APPENDIX C

Noise Modeling Technical Report

Construction and demolition noise were modeled for each type of activity that would occur in each phase of construction and demolition for the Proposed Project. The Authority provided this data as Phases B0 through B9. The noise modeling used the Authority's numbering for consistency with their data. However, for the public's ease in reviewing the Written Re-evaluation, the construction and demolition phases were renumbered to be Phases 1-10 in the main document. **Table C-1** below shows the construction activity associated with the Proposed Project and identifies both the Authority's and corresponding Written Re-evaluation's construction and demolition phase numbering. The data presented in this appendix presents the noise modeling using the Authority's phase numbering.

Table C-1
Modeled Phase Numbering v Written Re-evaluation Phase Numbering for Each Construction Activity

Modeled Phase Numbering	**B0**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**B8**	**B9**
Written Re-evaluation Phase Numbering	**Phase 1**	**Phase 2**	**Phase 3**	**Phase 4**	**Phase 5**	**Phase 6**	**Phase 7**	**Phase 8**	**Phase 9**	**Phase 10**
Construction Activity										
Site Mobilization and Demolition	X									
Mass Grading		X								
Excavation			X	X						
Utilities and Paving Landside - Terminal				X		X	X	X		
Utilities and Paving Airside - Terminal					X	X	X	X		
Garage Structure					X	X	X	X		
Building Structure					X	X				
Building Skin						X	X			
Demolition									X	
Utilities and Paving Landside - Taxiway										X
Utilities and Paving Airside - Taxiway										X

Proposed Replacement Passenger Terminal Project Draft Written Re-evaluation

Construction Noise Analysis Technical Report

HMMH Project Number 23-0229A
November 3, 2023

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1. Summary

To support the ongoing Federal Aviation Administration's (FAA's) Environmental Impact Statement (EIS) effort, this technical report has been prepared to assess construction noise for the Proposed Project, implementing the methodologies included in the latest version of the Federal Highway Administration (FHWA) Roadway Construction Noise Model (RCNM). The analysis conservatively assumes that all construction equipment anticipated for the current understanding of the Proposed Project would operate simultaneously for each construction phase. Where phases overlap in time, the analysis assumes both phases and all their associated equipment are operating simultaneously. In this way the analysis provides a conservative assessment of potential impacts.

2. Noise

2.1 Noise Descriptors

Noise levels are measured using a variety of scientific metrics. As a result of extensive research into the characteristics of noise and human response to that noise, standard noise descriptors have been developed for noise exposure analyses. The descriptors used in this construction noise analysis are described below.

A-Weighted Sound Pressure Level (dBA): The decibel (dB) is a unit used to describe sound pressure level. When expressed in dBA, the sound has been filtered to reduce the effect of very low and very high frequency sounds, much as the human ear filters sound frequencies. Without this filtering calculated and measured sound levels would include events that the human ear cannot hear (e.g., dog whistles and low frequency sounds, such as the groaning sounds emanating from large buildings with changes in temperature and wind). With A-weighting, calculations and sound monitoring equipment approximate the sensitivity of the human ear to sounds of different frequencies.

Some common sounds on the dBA scale are listed in Table 1. As shown, the relative perceived loudness of a sound doubles for each increase of 10 dBA, and a 10 dBA change in the sound level corresponds to a factor of 10 increase or decrease in relative sound energy. Figure 1 provides common sound levels and their typical levels.

Table 1. Common Sounds on the A-Weighted Decibel Scale

Sound	Sound level	Relative loudness (approximate)	Sound level
Rock music, with amplifier	120	64	1,000,000
Thunder, snowmobile (operator)	110	32	100,000
Boiler shop, power mower	100	16	10,000
Orchestral crescendo at 25 feet, noisy kitchen	90	8	1,000
Busy street	80	4	100
Interior of department store	70	2	10
Ordinary conversation, 3 feet away	60	1	1
Quiet automobiles at low speed	50	½	.1
Average office	40	¼	.01
City residence	30	1/8	.001
Quiet country residence	20	1/16	.0001
Rustle of leaves	10	1/32	.00001
Threshold of hearing	0	1/64	.000001
Source: U.S. Department of Housing and Urban Development. Aircraft Noise Impact--Planning Guidelines for Local Agencies, Figure 2-2. 1972.			

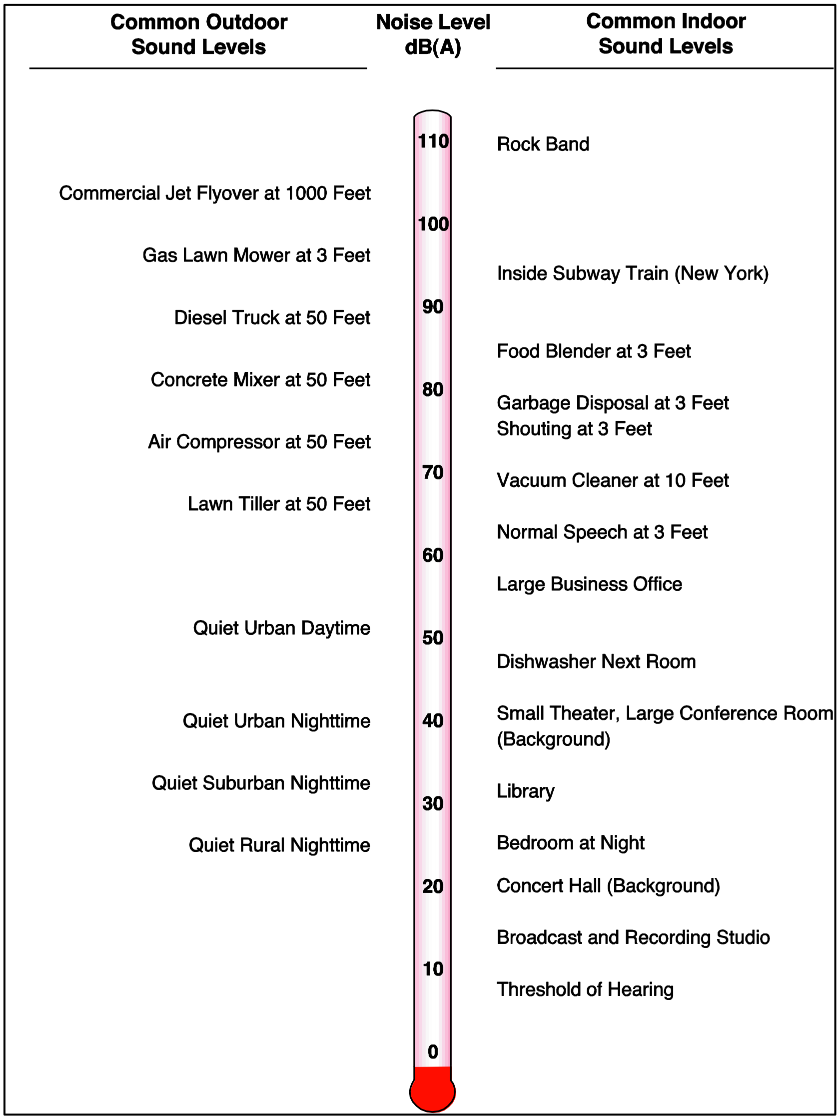

Figure 1. Sound Levels

In general, humans find a change in sound level of 3 dB is just noticeable, a change of 5 dBA is clearly noticeable, and a change of 10 dB is perceived as a doubling or halving sound level (i.e., an increase of 10 dB is perceived as being twice as loud and a decrease of 10 dB is perceived as being half as loud). Because of the logarithmic scale of the decibel unit, sound levels generally cannot be added or subtracted arithmetically. Two sounds of equal physical intensity will result in the sound level increasing by 3 dB, regardless of the initial sound level (see Figure 2). For example, 60 dB plus 60 dB equals 63 dB, 80 dB plus 80 dB equals 83 dB. However, where ambient noise levels are high in comparison to a new noise source, there will be a small change in noise levels. For example, when a 70 dB ambient noise levels are combined with a 60 dB noise source the resulting noise level equals 70.4 dB.

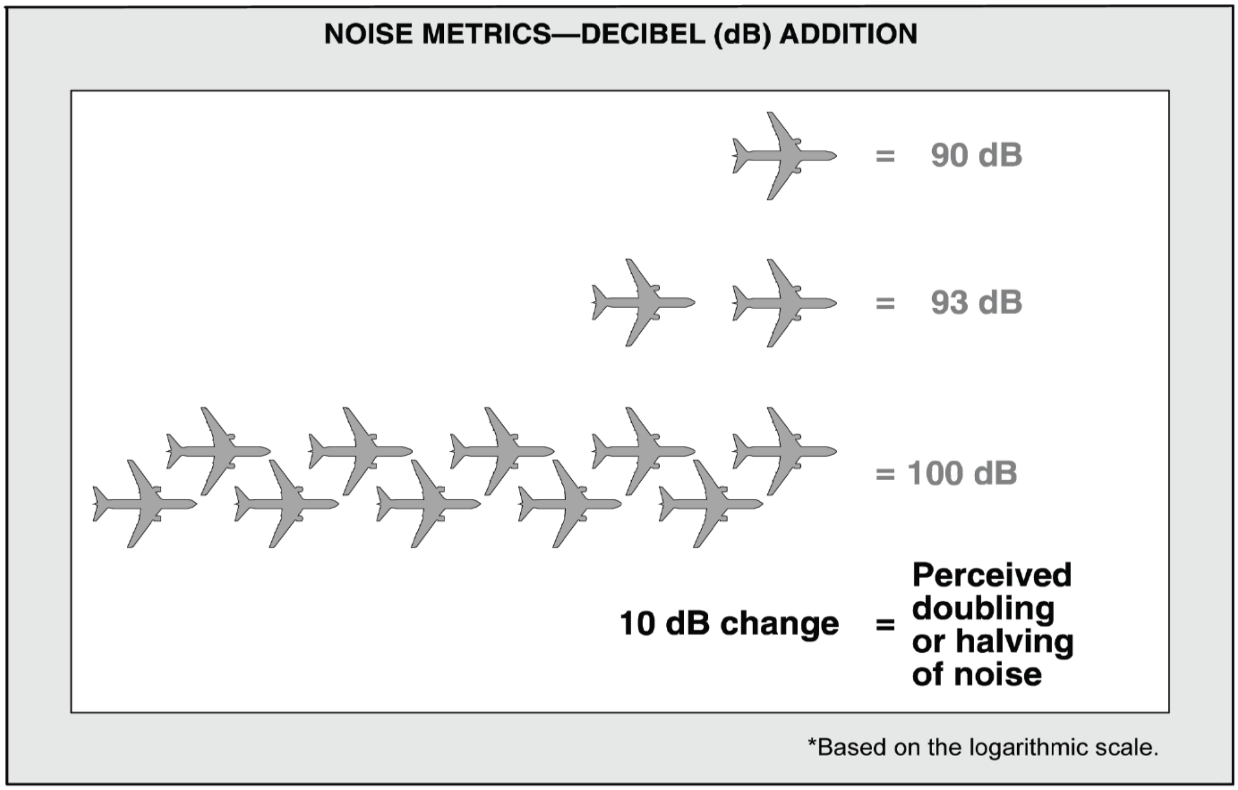

Figure 2. Decibel Addition

Maximum Noise Level (L_{max}): L_{max} is the maximum or peak sound level during a noise event. The metric accounts only for the instantaneous peak intensity of the sound and not for the duration of the event. As a vehicle or aircraft passes by an observer, the sound level increases to a maximum level and then decreases. Some sound level meters measure and record the maximum or L_{max} level.

Equivalent Continuous Noise Level (L_{eq}): L_{eq} is the sound level, expressed in dBA, of a steady sound that has the same A-weighted sound energy as the time-varying sound over the averaging period. L_{eq} is the average sound level for a specified time period (e.g., 24 hours, 8 hours, 1 hour, etc.). L_{eq} is calculated by integrating the sound energy from all noise events over a given time period and applying a factor for the number of events. L_{eq} can be expressed for any time interval; for example, the L_{eq} representing an averaged level over an 8-hour period would be expressed as $L_{eq}(8)$ and a one-hour period would be $L_{eq}(h)$.

