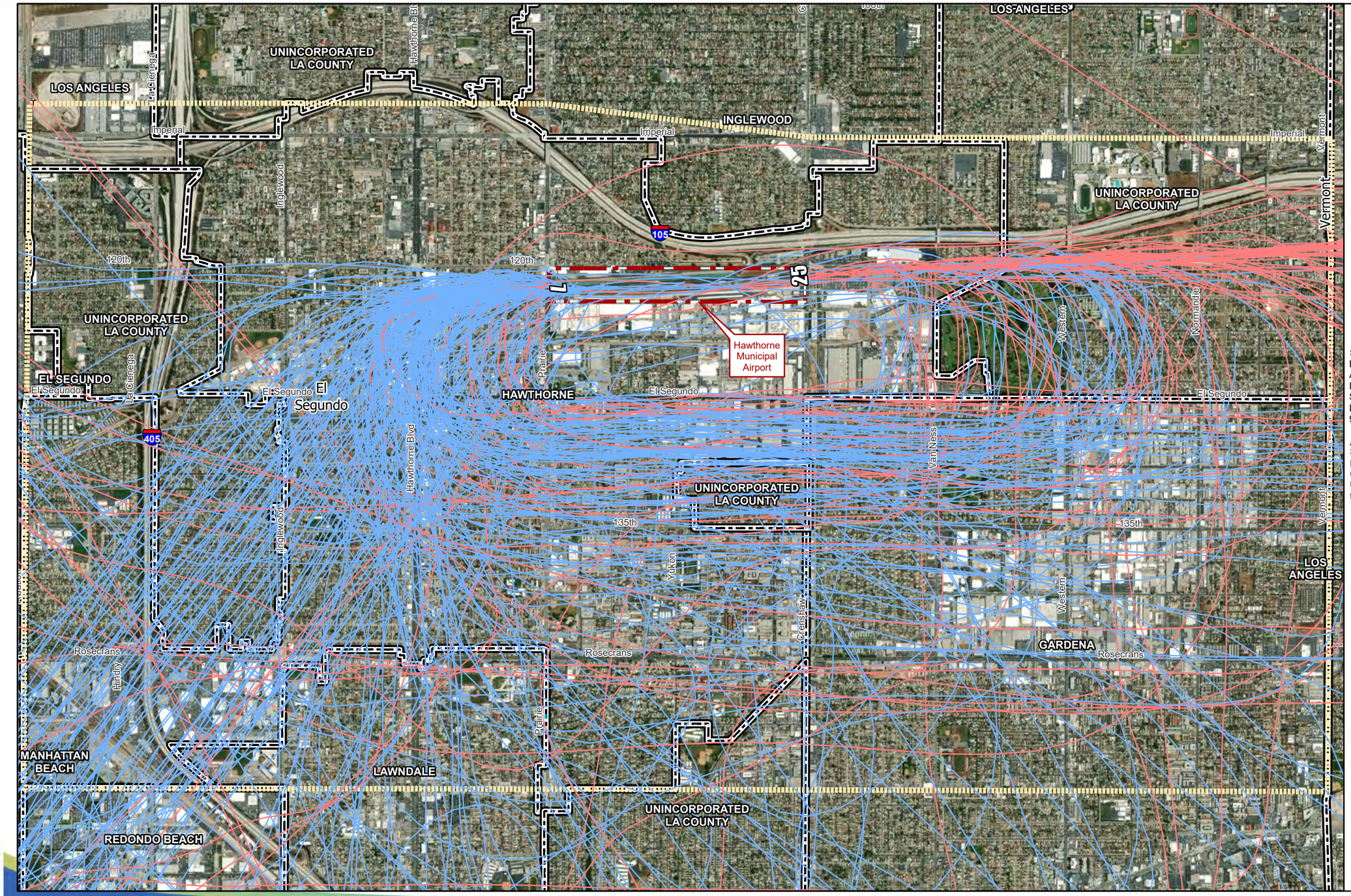
Day = 7:00 a.m. to 7:00 p.m.
Evening = 7:00 p.m. to 10:00 p.m.
Night = 10:00 p.m. to 7:00 a.m.
Source: Communication with ATCT staff and Coffman Associates analysis

RUNWAY USE

Runway use is generally influenced by the prevailing wind direction, as aircraft normally land and takeoff into the wind. Based on communication with airport and ATCT staff, and a review of radar flight track data, it is assumed that Runway 25 is used 99 percent of the time, while Runway 7 is used one percent of the time. This results in aircraft arriving to the airport from the east and departing to the west before making any turns. These assumptions were used for the existing and future conditions.

FLIGHT TRACKS

Flight patterns can be categorized within the following types: arrivals, departures, and local, or touch-and-go. Arrivals and departures correspond to itinerant traffic traveling to or from the airport, while local operations represent those operations conducted within the local traffic pattern. The touch-and-go nomenclature refers to an aircraft landing briefly on the runway and then resuming flight. Pilots use this technique to practice landings or other procedures. These paths are included in the model to indicate where each aircraft type operates. The AEDT arrival, departure, and local flight tracks for this study are based on radar flight track data obtained from Los Angeles International Airport for four randomly selected days, one from each quarter of calendar year 2019. The dates of the radar data are January 26, 2019; April 27, 2019; September 12, 2019; and December 3, 2019. **Exhibit 2C** depicts a radar



LEGEND

- Arrival Flight Tracks
- Departure Flight Tracks
- Airport Property
- Study Area
- Jurisdictional Boundaries

Sources
Los Angeles World Airports, Airport Noise and Operations Monitoring System (ANOMS)
Dates: 1-26-2019, 4-24-2019, 9-12-2019, 12-3-2019

Aerial Imagery Sources
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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24-hour flight track data sample from this time period. The ATCT staff was also consulted regarding typical flight patterns for the airport.

Exhibits 2D and **2E** illustrate the existing and future condition arrival and departure flight tracks, based on radar flight track data for fixed wing aircraft, which includes all aircraft operating at the airport, except helicopters. AEDT allows for flight tracks to be dispersed accounting for variances in flight paths due to wind conditions and/or pilot technique. Only the backbone, or center track, is shown as the dispersed tracks are not an output option from AEDT.

Existing and future condition flight tracks for local activity and helicopters are illustrated on **Exhibit 2F**. The local activity and helicopter flight tracks were also dispersed, as indicated with the bold and thin lines on the exhibit. As indicated on the exhibit, much of the activity occurs on the south side of the runway. This is due to the proximity of Hawthorne Municipal Airport to Los Angeles International Airport. The primary arrival/departure corridor for Los Angeles is located immediately north of Interstate Highway 105. In some air traffic conditions, helicopter training does occur on the north side of the airport between Interstate Highway 105 and Runway 7-25.

As illustrated on the exhibits, fixed wing arrivals and departures on both ends of the runway represent various flight paths depending on the aircraft's origin or destination. The flight tracks delineated in Exhibits 2D, 2E, and 2F for existing and future conditions are the same.

The existing flight track assumptions are based on current operating conditions at the airport and were developed using radar flight track data from LAX. Based on the current ALP, there are no planned changes to the locations of the runway endpoints which would alter the location of the arrival or departure points for the future conditions. Based on coordination with the ATCT, there are no planned changes to arrival or departure procedures at the airport that would change the flight tracks. Additionally, no additional noise abatement procedures are assumed in the development of the contours. As no flight path or procedure changes are anticipated in the forecast timeframe, the 2025 noise exposure contours are based on the same flight tracks as the existing condition (2020) noise exposure contours.

Flight Track Assignments

The previously discussed operational conditions and runway utilization are used to assign aircraft activity to each of the tracks. Ultimately, this information determines the geographic distribution of the noise generated by operations at the airport. Based on an evaluation of aircraft operating characteristics, runway utilization, and flight track data, percentages were assigned to each consolidated flight track. The total number of operations for each aircraft is distributed among the available flight tracks to represent the operating conditions at the airport.

AEDT OUTPUT

In accordance with 14 CFR Part 150, noise exposure contours were calculated using the AEDT at the 65, 70, and 75 dB levels for the 2020 and 2025 conditions. As outlined in FAA Order 5100.38D, *Airport Improvement Program Handbook*, the FAA recognizes CNEL (community noise equivalent level) as an alternative noise metric for California.

The extent and shape of the noise contours is influenced by the previously discussed modeling assumptions. For comparative purposes, the contour area for each range and timeframe is presented in **Table 2E**. Additionally, **Table 2F** presents the total acres for each contour that extends off airport property.

