NOISE AND VIBRATION IMPACT ANALYSIS

MASSACHUSETTS POINT PROJECT

RIVERSIDE, CALIFORNIA

LSA

May 2025

NOISE AND VIBRATION IMPACT ANALYSIS

MASSACHUSETTS POINT PROJECT

RIVERSIDE, CALIFORNIA

Submitted to:

Megan Rupard
EPD Solutions, Inc.
3333 Michelson Drive, Suite 500
Irvine, California 92612

Prepared by:

LSA
157 Park Place
Richmond, California 94801
(510) 236-6810
Project No. ESL2201.103

LSA

May 2025

TABLE OF CONTENTS

TABLE OF CONTENTS i
FIGURES AND TABLES ii
LIST OF ABBREVIATIONS AND ACRONYMS iii
INTRODUCTION 1
Project Location and Description 1
Existing Land Uses in the Project Area 5
NOISE AND VIBRATION FUNDAMENTALS 7
Characteristics of Sound 7
Measurement of Sound 7
Physiological Effects of Noise 8
Fundamentals of Vibration 10
REGULATORY SETTING 12
Applicable Noise Standards 12
City of Riverside 12
Federal Transit Administration 13
Applicable Vibration Standards 14
Federal Transit Administration 14
California Department of Transportation 14
OVERVIEW OF THE EXISTING NOISE ENVIRONMENT 16
Ambient Noise Measurements 16
Long-Term Noise Measurements 16
Existing Aircraft Noise 16
PROJECT IMPACTS 19
Short-Term Construction Noise Impacts 19
Short-Term Construction Vibration Impacts 22
Long-Term Off-Site Traffic Noise Impacts 24
Long-Term Traffic-Related Vibration Impacts 27
Long-Term Off-Site Stationary Noise Impacts 27
Heating, Ventilation, and Air Conditioning Equipment 27
Trash Bin Emptying Activities 27
Cold Storage Fan Units 27
Truck Loading and Unloading Activities 28
Cumulative Operations Noise Assessment 28
REFERENCES 30

APPENDICES

A: NOISE MONITORING DATA
B: CONSTRUCTION NOISE LEVEL CALCULATIONS
C: FHWA TRAFFIC NOISE MODEL PRINTOUTS
D: OPERATIONAL NOISE LEVEL CALCULATIONS

FIGURES AND TABLES

FIGURES

Figure 1: Project Location 3
Figure 2: Site Plan 4
Figure 3: Noise Monitoring Locations 18

TABLES

Table A: Definitions of Acoustical Terms 9
Table B: Common Sound Levels and Their Noise Sources 10
Table C: Operational Noise Level Standards 13
Table D: Detailed Assessment Daytime Construction Noise Criteria 14
Table E: Interpretation of Vibration Criteria for Detailed Analysis 14
Table F: Construction Vibration Damage Criteria 15
Table G: Long-Term 24-Hour Ambient Noise Monitoring Results 16
Table H: Typical Construction Equipment Noise Levels 20
Table I: Potential Construction Noise Impacts at Nearest Receptor 21
Table J: Vibration Source Amplitudes for Construction Equipment 23
Table K: Potential Construction Vibration Annoyance Impacts at Nearest Receptor 23
Table L: Potential Construction Vibration Damage Impacts at Nearest Receptor 23
Table M: Existing (2025) Traffic Noise Levels Without and With Project 25
Table N: Opening Year (2027) Traffic Noise Levels Without and With Project 26
Table O: Daytime Exterior Noise Level Impacts 28
Table P: Nighttime Exterior Noise Level Impacts 29

LIST OF ABBREVIATIONS AND ACRONYMS

ADA	Americans with Disabilities Act
ALUCP	Airport Land Use Compatibility Plan
APN	Assessor's Parcel Number
CEQA	California Environmental Quality Act
City	City of Riverside
CMU	concrete masonry unit
CNEL	Community Noise Equivalent Level
dB	decibel(s)
dBA	A-weighted decibel(s)
EV	electric vehicle
FAR	floor area ratio
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
FTA Manual	Federal Transit Administration's 2018 *Transit Noise and Vibration Impact Assessment Manual*
HVAC	heating, ventilation, and air conditioning
in/sec	inches per second
I-215	Interstate 215
L_{dn}	day-night average noise level
L_{eq}	equivalent continuous sound level
L_{max}	maximum instantaneous sound level
L_w	sound power levels
PPV	peak particle velocity
project	Massachusetts Point Project
RMS	root-mean-square
sf	square foot/feet
SR-60	State Route 60
SR-91	State Route 91
VdB	vibration velocity decibels

INTRODUCTION

This noise and vibration impact analysis has been prepared to evaluate the potential noise and vibration impacts and reduction measures associated with the Massachusetts Point Project (project) in Riverside, California. This report is intended to satisfy the City of Riverside (City) requirements for a project-specific noise and vibration impact analysis by examining the impacts of the project site and evaluating noise reduction measures that the project may require.

PROJECT LOCATION AND DESCRIPTION

The project site is located in the northern portion of Riverside at 2626 Kansas Avenue, 2069 Massachusetts Avenue, and 1989 Massachusetts Avenue. Regional access to the project site is provided via Interstate 215 (I-215), State Route 60 (SR-60), and State Route 91 (SR-91). Local access to the project site is provided via Kansas Avenue, Massachusetts Avenue, and Roberta Street (see Figure 1).

The project site encompasses approximately 14.42 acres and is identified by Assessor's Parcel Numbers (APNs) 210-130-015, -16, and -20. APN 210-130-015 (2626 Kansas Avenue) is currently developed with a commercial/industrial business, specializing in concrete, polymer, and fiberglass products manufacturing. APN 210-130-016 (2069 Massachusetts Avenue) is currently a lot used for bus parking and storage. APN 210-130-020 (1989 Massachusetts Avenue) currently operates as a bus parking and storage yard and contains two buildings totaling approximately 11,000 square feet (sf).

The proposed project would demolish the existing 99,850 sf of structures on 2626 Kansas Avenue and redevelop 2626 Kansas Avenue and 2069 Massachusetts Avenue with two Class A light industrial buildings at 99,900 sf and 99,950 sf on approximately 10.21 acres. Additional improvements would include landscaping, sidewalks, utility connections, implementation of stormwater facilities, construction of a cul-de-sac driveway, and pavement of parking areas and drive aisles. No development is proposed on APN 210-130-020 (1989 Massachusetts Avenue).

The proposed project would construct two new industrial buildings on a 10.21-acre portion of the site (2626 Kansas Avenue and 2069 Massachusetts Avenue), which would support warehouse and office uses. Building 1 is proposed to consist of 99,900 sf, inclusive of 93,900 sf of warehouse space and 6,000 sf of ground floor office space. Building 1 would have a footprint of 99,900 sf, resulting in a floor area ratio (FAR) of 0.45. Building 2 is proposed to consist of 99,950 sf, inclusive of 91,700 sf of warehouse space, 6,000 sf of ground floor office space, and 2,250 of mezzanine space to be used as office space. Building 2 would have a footprint of 97,700 sf, resulting in a FAR of 0.45 (see Figure 2).

The project would be operated as two light industrial warehouses with ancillary office uses and 20% cold storage. A light industrial warehouse is used for the storage, receiving, shipping, wholesaling, or manufacturing of goods and merchandise, and any incidental or accessory activities. Buildings 1 and 2 are designed such that business operations would be conducted primarily within the building, with the exception of traffic movement, parking, trailer connection and disconnection, storage, and the loading and unloading of trailers at designated loading bays. The outdoor cargo handling equipment

used during loading and unloading of trailers (e.g., yard trucks, hostlers, yard goats, pallet jacks, forklifts) would be non-diesel powered, in accordance with contemporary industry standards.

Building 1 would be oriented to the north, with frontages along Roberta Street to the north and Kansas Avenue to the west. Building 1 would be set back 79 feet from the northern property line, approximately 48 feet from the eastern property line, approximately 70 feet from the southern property line, and a minimum of 10 feet and 6 inches from the western property line.