Day-Night Average Sound Level (DNL): DNL, also referred to as L_{dn}, is expressed in dBA and represents the noise level over a 24-hour period. Because environmental noise fluctuates over time, DNL was devised to relate noise exposure over time to human response. DNL is a 24-hour average of the hourly L_{eq}, but with penalties to account for the increased sensitivity to noise events that occur during the more noise-sensitive nighttime periods. Specifically, DNL penalizes noise 10 dBA during the nighttime time period (10:00 p.m. to 7:00 a.m.), but it does not include an evening penalty (7:00 p.m. to 10:00 p.m.). Typically, DNL is about 1 dBA lower than CNEL (described below), although the difference may be greater if there is an abnormal concentration of noise events in the 7:00 p.m. to 10:00 p.m. time period. The U.S. Environmental Protection Agency (USEPA) introduced the metric in 1976 as a single number measurement of community noise exposure. The FAA adopted DNL as the noise metric for measuring aircraft noise under Federal Aviation Regulations (FAR) Part 150, Airport Noise Compatibility Planning. The Department of Housing and Urban Development, the Veterans Administration, the Department of Defense, the United States Coast Guard, and the Federal Transit Administration have also adopted DNL for measuring noise exposure. DNL is used to describe existing and predicted noise exposure in communities in airport environs based on the average daily operations during the year and the average annual operational conditions at an airport. Therefore, at a specific location near an airport, the noise exposure on a particular day is likely to be higher or lower than the annual average noise exposure depending on the specific operations at an airport on that day. DNL is widely accepted as the best available method to describe aircraft noise exposure and is the noise descriptor required for aircraft noise exposure analyses and land use compatibility planning under FAR Part 150 and for environmental assessments for airport improvement projects (FAA Order 1050.1F).

Community Noise Equivalent Level (CNEL): CNEL, expressed in dBA, is the standard metric used in California to represent cumulative noise exposure. Like DNL, CNEL provides a single-number description of the sound energy to which a person or community is exposed over a period of 24 hours. CNEL includes penalties applied to noise events occurring after 7:00 p.m. and before 7:00 a.m., when noise is considered more intrusive; it also accounts for the typically lower ambient noise levels during these hours. The penalized time period is further subdivided into evening (7:00 p.m. through 9:59 p.m.) and nighttime (10:00 p.m. to 6:59 a.m.). A 10 dB penalty is added to nighttime noise events (equivalent to a ten-fold increase in aircraft operations) and a 5 dB penalty is added to evening noise events. The evening weighting is the only difference between CNEL and DNL.

2.2 Noise Attenuation

Construction noise typically dissipates at a rate of approximately 6.0 dB for each doubling of distance (between the noise source and the receptor). As an example, construction equipment with mufflers (independent of background ambient noise levels) during excavation and grading may generate a noise level of approximately 86 dBA L_{eq} at 50 feet from the noise source. Based on a sound dissipation rate of 6 dB per doubling of distance, a sound level of 86 dBA at 50 feet from the noise source would be approximately 80 dBA at a distance of 100 feet, 74 dBA at a distance of 200 feet, and so on. That sound drop-off rate does not take into account any intervening shielding (including landscaping or trees) or barriers, such as structures or hills between the noise source and noise receptor. A barrier that breaks the line-of-sight between a source and a receiver will typically result in at least 5 dB of noise reduction. A higher barrier may provide as much as 20 dB of noise reduction.

2.3 Effects of Noise on Humans

The effects of noise on humans can be grouped into three general categories:[1]

Subjective effects of annoyance, nuisance, dissatisfaction;

Physiological effects such as starting hearing loss; and,

Interference with activities such as speech, sleep, and learning.

With respect to annoyance, human response to sound is highly individualized. Many factors influence the response to noise including the character of the noise, the variability of the sound level, the presence of tones or impulses, and the time of day of the occurrence. Additionally, non-acoustical factors, such as individual opinion of the noise source, the ability to adapt to the noise, the attitude towards the source and those associated with it, and the predictability of the noise, all influence the response to noise. These factors result in the reaction to noise being highly subjective, with the perceived effect of a particular noise varying widely among individuals in a community.

Noise-induced hearing loss usually takes years to develop. Hearing loss is one of the most obvious and easily quantifiable effects of excessive exposure to noise. While the loss may be temporary at first, it can become permanent after continued exposure. When combined with hearing loss associated with aging, the amount of hearing loss directly due to the environment is difficult to quantify. Although the major cause of noise-induced hearing loss is occupational, non-occupational sources may also be a factor.

Noise can mask important sounds and disrupt communication between individuals in a variety of settings. This process can cause anything from a slight irritation to a serious safety hazard, depending on the circumstance. Noise can disrupt face-to-face communication and telephone communication, and the enjoyment of music and

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[1] U.S. Environmental Protection Agency, Office of Noise Abatement and Control, *Annoyance, Loudness, and Measurement of Repetitive Type of Impulsive Noise Sources,* pg. 3-1, November 1979.

television in the home. Interference with communication has proved to be one of the most important components of noise-related annoyance.

3. Regulatory Environment

Many government agencies have established noise standards and guidelines to protect citizens from potential hearing damage and various other adverse effects associated with noise. Construction noise is regulated at the local level by the cities of Burbank and Los Angeles. The city policies that relate to construction noise are summarized the subsections that follow.

3.1 City of Burbank Noise Regulation

The City of Burbank Municipal Code (Chapter III, Article II, Division 1 - Division 2) provides regulations regarding allowable increases in noise levels in terms of established noise criteria. Supplementing these regulations, the City of Burbank has also established guidelines that are used for land use planning purposes.

Chapter III of the Burbank Municipal Code (City of Burbank Noise Ordinance) establishes acceptable ambient sound levels to regulate intrusive noises (e.g., stationary mechanical equipment and vehicles other than those traveling on public streets, as further described below) within specific land use zones.

3.2 City of Burbank General Plan Noise Element

The City of Burbank has developed a Noise Element of the General Plan to guide in the development of noise regulations. The Noise Element of the City of Burbank General Plan addresses noise mitigation regulations, strategies, and programs and delineates federal, state, and City of Burbank jurisdiction relative to rail, automotive, aircraft, and nuisance noise. The City of Los Angeles has adopted local guidelines based, in part, on the community noise compatibility guidelines established by the California Department of Health Services (CDHS) for use in assessing the compatibility of various land use types with a range of noise levels. CNEL guidelines for specific land uses are classified into four categories: (1) “normally acceptable,” (2) “possibly acceptable,” (3) “normally unacceptable,” and (4) “clearly unacceptable.” A CNEL value of 65 dBA is the upper limit of what is considered a “normally acceptable” noise environment for multi-family residential uses, although a CNEL as high as 70 dBA is considered “conditionally acceptable.” The upper limit of what is considered “normally unacceptable” for residential uses is set at 71 dBA CNEL.

3.3 City of Los Angeles Noise Standards

The City of Los Angeles municipal code (LAMC) noise regulations are not applicable to operational noise from the Airport. However, in accordance with Section 41.40 of the LAMC, construction noise is restricted as follows:

> *“No person shall, between the hours of 9:00 PM and 7:00 AM of the following day, perform any construction or repair work of any kind upon, or any excavating for, any building or structure, where any of the foregoing entails the use of any power-driven drill, riveting machine excavator or any other machine, tool, device or equipment which makes loud noises to the disturbance of persons occupying sleeping quarters in any dwelling hotel or apartment or other place of residence. In addition, the operation, repair or servicing of construction equipment and the job-site delivering of construction materials in such areas shall be prohibited during the hours herein specified. Any person who knowingly and willfully violates the foregoing provision shall be deemed guilty of a misdemeanor punishable as elsewhere provided in this Code.”*

The City of Los Angeles Noise Regulation (Noise Regulation) also limits noise from construction equipment within 500 feet of a residential zone to 75 dBA, measured at a distance of 50 feet from the source, unless compliance with this limitation is technically infeasible. Technically infeasible means the noise limitation cannot be met despite the use of mufflers, shields, sound walls and/or any other noise reduction device or techniques during the operation of equipment. The Noise Regulation prohibits construction noise between the hours of 9:00 PM and 7:00 AM Monday through Friday and on Saturday before 8:00 AM and after 6:00 PM and does not allow construction noise on Sunday. The City of Los Angeles may provide permission to work outside of these hours if it is in the public interest, or where a hardship or injustice, or unreasonable delay would result from its interruption during the hours provided in Section 41.40 of the LAMC.

Construction noise would not exceed the City of Los Angeles Nosie Regulation of 75 dBA within 500 feet of a residential zone.

3.4 Impact Criteria

The Proposed Project would result in an impact related to construction equipment noise if construction activities would:

Exceed the City of Los Angeles construction noise threshold for those noise sensitive areas within the City of Los Angeles's limits, or

Exceed existing ambient exterior noise levels by 5 dB or more at a noise-sensitive use in association with the following:

- Construction activities lasting more than 10 days in a 3-month period; or
- Construction activities occurring between the hours of 9:00 p.m. and 7:00 a.m. Monday through Friday, before 8:00 a.m. or after 6:00 p.m. on Saturday, or at any time on Sunday.

The 5 dB or more increase threshold is based on the City of Los Angeles California Environmental Quality Act (CEQA) Thresholds Guide's significance thresholds for construction noise.[2] It is anticipated that construction of the Proposed Project would involve construction activities lasting more than ten days in a three month period, and it is likely that Project-related construction may periodically occur within evening/nighttime hours and on weekends; hence, this threshold was utilized for the construction equipment noise impact analysis. This impact threshold is also used for those areas within the City of Burbank limits since it is more conservative than the City of Burbank regulations.

4. Methodology

Construction activities typically generate noise from the operation of equipment required for demolition and construction of various facilities. Proposed Project construction noise has been evaluated by considering the construction activity, calculating the construction-related noise level at nearby noise-sensitive receptor locations, and comparing these construction-related noise levels to local construction noise limits and existing ambient noise levels. Specifically, the following methods were used in the analysis:

1. Existing (ambient) Leq dBA noise levels at five surrounding noise-sensitive receptor locations were collected over a one-week period.
2. Typical noise levels for each type of construction equipment (e.g., jackhammers, bulldozers, excavators, dump trucks, pavers, etc.) were obtained from the FHWA RCNM version 2.0[3]. Usage factors for equipment types were included in the calculations, based on factors identified by FHWA as being typical for construction of roadway infrastructure projects and are consistent with the construction efforts for the Proposed Project.
3. Calculations of construction noise were conducted using the approach described in the RCNM user's manual and conducted in the three-dimensional sound propagation software program SoundPLAN. This model accounts for intervening buildings, topography, acoustically hard and soft surfaces, and other inputs that can affect how sound attenuates with distance.
4. Construction noise was calculated for daytime periods based on the anticipated construction phasing. The construction phases were provided by the Authority and were used to calculate construction noise exposure throughout the time periods when construction would occur. The construction phasing assumes nine construction phases and one demolition phase. The construction

[2] City of Los Angeles, *L.A. CEQA Thresholds Guide, Your Resource for Preparing CEQA Analyses in Los Angeles*, 2006.

[3] FHWA RCNM 2.0, FHWA 2018, accessed online RCNM Version 2.0 - Construction Noise - Noise - Environment - FHWA (dot.gov)

phases would occur prior to the demolition phase because the replacement terminal would need to be completed and operational prior to the demolition of the existing terminal.

5. To determine noise levels associated with each phase of construction of the Proposed Project, it was assumed that every piece of construction equipment identified for that phase would be operating at the same time. This is the most conservative approach to identifying construction noise because the use of every piece of construction equipment at the same time would be difficult to achieve and not typical for most construction projects. The detailed calculation methods for construction are based on the quantities of construction equipment, schedule of construction efforts, construction equipment noise source levels, and the equations provided in Section 5 of the RCNM User's Manual. It is also consistent with the Court's directive to consider noise levels from multiple pieces of equipment operating at the same time.
6. To determine construction noise from multiple pieces of equipment operating simultaneously, the SoundPLAN model was used following the general methodology prescribed in the RCNM User's Manual.
7. To be consistent with the City of Los Angeles's noise standards, this analysis assumes construction would occur on weekdays from 7:00 AM to 9:00 PM.
8. Calculated total noise levels at noise measurement locations were then compared to ambient noise levels and the City of Los Angeles's noise standards.

The anticipated construction schedule is provided in Figure 3. The construction phases and equipment quantities used in this analysis are listed in Table A-1 of Appendix A.