TABLE 2E
Comparative Areas of Noise Exposure
Hawthorne Municipal Airport

	Area (Acres)	
	2020	2025
65-70 CNEL	89.3	99.3
70-75 CNEL	40.9	45.6
75+ CNEL	25.2	29.7
Total	**155.4**	**174.6**

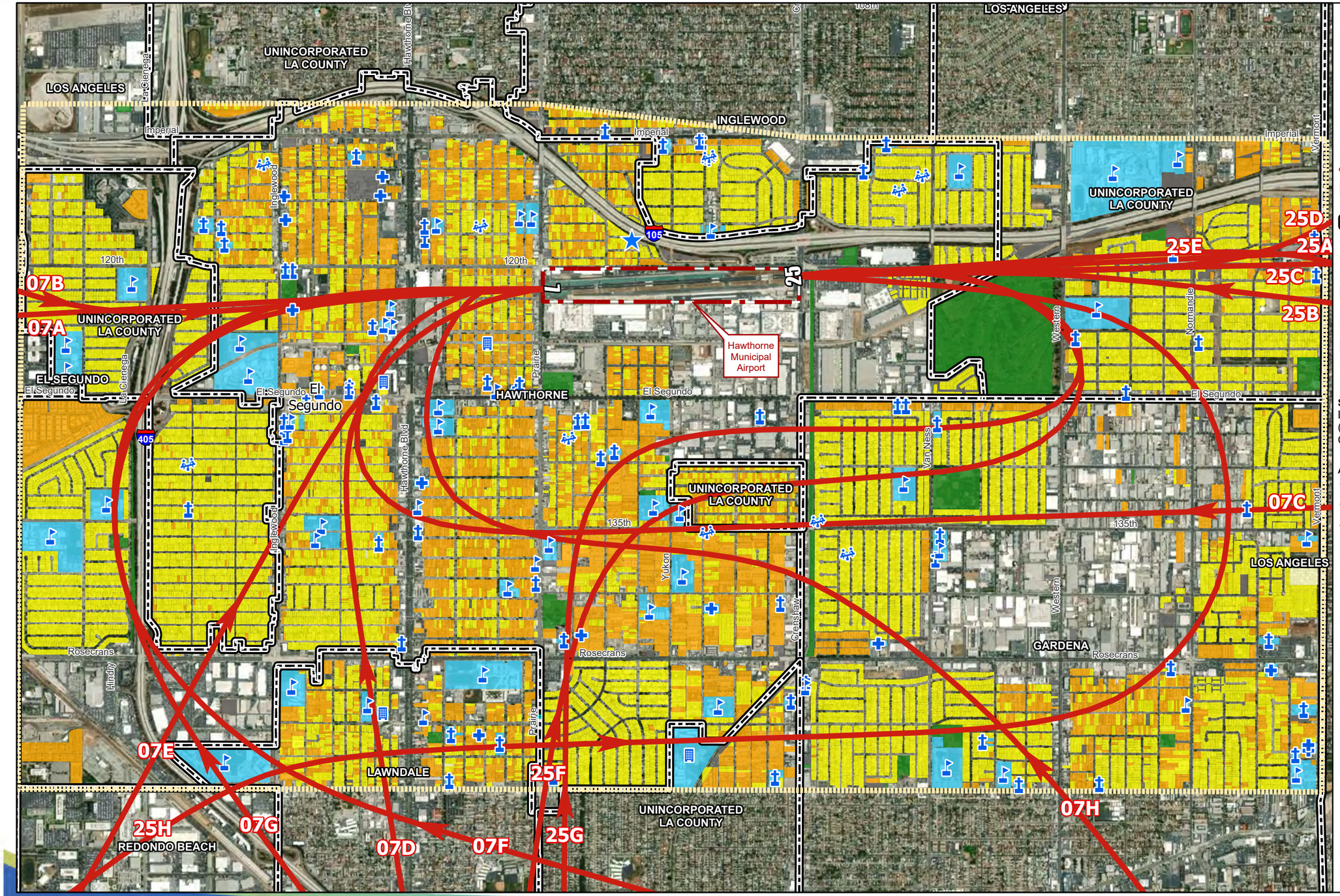
Notes:
1. Acreages represent only those areas between the stated contour ranges.
Source: Coffman Associates' analysis

The following sections present the noise contours for the 2020 and 2025 scenarios. As illustrated on the exhibits, the area of noise exposure is greatest near the runway ends, which reflects the typical flight procedures at all airports. In some cases, the contours may extend off airport property. Additionally, depending on airport operating characteristics, sideline noise, represented by the portion of the contour running parallel to the runway, may also extend off airport property.

TABLE 2F
Contour Area Extending Off Existing Airport Property
Hawthorne Municipal Airport

	Area (Acres)	
	2020	2025
65-70 CNEL	61.7	76.9
70-75 CNEL	12.2	14.7
75+ CNEL	1.8	2.9
Total	**75.6**	**94.4**

Notes:
1. Acreages represent only those areas between the stated contour ranges.
Source: Coffman Associates' analysis



LEGEND

- Beach Boys Childhood Home Historical Marker
- Healthcare Facility
- Place of Worship
- Public
- School
- Daycare
- Arrival Flight Tracks
- Airport Property
- Study Area
- Jurisdictional Boundaries

Existing Land Use

- Single-Family Residential
- Multi-Family Residential
- Parks/Open Space
- Manufactured Homes
- Noise Sensitive Uses
- Undeveloped/Vacant

Sources
Los Angeles County Assessor (December 2019);
Coffman Associates Analysis

Aerial Imagery Sources
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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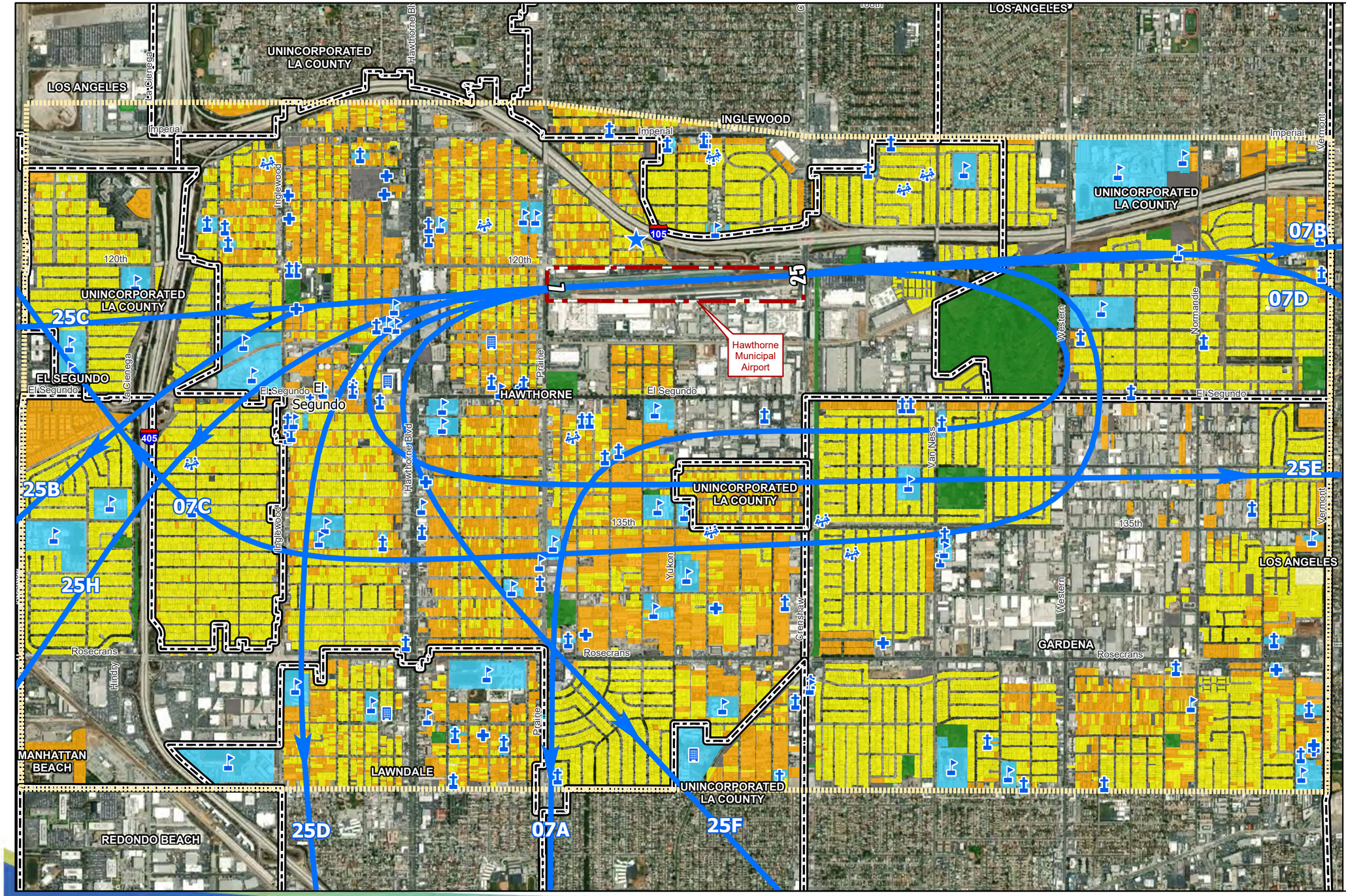
Exhibit 2D
ARRIVAL FLIGHT TRACKS (EXISTING AND FUTURE)