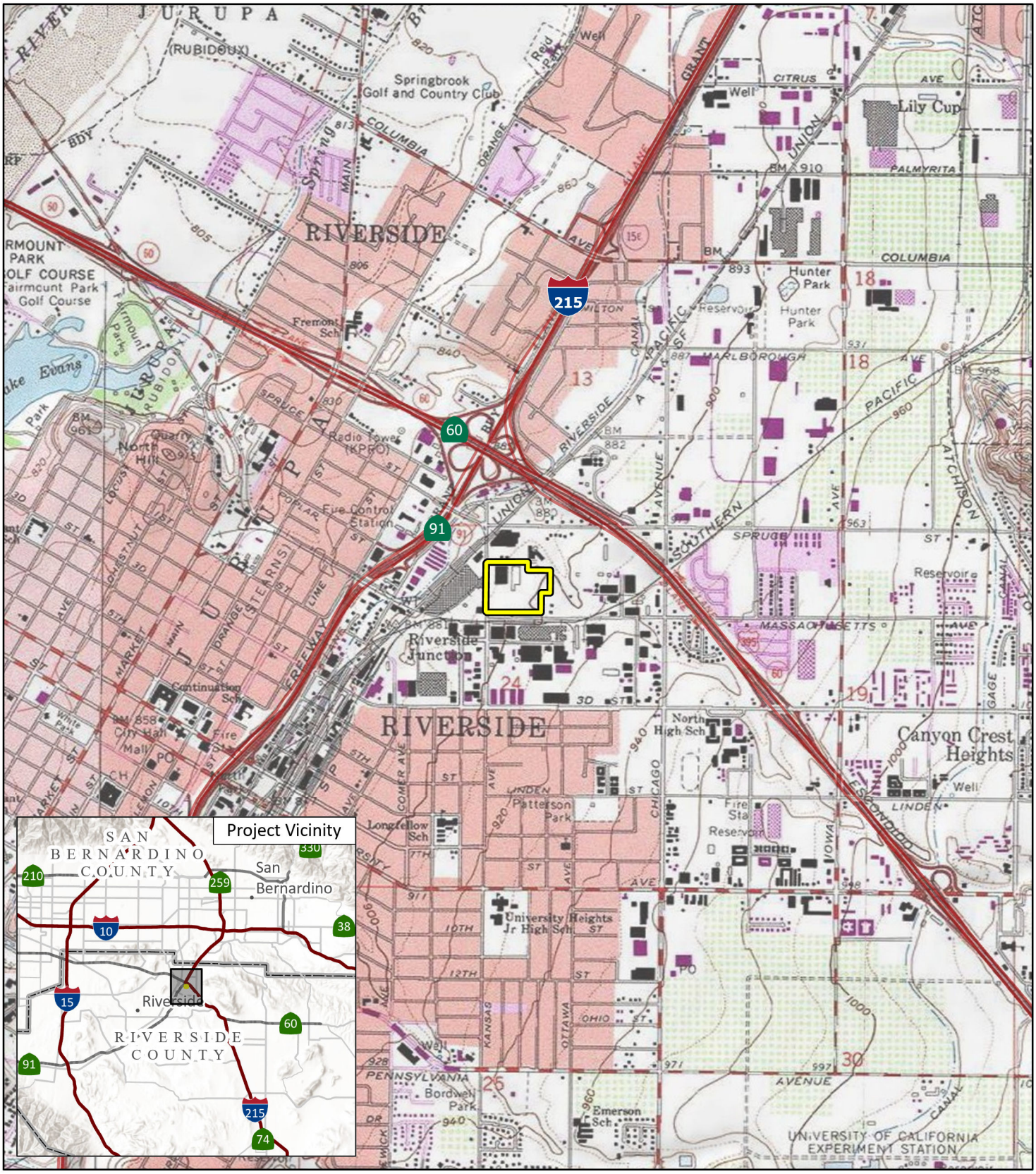


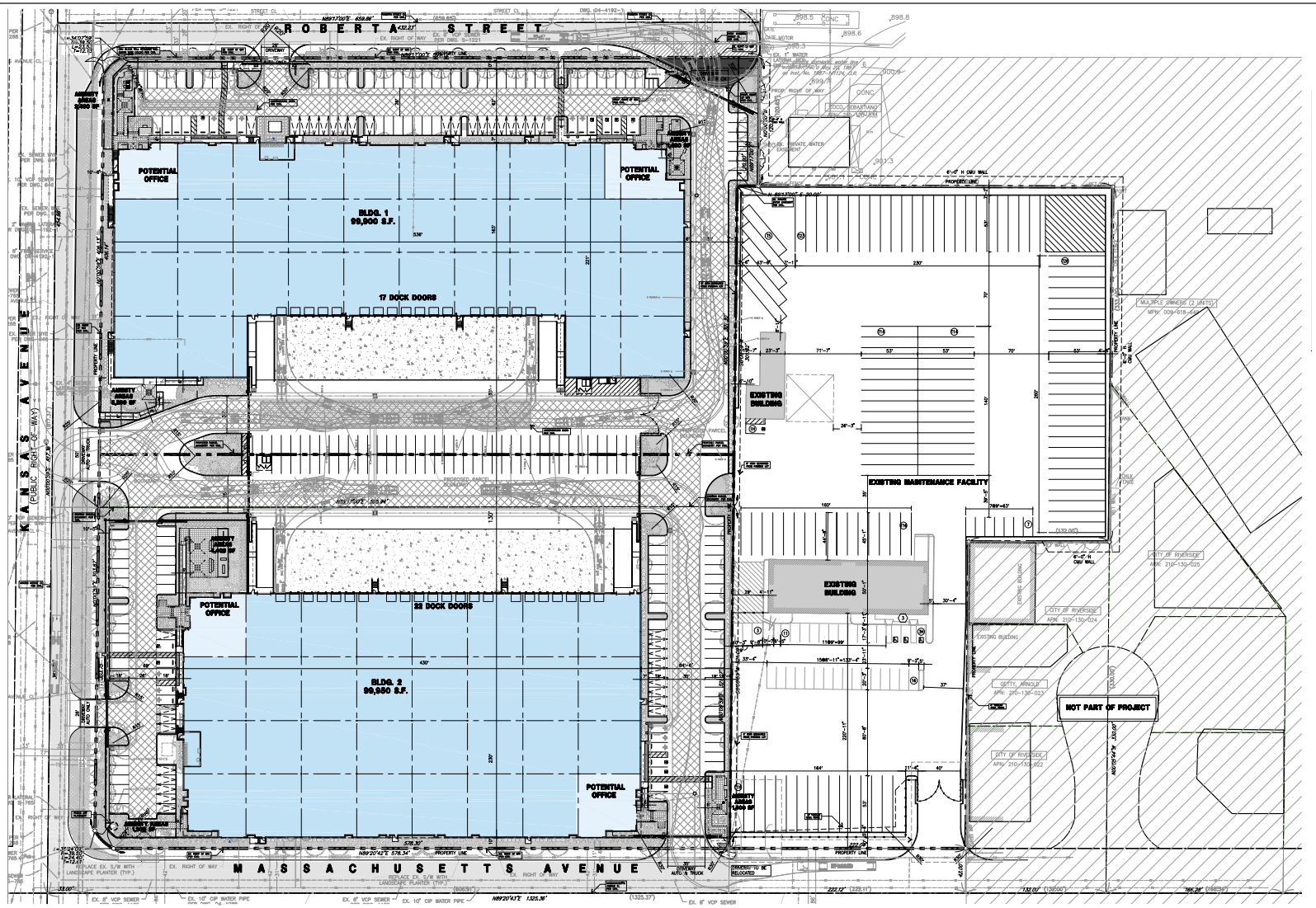
FIGURE 1

0 1000 2000
FEET

Massachusetts Point
Project Location

SOURCE: USGS 7.5' Quad - *Riverside East (1980)*, CA

I:\E\ESL2201.103\GIS\Pro\Massachusetts Point\Massachusetts Point.aprx (2/28/2025)



LSA

FIGURE 2

0 45 90

FEET

SOURCE: HPA Architecture

I:\E\ESL2201.103\G\Site_Plan.ai (3/5/2025)

Massachusetts Point Project

Site Plan

Building 2 would be oriented to the west, along Kansas Avenue to the west and Massachusetts Avenue to the south. Building 2 would be set back 130 feet from the northern property line, approximately 84 feet from the eastern property line, approximately 10 feet from the southern property line, and approximately 79 feet from the western property line.

The project would include approximately 22,240 sf (or 0.51 acres) of ornamental landscaping around the perimeter of the site and in between parking areas. Landscaping would include 24-inch and 36-inch box trees, 5-gallon shrubs, accents, and groundcover to screen the proposed building, parking, and loading areas from off-site viewpoints.

Building 1 would include 6-foot-high metal sliding gates at the two driveways on Roberta Street and at the east and west entrances to the truck court to provide controlled access. Additionally, a 6-foot-high fence (consisting of a 4-foot-high concrete masonry unit [CMU] wall with 2 feet of tubular steel on top) would be installed along the northern property line, a portion of the northwest property line, and along the southern property line where the truck trailer parking is located. Building 1 would also include a 6-foot-high tubular steel fence along the eastern property line.

Building 2 would include 6-foot-high metal sliding gates at the driveway on Massachusetts Avenue, at the northwest entrance to the passenger vehicle parking, and along the eastern entrance to the truck court to provide controlled access. Additionally, a 6-foot-high fence (consisting of a 4-foot-high CMU wall with 2 feet of tubular steel on top) would be installed along the northern property line along the truck trailer parking, as well as along the western property line and along the southwest and southeast portions of the southern property line. Building 2 would also include a 6-foot-high tubular steel fence along the eastern property line.

Building 1 would include 17 dock doors located along the southern side of the building. Additionally, Building 1 would include 130 passenger vehicle spaces, inclusive of electric vehicle (EV) and Americans with Disabilities Act (ADA)-accessible spaces, for use by employees and visitors in surface lots to the north, south, and east sides of Building 1.

Building 2 would include 22 dock doors located along the northern side of the building. Additionally, Building 2 would include 131 passenger vehicle spaces, inclusive of EV and ADA spaces for use by employees and visitors in surface lots to the north, east, and west sides of Building 2.

EXISTING LAND USES IN THE PROJECT AREA

The project site is primarily surrounded by existing industrial uses. The areas adjacent to the project site include the following uses:

- **North:** Existing industrial (manufacturing) uses and a former single-family residence opposite Roberta Street
- **East:** Existing industrial (manufacturing) uses and homeless shelter and services
- **South:** Existing industrial (manufacturing) uses opposite Massachusetts Avenue
- **West:** Existing industrial (manufacturing) uses opposite Kansas Avenue

The nearest sensitive receptor is the existing housing assistance shelter located at 2801 Hulen Place, approximately 220 feet away from the eastern project construction boundary.

NOISE AND VIBRATION FUNDAMENTALS

CHARACTERISTICS OF SOUND

Noise is usually defined as unwanted sound. Noise consists of any sound that may produce physiological or psychological damage and/or interfere with communication, work, rest, recreation, and sleep.

To the human ear, sound has two significant characteristics: pitch and loudness. Pitch is generally an annoyance, while loudness can affect the ability to hear. Pitch is the number of complete vibrations, or cycles per second, of a sound wave, which results in the tone's range from high to low. Loudness is the strength of a sound, and it describes a noisy or quiet environment; it is measured by the amplitude of the sound wave. Loudness is determined by the intensity of the sound waves combined with the reception characteristics of the human ear. Sound intensity is the average rate of sound energy transmitted through a unit area perpendicular to the direction in which the sound waves are traveling. This characteristic of sound can be precisely measured with instruments. The analysis of a project defines the noise environment of the project area in terms of sound intensity and its effect on adjacent sensitive land uses.

MEASUREMENT OF SOUND

Sound intensity is measured with the A-weighted decibel (dBA) scale to correct for the relative frequency response of the human ear. That is, an A-weighted noise level de-emphasizes low and very high frequencies of sound, similar to the human ear's de-emphasis of these frequencies. Decibels (dB), unlike the linear scale (e.g., inches or pounds), are measured on a logarithmic scale representing points on a sharply rising curve.