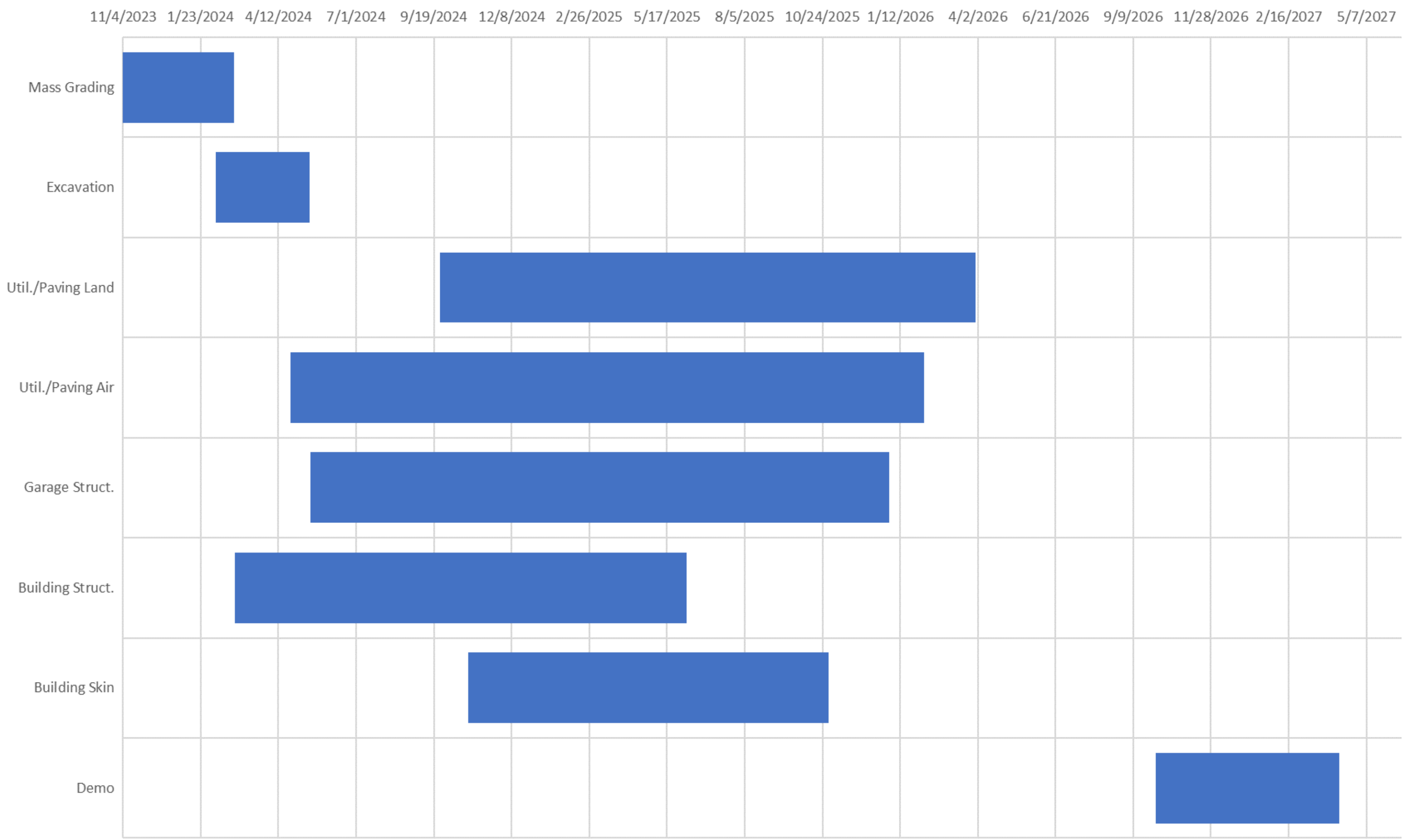

Figure 3. Proposed Project Preliminary Construction Schedule

5. Existing Conditions

For the construction noise analysis daytime is defined as occurring from 7:00 AM to 9:00 PM in the Los Angeles City Code.

The noise measurements were conducted over a week-long period at the five locations chosen by the FAA using type 1 precision sound level meters, which continuously log sound levels and record audio of significant sound events. The results of these noise measurements are provided in Table 2 (see Appendix B for additional detail).

Table 2. Measurement Summary

Measurement Number (Census Block Group)	Jurisdiction	Daytime Leq (7:00 AM – 9:00 PM)	CNEL
M1 (1232.04)	City of Los Angeles	64	65
M2 (1232.03)	City of Los Angeles	69	70
M3 (3110)	City of Burbank	58	59
M4 (3105.01)	City of Burbank	60	63
M5 (1021.05)	City of Los Angeles	62	65

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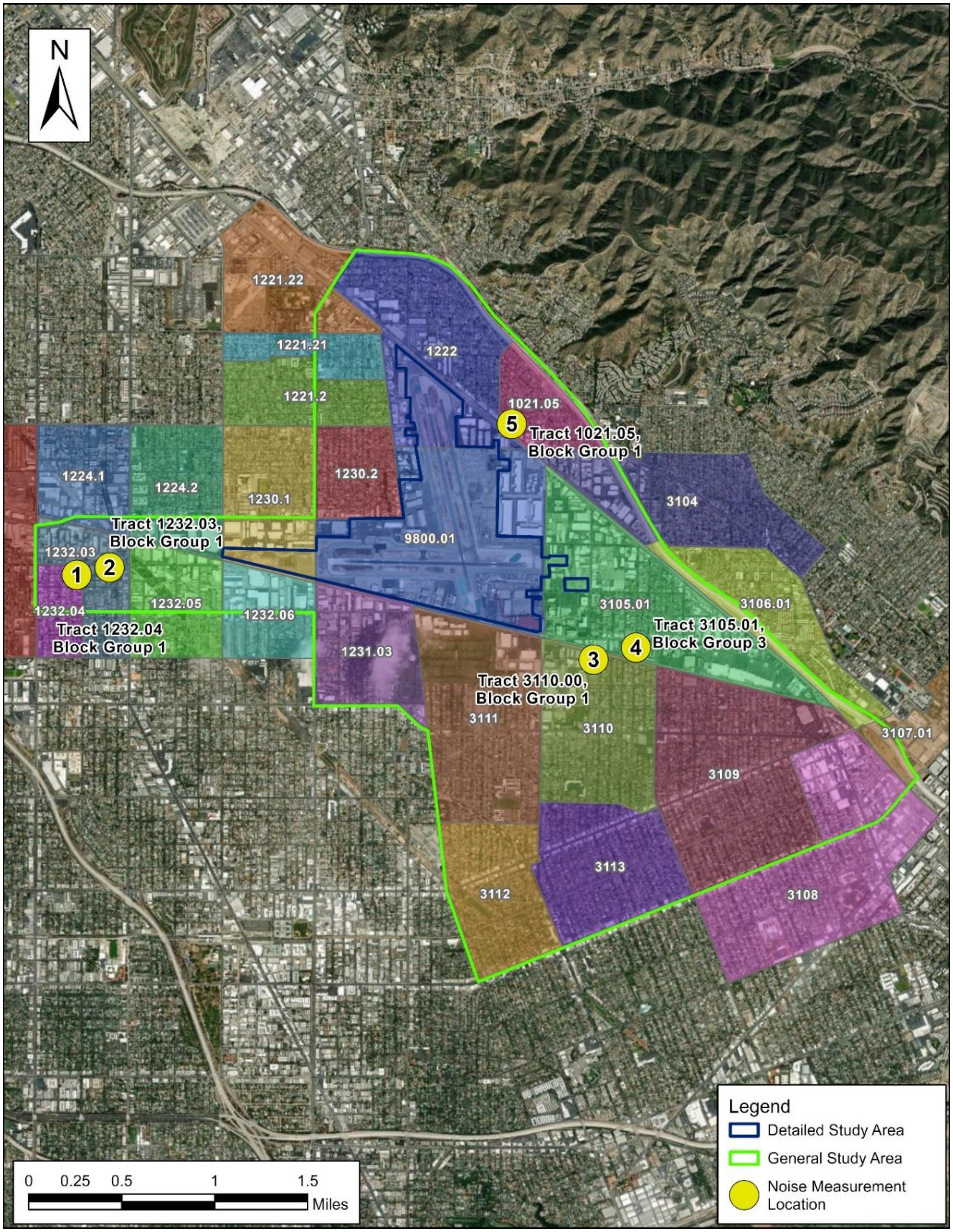

Figure 4. Noise Measurement Locations

Sources: U.S. Census Bureau, 2018; RS&H, 2023.

6. Impact Analysis

6.1 Construction Noise Analysis

Construction noise was assessed by implementing the methodologies included in the latest version of the FHWA RCNM. Quantitative assessment of noise from construction includes calculations of noise propagation from heavy construction anticipated for the Proposed Project at the five noise measurement locations. As shown in Figure 4, there are several types of noise-sensitive uses in proximity to the Proposed Project. Figure 5 shows locations of the receivers around the Airport that were evaluated in the analysis.

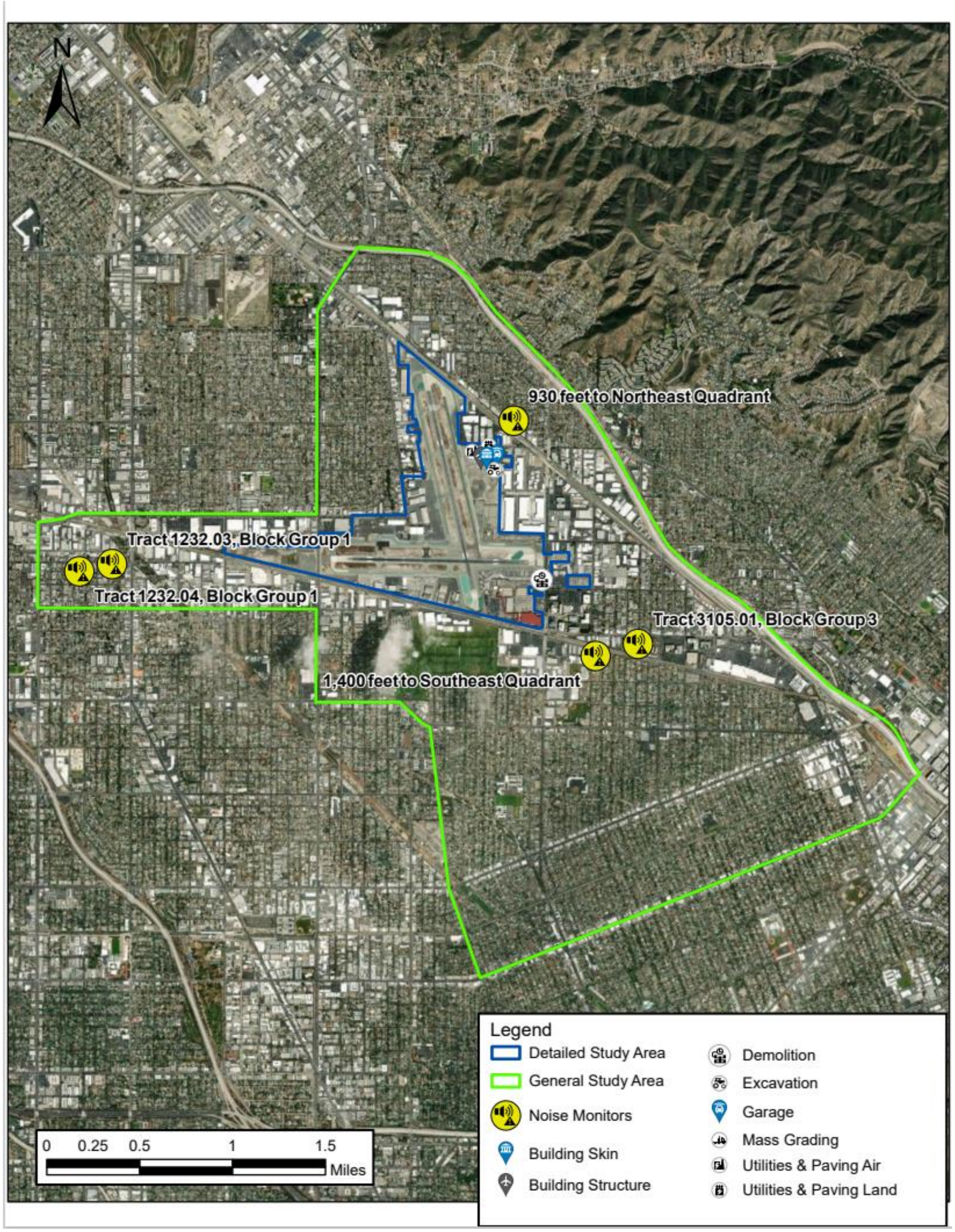

Figure 5. Construction Noise Analysis Receivers

The details of the construction effort were provided by the Authority and were used to calculate construction noise exposure throughout the time periods of days when construction would occur. This included ten separate construction phases, which were developed to ensure that a maximum quantity of construction equipment would be analyzed simultaneously. These construction phases and the construction equipment to be used for each construction scenario are presented in Appendix B. The detailed calculation methods for construction are based on the quantities of construction equipment, schedule of construction efforts, and construction equipment noise source levels and utilizing the equations provided in Section 5 of the RCNM User's Manual.

Table 4 provides the predicted Leq for construction phases BO through B7 and B9. Table 5 lists the predicted changes in sound levels at each of the measurement locations. The changes were calculated by logarithmically adding the predicted construction noise level to the measured daytime Leq and comparing that to the measured Leq. Figure 6 through Figure 15 are noise contour maps for construction scenarios B1 through B7 and B9 depicting how construction noise would attenuate with distance over the census block groups included in this analysis.