LEGEND

- Beach Boys Childhood Home Historical Marker
- Healthcare Facility
- Place of Worship
- Public
- School
- Daycare
- Departure Flight Tracks
- Airport Property
- Study Area
- Jurisdictional Boundaries

Existing Land Use

- Single-Family Residential
- Multi-Family Residential
- Parks/Open Space
- Manufactured Homes
- Noise Sensitive Uses
- Undeveloped/Vacant

Sources
Los Angeles County Assessor (December 2019);
Coffman Associates Analysis

Aerial Imagery Sources
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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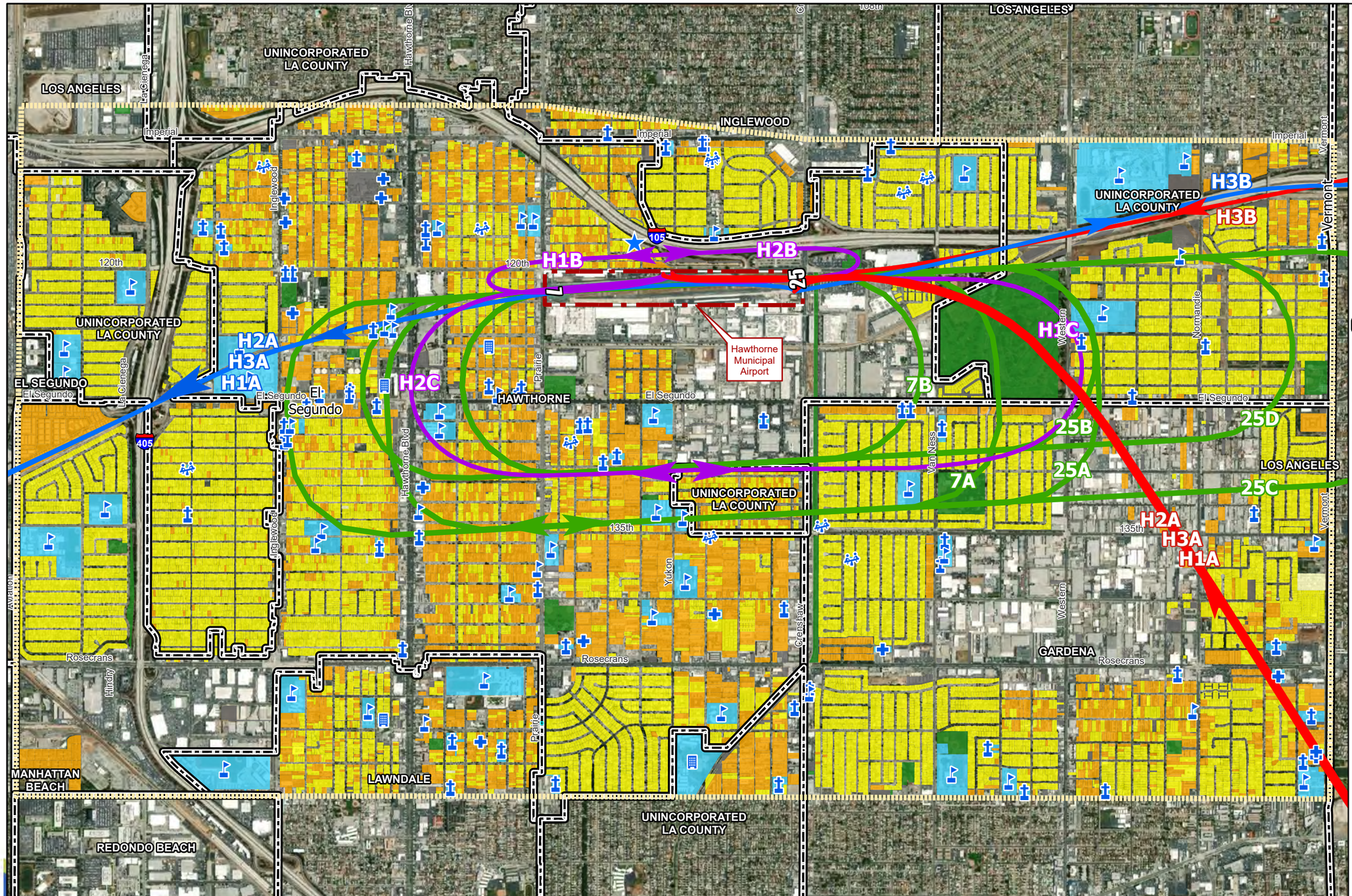
Exhibit 2E
DEPARTURE FLIGHT TRACKS (EXISTING AND FUTURE)



LEGEND

- Beach Boys Childhood Home Historical Marker
- Healthcare Facility
- Place of Worship
- Public
- School
- Daycare

Flight Tracks

- Helicopter Departure Flight Tracks
- Helicopter Arrival Flight Tracks
- Helicopter Touch and Go Flight Tracks
- Touch and Go Flight Tracks
- Airport Property
- Study Area
- Jurisdictional Boundaries

Existing Land Use

- Single-Family Residential
- Multi-Family Residential
- Parks/Open Space
- Manufactured Homes
- Noise Sensitive Uses
- Undeveloped/Vacant

Sources
Los Angeles County Assessor (December 2019);
Coffman Associates Analysis

Aerial Imagery Sources
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2020 NOISE EXPOSURE CONTOURS

As indicated on **Exhibit 2G** and **Table 2F**, the 65, 70 and 75 CNEL noise contours extend off airport property.

Typically, departure spool-up noise is the loudest component of aircraft operations; therefore, as shown on the exhibit, the contours are widest from east near the Runway 25 end, resulting from a majority (99%) of aircraft departing on Runway 25 to the west. The width of the contours on the north side of the airport near W. 120th Street is influenced by helicopter activity. Two helipads are located in this area. To the west, the contour elongates, which is indicative of departure noise as an aircraft gains altitude after leaving the ground.

As indicated in **Table 2F**, the total area of the 2020 noise contours located off airport property is 75.6 acres.

2025 NOISE EXPOSURE CONTOURS

The 2025 noise exposure contours are depicted on **Exhibit 2H**. The shape of the contours is similar to the 2020 scenario discussed previously. When compared to the 2020 scenario, the 65, 70, and 75 CNEL noise contours are slightly larger. This is likely due to projected increases in operations as presented in **Table 2C.** The contours are similarly influenced by a majority of departures to the west and helicopter activity.

As indicated in **Table 2F**, the total area of the 2025 noise contours located off airport property is 94.4 acres.

AIRCRAFT NOISE MEASUREMENT PROGRAM

Noise measurements were conducted near Hawthorne Municipal Airport beginning on February 17, 2020 and concluding on February 23, 2020. The measurement program was designed and undertaken to provide field-collected data for comparison with the computer-predicted values generated with AEDT, which only represent noise associated with Hawthorne Municipal Airport operations.

It should be noted that when comparing field measurements to computer-generated noise levels, discrepancies may exist. The 24-hour field measurements represent noise conditions for individual days, while the computer model represents the average annual condition for the measurement site. As a result, field-measured noise levels may be greater or less than the average condition represented by the model. These differences can be attributed to a number of variables, including the number and type of aircraft operations, operations from other area airports, interference from non-aviation noise, and climatic conditions.

Information collected during the noise monitoring program includes 24-hour measurements at eight different sites, ranging in durations of 24 hours to 72 hours for comparison with computer-generated CNEL. CNEL is a measure of cumulative sound energy during a 24-hour period. As with the AEDT, all

noise events occurring from 7:00 p.m. to 10:00 p.m. are assigned a 4.77 dB penalty, and noise events occurring between 10:00 p.m. to 7:00 a.m. are assigned a 10 decibel (dB) penalty to account for the potentially greater annoyance caused by evening and nighttime noise.

In addition to the cumulative noise data, information was collected for single event measurements. This information is used as an indicator of typical dB and sound exposure levels (SEL) within the airport area. All procedures and equipment involved in the aircraft noise measurement program were performed pursuant to guidelines set forth by Part 150, § A150.3.

ACOUSTICAL MEASUREMENTS

Four (4) Larson Davis Model 831 sound level meters were used to collect data during the noise measurement program. Each unit was equipped with an external microphone and a weatherproof case to protect the equipment from inclement weather.