For example, 10 dB is 10 times more intense than 0 dB, 20 dB is 100 times more intense than 0 dB, and 30 dB is 1,000 times more intense than 0 dB. Thirty decibels (30 dB) represents 1,000 times as much acoustic energy as 0 dB. The decibel scale increases as the square of the change, representing the sound pressure energy. A sound as soft as human breathing is about 10 times greater than 0 dB. The decibel system of measuring sound gives a rough connection between the physical intensity of sound and its perceived loudness to the human ear. A 10 dB increase in sound level is perceived by the human ear as only a doubling of the sound's loudness. Ambient sounds generally range from 30 dB (very quiet) to 100 dB (very loud).

Sound levels are generated from a source, and their decibel level decreases as the distance from that source increases. Sound levels dissipate exponentially with distance from their noise sources. For a single point source, sound levels decrease approximately 6 dB for each doubling of distance from the source. This drop-off rate is appropriate for noise generated by stationary equipment. If noise is produced by a line source (e.g., highway traffic or railroad operations), the sound decreases 3 dB for each doubling of distance in a hard site environment. Line source sound levels decrease 4.5 dB for each doubling of distance in a relatively flat environment with absorptive vegetation.

There are many ways to rate noise for various time periods, but an appropriate rating of ambient noise affecting humans also accounts for the annoying effects of sound. The equivalent continuous sound level (L_{eq}) is the total sound energy of time-varying noise over a sample period. However, the predominant rating scales for human communities in the State of California are the L_{eq} and Community Noise Equivalent Level (CNEL) or the day-night average noise level (L_{dn}) based on A-weighted decibels. CNEL is the time-weighted average noise over a 24-hour period, with a 5 dBA weighting factor applied to the hourly L_{eq} for noises occurring from 7:00 p.m. to 10:00 p.m. (defined as relaxation hours) and a 10 dBA weighting factor applied to noises occurring from 10:00 p.m. to 7:00 a.m. (defined as sleeping hours). L_{dn} is similar to the CNEL scale but without the adjustment for events occurring during the relaxation. CNEL and L_{dn} are within 1 dBA of each other and are normally interchangeable. The City uses the CNEL noise scale for long-term traffic noise impact assessment.

Other noise rating scales of importance when assessing the annoyance factor include the maximum instantaneous noise level (L_{max}), which is the highest sound level that occurs during a stated time period. The noise environments discussed in this analysis for short-term noise impacts are specified in terms of maximum levels denoted by L_{max}, which reflects peak operating conditions and addresses the annoying aspects of intermittent noise. It is often used together with another noise scale, or noise standards in terms of percentile noise levels, in noise ordinances for enforcement purposes. For example, the L_{10} noise level represents the noise level exceeded 10 percent of the time during a stated period. The L_{50} noise level represents the median noise level. Half the time the noise level exceeds this level, and half the time it is less than this level. The L_{90} noise level represents the noise level exceeded 90 percent of the time and is considered the background noise level during a monitoring period. For a relatively constant noise source, the L_{eq} and L_{50} are approximately the same.

Noise impacts can be described in three categories. The first category includes audible impacts, which are increases in noise levels noticeable to humans. Audible increases in noise levels generally refer to a change of 3 dB or greater because this level has been found to be barely perceptible in exterior environments. The second category, potentially audible, refers to a change in the noise level between 1 dB and 3 dB. This range of noise levels has been found to be noticeable only in laboratory environments. The last category includes changes in noise levels of less than 1 dB, which are inaudible to the human ear. Only audible changes in existing ambient or background noise levels are considered potentially significant.

Physiological Effects of Noise

Physical damage to human hearing begins at prolonged exposure to sound levels higher than 85 dBA. Exposure to high sound levels affects the entire system, with prolonged sound exposure in excess of 75 dBA increasing body tensions, thereby affecting blood pressure and functions of the heart and the nervous system. In comparison, extended periods of sound exposure above 90 dBA would result in permanent cell damage. When the sound level reaches 120 dBA, a tickling sensation occurs in the human ear, even with short-term exposure. This level of sound is called the threshold of feeling. As the sound reaches 140 dBA, the tickling sensation is replaced by a feeling of pain in the ear (i.e., the threshold of pain). A sound level of 160–165 dBA will result in dizziness or a

loss of equilibrium. The ambient or background noise problem is widespread and generally more concentrated in urban areas than in outlying, less developed areas.

Table A lists definitions of acoustical terms, and Table B shows common sound levels and their sources.

Table A: Definitions of Acoustical Terms

Term	Definitions
Decibel, dB	A unit of sound measurement that denotes the ratio between two quantities that are proportional to power; the number of decibels is 10 times the logarithm (to the base 10) of this ratio.
Frequency, Hz	Of a function periodic in time, the number of times that the quantity repeats itself in 1 second (i.e., the number of cycles per second).
A-Weighted Sound Level, dBA	The sound level obtained by use of A-weighting. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. (All sound levels in this report are A-weighted unless reported otherwise.)
L_{01}, L_{10}, L_{50}, L_{90}	The fast A-weighted noise levels that are equaled or exceeded by a fluctuating sound level 1%, 10%, 50%, and 90% of a stated time period, respectively.
Equivalent Continuous Noise Level, L_{eq}	The level of a steady sound that, in a stated time period and at a stated location, has the same A-weighted sound energy as the time-varying sound.
Community Noise Equivalent Level, CNEL	The 24-hour A-weighted average sound level from midnight to midnight, obtained after the addition of 5 dBA to sound levels occurring in the evening from 7:00 p.m. to 10:00 p.m. and after the addition of 10 dBA to sound levels occurring in the night between 10:00 p.m. and 7:00 a.m.
Day/Night Noise Level, L_{dn}	The 24-hour A-weighted average sound level from midnight to midnight, obtained after the addition of 10 dBA to sound levels occurring in the night between 10:00 p.m. and 7:00 a.m.
L_{max}, L_{min}	The maximum and minimum A-weighted sound levels measured on a sound level meter, during a designated time interval, using fast time averaging.
Ambient Noise Level	The all-encompassing noise associated with a given environment at a specified time. Usually a composite of sound from many sources from many directions, near and far; no particular sound is dominant.
Intrusive	The noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, time of occurrence, and tonal or informational content, as well as the prevailing ambient noise level.

Sources: *Technical Noise Supplement* (Caltrans 2013); *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018).
Caltrans = California Department of Transportation
FTA = Federal Transit Administration

Table B: Common Sound Levels and Their Noise Sources

Noise Source	A-Weighted Sound Level in Decibels	Noise Environments	Subjective Evaluations
Near Jet Engine	140	Deafening	128 times as loud
Civil Defense Siren	130	Threshold of Pain	64 times as loud
Hard Rock Band	120	Threshold of Feeling	32 times as loud
Accelerating Motorcycle at a Few Feet Away	110	Very Loud	16 times as loud
Pile Driver; Noisy Urban Street/ Heavy City Traffic	100	Very Loud	8 times as loud
Ambulance Siren; Food Blender	95	Very Loud	—
Garbage Disposal	90	Very Loud	4 times as loud
Freight Cars; Living Room Music	85	Loud	—
Pneumatic Drill; Vacuum Cleaner	80	Loud	2 times as loud
Busy Restaurant	75	Moderately Loud	—
Near Freeway Auto Traffic	70	Moderately Loud	Reference level
Average Office	60	Quiet	One-half as loud
Suburban Street	55	Quiet	—
Light Traffic; Soft Radio Music in Apartment	50	Quiet	One-quarter as loud
Large Transformer	45	Quiet	—
Average Residence without Stereo Playing	40	Faint	One-eighth as loud
Soft Whisper	30	Faint	—
Rustling Leaves	20	Very Faint	—
Human Breathing	10	Very Faint	Threshold of Hearing
—	0	Very Faint	—

Source: Compiled by LSA (2023).

FUNDAMENTALS OF VIBRATION

Vibration refers to ground-borne noise and perceptible motion. Ground-borne vibration is almost exclusively a concern inside buildings and is rarely perceived as a problem outdoors, where the motion may not be discernible, but without the effects associated with the shaking of a building there is less adverse reaction. Vibration energy propagates from a source through intervening soil and rock layers to the foundations of nearby buildings. The vibration then propagates from the foundation throughout the remainder of the structure. Building vibration may be perceived by occupants as the motion of building surfaces, the rattling of items sitting on shelves or hanging on walls, or a low-frequency rumbling noise. The rumbling noise is caused by the vibration of walls, floors, and ceilings that radiate sound waves. Annoyance from vibration often occurs when the vibration exceeds the threshold of perception by 10 dB or less. This is an order of magnitude below the damage threshold for normal buildings.

Typical sources of ground-borne vibration are construction activities (e.g., blasting, pile-driving, and operating heavy-duty earthmoving equipment), steel-wheeled trains, and occasional traffic on rough roads. Problems with both ground-borne vibration and noise from these sources are usually localized to areas within approximately 100 feet from the vibration source, although there are examples of ground-borne vibration causing interference out to distances greater than 200 feet as detailed in the Federal Transit Administration's (FTA) 2018 *Transit Noise and Vibration Impact Assessment Manual* (FTA Manual). When roadways are smooth, vibration from traffic, even heavy

trucks, is rarely perceptible. It is assumed for most projects that the roadway surface will be smooth enough that ground-borne vibration from street traffic will not exceed the impact criteria; however, construction of the project could result in ground-borne vibration that may be perceptible and annoying.

Ground-borne noise is not likely to be a problem because noise arriving via the normal airborne path will usually be greater than ground-borne noise.

Ground-borne vibration has the potential to disturb people and damage buildings. Although it is very rare for train-induced ground-borne vibration to cause even cosmetic building damage, it is not uncommon for construction processes such as blasting and pile-driving to cause vibration of sufficient amplitudes to damage nearby buildings (FTA 2018). Ground-borne vibration is usually measured in terms of vibration velocity, either the root-mean-square (RMS) velocity or peak particle velocity (PPV). The RMS is best for characterizing human response to building vibration, and PPV is used to characterize the potential for damage. Decibel notation acts to compress the range of numbers required to describe vibration. Vibration velocity level in decibels is defined as

$$L_v = 20 \log_{10} [V/V_{ref}]$$

where "L_v" is the vibration velocity in decibels (VdB), "V" is the RMS velocity amplitude, and "V_{ref}" is the reference velocity amplitude, or 1×10^{-6} inches/second (in/sec) used in the United States.