Construction noise levels would generally be highest at measurement number five (M5) within census block group 1021.05. At all other measurement locations, construction noise levels would be below the measured daytime (7:00 am to 9:00 pm) Leq. Exceedances of the ambient daytime noise levels would not necessarily constitute an impact unless the level is significantly higher than ambient. Generally speaking, a 3 dB change in similar sound levels would barely be noticeable by typical human hearing, a 5 dB change is readily noticeable, and a 10 dB change would be perceived as a doubling in sound. Construction noise would range from no change to 6 dB above ambient at M5 with the largest increases associated with construction phases five and six. Changes in sound levels that would not be readily perceptible would not constitute an impact; however, increases of 5 dB would be readily perceptible.

Table 3. Construction and Demolition Noise dBA Leq by Construction and Demolition Phase Number

Measurement Number (Census Block Group)	Daytime dBA Leq	dBA Leq by Construction Phase									
		B0	B 1	B 2	B 3	B 4	B 5	B 6	B 7	B 8	B 9
M1 (1232.04)	64	25	33	36	39	41	44	43	37	32	39
M2 (1232.03)	69	26	34	37	40	42	45	44	38	33	40
M3 (3110)	58	31	40	42	47	49	52	52	45	38	45
M4 (3105.01)	60	32	40	43	48	50	54	53	46	48	48
M5 (1021.05)	62	44	54	58	60	64	67	67	59	46	58

Table 4. Predicted Increase in Noise by Construction and Demolition Phase Number

Measurement Number (Census Block Group)	Predicted Increase (dB)									
	B 0	B 1	B 2	B 3	B 4	B 5	B 6	B 7	B 8	B 9
M1 (1232.04)	0	0	0	0	0	0	0	0	0	0
M2 (1232.03)	0	0	0	0	0	0	0	0	0	0
M3 (3110)	0	0	0	0	1	1	1	0	0	0
M4 (3105.01)	0	0	0	0	0	1	1	0	0	0
M5 (1021.05)	0	1	1	2	4	6	6	2	0	1