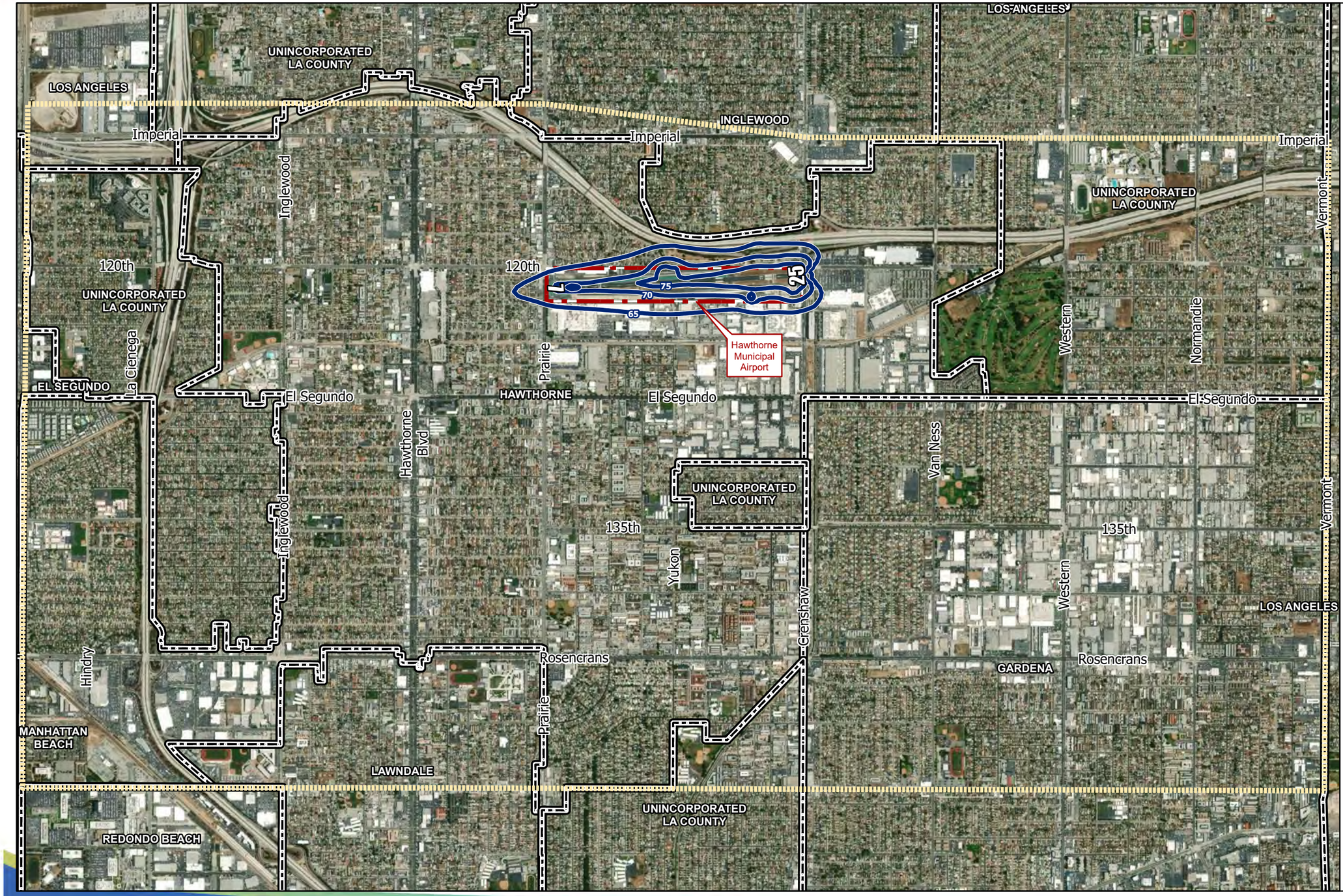
To ensure consistency between measurement locations, each unit was calibrated with a Larson Davis calibration device. A calibrator, with an accuracy of 0.5 decibels (dB), was used for all instruments. At the completion of each field measurement, the monitors were re-calibrated.

Logged noise data was retrieved from the monitors during routine site visits and stored on a laptop computer. The raw data from each unit is included in the analysis discussed later in this section.

Measurement Procedures

To minimize the potential for non-aircraft noise measurements, thresholds for noise levels and duration were established. These thresholds are programmed as part of the initial setup for the noise monitoring equipment. A minimum threshold of approximately 5 to 10 dB greater than the ambient level was established for the noise measurements. This excluded any noise event below the threshold. Additionally, a minimum event duration of five seconds was set to ensure that brief events (door slam, dog barking, etc.) were not recorded. These two thresholds limit the single noise events logged by the noise monitor. Only those events which exceed both thresholds were noted as noise events and included as part of the raw data.

Single events that met both criteria were retained and analyzed to consider all noise present at the site, regardless of its level, and provide hourly summations of equivalent noise levels (Leq). Also, the equipment optionally provided information on SEL values for each event which exceeded the preset threshold and duration, and distributions of decibel levels throughout the measurement period. The Larson Davis Model 831 sound level meters are equipped to make a digital recording of an event that exceeds the programmed thresholds. This feature aids the user in identifying aviation-related events when calculating noise exposure for the location. A 15-second sound file is saved within the instrument's memory and is downloaded during routine site visits. This 15-second sound file can then be used to identify the source of the noise event.



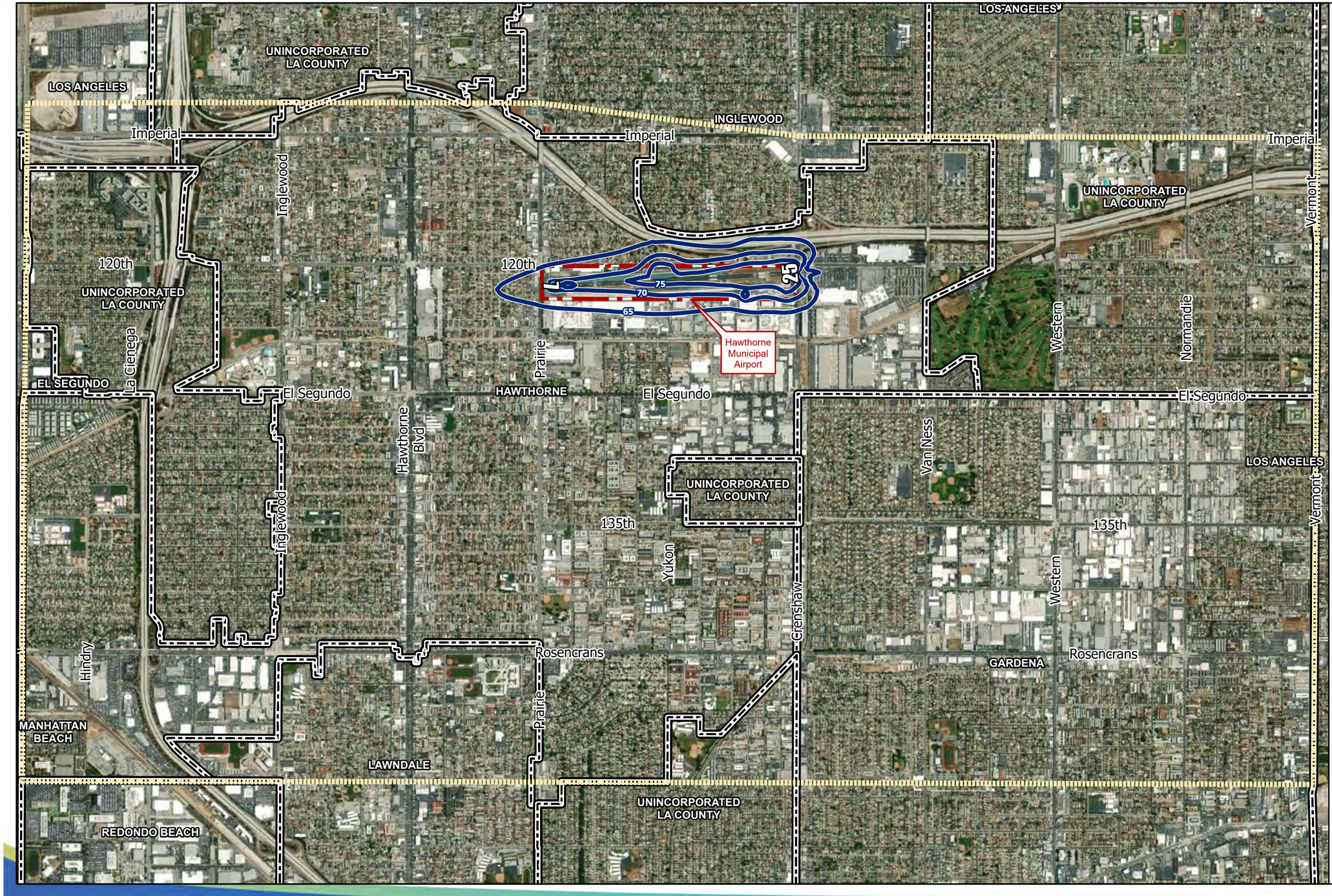
LEGEND

- 2020 CNEL Noise Contours
- Airport Property
- Study Area
- Jurisdictional Boundaries

CNEL - Community Noise Equivalent Level

Sources
Coffman Associates Analysis

Aerial Imagery Sources
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



LEGEND

- 2025 CNEL Noise Contours
- Airport Property
- Study Area
- Jurisdictional Boundaries

CNEL - Community Noise Equivalent Level

Sources
Coffman Associates Analysis

Aerial Imagery Sources
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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1" = 2,000'

Weather Information

Weather can influence aviation activity at an airport. Severe weather, such as strong thunderstorms, is likely to reduce the number of operations at an airport, while unseasonably warm weather may increase the number of operations at an airport. **Table 2G** summarizes the weather observed during the noise measurement program as reported from the Los Angeles International Airport weather station. As indicated in the table, daily high temperatures ranged between 64 and 79 degrees F, while low temperatures ranged between 48 and 58 degrees F. In comparison to the monthly average for February, the daily high and low temperatures were above and below the averages of 69.8 F (average high) and 52.3 F (average low). Average wind speeds ranged from 2.2 to 5.1 miles per hour, with maximum wind speeds of up to 22 miles per hour. There were only trace amounts of precipitation on two of the monitoring days. No severe weather events were recorded during the noise measurement program. The weather during the noise measurement program indicates favorable conditions for aviation activity.