REGULATORY SETTING

APPLICABLE NOISE STANDARDS

The applicable noise standards governing the project site include the criteria in the City's Noise Element of the General Plan and the City's Municipal Code.

City of Riverside

Noise Element of the General Plan

The City of Riverside General Plan Noise Element establishes policies to guard against the creation of any new noise and land use conflicts, and to minimize the impact of existing noise sources on the community. The noise compatibility criteria provide the City of Riverside with a planning tool to gauge the compatibility of land uses relative to existing and future exterior noise levels. The *Noise/Land Use Noise Compatibility Criteria* matrix indicates that industrial land uses, such as the proposed project, are considered normally acceptable with exterior noise levels below 70 dBA CNEL, and conditionally acceptable with noise levels between 70 dBA and 80 dBA CNEL. For conditionally acceptable land uses, new development should be undertaken only after detailed analysis of noise reduction requirements are made.

The following objectives and policies are applicable to the project:

- **Objective N-1:** Minimize noise levels from point sources throughout the community and, wherever possible, mitigate the effects of noise to provide a safe and healthful environment.
    - **Policy N-1.2:** Require the inclusion of noise-reducing design features in development consistent with standards in Figure N–10 (Noise/Land Use Compatibility Criteria), Title 24 California Code of Regulations and Title 7 of the Municipal Code.
    - **Policy N-1.4:** Incorporate noise considerations into the site plan review process, particularly with regard to parking and loading areas, ingress/egress points and refuse collection areas.
- **Objective N-4:** Minimize ground transportation-related noise impacts.
    - **Policy N–4.1:** Ensure that noise impacts generated by vehicular sources are minimized through the use of noise reduction features (e.g., earthen berms, landscaped walls, lowered streets, improved technology).

City of Riverside Municipal Code

The City of Riverside Municipal Code, Title 7 Noise Control, Section 7.25.010 establishes the noise level standards for stationary noise sources as shown in Table C. For residential properties, the exterior noise level shall not exceed 55 dBA L_{eq} during the daytime hours (7:00 a.m. to 10:00 p.m.) and 45 dBA L_{eq} during the nighttime hours (10:00 p.m. to 7:00 a.m.). For Industrial properties, the exterior noise level shall not exceed 70 dBA L_{eq} anytime.

Table C: Operational Noise Level Standards

Land Use Category	Exterior Noise Level Standards (dBA)	
	Time Period	Noise Level
Residential	Night (10:00 p.m. to 7:00 a.m.)	45 dBA
	Day (7:00 a.m. to 10:00 p.m.)	55 dBA
Office/Commercial	Anytime	65 dBA
Industrial	Anytime	70 dBA
Community Support	Anytime	60 dBA
Public Recreation Facility	Anytime	65 dBA
Nonurban	Anytime	70 dBA

Source: City of Riverside, Title 7, Section 7.25.010.
[1] Daytime means 7:00 a.m. to 10:00 p.m.
[2] Nighttime means 10:01 p.m. to 6:59 a.m.
dBA = A-weighted decibels

Section 7.35.020[G] of the City's Municipal Code states that construction activities are not permitted between the hours of 7:00 p.m. to 7:00 a.m. on weekdays, between the hours of 5:00 p.m. and 8:00 a.m. on Saturdays, or at any time on Sunday or a federal holiday. While the City establishes limits to the hours during which construction activity may take place, the City of Riverside General Plan or Municipal Code do not establish numeric maximum acceptable construction source noise levels at potentially affected receivers, which would allow for a quantified determination of what California Environmental Quality Act (CEQA) constitutes as a substantial temporary or periodic noise increase. Therefore, a numerical construction threshold based on the FTA's *Transit Noise and Vibration Impact Assessment Manual* (FTA Manual) is used for analysis of daytime construction impacts, as discussed below.

Federal Transit Administration

According to the FTA, local noise ordinances are typically not very useful in evaluating construction noise. They usually relate to nuisance and hours of allowed activity, and sometimes specify limits in terms of maximum levels, but are generally not practical for assessing the impact of a construction project. Project construction noise criteria should account for the existing noise environment, the absolute noise levels during construction activities, the duration of the construction, and the adjacent land use. Due to the lack of standardized construction noise thresholds, the FTA provides guidelines that can be considered reasonable criteria for construction noise assessment. This is shown in Table D.

Table D: Detailed Assessment Daytime Construction Noise Criteria

Land Use	Daytime 8-hour L_{eq} (dBA)
Residential	80
Commercial	85
Industrial	90

Source: *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018).
dBA = A-weighted decibels
FTA = Federal Transit Administration
L_{eq} = equivalent continuous sound level

APPLICABLE VIBRATION STANDARDS

Federal Transit Administration

Vibration standards included in the FTA Manual are used in this analysis for ground-borne vibration impacts on human annoyance. The criteria for environmental impact from ground-borne vibration and noise are based on the maximum levels for a single event. Table E provides the criteria for assessing the potential for interference or annoyance from vibration levels in a building.

Table E: Interpretation of Vibration Criteria for Detailed Analysis

Land Use	Max L_v (VdB)[1]	Description of Use
Workshop	90	Vibration that is distinctly felt. Appropriate for workshops and similar areas not as sensitive to vibration.
Office	84	Vibration that can be felt. Appropriate for offices and similar areas not as sensitive to vibration.
Residential Day	78	Vibration that is barely felt. Adequate for computer equipment and low-power optical microscopes (up to 20×).
Residential Night and Operating Rooms	72	Vibration is not felt, but ground-borne noise may be audible inside quiet rooms. Suitable for medium-power microscopes (100×) and other equipment of low sensitivity.

Source: *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018).
[1] As measured in 1/3-octave bands of frequency over a frequency range of 8 to 80 Hertz.
FTA = Federal Transit Administration
Max = maximum
L_v = velocity in decibels
VdB = vibration velocity decibels

California Department of Transportation

Table F lists the potential vibration building damage criteria associated with construction activities, as suggested in the California Department of Transportation (Caltrans) *Transportation and Construction Vibration Guidance Manual* (Caltrans 2020) (Caltrans Manual). Caltrans guidelines show that a vibration level of up to 0.5 in/sec in PPV is considered safe for newer residential structures and modern industrial or commercial buildings and would not result in any construction vibration damage.

Table F: Construction Vibration Damage Criteria

Structure / Condition	PPV (in/sec)
Extremely fragile historic buildings, ruins, ancient monuments	0.08
Fragile buildings	0.10
Historic and some old buildings	0.25
Older residential structures	0.30
New residential structures	0.50
Modern industrial / commercial buildings	0.50

Source: Table 19, *Transportation and Construction Vibration Guidance Manual* (Caltrans 2020).
in/sec = inch/inches per second
PPV = peak particle velocity

OVERVIEW OF THE EXISTING NOISE ENVIRONMENT

The primary existing noise sources in the project area include vehicle traffic from Roberta Street, Kansas Avenue and Massachusetts Avenue, and industrial noises in the vicinity of the project site.

AMBIENT NOISE MEASUREMENTS

Long-Term Noise Measurements

To assess existing noise levels, LSA conducted two long-term noise measurements in the vicinity of the project site. The long-term (24-hour) noise level measurements were conducted on February 3 through February 4, 2025, using two Larson Davis Spark 706RC Dosimeters. Table G provides a summary of the measured hourly noise levels and calculated CNEL level from the long-term noise level measurements. As shown in Table G, the calculated CNEL levels reached 70.5 dBA CNEL. Hourly noise levels at surrounding uses are as low as 54.2 dBA L_{eq} during nighttime hours and 60.8 dBA L_{eq} during daytime hours. Noise measurement sheets are provided in Appendix A. Figure 3 shows the long-term monitoring locations.

Table G: Long-Term 24-Hour Ambient Noise Monitoring Results

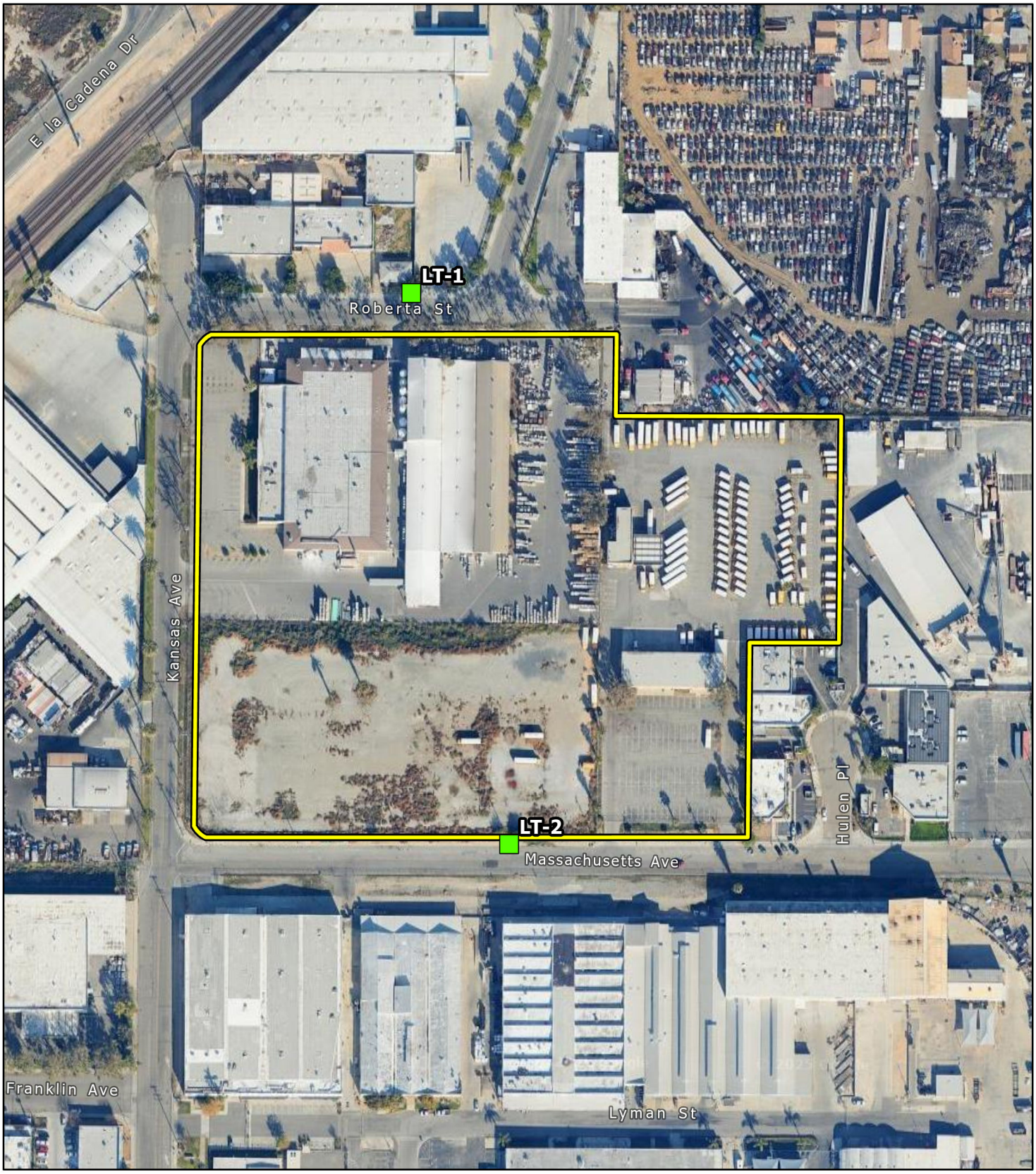
Location		Daytime Noise Levels[1] (dBA L_{eq})	Evening Noise Levels[2] (dBA L_{eq})	Nighttime Noise Levels[3] (dBA L_{eq})	Daily Noise Levels (dBA CNEL)
LT-1	2053 Roberta Street, Riverside. In a tree on the southeast corner of the property, approximately 27 ft from the Roberta Street centerline.	62.6–67.4	64.0–66.0	60.7–66.5	70.5
LT-2	On a utility pole at the south side of the project site, approximately 34 ft from the Massachusetts Avenue centerline.	60.8–64.5	60.8–62.9	54.2–62.5	66.7