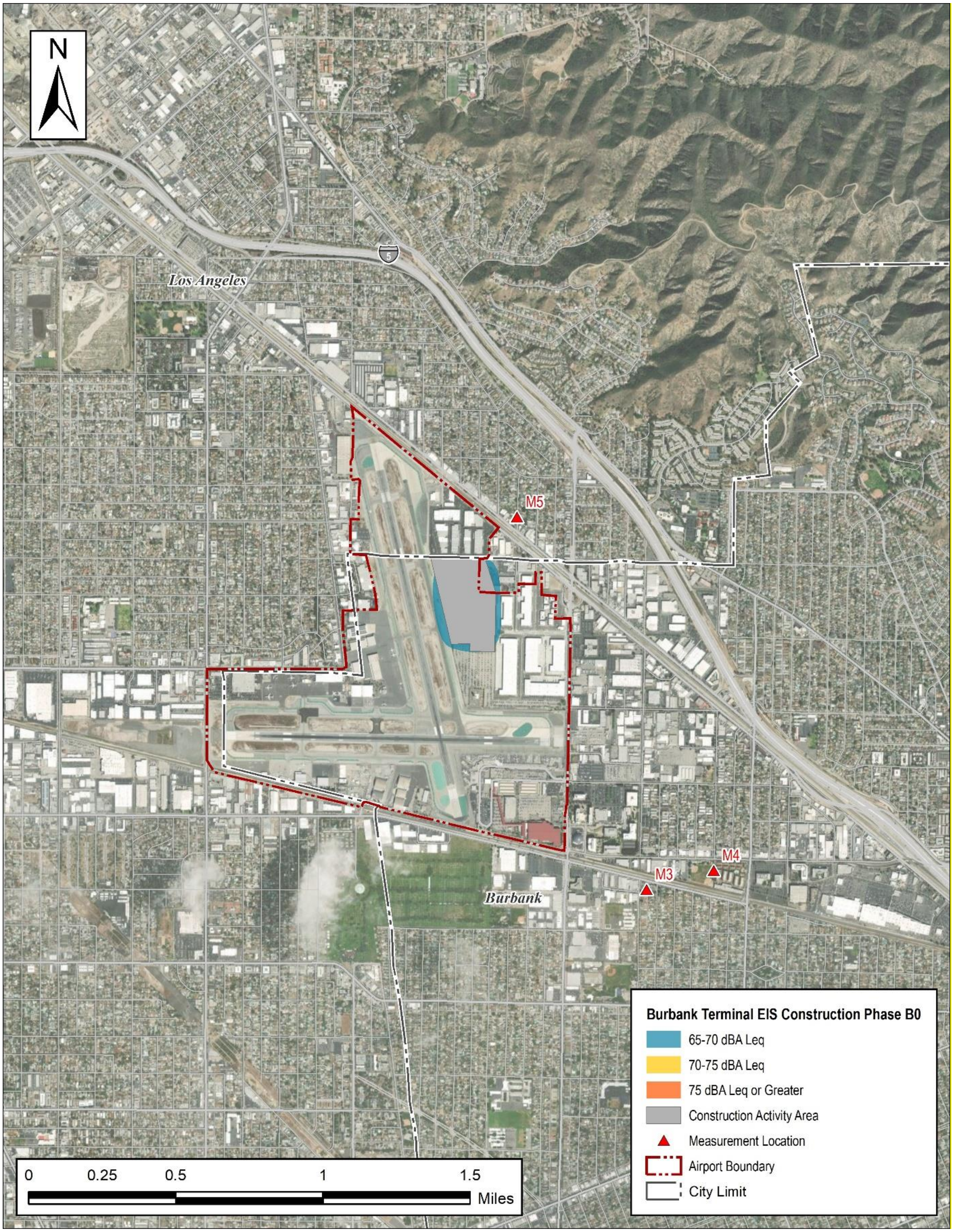

Figure 6. Construction Phase B0 dBA Leq Noise Contours

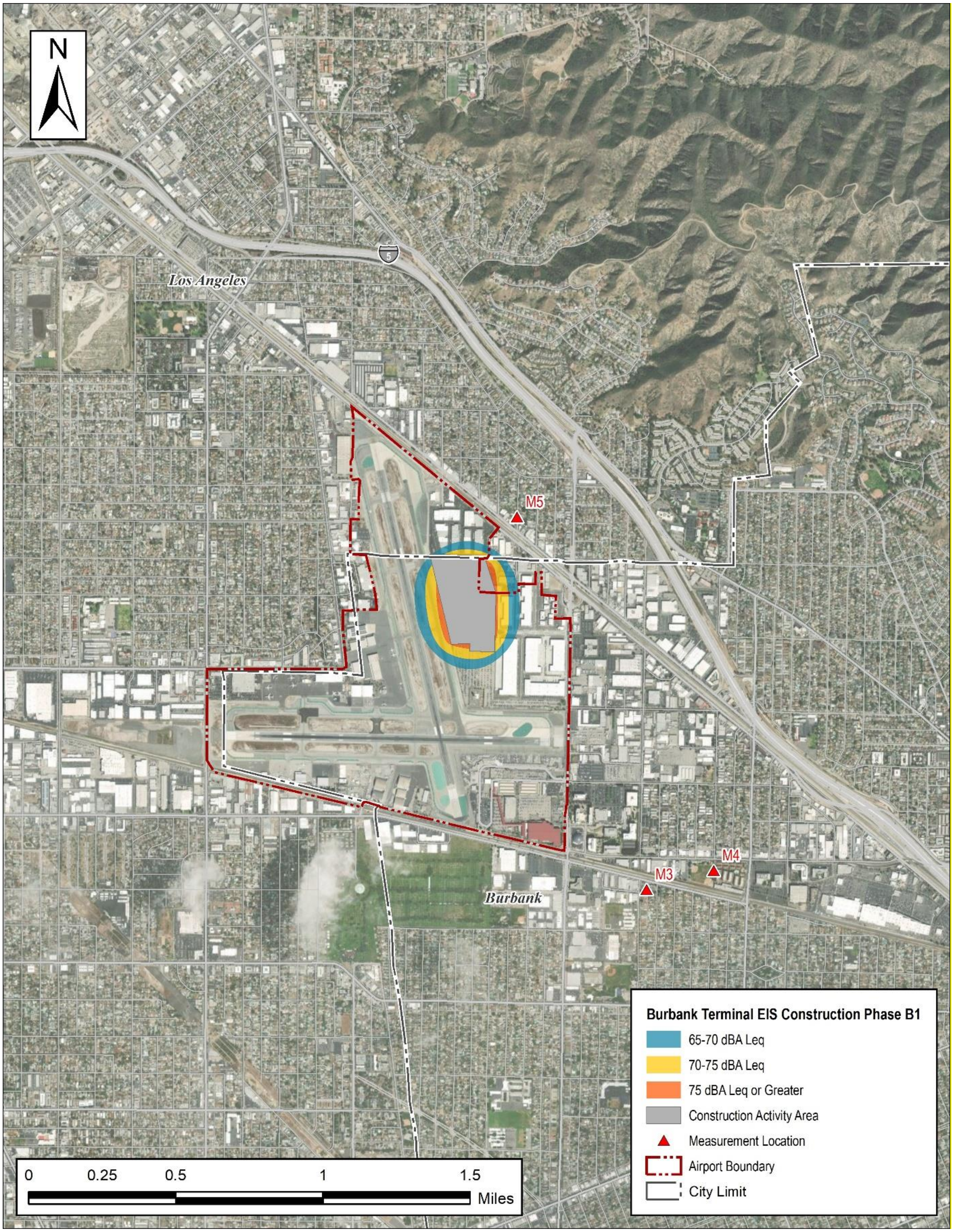

Figure 7. Construction Phase B1 dBA Leq Noise Contours

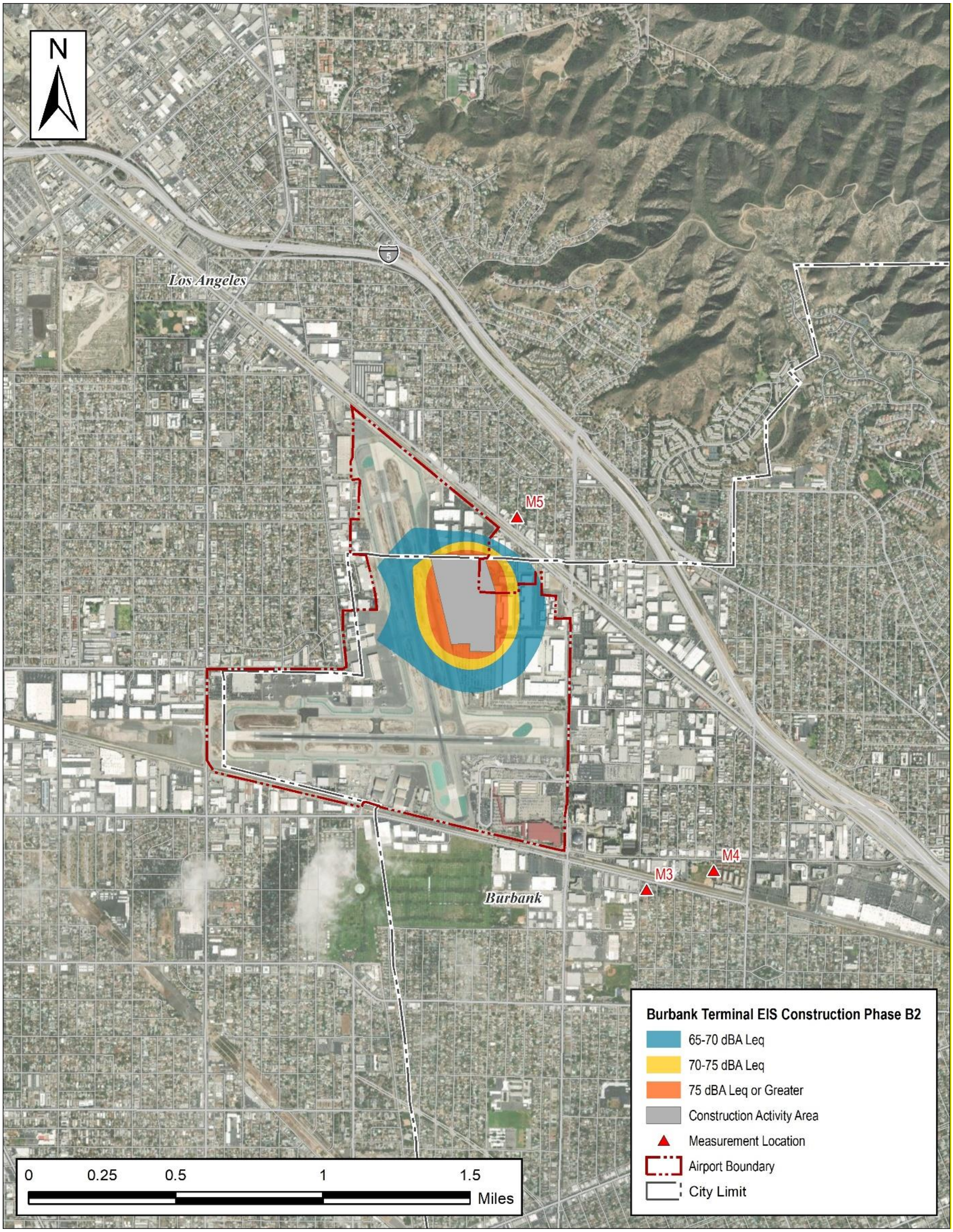

Figure 8. Construction Phase B2 dBA Leq Noise Contours

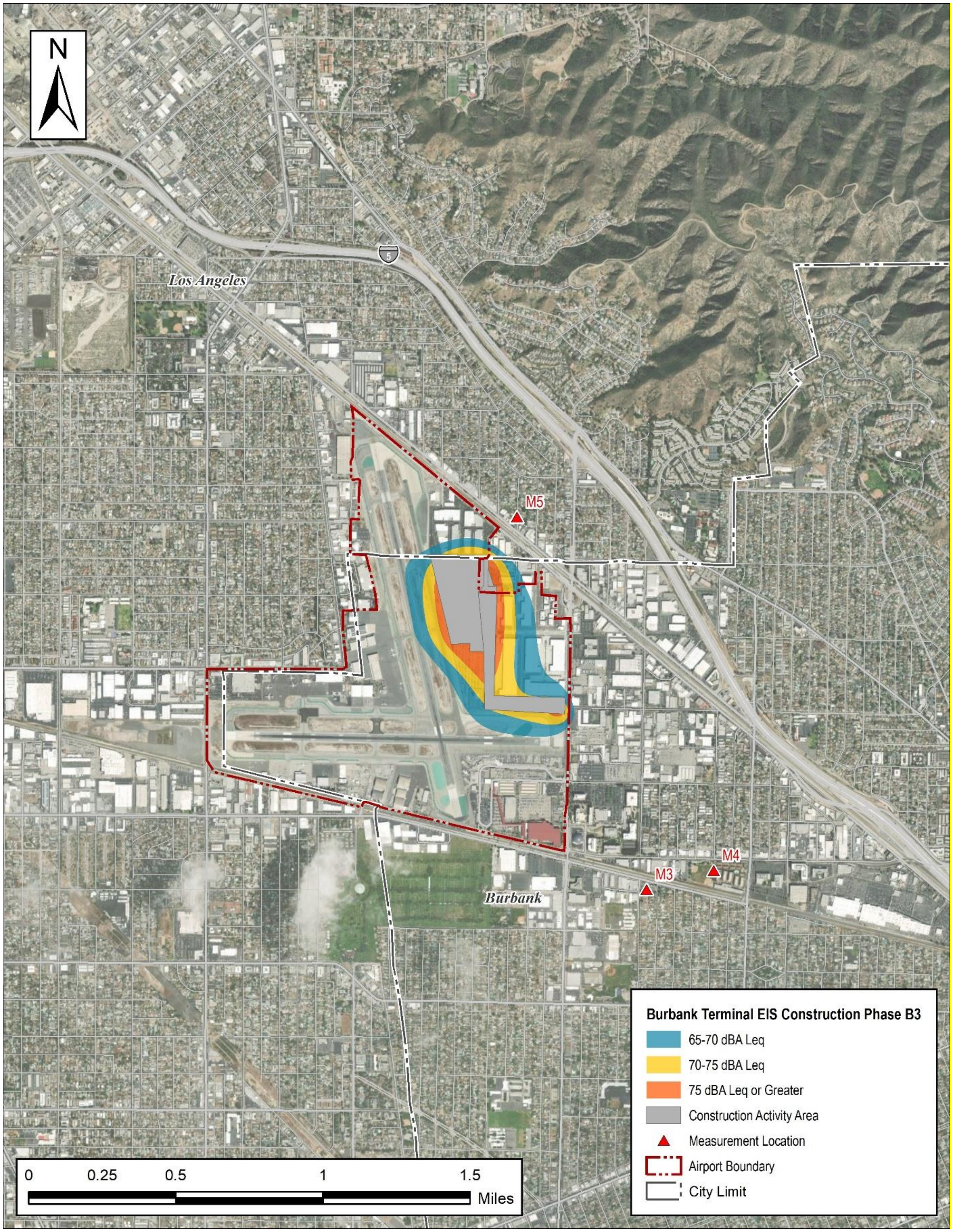

Figure 9. Construction Phase B3 dBA Leq Noise Contours

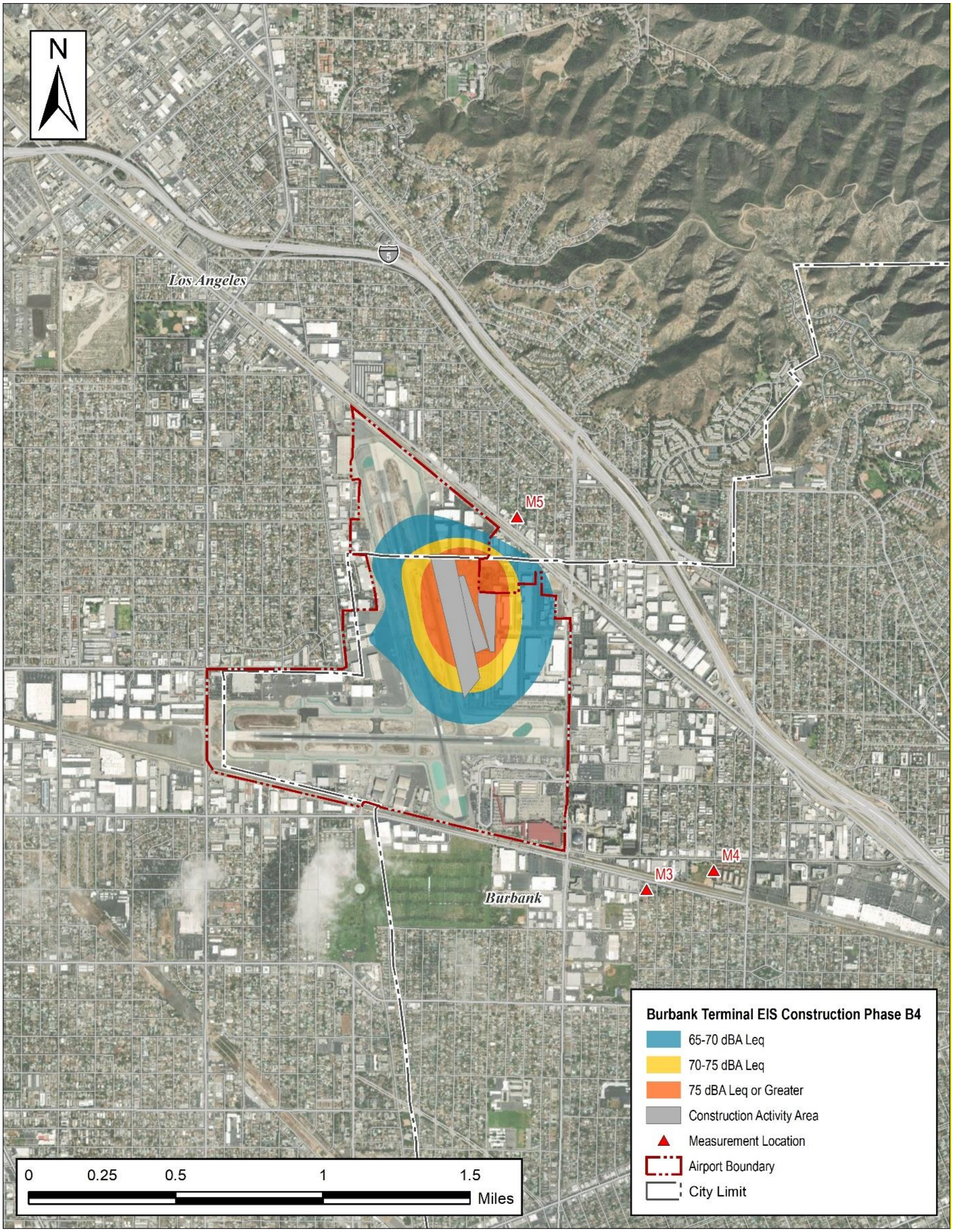

Figure 10. Construction Phase B4 dBA Leq Noise Contours

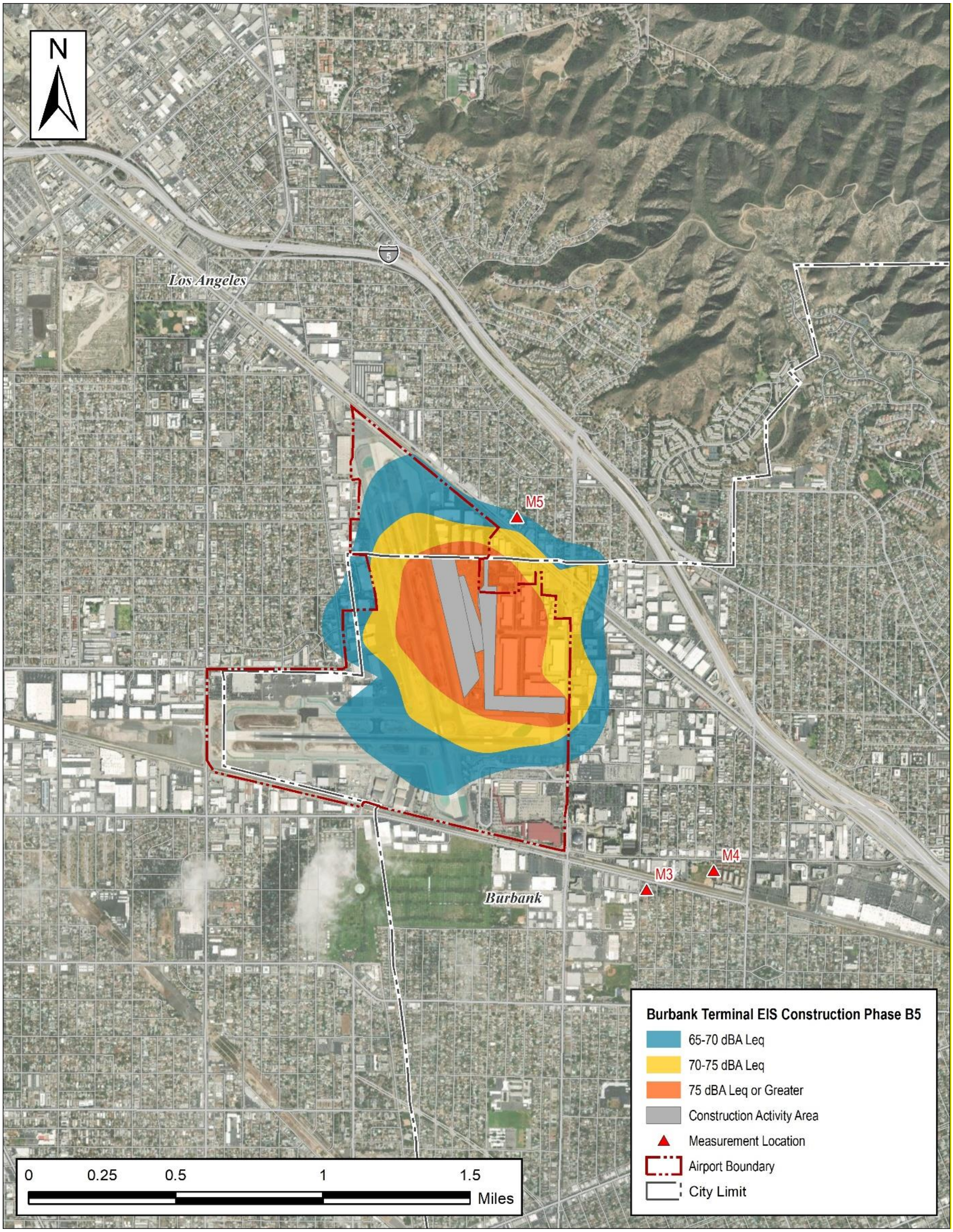

Figure 11. Construction Phase B5 dBA Leq Noise Contours

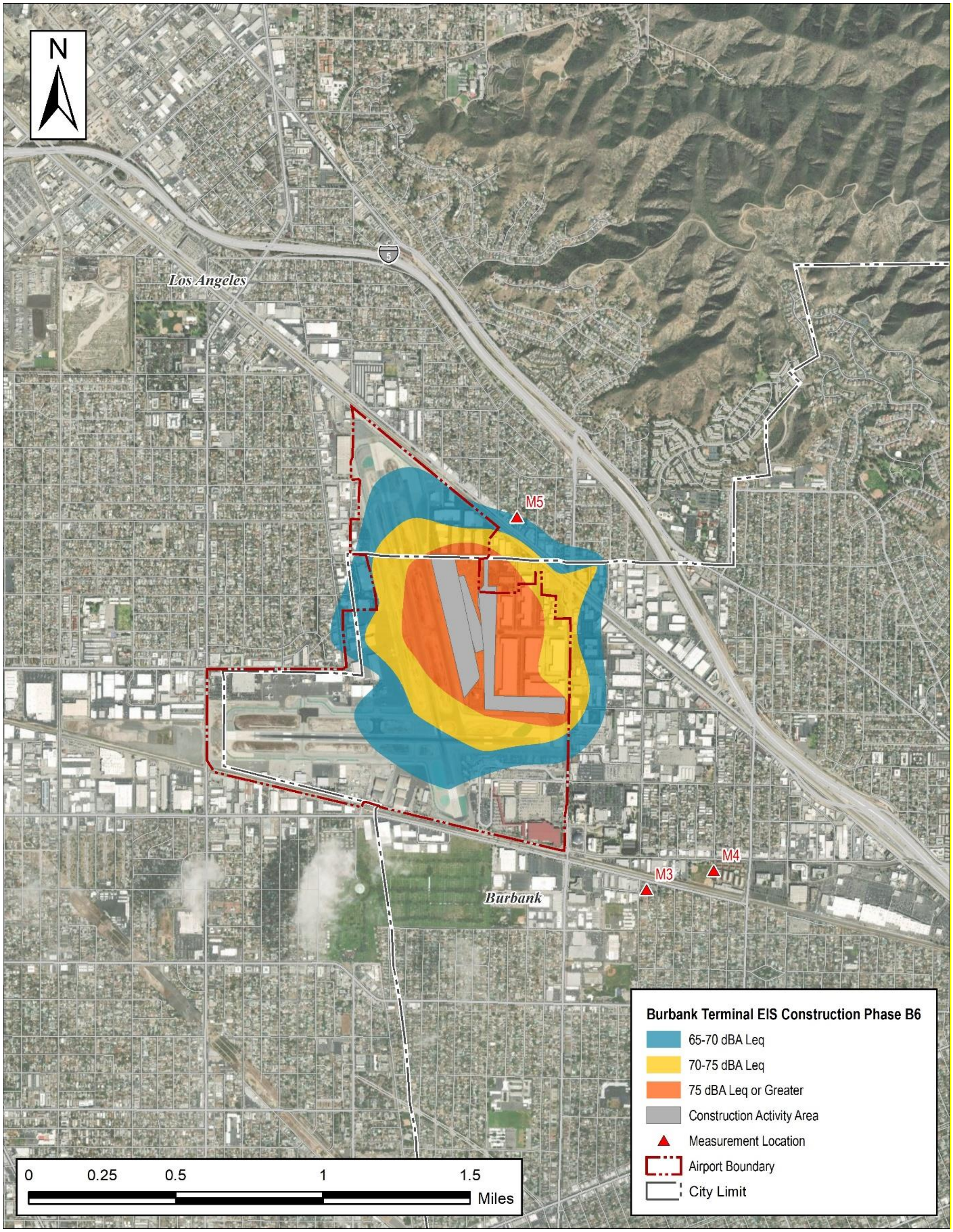

Figure 12. Construction Phase B6 dBA Leq Noise Contours

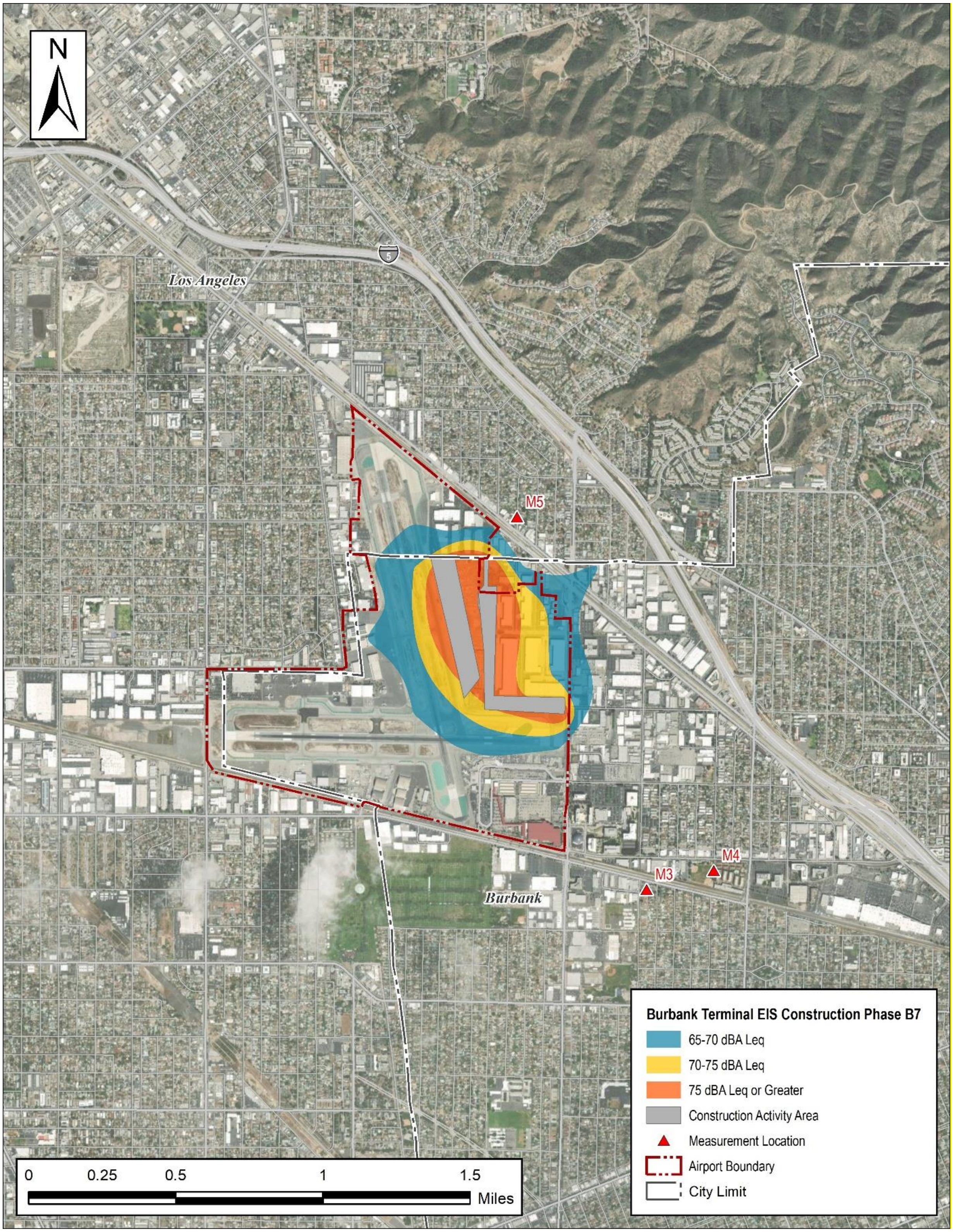