TABLE 2G
Noise Measurement Program Weather Conditions
Hawthorne Municipal Airport

	Date							
	February Daily Average	2/17	2/18	2/19	2/20	2/21	2/22	2/23
Mean Temperature (°F)	61.0	57	62	61	66	65	62	60
Maximum Temperature (°F)	69.8	66	69	66	79	75	65	64
Minimum Temperature (°F)	52.3	48	55	56	52	55	58	55
Precipitation (in)	>0.01	0	0	0	0	T[1]	0	T[1]
Average Wind Speed (MPH)	6.6	3.1	4.6	3.0	2.2	3.8	5.1	3.5
Wind Direction	NNW	SW	SW	SW	W	SW	SW	SW
Maximum Wind Speed (MPH)	36	14	18	15	22	18	20	17

[1] *T = indicates a trace amount of precipitation recorded on that date*

Source: Los Angeles International Airport Weather Reporting Station, February 17 – 23, 2020
http://w2.weather.gov/climate/getclimate.php?wfo=mtr

Aircraft Noise Measurement Sites and Summary

Monitors were positioned in locations that did not include unusual terrain characteristics, such as berms, or other loud non-aviation noise sources which could adversely affect the quality of the measurements. Examples of non-aviation noise sources include trains, automobiles, landscaping equipment, construction activities, and air conditioner units. Prior to selecting the sites, the Planning Advisory Committee was contacted to solicit input on potential locations for the monitors. The original program included eight sites; however, based on input from the Planning Advisory Committee, the City of Hawthorne arranged to have monitoring at three additional sites within Hermosa Beach, Manhattan Beach, and Redondo Beach.

While multiple sites met the desired criteria for monitoring, the selected sites fulfill the above criteria and provide a representative sampling of the varying noise conditions in the airport vicinity. The location

of the noise monitor sites is depicted on **Exhibit 2J** and the sites are summarized below in **Table 2H**. As indicated in the table, eight of the measurements were conducted at residential locations within communities near the airport. Additionally, two monitors were placed at Hawthorne Municipal Airport and one was placed at the Hawthorne Memorial Center.

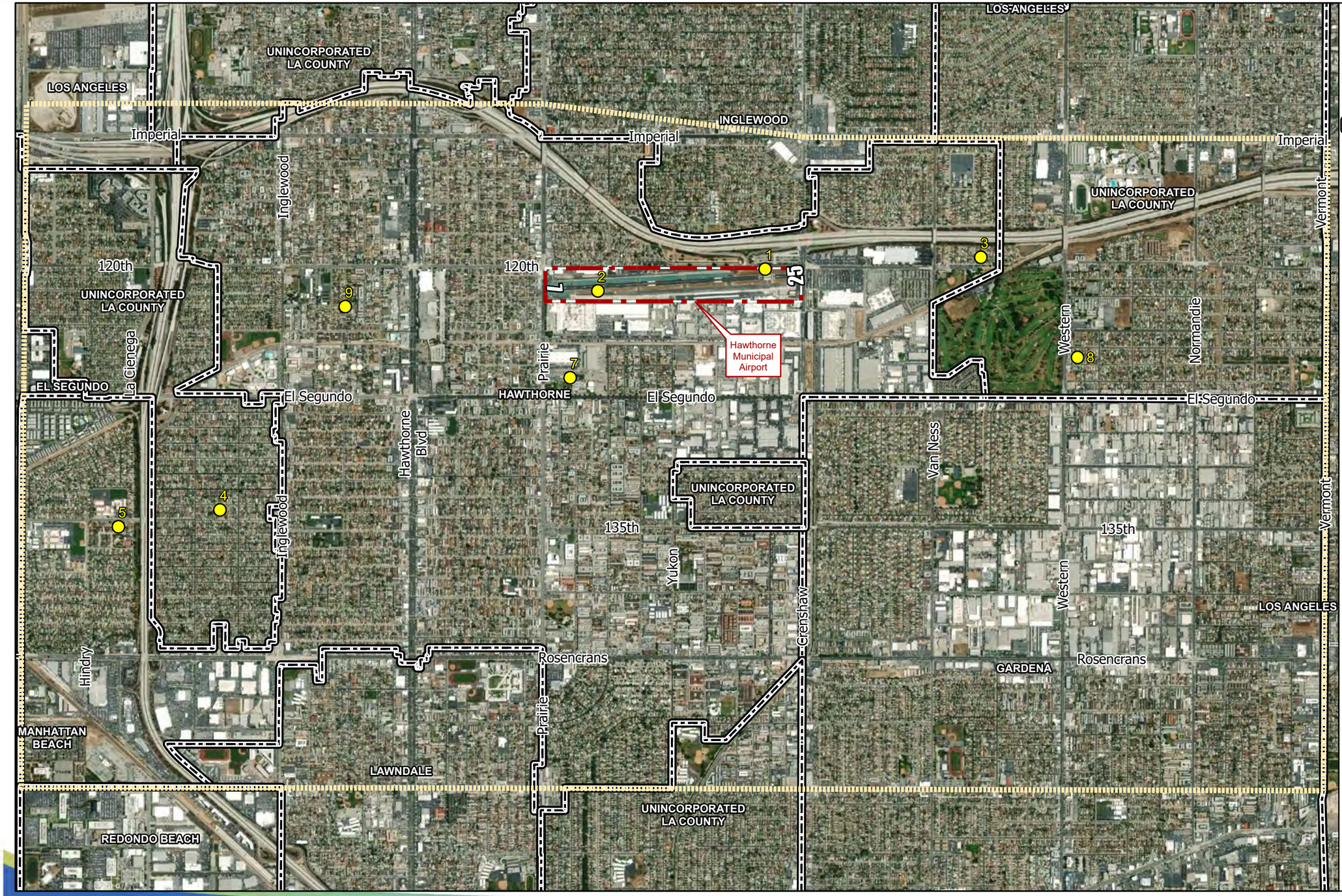
TABLE 2H
Noise Measurement Sites
Hawthorne Municipal Airport

Site	Location	Duration (hours)
1	Hawthorne Municipal Airport – Runway 25 end	72
2	Hawthorne Municipal Airport – Runway 7 end	72
3	Residence near Tarron Avenue and W. 120th St., Hawthorne	48
4	Residence near W. 134th Place and Shoup Avenue, Hawthorne	48
5	Residence near W. 135th Street and Isis Avenue, Hawthorne	48
6	Residence near 15th Street and Harkness Street, Manhattan Beach	48
7	Hawthorne Memorial Center, Hawthorne	24
8	Residence near W. 126th Street and Western Avenue, Hawthorne	24
9	Residence near W. Broadway and Ramona Avenue, Hawthorne	48
10	Residence near Dow Avenue and Manhattan Beach Boulevard, Redondo Beach	48
11	Residence near 30th Street and Ardmore Avenue, Hermosa Beach	48

A summary of the single event noise data collected during the measurement period is presented in **Table 2J**. This information includes:

- Maximum recorded noise level in dB (L_{max});
- Longest single event duration in seconds (Max Duration);
- Total number of events above 60 dB SEL;
- Number of single events within the ranges of 60-70 dB, 70-80 dB, 80-90 dB, 90-100 dB, and above 100 dB SEL; and
- Number of events identified as aircraft operations based on audio recordings of the events.