Source: Compiled by LSA (2025).
Note: Noise measurements were conducted from February 3 to February 4, 2025, starting at 1:00 p.m.
[1] Daytime Noise Levels = noise levels during the hours from 7:00 a.m. to 7:00 p.m.
[2] Evening Noise Levels = noise levels during the hours from 7:00 p.m. to 10:00 p.m.
[3] Nighttime Noise Levels = noise levels during the hours from 10:00 p.m. to 7:00 a.m.
CNEL = Community Noise Equivalent Level ft = foot/feet
dBA = A-weighted decibels L_{eq} = equivalent continuous sound level

EXISTING AIRCRAFT NOISE

Airport-related noise levels are primarily associated with aircraft engine noise made while aircraft are taking off, landing, or running their engines while still on the ground. The closest airports to the proposed project site are Flabob Airport and Riverside Municipal Airport located approximately 3.1 and 5.4 miles west and southwest of the project site, respectively. Based on Map FL-3, Noise Compatibility Contours, of Riverside County Airport Land Use Compatibility Plan (ALUCP) Policy Document, the project is located outside the 65 dBA CNEL noise contour for Flabob Airport (County of Riverside 2004). Based on Exhibit RI-5, Future Noise Impacts, of Riverside County ALUCP – West County Airports Background data, the project is located outside the 65 dBA CNEL noise contour for

Riverside Municipal Airport (County of Riverside 2005). Additionally, March Air Reserve Base/Inland Port Airport is located approximately 7.8 miles southeast of the project site. The project site is located within Zone E of the March Air Reserve Base/Inland Port Airport Influence Area. However, it is outside the 65 dBA CNEL noise contour (Mead & Hunt 2014). Because the project site is located outside the 65 dBA CNEL airport noise contours, the project would not be adversely affected by airport/airfield noise, nor would the project contribute to or result in adverse airport/airfield noise impacts. No further analysis is required.



LSA

Project Location

Noise Monitoring Locations

FIGURE 3

N

0 100 200

FEET

SOURCE: Google Maps (2024)

I:\E\ESL2201.103\GIS\Pro\Massachusetts Point\Massachusetts Point.aprx (2/19/2025)

Massachusetts Point

Noise Monitoring Locations

PROJECT IMPACTS

SHORT-TERM CONSTRUCTION NOISE IMPACTS

Two types of short-term noise impacts could occur during the construction of the proposed project. First, construction crew commutes and the transport of construction equipment and materials to the site for the proposed project would incrementally increase noise levels on access roads leading to the site. Although there would be a relatively high single-event noise-exposure potential causing intermittent noise nuisance (passing trucks at 50 feet would generate up to 84 dBA L_{max}), the effect on longer-term ambient noise levels would be small when compared to the existing average daily traffic (ADT) volume on Massachusetts Avenue. Based on the *Traffic Impact Analysis for Massachusetts Point Project* (EPD Solutions, Inc. 2025), the existing ADT on Massachusetts Avenue is 1,100 ADT. During the demolition phase, approximately 5,956 acoustically equivalent trips would occur during an average day from worker and delivery activities resulting in a traffic noise increase of approximately 8.0 dBA, as shown in Appendix B. The acoustically equivalent traffic volume is used in order to account for the additional noise a heavy truck creates as compared to automobile traffic and does not represent the actual number of vehicles associated with construction activities. Because this effort has a very short duration, approximately 15 days, the phase of construction with the greatest duration is the building construction phase. Over the period of approximately 200 days, the expected noise increase would be 1.7 dBA. A noise level increase of less than 3 dBA would not be perceptible to the human ear in an outdoor environment. Therefore, short-term construction-related impacts associated with worker commutes and equipment transport to the project site would be less than significant.

The second type of short-term noise impact is related to noise generated during construction, which includes demolition, site preparation, grading, building construction, paving, and architectural coating on the project site. Construction is completed in discrete steps, each of which has its own mix of equipment and, consequently, its own noise characteristics. These various sequential phases would change the character of the noise generated on the site and, therefore, the noise levels surrounding the site as construction progresses. Despite the variety in the type and size of construction equipment, similarities in the dominant noise sources and patterns of operation allow construction-related noise ranges to be categorized by work phase. Table H lists typical construction equipment noise levels recommended for noise impact assessments, based on a distance of 50 feet between the equipment and a noise receptor, taken from the Federal Highway Administration's (FHWA) *FHWA Roadway Construction Noise Model* (FHWA 2006).

In addition to the reference maximum noise level, the usage factor provided in Table H is used to calculate the hourly noise level impact for each piece of equipment based on the equation on the following page.

Table H: Typical Construction Equipment Noise Levels

Equipment Description	Acoustical Usage Factor (%)[1]	Maximum Noise Level (L_{max}) at 50 Ft[2]
Auger Drill Rig	20	84
Backhoes	40	80
Compactor (Ground)	20	80
Compressor	40	80
Cranes	16	85
Dozers	40	85
Dump Trucks	40	84
Excavators	40	85
Flat Bed Trucks	40	84
Forklift	20	85
Front-End Loaders	40	80
Graders	40	85
Impact Pile Drivers	20	95
Jackhammers	20	85
Paver	50	77
Pickup Truck	40	55
Pneumatic Tools	50	85
Pumps	50	77
Rock Drills	20	85
Rollers	20	85
Scrapers	40	85
Tractors	40	84
Trencher	50	80
Welder	40	73

Source: *FHWA Roadway Construction Noise Model User's Guide,* Table 1 (FHWA 2006).
Note: Noise levels reported in this table are rounded to the nearest whole number.
[1] Usage factor is the percentage of time during a construction noise operation that a piece of construction equipment is operating at full power.
[2] Maximum noise levels were developed based on Specification 721.560 from the Central Artery/Tunnel program to be consistent with the City of Boston's Noise Code for the "Big Dig" project.
FHWA = Federal Highway Administration
ft = foot/feet
L_{max} = maximum instantaneous sound level

$$L_{eq}(equip) = E.L. + 10\log(U.F.) - 20\log\left(\frac{D}{50}\right)$$

where: $L_{eq}(equip)$ = L_{eq} at a receiver resulting from the operation of a single piece of equipment over a specified time period.

E.L. = noise emission level of the particular piece of equipment at a reference distance of 50 feet.

U.F. = usage factor that accounts for the fraction of time that the equipment is in use over the specified period of time.

D = distance from the receiver to the piece of equipment.

Each piece of construction equipment operates as an individual point source. Using the following equation, a composite noise level can be calculated when multiple sources of noise operate simultaneously:

$$Leq\ (composite) = 10 * \log_{10}\left(\sum_{1}^{n} 10^{\frac{Ln}{10}}\right)$$

Using the equations from the methodology above, the reference information in Table H, and the construction equipment list provided, the composite noise levels of each construction phase were calculated. The project construction composite noise levels at a distance of 50 feet would range from 74 dBA L_{eq} to 88 dBA L_{eq}, with the highest noise levels occurring during the site preparation and grading phases.

Once composite noise levels are calculated, reference noise levels can then be adjusted for distance using the following equation:

$$Leq\ (at\ distance\ X) = Leq\ (at\ 50\ feet) - 20 * \log_{10}\left(\frac{X}{50}\right)$$

In general, this equation shows that doubling the distance would decrease noise levels by 6 dBA while halving the distance would increase noise levels by 6 dBA.

Table I shows the nearest sensitive uses to the project site, their distance from the center of construction activities, and composite noise levels expected during construction. These noise level projections do not consider intervening topography or barriers. Construction equipment calculations are provided in Appendix B.

Table I: Potential Construction Noise Impacts at Nearest Receptor

Receptor (Location)	Composite Noise Level (dBA L_{eq}) at 50 ft[1]	Distance (ft)	Construction Noise Level Standard (dBA L_{eq})	Composite Noise Level (dBA L_{eq})
Industrial (West)	88	435	90	70
Industrial (North)		450	90	69
Industrial (South)		500	90	68
Residential (East)		530	80	68

Source: Compiled by LSA (2025).