Figure 13. Construction Phase B7 dBA Leq Noise Contours

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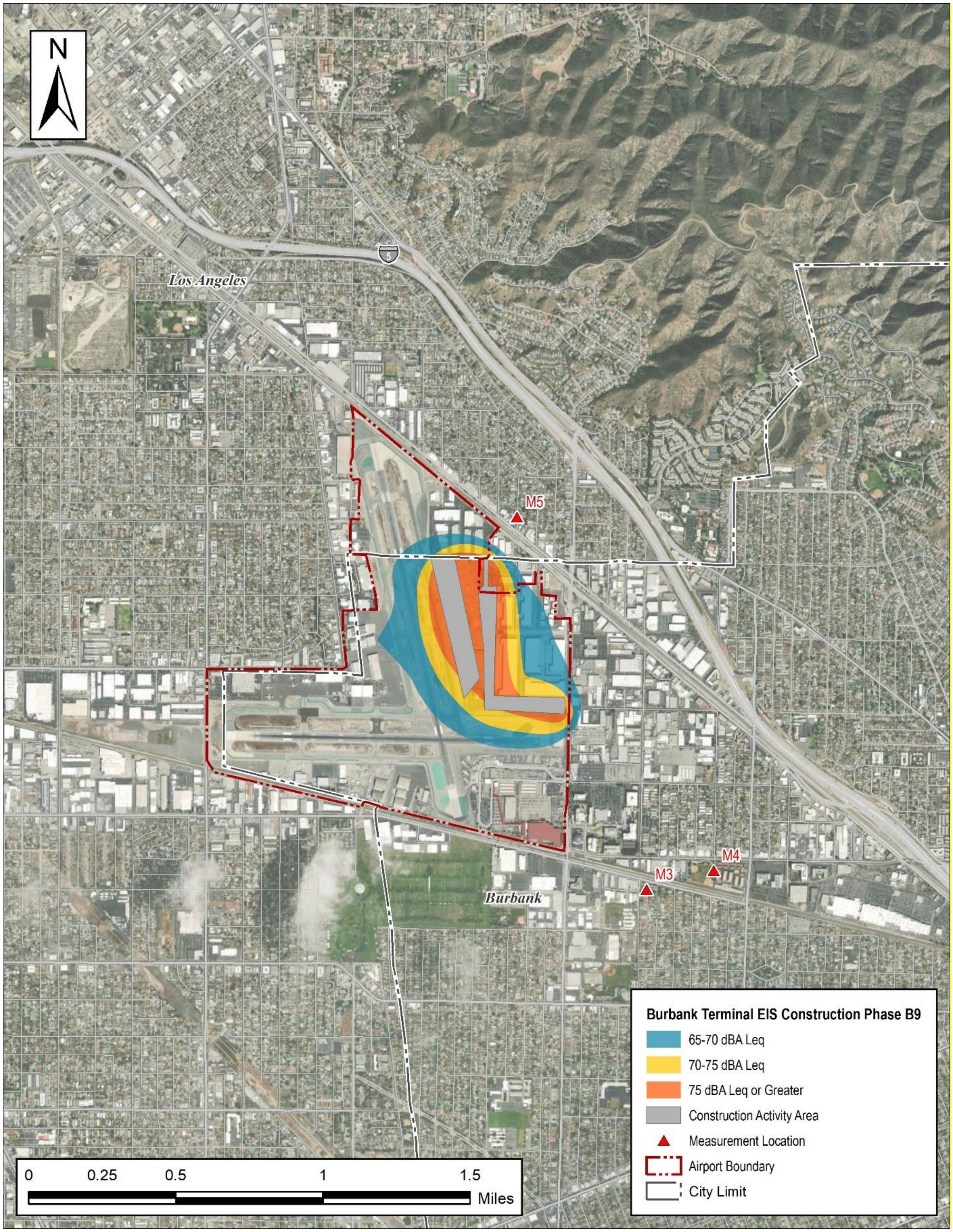


Figure 14. Construction Phase B9 dBA Leq Noise Contours

6.2 Demolition Noise Analysis

Demolition noise was assessed using the same methodologies as those for the construction noise analysis. Table 5 provides the predicted Leq for the demolition efforts and Figure 15 is a map of the demolition noise contours. As with construction phases B0 through B7 and B9, the highest construction noise levels associated with the demolition effort would occur at M5; however, these levels would be well below the measured daytime Leq. For this reason, no impact is predicted due to demolition noise associated with the project.