As indicated in **Table 2J**, the maximum recorded sound level (L_{max}) for all measurement periods ranged between 74.4 dB at Site 6 near 15th Street and Harkness Street, Manhattan Beach, and 104.2 dB at Site 2 on airport property. Of the 11 sites, five had L_{max} values attributed to aircraft operations and seven (Sites 1, 3, 5, 6, 7, 10, and 11) had L_{max} values identified as non-aviation noise (motorcycle, dog barking, birds, emergency vehicles, and automobile traffic). As noted in the table, the maximum duration of events at the sites ranged between 28.9 seconds and 3,424.8 seconds. It is important to note that in many cases, the L_{max} and maximum duration are from different events. It is important to note that, based on available information, the event duration of 3,424.8 seconds was not solely created by aircraft noise. While it is possible that overflight contributed to the extended period of elevated noise, other non-aircraft events are accountable for the extended noise event.

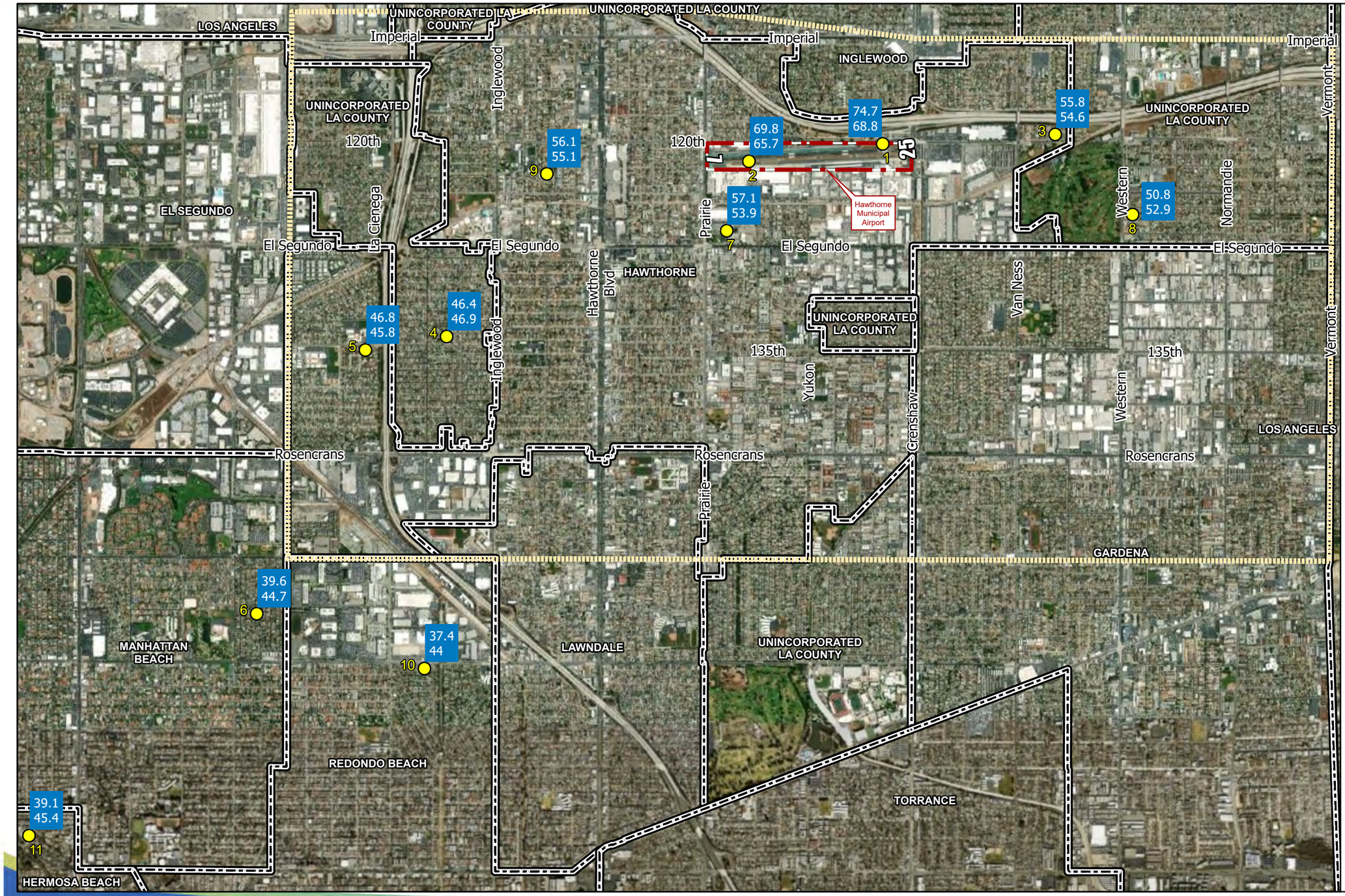


LEGEND

- Noise Monitoring Locations
- Airport Property
- Study Area
- Jurisdictional Boundaries

Sources
Coffman Associates Analysis

Aerial Imagery Sources
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



LEGEND

- Noise Monitoring Locations
- Airport Property
- Study Area
- Jurisdictional Boundaries

50.8 AEDT Generated Value
52.9 Measured Value

Sources
Coffman Associates Analysis

Aerial Imagery Sources
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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1" = 2,500'

TABLE 2J
Noise Measurement Single Event Data Summary
Hawthorne Municipal Airport

Site/Day	L_{max}	Max Duration (sec)	Sound Exposure Level Event Summary: Below 60 dB	60-70 dB	70-80 dB	80-90 dB	90-100 dB	100+ dB	Aircraft Events
Site 1 – Hawthorne Municipal Airport – Runway 25 end									
Day 1	103.9	144	0	0	0	50	68	16	107
Day 2	98.9[1]	35.8	0	0	0	28	39	3	50
Day 3	106	412.9	0	0	0	72	91	14	149
Site 2 – Hawthorne Municipal Airport – Runway 7 end									
Day 1	103.2	347.9	0	0	32	75	49	4	145
Day 2	94.9	160	0	0	12	28	24	1	54
Day 3	104.2	160	0	0	41	99	44	9	170
Site 3 – Residence near Tarron Avenue and W. 120th St., Hawthorne									
Day 1	88.4[2]	42.4	0	32	43	33	5	0	81
Day 2	89.5[2]	28.9	0	27	26	22	1	0	22
Site 4 – Residence near W. 134th Place and Shoup Avenue, Hawthorne									
Day 1	77.9	271.7	1	112	61	12	0	0	97
Day 2	79.8	1,906	158	296	80	16	1	1	100
Site 5 – Residence near W. 135th Street and Isis Avenue, Hawthorne									
Day 1	81.2[2]	3,424.8	0	66	71	21	1	0	41
Day 2	77.2	1,183.5	0	153	145	20	2	0	64
Site 6 – Residence near 15th Street and Harkness Street, Manhattan Beach									
Day 1	74.4	98.8	3	143	57	5	0	0	77
Day 2	92.5[3]	519.1	4	191	79	14	5	3	122
Site 7 – Hawthorne Memorial Center, Hawthorne									
Day 1	82.0[4]	1,018.9	0	419	441	68	4	0	176
Site 8 – Residence near W. 126th Street and Western Avenue, Hawthorne									
Day 1	89.6	2,591.2	50	268	49	8	2	1	115
Site 9 – Residence near W. Broadway and Ramona Avenue, Hawthorne									
Day 1	86.5	165.3	20	778	140	43	13	0	138
Day 2	86.7	354.2	27	655	98	34	9	0	104
Site 10 - Residence near Dow Avenue and Manhattan Beach Boulevard, Redondo Beach									
Day 1	77.7	319.3	3	275	59	7	0	0	109
Day 2	76.1[5]	96.4	3	241	69	2	0	0	92
Site 11 - Residence near 30th Street and Ardmore Avenue, Hermosa Beach									
Day 1	86.7[2]	464.6	243	265	44	9	3	0	145
Day 2	87.9[2]	312.9	297	167	50	7	4	0	171

Note: L_{max} and Maximum Duration may be from different events.
[1] *Noise value generated by a motorcycle.*
[2] *Noise value generated by a dog barking.*
[3] *Noise value generated by birds.*
[4] *Noise value generated by emergency vehicles.*
[5] *Noise value generated by passing traffic.*
Source: Coffman Associates' analysis.

Table 2K includes a summary of the cumulative data collected for each site, which includes the 24-hour LEQ, CNEL(24), and CNEL(24t) for each site. The LEQ metric is derived by accumulating all noise events logged during a given period and logarithmically averaging it. It is similar to the CNEL metric except that no extra weight is attached to nighttime or evening noise events. The CNEL(24) value represents the noise condition from all noise sources logged with the sound level meter. The CNEL(24t) is a reasonable approximation of the CNEL attributable to aircraft noise alone. Only those events identified as aircraft noise, based on sound recordings, are included in the CNEL(24t) calculation. In some cases, CNEL(24t) may include noise from operations associated with airports other than Hawthorne Municipal Airport. For sites with multiple 24-hour measurements, a logarithmic average of each individual 24-hour period is provided as an estimate of the average overall measurement for that site.