1 The composite construction noise level represents the site preparation and paving phases which are expected to result in the greatest noise level as compared to other phases.

2 The assessment distance is associated with the average condition, identified by the distance from the center of construction activities to surrounding uses.

dBA L_{eq} = average A-weighted hourly noise level
ft = foot/feet

While construction noise will vary, it is expected that composite noise levels during construction would reach 70 dBA L_{eq} at the nearest industrial uses to the west and 68 dBA L_{eq} at the nearest residential use to the east during daytime hours. These predicted noise levels would only occur

when all construction equipment is operating simultaneously and, therefore, are assumed to be rather conservative in nature. While construction-related short-term noise levels have the potential to be higher than existing ambient noise levels in the project area under existing conditions, the noise impacts would no longer occur once project construction is completed.

As stated above, noise impacts associated with construction activities are regulated by the City's Noise Ordinance. The proposed project would comply with the construction hours specified in the City's Noise Ordinance, which states that construction activities are not permitted between the hours of 7:00 p.m. to 7:00 a.m. on weekdays, between the hours of 5:00 p.m. and 8:00 a.m. on Saturdays, or at any time on Sunday or a federal holiday.

As it relates to off-site uses, on-site construction-related noise impacts from construction equipment would remain below the 80 dBA L_{eq} and 90 dBA L_{eq} 8-hour construction noise level criteria for daytime construction noise level criteria as established by the FTA for residential and industrial land uses, respectively; therefore, the impact would be considered less than significant.

SHORT-TERM CONSTRUCTION VIBRATION IMPACTS

This construction vibration impact analysis discusses the level of human annoyance using vibration levels in RMS (VdB) and assesses the potential for building damages using vibration levels in PPV (in/sec). This is because vibration levels calculated in RMS are best for characterizing human response to building vibration, while vibration level in PPV is best for characterizing potential for damage.

Table J shows the PPV and VdB values at 25 feet from the construction vibration source. As shown in Table J, bulldozers, and other heavy-tracked construction equipment (expected to be used for this project) generate approximately 0.089 PPV in/sec or 87 VdB of ground-borne vibration when measured at 25 feet, based on the FTA Manual. The distance to the nearest buildings for vibration impact analysis is measured between the nearest off-site buildings and the project construction boundary (assuming the construction equipment would be used at or near the project setback line).

The formulae for vibration transmission are provided below and Tables K and L below provide a summary of off-site construction vibration levels.

$$L_v dB\ (D) = L_v dB\ (25\ ft) - 30\ Log\ (D/25)$$

$$PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$$

Table J: Vibration Source Amplitudes for Construction Equipment

Equipment	Reference PPV/L_V at 25 ft	
	PPV (in/sec)	L_V (VdB)[1]
Pile Driver (Impact), Typical	0.644	104
Pile Driver (Sonic), Typical	0.170	93
Vibratory Roller	0.210	94
Hoe Ram	0.089	87
Large Bulldozer[2]	**0.089**	**87**
Caisson Drilling	0.089	87
Loaded Trucks[2]	**0.076**	**86**
Jackhammer	0.035	79
Small Bulldozer	0.003	58

Source: *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018).
[1] RMS vibration velocity in decibels (VdB) is 1 µin/sec.
[2] Equipment shown in **bold** is expected to be used on site.
µin/sec = microinches per second
ft = foot/feet
FTA = Federal Transit Administration
in/sec = inch/inches per second
L_V = velocity in decibels
PPV = peak particle velocity
RMS = root-mean-square
VdB = vibration velocity decibels

Table K: Potential Construction Vibration Annoyance Impacts at Nearest Receptor

Receptor (Location)	Reference Vibration Level (VdB) at 25 ft[1]	Distance (ft)[2]	Vibration Level (VdB)
Industrial (West)	87	435	50
Industrial (North)		450	49
Industrial (South)		500	48
Residential (East)		530	47

Source: Compiled by LSA (2025).
[1] The reference vibration level is associated with a large bulldozer, which is expected to be representative of the heavy equipment used during construction.
[2] The assessment distance is associated with the average condition, identified by the distance from the center of construction activities to surrounding uses.
ft = foot/feet
VdB = vibration velocity decibels

Table L: Potential Construction Vibration Damage Impacts at Nearest Receptor

Receptor (Location)	Reference Vibration Level (PPV) at 25 ft[1]	Distance (ft)[2]	Vibration Level (PPV)
Industrial (West)	0.089	60	0.024
Industrial (North)		45	0.037
Industrial (South)		105	0.010
Residential (East)		220	0.003

Source: Compiled by LSA (2025).
[1] The reference vibration level is associated with a large bulldozer, which is expected to be representative of the heavy equipment used during construction.
[2] The assessment distance is associated with the peak condition, identified by the distance from the perimeter of construction activities to surrounding structures.
ft = foot/feet
PPV = peak particle velocity

As shown in Table E, above, the threshold at which vibration levels would result in annoyance would be 78 VdB and 84 VdB for daytime residential uses and office type uses, respectively. As shown in

Table F, the Caltrans guidelines indicate that for fragile buildings, the construction vibration damage criterion is 0.1 in/sec in PPV, while for new residential structures and modern industrial buildings, the construction vibration damage criterion is 0.5 in/sec in PPV.

Based on the information provided in Table K, vibration levels are expected to approach 50 VdB at the closest industrial uses to the west and 47 VdB at the nearest residential use to the east and would not exceed the annoyance thresholds.

Based on the information provided in Table L, vibration levels are expected to approach 0.037 in/sec PPV at the nearest surrounding structures to the north and would not exceed the 0.1 PPV in/sec damage threshold considered safe for fragile buildings, which would result in a less than significant impact. Vibration levels at all other buildings would be lower. Therefore, construction would not result in any vibration damage, and impacts would be less than significant.

Because construction activities are regulated by the City's Municipal Code, which states that construction activities are not permitted between the hours of 7:00 p.m. to 7:00 a.m. on weekdays, between the hours of 5:00 p.m. and 8:00 a.m. on Saturdays, or at any time on Sunday or a federal holiday, vibration impacts would not occur during the more sensitive nighttime hours.

LONG-TERM OFF-SITE TRAFFIC NOISE IMPACTS

The FHWA Highway Traffic Noise Prediction Model (FHWA RD-77-108) was used to evaluate traffic-related noise conditions along street segments in the project vicinity. This model requires various parameters, including traffic volumes, vehicle mix, vehicle speed, and roadway geometry, to compute typical equivalent noise levels during daytime, evening, and nighttime hours. The resulting noise levels are weighted and summed over 24-hour periods to determine the CNEL values. The Existing (2024) and Opening Year (2027) Without and With Project ADT volumes were obtained from the *Traffic Impact Analysis for Massachusetts Point Project* (EPD Solutions, Inc. 2025). The standard vehicle mix for Southern California roadways was used for roadways in the project vicinity. Tables M and N list the traffic noise levels for the Existing (2024) and Opening Year (2027) Without and With Project scenarios, respectively. These noise levels represent the worst-case scenario, which assumes that no shielding is provided between the traffic and the location where the noise contours are drawn. The specific assumptions used in developing these noise levels and the model printouts are provided in Appendix C.

The results of the calculations show that an increase of up to 1.5 dBA CNEL is expected along the road segments in the vicinity of the project. A noise level increase of less than 3 dBA would not be perceptible to the human ear; therefore, the traffic noise increase in the vicinity of the project site resulting from the proposed project would be less than significant.

Table M: Existing (2025) Traffic Noise Levels Without and With Project

Roadway Segment	Without Project Traffic Conditions					With Project Traffic Conditions					
	ADT	Centerline to 70 dBA CNEL (ft)	Centerline to 65 dBA CNEL (ft)	Centerline to 60 dBA CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane	ADT	Centerline to 70 dBA CNEL (ft)	Centerline to 65 dBA CNEL (ft)	Centerline to 60 dBA CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane	Increase from Baseline Conditions
Roberta Street East of Kansas Street	2,290	< 50	< 50	< 50	57.5	2,330	< 50	< 50	< 50	57.6	0.1
Kansas Street South of Roberta Street	2,300	< 50	< 50	< 50	57.5	2,340	< 50	< 50	< 50	57.6	0.1
Kansas Street South of Massachusetts Avenue	3,490	< 50	< 50	60	58.8	3,550	< 50	< 50	60	58.9	0.1
Massachusetts Avenue East of Kansas Street	1,110	< 50	< 50	< 50	52.7	1,550	< 50	< 50	< 50	54.2	1.5
Massachusetts Avenue East of Chicago Avenue	390	< 50	< 50	< 50	49.8	400	< 50	< 50	< 50	49.9	0.1
Chicago Avenue North of Massachusetts Avenue	18,730	< 50	130	403	67.6	18,740	< 50	130	404	67.6	0.0
Chicago Avenue between Massachusetts Avenue and 3rd Street	18,730	< 50	130	403	67.6	19,450	< 50	135	419	67.7	0.1
Chicago Avenue South of 3rd Street	17,760	< 50	123	383	67.3	17,770	< 50	123	383	67.3	0.0
3rd Street West of Chicago Street	14,210	< 50	100	306	66.4	14,210	< 50	100	306	66.4	0.0
3rd Street East of Chicago Street	17,850	< 50	124	385	67.3	18,710	< 50	130	403	67.6	0.3

Source: Compiled by LSA (2025).
ADT = average daily traffic
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibels
ft = foot/feet