Table 5. Demolition Noise dBA Leq

Measurement Number (Census Block Group)	Daytime dBA Leq	B8 Demolition dBA Leq
M1 (1232.04)	64	32
M2 (1232.03)	69	33
M3 (3110)	58	35
M4 (3105.01)	60	48
M5 (1021.05)	62	46

Figure 15. Demolition Phase B8 dBA Leq Noise Contours

APPENDIX A. CONSTRUCTION ASSUMPTIONS

Table 2. Construction Phases and Equipment Quantities

Construction Phase Number	Construction Activity Type	Equipment Type	Quantity
B0	Mobilization	Dozer	1
		Dump Trucks	2
		Excavator	2
		Loader	1
		Roller	1
		Skid Steer	1
B1	Mass Grading	100 Ton Hydro Crane	1
		Compactors	2
		Concrete Trucks	6
		Delivery Trucks	3
		Demo Saw	2
		Dozer	3
		Dump Trucks	14
		Excavator	5
		Fill Station	1
		Grader	1
		Grout Pump	1
		Jack Hammer	1
		Loader	3
		Mixer	1
		Motor Grader	2
		Pan/Scraper	3
		Roller	2
		Skid Steer	1
		Water Truck	3
		All Terrain Forklift	3
B2	Excavation	Boom Lift	2
		Chain Saw	1
		Crane	2
		Delivery Truck	7
		Dozer	1
		Dump Truck	10
		Excavator	2
		Generator	3
		Loader	1
		Pumps	1

Table 2. Construction Phases and Equipment Quantities

Construction Phase Number	Construction Activity Type	Equipment Type	Quantity
		Roller	1
		Tie Back Drill	1
		Tow Behind Air Compressor	2
		Vibrator/Pile Hammer	2
		Welder	1
		All Terrain Forklift	2
B3	Excavation, Utilities and Paving Landside - Terminal	All Terrain Forklift	2
		Asphalt Paver	1
		Belt Loader	1
		Boom Lift	2
		Chain Saw	1
		Compactors	2
		Conc./Asphalt Truck	6
		Concrete Paver	1
		Concrete Trucks	6
		Crane	2
		Cure Machine	1
		Delivery Truck	7
		Dowel Drill	2
		Dozer	1
		Dump Truck	10
		Dump Trucks	10
		Excavator	3
		Form Slip	1
		Generator	3
		Grader	1
		Jack Hammer	1
		Joint Saw	1
		Loader	2
		Paver	1
		Pumps	1
		Roller	2
		Roller Screed	1
		Skid steer	2
		Tie Back Drill	1
		Tow Behind Air Compressor	2
		Vibrator/Pile Hammer	2

Table 2. Construction Phases and Equipment Quantities

Construction Phase Number	Construction Activity Type	Equipment Type	Quantity
		Welder	2
B4	Utilities and Paving Airside – Terminal, Garage Structure, Building Structure	Asphalt Paver	1
		Belt Loader	1
		Compactor	4
		Compactors	4
		Conc./Asphalt Truck	6
		Concrete Paver	1
		Concrete Pump	2
		Concrete Truck	30
		Concrete Trucks	8
		Crawler Crane	4
		Cure Machine	1
		Deep Foundation Drill	2
		Deep Foundation Drill ??	2
		Delivery Truck	2
		Delivery Trucks	2
		Demo Saw	10
		Dowel Drill	2
		Dump Truck	5
		Dump Trucks	20
		Excavator	7
		Form Slip	1
		Generator	20
		Grader	1
		Grinder	6
		Impact Gun	6
		Jack Hammer	14
		Joint Saw	1
		Loader	4
		Material Truck	22
		Mini Excavator	4
		Paver	1
		Roller	4
		Roller Screed	1
		Skid steer	6
		Tow Behind Compressor	1

Table 2. Construction Phases and Equipment Quantities

Construction Phase Number	Construction Activity Type	Equipment Type	Quantity
		Tower Crane	3
		Trowel Mech	12
		Vibrators	12
		Warehouse Fork	12
		Water Truck	2
		Welder	11
B5	Utilities and Paving Landside – Terminal, Utilities and Paving Airside – Terminal, Garage Structure, Building Structure, Building Skin	All Terrain Forklift	15
		Asphalt Paver	2
		Belt Loader	2
		Boom Lift	14
		Compactor	4
		Compactors	8
		Conc./Asphalt Truck	12
		Concrete Paver	2
		Concrete Pump	2
		Concrete Truck	30
		Concrete Trucks	16
		Crawler Crane	4
		Cure Machine	2
		Cutting Station	6
		Deep Foundation Drill	2
		Deep Foundation Drill ??	2
		Delivery Truck	4
		Delivery Trucks	2
		Demo Saw	11
		Dowel Drill	4
		Drills	45
		Dump Truck	5
		Dump Trucks	40
		Excavator	10
		Form Slip	2
		Generator	36
		Grader	2
		Grinder	6
		Impact Gun	6

Table 2. Construction Phases and Equipment Quantities

Construction Phase Number	Construction Activity Type	Equipment Type	Quantity
		Jack Hammer	16
		Joint Saw	2
		Loader	6
		Material Truck	22
		Mini Excavator	4
		Mobile Crane	1
		Paver	2
		Roller	6
		Roller Screed	2
		Skid steer	8
		Tow Behind Compressor	1
		Tower Crane	3
		Trowel Mech	12
		Vibrators	12
		Warehouse Fork	12
		Water Truck	2
		Welder	12
B6	Utilities and Paving Landside – Terminal, Utilities and Paving Airside – Terminal, Garage Structure, Building Skin	All Terrain Fork Lift	2
		All Terrain Forklift	7
		Asphalt Paver	2
		Belt Loader	2
		Boom Lift	14
		Compactor	2
		Compactors	8
		Conc./Asphalt Truck	12
		Concrete Paver	2
		Concrete Pump	1
		Concrete Truck	15
		Concrete Trucks	16
		Cure Machine	2
		Cutting Station	6
		Deep Foundation Drill	2
		Delivery Truck	3
		Delivery Trucks	2
		Demo Saw	5

Table 2. Construction Phases and Equipment Quantities

Construction Phase Number	Construction Activity Type	Equipment Type	Quantity
		Dowel Drill	4
		Drills	45
		Dump Truck	4
		Dump Trucks	40
		Excavator	8
		Form Slip	2
		Generator	26
		Grader	2
		Jack Hammer	10
		Joint Saw	2
		Loader	5
		Material Truck	8
		Mini Excavator	2
		Mobile Crane	1
		Paver	2
		Roller	5
		Roller Screed	2
		Skid steer	6
		Tow Behind Compressor	1
		Tower Crane	3
		Trowel Mech	6
		Vibrators	6
		Warehouse Fork	4
		Water Truck	1
		Welder	2
B7	Utilities and Paving Landside – Terminal, Utilities and Paving Airside – Terminal ,Garage Structure	All Terrain Forklift	5
		Asphalt Paver	2
		Belt Loader	2
		Compactor	2
		Compactors	8
		Conc./Asphalt Truck	12
		Concrete Paver	2
		Concrete Pump	1
		Concrete Truck	15
		Concrete Trucks	16
		Cure Machine	2

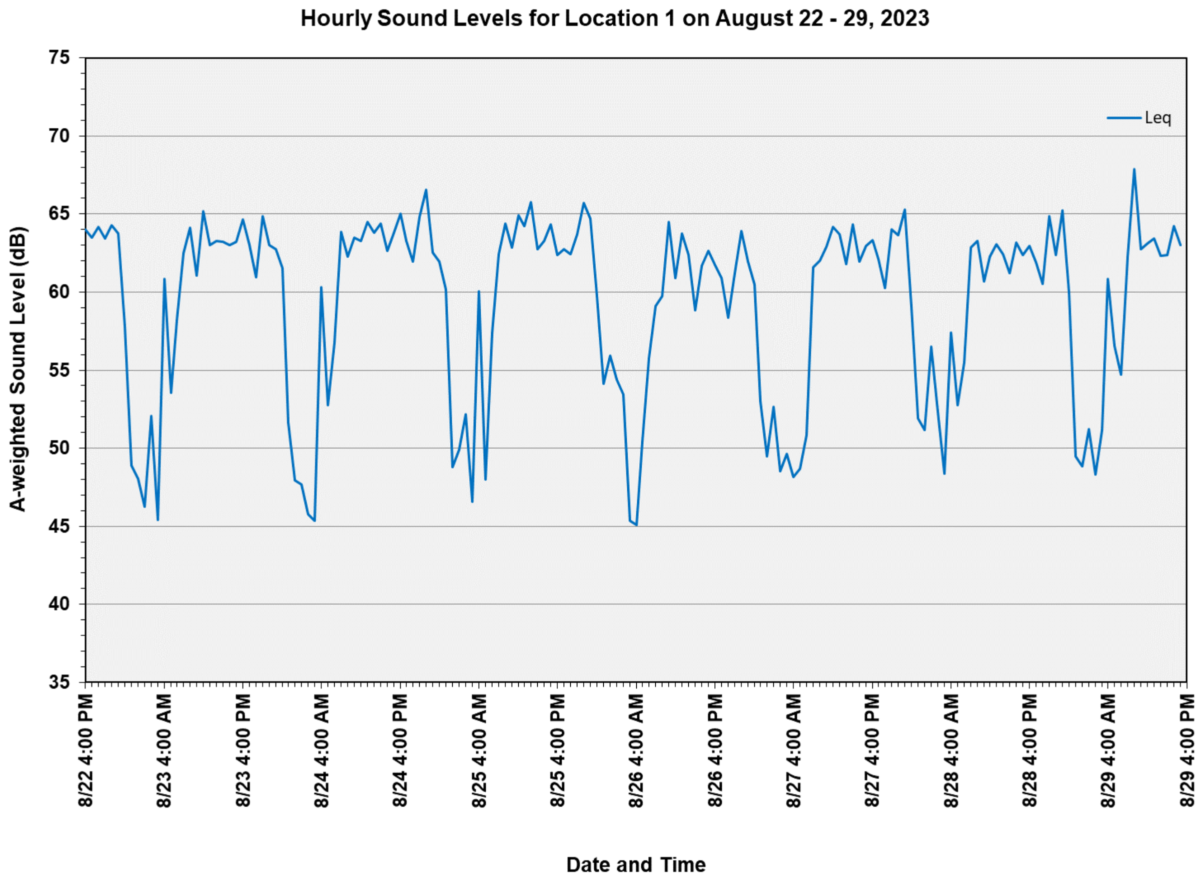
Table 2. Construction Phases and Equipment Quantities

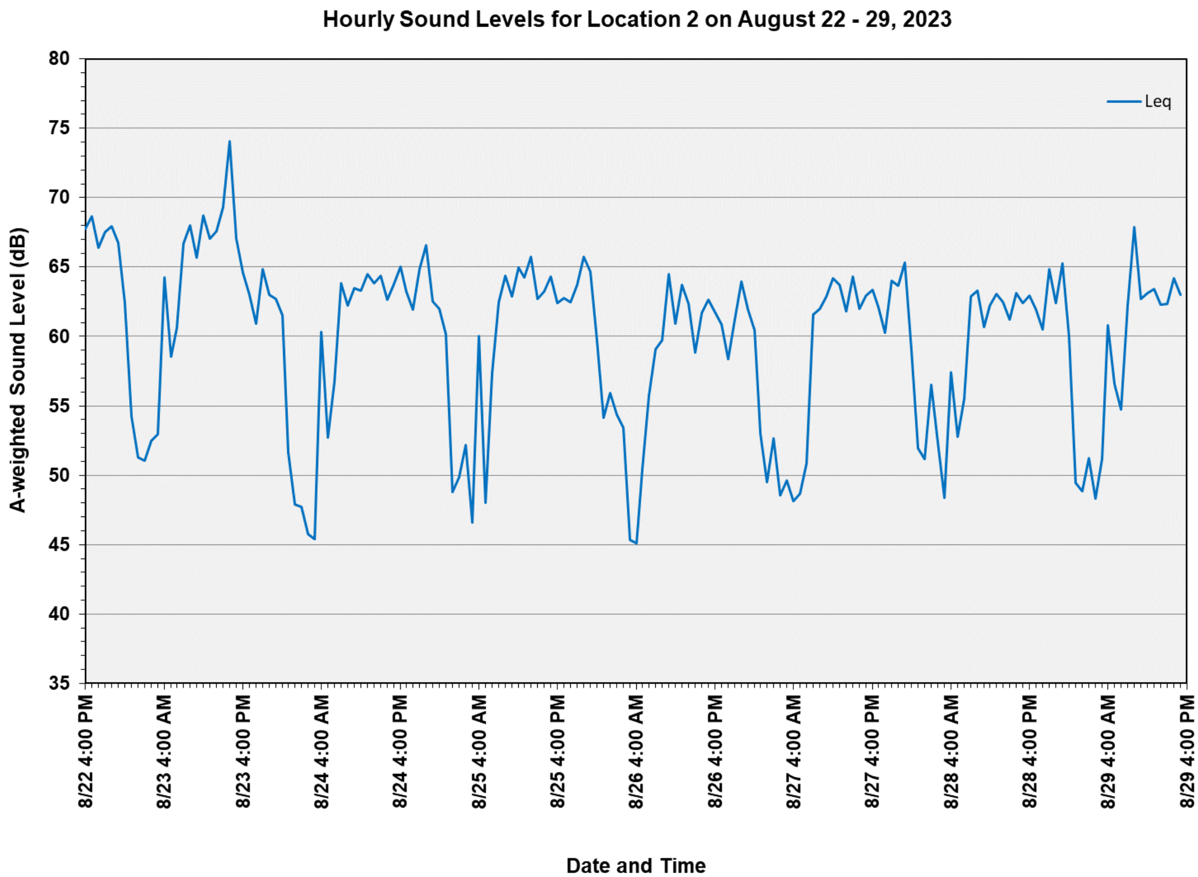
Construction Phase Number	Construction Activity Type	Equipment Type	Quantity
		Deep Foundation Drill	2
		Delivery Truck	3
		Delivery Trucks	2
		Demo Saw	5
		Dowel Drill	4
		Dump Truck	4
		Dump Trucks	40
		Excavator	8
		Form Slip	2
		Generator	10
		Grader	2
		Jack Hammer	10
		Joint Saw	2
		Loader	5
		Material Truck	8
		Mini Excavator	2
		Paver	2
		Roller	5
		Roller Screed	2
		Skid steer	6
		Tow Behind Compressor	1
		Tower Crane	3
		Trowel Mech	6
		Vibrators	6
		Warehouse Fork	4
		Water Truck	1
		Welder	2
B8	Demolition	Articulating Loader	11
		Dozer	2
		Excavator	4
		Excavator / Sorting	8
		Haul Truck	29
		Pulverizer / Ramhoe	8
		Skid Steer	10
		Water Truck	5
B9	Utilities and Paving Landside – Taxiway, Utilities and Paving Airside – Taxiway	Dump Trucks	40
		Concrete Trucks	16