As indicated in the table, the sites with the greatest LEQ(24), CNEL(24), and CNEL(24t) values are those located on airport property at Sites 1 and 2. The sites with the greatest LEQ(24), CNEL(24), and CNEL(24t) values are those located on airport property at Sites 1 and 2. Off airport, the greatest LEQ(24) and CNEL(24) measurements were measured at Site 6 (residence near 15th Street and Harkness Street, Manhattan Beach) and the greatest CNEL(24t), which is noise attributed only to aircraft events, was measured at Site 9 (W. Broadway and Ramona Avenue, Hawthorne).

COMPARATIVE MEASUREMENT ANALYSIS

The CNEL values derived from the field noise measurements have been compared to the computer-modeled noise values for the same geographic locations. In doing this, it is important to note the distinction between the two values. The computer-modeled CNEL values are analogous to the climate of an area and represent the noise levels on an average day of the period under consideration. In contrast, the field measurements reflect only the noise levels on the specific days of measurement. With this understanding in mind, it is useful to evaluate the comparative aircraft CNEL levels of the measurement sites. As previously discussed, the CNEL(24t) was used as it is a reasonable approximation of the CNEL attributable to aircraft noise alone.

CNEL Comparison

This analysis provides a direct comparison of the measured and predicted values for each noise measurement site. To facilitate such a comparison, it is necessary to ensure that the computer model input is representing the observed reality as accurately as possible within the capabilities of the model. The differences between the modeled and measured CNEL(24t) values are depicted on **Exhibit 2J** and within **Table 2M**. A positive number in the difference column represents a modeled value which is greater than the measured value, while a negative number in the column indicates a modeled value which is less than the measured value.

TABLE 2K
Noise Measurement Cumulative Data Summary
Hawthorne Municipal Airport

Site/Day	LEQ(24)	CNEL(24)	CNEL(24t)
Site 1 – Hawthorne Municipal Airport – Runway 25 end			
Day 1	69.5	70.7	69.5
Day 2	62.2	66.1	63.4
Day 3	70.8	71.5	70.7
Average	68.8	70.0	68.8
Site 2 – Hawthorne Municipal Airport – Runway 7 end			
Day 1	65.5	66.9	66.8
Day 2	59.9	63.4	63.3
Day 3	65.8	66.8	66.3
Average	64.4	66.0	65.7
Site 3 – Residence near Tarron Avenue and W. 120th St., Hawthorne			
Day 1	53.9	56.4	56.1
Day 2	51.9	54.4	52.3
Average	53.1	55.5	54.6
Site 4 – Residence near W. 134th Place and Shoup Avenue, Hawthorne			
Day 1	47.4	49.7	47.4
Day 2	59.1	59.4	46.8
Average	56.4	56.9	47.1
Site 5 – Residence near W. 135th Street and Isis Avenue, Hawthorne			
Day 1	51.2	59.0	44.8
Day 2	53.1	62.0	46.7
Average	52.3	60.8	45.8
Site 6 – Residence near 15th Street and Harkness Street, Manhattan Beach			
Day 1	45.1	45.9	43.5
Day 2	64.2	73.1	45.6
Average	61.2	70.1	44.7
Site 7 – Hawthorne Memorial Center, Hawthorne			
Day 1	57.1	62.5	53.9
Site 8 – Residence near W. 126th Street and Western Avenue, Hawthorne			
Day 1	54.5	55.3	52.9
Site 9 – Residence near W. Broadway and Ramona Avenue, Hawthorne			
Day 1	57.0	58.1	56.7
Day 2	55.2	56.7	52.2
Average	56.2	57.4	55.1
Site 10 – Residence near Dow Avenue and Manhattan Beach Boulevard, Redondo Beach			
Day 1	46.5	48.2	44.9
Day 2	45.3	47.7	42.7
Average	46.0	48.0	44.0
Site 11 – Residence near 30th Street and Ardmore Avenue, Hermosa Beach			
Day 1	52.2	52.5	42.7
Day 2	52.4	53.0	47.1
Average	52.3	52.8	45.4

Source: Coffman Associates' analysis

TABLE 2L
Noise Measurement vs. AEDT Predicted CNEL Values
Hawthorne Municipal Airport

Site/Day	Measured (CNEL[24t][1])	AEDT Predicted 2020[2]	Difference[3]
Site 1 – Hawthorne Municipal Airport – Runway 25 end			
	68.8	74.7	5.8
Site 2 – Hawthorne Municipal Airport – Runway 7 end			
	65.7	69.8	4.4
Site 3 – Residence near Tarron Avenue and W. 120th St., Hawthorne			
	54.6	55.8	1.3
Site 4 – Residence near W. 134th Place and Shoup Avenue, Hawthorne			
	46.9	46.4	-0.5
Site 5 – Residence near W. 135th Street and Isis Avenue, Hawthorne			
	45.8	46.8	1.0
Site 6 – Residence near 15th Street and Harkness Street, Manhattan Beach			
	44.7	39.6	-5.0
Site 7 – Hawthorne Memorial Center, Hawthorne			
	53.9	57.1	3.3
Site 8 – Residence near W. 126th Street and Western Avenue, Hawthorne			
	52.9	50.8	-2.1
Site 9 – Residence near W. Broadway and Ramona Avenue, Hawthorne			
	55.1	56.1	1.1
Site 10 – Residence near Dow Avenue and Manhattan Beach Boulevard, Redondo Beach			
	44.0	37.4	-6.5
Site 11 – Residence near 30th Street and Ardmore Avenue, Hermosa Beach			
	45.4	39.1	-6.3

[1] *May include events from airports other than Hawthorne Municipal Airport, including Chino Airport, Long Beach Airport, Los Angeles International Airport, Santa Monica Airport, Torrance Airport, and Van Nuys Airport.*
[2] *2020 noise exposure contours based on 207 daily operations.*
[3] *A positive number in the difference column represents a modeled value that is greater than the measured value, while a negative number in the column indicates a modeled value that is less than the measured value.*
Source: Coffman Associates' analysis

As indicated in **Table 2L**, many of the AEDT modeled values are greater than the individual 24-hour measurements and logarithmic averages for each of the sites. These differences indicate that the model is predicting more noise at each site when compared to the measured noise.

This may be attributed to the number of operations occurring at Hawthorne Municipal Airport during the measurement period. As stated in **Table 2C**, the 2020 contours are based on 75,405 annual operations, which equates to approximately 207 daily operations. In comparison, based on radar flight track data obtained for the noise measurement period, daily operations totals presented in **Table 2M** for the five-day measurement period ranged between 57 and 172, which represents 27.5 to 83 percent of modeled operations.

TABLE 2M
Daily Operations During Noise Measurement Program
Hawthorne Municipal Airport

Date	Operations Estimated from LAX Radar Flight Track Data
February 17, 2020	128
February 18, 2020	57
February 19, 2020	146
February 20, 2020	135
February 21, 2020	155
February 22, 2020	68
February 23, 2020	172
AEDT Average Day	207

*Note: Operations represent counts starting at 12:00 a.m. on the stated date, which differs from the 24-hour measurement periods that varied by site. Equipment placement times at each location generally ranged from 8:00 a.m. to 1:00 p.m.; therefore, a direct comparison of the number of airport events presented in **Table 2J** is not possible.*

Source: Los Angeles World Airports, Airport Noise and Operations Monitoring System (ANOMS), Coffman Associates' analysis

Measured levels at Sites 4, 6, 8, 10, and 11 were sites where modeled noise was less than the measured noise. This may be a result of multiple factors, such as contamination from airport activity from airports other than Hawthorne Municipal Airport, passing traffic, thunderstorms, or ambient neighborhood noise (i.e., dogs barking, children playing, or passing friendly conversation). To determine whether aircraft noise contributed to modeled noise for each of these sites, a half-mile buffer was drawn around the site for comparison to radar flight track data for the specific monitoring. Within each of these buffered areas, the number of operations to or from Hawthorne Municipal Airport were counted for comparison to the number of operations not associated with Hawthorne Municipal Airport. The results of this analysis are presented in **Table 2N**. As noted in the table, the number of operations associated with airports other than Hawthorne Municipal Airport were within one-half mile of Sites 4, 6, 10, and 11. Based on a review of the flight track information associated with these tracks, aircraft overflying these areas are associated with Chino Airport, Long Beach Airport, Los Angeles International Airport, Santa Monica Airport, Torrance Airport, and Van Nuys Airport. Aircraft associated with these operations include Airbus A320, Boeing 737, Lear 45, Gulfstream 650, Beechcraft Bonanza, Cessna 172, Sirrus SR22, and Mooney M20.