Table N: Opening Year (2027) Traffic Noise Levels Without and With Project

Roadway Segment	Without Project Traffic Conditions					With Project Traffic Conditions					
	ADT	Centerline to 70 dBA CNEL (ft)	Centerline to 65 dBA CNEL (ft)	Centerline to 60 dBA CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane	ADT	Centerline to 70 dBA CNEL (ft)	Centerline to 65 dBA CNEL (ft)	Centerline to 60 dBA CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane	Increase from Baseline Conditions
Roberta Street East of Kansas Street	2,380	< 50	< 50	< 50	57.7	2,420	< 50	< 50	< 50	57.7	0.0
Kansas Street South of Roberta Street	2,390	< 50	< 50	< 50	57.7	2,430	< 50	< 50	< 50	57.8	0.1
Kansas Street South of Massachusetts Avenue	3,730	< 50	< 50	63	59.1	3,790	< 50	< 50	64	59.2	0.1
Massachusetts Avenue East of Kansas Street	1,260	< 50	< 50	< 50	53.3	1,700	< 50	< 50	< 50	54.6	1.3
Massachusetts Avenue East of Chicago Avenue	400	< 50	< 50	< 50	49.9	410	< 50	< 50	< 50	50.0	0.1
Chicago Avenue North of Massachusetts Avenue	21,060	< 50	145	453	68.1	21,070	< 50	145	454	68.1	0.0
Chicago Avenue between Massachusetts Avenue and 3rd Street	20,850	< 50	144	449	68.0	21,720	< 50	150	468	68.2	0.2
Chicago Avenue South of 3rd Street	20,680	< 50	143	445	68.0	20,690	< 50	143	445	68.0	0.0
3rd Street West of Chicago Street	19,960	< 50	138	430	67.8	19,960	< 50	138	430	67.8	0.0
3rd Street East of Chicago Street	23,910	57	164	515	68.6	24,770	59	170	533	68.8	0.2

Source: Compiled by LSA (2025).
ADT = average daily traffic
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibel
ft = foot/feet

LONG-TERM TRAFFIC-RELATED VIBRATION IMPACTS

The proposed project would not generate vibration levels related to on-site operations. In addition, vibration levels generated from project-related traffic on the adjacent roadways are unusual for on-road vehicles because the rubber tires and suspension systems of on-road vehicles provide vibration isolation. Based on a reference vibration level of 0.076 in/sec PPV, structures greater than 20 feet from the roadways that contain project trips would experience vibration levels below the most conservative standard of 0.12 in/sec PPV, and therefore vibration levels generated from project-related traffic on the adjacent roadways would be less than significant and no mitigation is required.

LONG-TERM OFF-SITE STATIONARY NOISE IMPACTS

Adjacent off-site land uses would be potentially exposed to stationary-source noise impacts from the proposed on-site heating, ventilation, and air conditioning (HVAC) equipment, trash bin emptying activities, cold storage fan units, and truck deliveries and loading and unloading activities. The potential noise impacts to off-site sensitive land uses from the proposed HVAC equipment and truck delivery activities are discussed below. To provide a conservative analysis, it is assumed that operations would occur equally during all hours of the day and that half of the loading docks would be active at all times. Additionally, it is assumed that within any given hour, 32 heavy trucks, including 3-axle and 4-axle trucks during the peak period, would maneuver to park near or back into one of the proposed loading docks. To determine the future noise impacts from project operations to the noise sensitive uses, a three-dimensional noise model, SoundPLAN, was used to incorporate the site topography. Appendix C presents a graphic representation of the operational noise impacts.

Heating, Ventilation, and Air Conditioning Equipment

The project would have various rooftop mechanical equipment, including HVAC units, atop the proposed buildings. Based on the project site plan, the project is assumed to have eight rooftop HVAC units atop each proposed building and assumed to operate 24 hours per day. The HVAC equipment could operate 24 hours per day and would generate sound power levels (L_w) of up to 87 dBA L_w or a sound pressure level of 72 dBA L_{eq} at 5 feet, based on manufacturer data (Trane n.d.).

Trash Bin Emptying Activities

The project is estimated to have two trash dumpsters: one near the southeastern corner of Building 1 and one at the western side of the parking between the two buildings. The trash emptying activities would take place for a period less than 1 minute and would generate a sound power level of up to 118.6 dBA L_w or a sound pressure level of 84 dBA L_{eq} at 50 feet, based on reference information within SoundPLAN.

Cold Storage Fan Units

According to the project description, approximately 20 percent of the project site would be cold storage. Noise levels generated by cold storage fan units would be similar to noise readings from previously gathered reference noise level measurements, which generate a noise level of 57.5 dBA Leq at 60 ft based on measurements taken by LSA (*Operational Noise Impact Analysis for Richmond Wholesale Meat Distribution Center* [LSA 2016]).

Truck Arrival and Departure Activities

Noise levels generated by delivery trucks would be similar to noise readings from truck loading and unloading activities, which generate a noise level of 75 dBA L_{eq} at 20 feet based on measurements taken by LSA (*Operational Noise Impact Analysis for Richmond Wholesale Meat Distribution Center* [LSA 2016]). Shorter term noise levels that occur during the docking process taken by LSA were measured to be 76.3 dBA L_8 at 20 feet. Trucks would arrive on site and maneuver their trailers so that trailers would be parked within the loading docks. During this process, noise levels are associated with the truck engine noise, air brakes, and back-up alarms while the truck is backing into the dock. These noise levels would occur for a shorter period of time (less than 5 minutes). After a truck enters the loading dock, the doors would be closed, and the remainder of the truck loading activities would be enclosed and therefore much less perceptible. Consistent with the *Traffic Impact Analysis for Massachusetts Point Project* (EPD Solutions, Inc. 2025), it is assumed that truck arrivals and departure activities could occur at 32 spaces (16 at each building) for a period of less than 5 minutes each.

Truck Loading and Unloading Activities

Noise levels taken by LSA for delivery trucks being loaded and unloaded for a similar type of project (*Operational Noise Impact Analysis for Richmond Wholesale Meat Distribution Center* [LSA 2016]), generated a noise level of 75 dBA L_{eq} at 20 feet. Noise levels generated by delivery trucks being loaded and unloaded for the proposed project are also assumed to be 75 dBA L_{eq} at 20 feet because they are similar types of projects. Based on prior analysis experience, it is reasonable to assume that unloading activities could occur at half of the total docks (20 docks) simultaneously for a period of 30 minutes in a given hour.

Cumulative Operations Noise Assessment

The results in Tables O and P show that the noise levels at the closest sensitive use to the north of the project site would experience noise level impacts that would not exceed the residential use daytime and nighttime noise standards of 55 dBA L_{eq} and 45 dBA L_{eq}, respectively. A graphic representation of the operational noise impacts is presented in Appendix D. Therefore, the impact would be less than significant, and no noise reduction measures are required.

Table O: Daytime Exterior Noise Level Impacts

Receptor	Direction	Existing Quietest Daytime Noise Level (dBA L_{eq})	Project-Generated Noise Levels (dBA L_{eq})	Potential Operational Noise Impact?[1]
Residence	East	60.8	53.2	No

Source: Compiled by LSA (2025)

[1] A potential operational noise impact would occur if (1) the quietest daytime ambient hour is less than 55 dBA L_{eq} and project noise impacts are greater than 55 dBA L_{eq}, OR (2) the quietest daytime ambient hour is greater than 55 dBA L_{eq} and project noise impacts are 3 dBA greater than the quietest daytime ambient hour.

dBA = A-weighted decibels

L_{eq} = equivalent continuous noise level

Table P: Nighttime Exterior Noise Level Impacts

Receptor	Direction	Existing Quietest Nighttime Noise Level (dBA L_{eq})	Project-Generated Noise Levels (dBA L_{eq})	Potential Operational Noise Impact?[1]
Residence	East	54.2	53.1	No

Source: Compiled by LSA (2025).

[1] A potential operational noise impact would occur if (1) the quietest nighttime ambient hour is less than 45 dBA L_{eq} and project noise impacts are greater than 45 dBA L_{eq}, OR (2) the quietest nighttime ambient hour is greater than 45 dBA L_{eq} and project noise impacts are 3 dBA greater than the quietest nighttime ambient hour.

dBA = A-weighted decibels

L_{eq} = equivalent continuous noise level

REFERENCES

California Department of Transportation (Caltrans). 2013. *Technical Noise Supplement to the Traffic Noise Analysis Protocol.* September.

City of Riverside. 2018. *General Plan Noise Element*. February.

_____. 2024. Municipal Code. December 6. Website https://library.municode.com/ca/riverside/codes/code_of_ordinances (accessed March 2025).

County of Riverside. 2004. *Riverside County Airport Land Use Compatibility Plan Policy Document*. December.

_____. 2005. *Riverside County ALUCP – West County Airports Background Data*. March.

EPD Solutions, Inc. 2025. *Traffic Impact Analysis for Massachusetts Point Project.* February 3.

Federal Highway Administration (FHWA). 2006. *Roadway Construction Noise Model User's Guide.* January. Washington, D.C. Website: www.fhwa.dot.gov/environment/noise/construction_noise/rcnm/rcnm.pdf (accessed March 2025).

Federal Transit Administration (FTA). 2018. *Transit Noise and Vibration Impact Assessment Manual*. Office of Planning and Environment. Report No. 0123. September.

LSA Associates, Inc. (LSA). 2016. *Operational Noise Impact Analysis for Richmond Wholesale Meat Distribution Center*. May.

Mead & Hunt. 2014. *March Air Reserve Base/Inland Port Airport Land Use Compatibility Plan*.

Trane. n.d. *Fan Performance – Product Specifications RT-PRC023AU-EN.*

APPENDIX A

NOISE MONITORING DATA

Noise Measurement Survey – 24 HR

Project Number: ESL2201.103
Project Name: Massachusetts Point Whse.

Test Personnel: Corey Knips
Equipment: LD Spark 706RC (SN: 17206)

Site Number: LT-1 Start Date: 2/3/2025

Time: From 1:00 p.m. To 1:00 p.m.

Site Location: 2053 Roberta Street, Riverside. In a tree on the southeast corner of the property, approximately 27 feet from the Roberta Street centerline.

Primary Noise Sources: Light traffic on Roberta Street and industrial activity (such as truck activity) across the street to the south.