Table 2. Construction Phases and Equipment Quantities

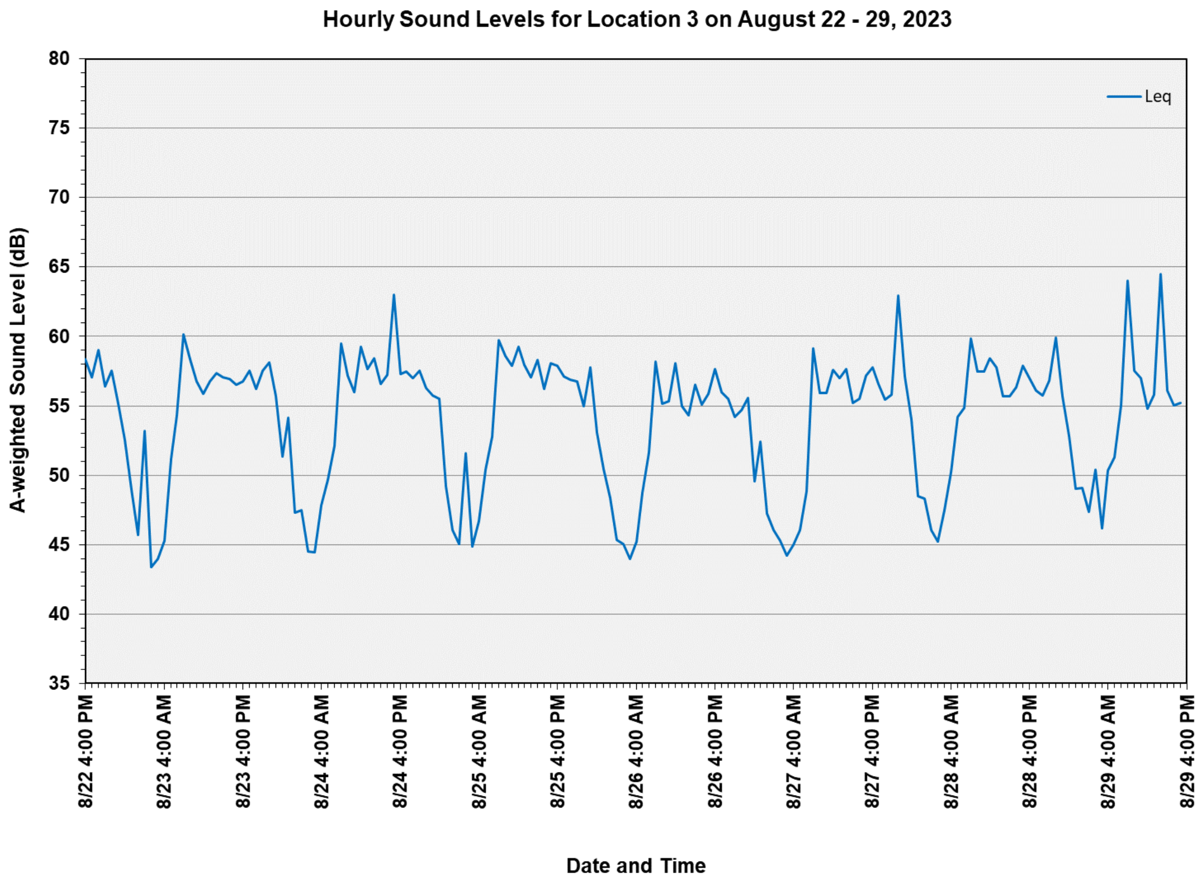
Construction Phase Number	Construction Activity Type	Equipment Type	Quantity
		Conc./Asphalt Truck	12
		Compactors	8
		Excavator	6
		Loader	4
		Jack Hammer	4
		Roller	4
		Dowel Drill	4
		Skid Steer	4
		Delivery Trucks	2
		Cure Machine	2
		Demo Saw	2
		All Terrain Fork Lift	2
		Joint Saw	2
		Roller Screed	2
		Paver	2
		Welder	2
		Belt Loader	2
		Concrete Paver	2
		Asphalt Paver	2
		Delivery Truck	2
		Form Slip	2
		Grader	2

APPENDIX B. MEASUREMENT DATA

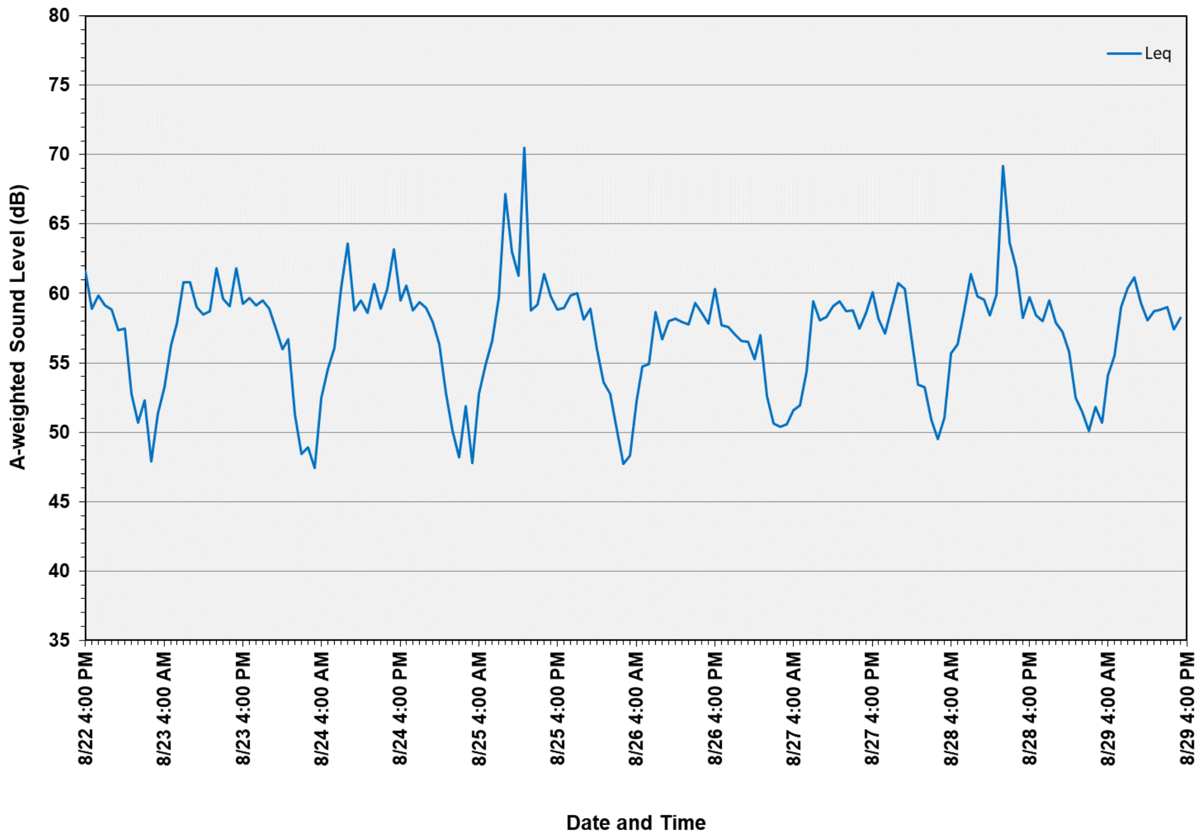


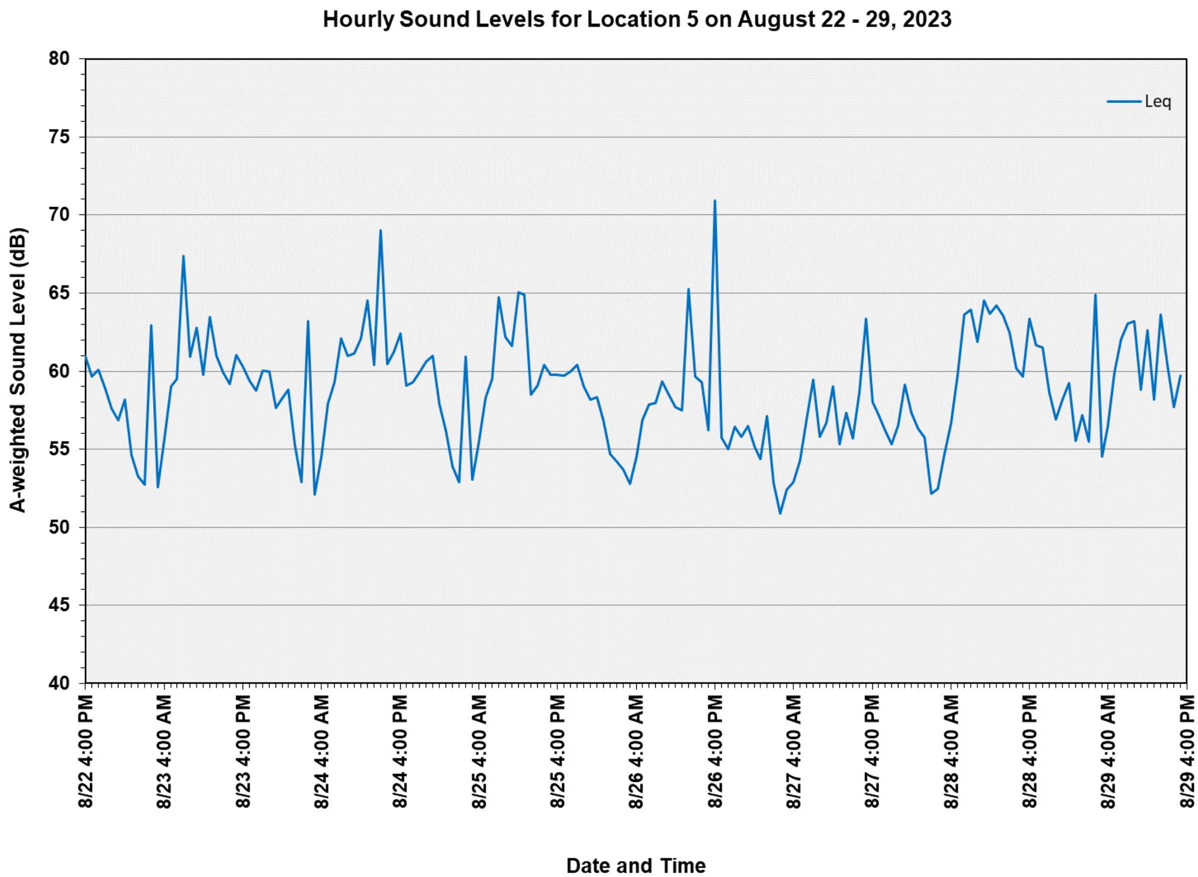


Note: Equipment failure at Location 2 resulted in 40 hours of data loss.


Hourly Sound Levels for Location 3 on August 22 - 29, 2023
Leq
A-weighted Sound Level (dB)
80
75
70
65
60
55
50
45
40
35
8/22 4:00 PM
8/23 4:00 AM
8/23 4:00 PM
8/24 4:00 AM
8/24 4:00 PM
8/25 4:00 AM
8/25 4:00 PM
8/26 4:00 AM
8/26 4:00 PM
8/27 4:00 AM
8/27 4:00 PM
8/28 4:00 AM
8/28 4:00 PM
8/29 4:00 AM
8/29 4:00 PM
Date and Time

Hourly Sound Levels for Location 4 on August 22 - 29, 2023




Hourly Sound Levels for Location 5 on August 22 - 29, 2023
Leq
A-weighted Sound Level (dB)
80
75
70
65
60
55
50
45
40
8/22 4:00 PM
8/23 4:00 AM
8/23 4:00 PM
8/24 4:00 AM
8/24 4:00 PM
8/25 4:00 AM
8/25 4:00 PM
8/26 4:00 AM
8/26 4:00 PM
8/27 4:00 AM
8/27 4:00 PM
8/28 4:00 AM
8/28 4:00 PM
8/29 4:00 AM
8/29 4:00 PM
Date and Time