To illustrate the potential for the presence of aircraft from other airports within the vicinity of the noise monitors, **Exhibit 2K** depicts the traffic from Hawthorne Municipal Airport and from other airports within one half mile of Sites 6, 10, and 11 for February 19-22, 2020. As depicted, these areas are frequently overflown by aircraft traveling to or from airports other than Hawthorne Municipal Airport. Eliminating events associated with airports other than Hawthorne Municipal Airport from the calculations would likely decrease the measured noise for these sites. However, sufficient detail, specifically the time at which the aircraft passed over the noise monitor, is not available from the radar data obtained to accurately correlate the measured noise events to the flight tracks. The radar flight track data only approximates the time at which an aircraft arrives or departs from an airport. Additionally, given that these sites are more than three miles away from the airport and the airspeed of these aircraft is unknown, the time at which the aircraft were near cannot be calculated with certainty.

TABLE 2N
Operations within One-Half Mile of Noise Monitors
Hawthorne Municipal Airport

		Operations within One-Half Mile of Noise Monitoring Site					
Site	Date	Hawthorne Municipal Airport Operations	Percentage of Hawthorne Municipal Airport Operations	Other Airport Operations	Percentage of Other Airport Operations	Total Operations	Measurement vs. AEDT
4	February 17, 2020	37	51.4%	35	48.6%	72	-0.5
4	February 22, 2020	18	66.7%	9	33.3%	27	-0.5
6	February 19, 2020	28	20.0%	112	80.0%	140	-5.0
6	February 20, 2020	17	10.1%	151	89.9%	168	-5.0
8	February 20, 2020	80	81.6%	18	18.4%	98	-2.1
10	February 21, 2020	13	9.6%	122	90.4%	135	-6.5
10	February 22, 2020	6	6.7%	84	93.3%	90	-6.5
11	February 21, 2020	21	30.4%	48	69.6%	69	-6.3
11	February 22, 2020	17	35.4%	31	64.6%	48	-6.3

*Note: Operations represent counts starting at 12:00 a.m. on the stated date, which differs from the 24-hour measurement periods that varied by site. Equipment placement times at each location generally ranged from 8:00 a.m. to 1:00 p.m.; therefore, a direct comparison of the number of airport events presented in **Table 2J** is not possible.*

A positive number in the Measurement vs. AEDT column represents a modeled value that is greater than the measured value, while a negative number in the column indicates a modeled value that is less than the measured value.

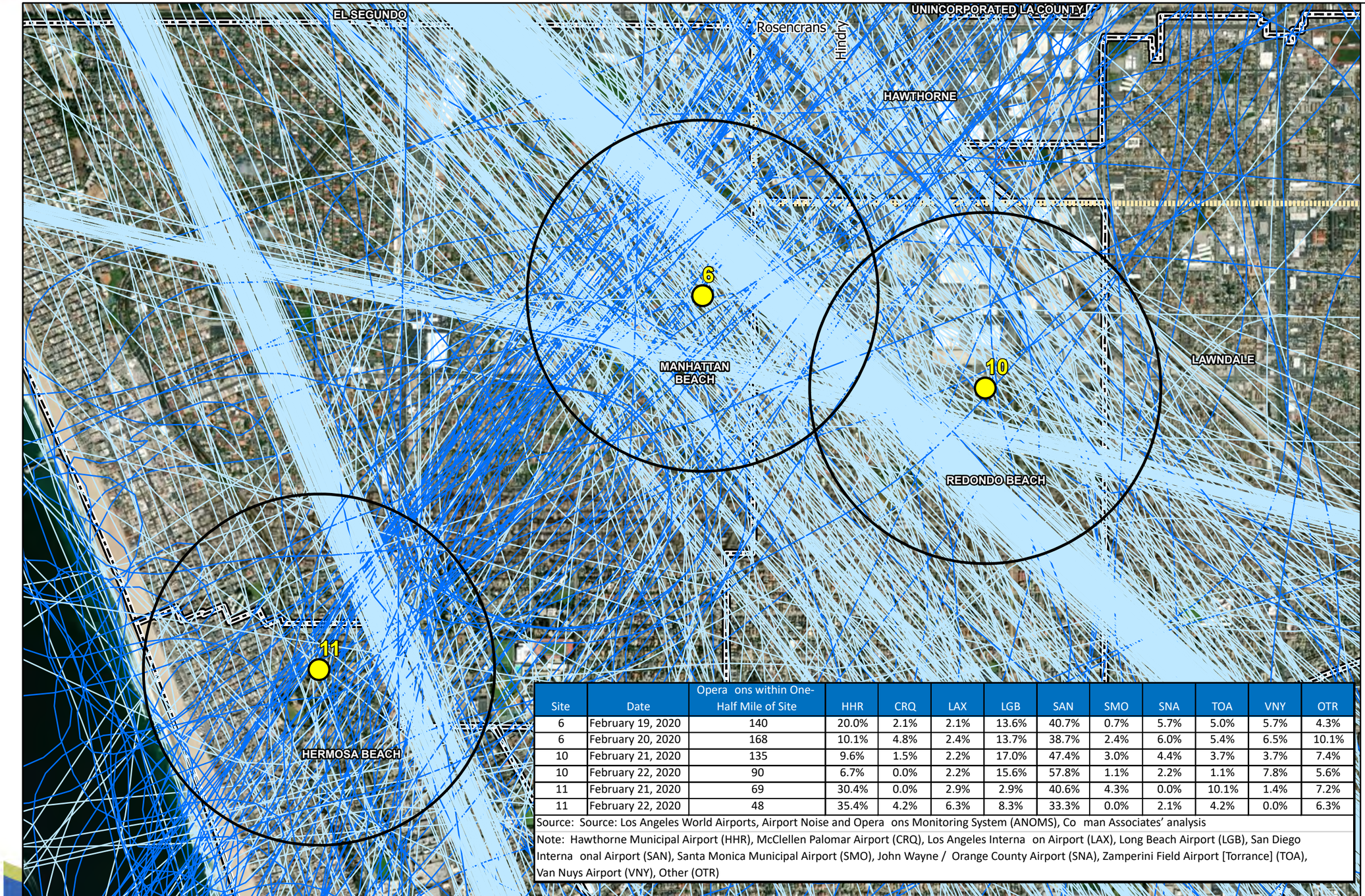
Source: Los Angeles World Airports, Airport Noise and Operations Monitoring System (ANOMS), Coffman Associates' analysis

SUMMARY

The information presented in this chapter defines the noise patterns for current and future activity at Hawthorne Municipal Airport. These contours do not include additional noise abatement measures in use at the airport. It does not attempt to evaluate or otherwise include activity over which the airport has no control, such as other aircraft transiting the area and not stopping at the airport.

It should be emphasized that the CNEL noise contour lines drawn on the maps do not represent absolute boundaries of acceptability in personal response to noise, nor do they represent the actual noise conditions on any specific day, but rather the conditions of an average day derived from annual information.

The 2020 and 2025 65 CNEL and greater noise exposure contours developed in this chapter will be used in Chapter Three to identify the areas impacted by airport noise based on federal guidance.



LEGEND

- Noise Monitoring Locations
- Radar Traffic from Other Airports
- Radar Traffic from Hawthorne Airport
- Half Mile Buffer of Noise Monitoring Locations
- Airport Property
- Study Area
- Jurisdictional Boundaries

Sources
Los Angeles World Airports, Airport Noise and Operations Monitoring System (ANOMS)
Dates: 2-19 through 2-22-2020

Aerial Imagery Sources
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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1" = 1,500'

Site	Date	Opera ons within One-Half Mile of Site	HHR	CRQ	LAX	LGB	SAN	SMO	SNA	TOA	VNY	OTR
6	February 19, 2020	140	20.0%	2.1%	2.1%	13.6%	40.7%	0.7%	5.7%	5.0%	5.7%	4.3%
6	February 20, 2020	168	10.1%	4.8%	2.4%	13.7%	38.7%	2.4%	6.0%	5.4%	6.5%	10.1%
10	February 21, 2020	135	9.6%	1.5%	2.2%	17.0%	47.4%	3.0%	4.4%	3.7%	3.7%	7.4%
10	February 22, 2020	90	6.7%	0.0%	2.2%	15.6%	57.8%	1.1%	2.2%	1.1%	7.8%	5.6%
11	February 21, 2020	69	30.4%	0.0%	2.9%	2.9%	40.6%	4.3%	0.0%	10.1%	1.4%	7.2%
11	February 22, 2020	48	35.4%	4.2%	6.3%	8.3%	33.3%	0.0%	2.1%	4.2%	0.0%	6.3%

Source: Source: Los Angeles World Airports, Airport Noise and Opera ons Monitoring System (ANOMS), Co man Associates' analysis

Note: Hawthorne Municipal Airport (HHR), McClellen Palomar Airport (CRQ), Los Angeles Interna on Airport (LAX), Long Beach Airport (LGB), San Diego Interna onal Airport (SAN), Santa Monica Municipal Airport (SMO), John Wayne / Orange County Airport (SNA), Zamperini Field Airport [Torrance] (TOA), Van Nuys Airport (VNY), Other (OTR)

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