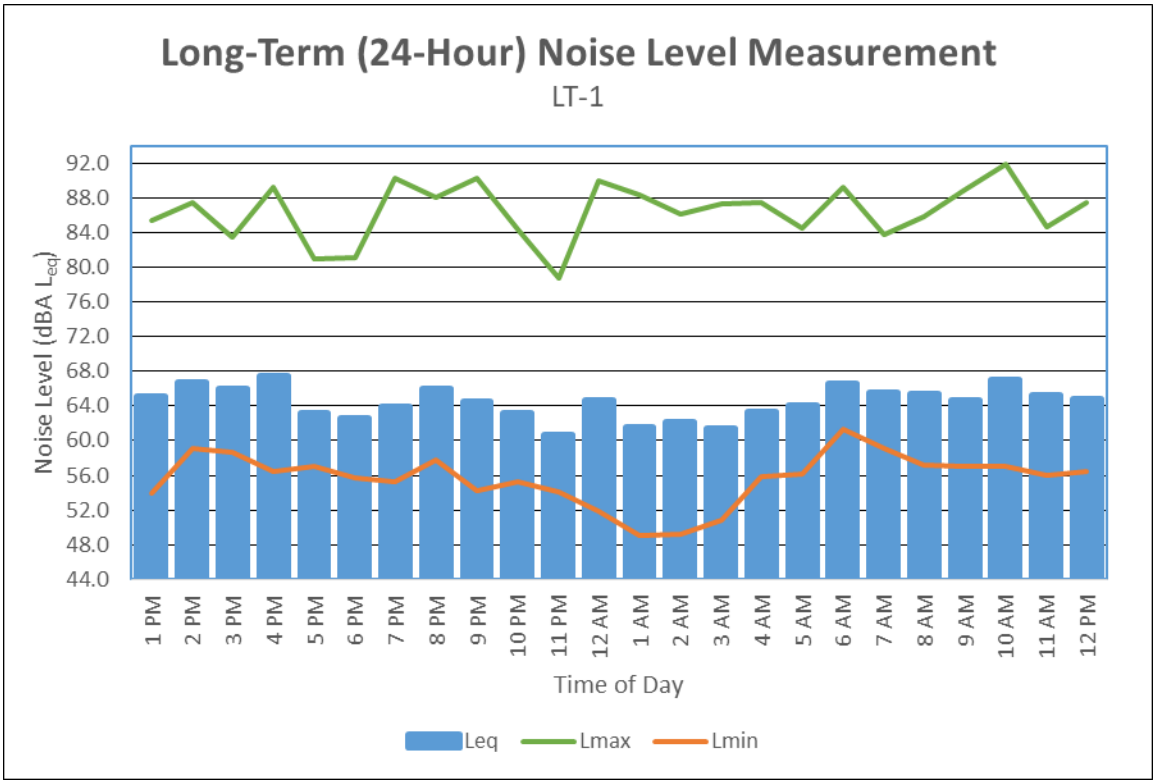
Comments: Home was abandoned and partially demolished.

Photo:

Long-Term (24-Hour) Noise Level Measurement Results at LT-1

Start Time	Date	Noise Level (dBA)		
		L_{eq}	L_{max}	L_{min}
1:00 PM	2/3/2025	65.1	85.4	53.9
2:00 PM	2/3/2025	66.7	87.5	59.1
3:00 PM	2/3/2025	66.0	83.5	58.6
4:00 PM	2/3/2025	67.4	89.2	56.5
5:00 PM	2/3/2025	63.2	81.0	57.1
6:00 PM	2/3/2025	62.6	81.1	55.7
7:00 PM	2/3/2025	64.0	90.2	55.2
8:00 PM	2/3/2025	66.0	88.1	57.8
9:00 PM	2/3/2025	64.4	90.3	54.2
10:00 PM	2/3/2025	63.2	84.4	55.3
11:00 PM	2/3/2025	60.7	78.8	54.1
12:00 AM	2/4/2025	64.6	89.9	51.9
1:00 AM	2/4/2025	61.6	88.4	49.1
2:00 AM	2/4/2025	62.2	86.1	49.2
3:00 AM	2/4/2025	61.4	87.3	50.9
4:00 AM	2/4/2025	63.4	87.5	55.9
5:00 AM	2/4/2025	64.0	84.5	56.2
6:00 AM	2/4/2025	66.5	89.2	61.3
7:00 AM	2/4/2025	65.5	83.8	59.1
8:00 AM	2/4/2025	65.4	85.8	57.2
9:00 AM	2/4/2025	64.7	88.9	57.1
10:00 AM	2/4/2025	67.1	91.8	57.1
11:00 AM	2/4/2025	65.2	84.6	56.0
12:00 PM	2/4/2025	64.8	87.5	56.5

Source: Compiled by LSA Associates, Inc. (2025).
dBA = A-weighted decibel
L_{eq} = equivalent continuous sound level
L_{max} = maximum instantaneous noise level
L_{min} = minimum measured sound level



Noise Measurement Survey – 24 HR

Project Number: ESL2201.103
Project Name: Massachusetts Point Whse.

Test Personnel: Corey Knips
Equipment: LD Spark 706RC (SN: 17814)

Site Number: LT-2 Start Date: 2/3/2025

Time: From 1:00 p.m. To 1:00 p.m.

Site Location: South side of the project side, on a utility pole. Approximately 34 feet from the Massachusetts Avenue centerline.

Primary Noise Sources: Light traffic on Massachusetts Avenue and industrial activity (such as truck and forklift activity) across the street to the south.

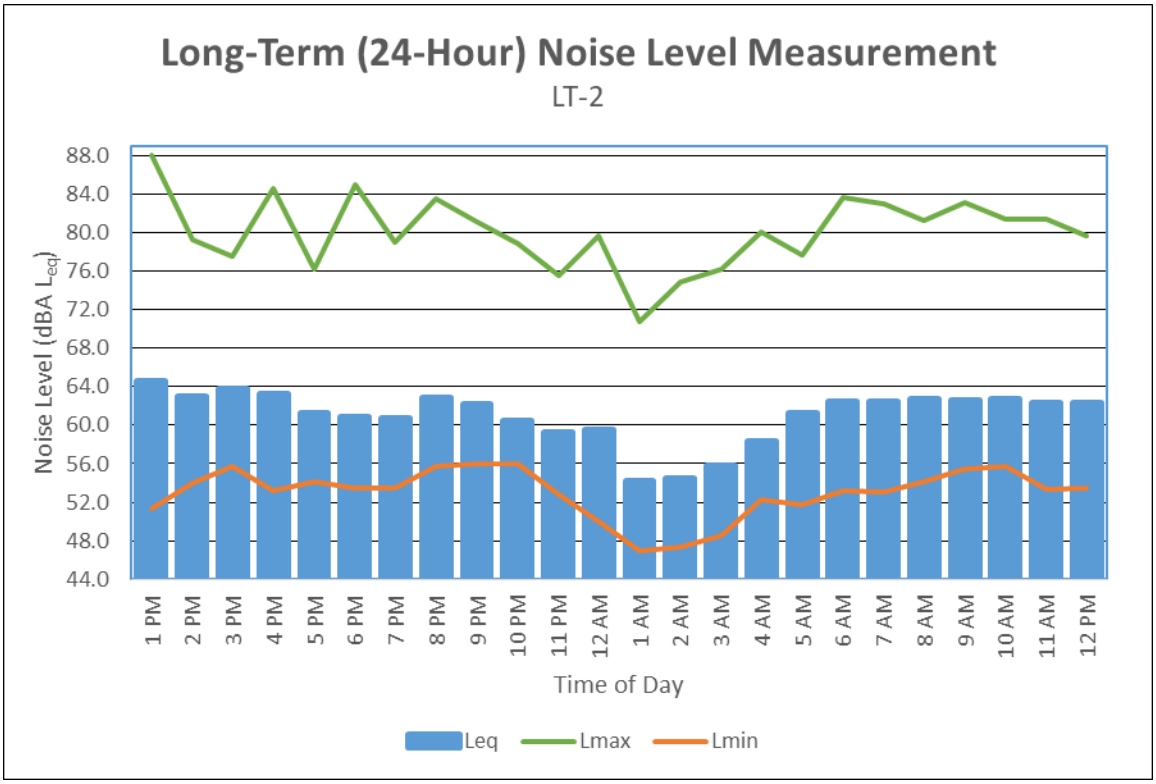
Comments:

Photo:

Long-Term (24-Hour) Noise Level Measurement Results at LT-2

Start Time	Date	Noise Level (dBA)		
		L_{eq}	L_{max}	L_{min}
1:00 PM	2/3/2025	64.5	88.0	51.3
2:00 PM	2/3/2025	62.9	79.2	54.0
3:00 PM	2/3/2025	63.7	77.5	55.7
4:00 PM	2/3/2025	63.3	84.6	53.2
5:00 PM	2/3/2025	61.2	76.2	54.1
6:00 PM	2/3/2025	60.8	84.9	53.5
7:00 PM	2/3/2025	60.8	79.0	53.5
8:00 PM	2/3/2025	62.9	83.5	55.7
9:00 PM	2/3/2025	62.2	81.1	56.0
10:00 PM	2/3/2025	60.5	78.8	56.0
11:00 PM	2/3/2025	59.2	75.5	52.8
12:00 AM	2/4/2025	59.5	79.6	50.0
1:00 AM	2/4/2025	54.2	70.7	47.0
2:00 AM	2/4/2025	54.5	74.9	47.3
3:00 AM	2/4/2025	55.8	76.2	48.5
4:00 AM	2/4/2025	58.4	80.0	52.3
5:00 AM	2/4/2025	61.3	77.7	51.8
6:00 AM	2/4/2025	62.5	83.6	53.2
7:00 AM	2/4/2025	62.4	83.0	53.1
8:00 AM	2/4/2025	62.7	81.3	54.2
9:00 AM	2/4/2025	62.5	83.1	55.5
10:00 AM	2/4/2025	62.8	81.4	55.7
11:00 AM	2/4/2025	62.3	81.4	53.3
12:00 PM	2/4/2025	62.4	79.7	53.5

Source: Compiled by LSA Associates, Inc. (2025).
dBA = A-weighted decibel
L_{eq} = equivalent continuous sound level
L_{max} = maximum instantaneous noise level
L_{min} = minimum measured sound level



APPENDIX B

CONSTRUCTION NOISE LEVEL CALCULATIONS

Construction Calculations

Phase: Demolition

Equipment	Quantity	Reference (dBA) 50 ft Lmax	Usage Factor[1]	Distance to Receptor (ft)	Ground Effects	Noise Level (dBA) Lmax	Leq
Concrete Saw	1	90	20	50	0.5	90	83
Excavator	3	81	40	50	0.5	81	82
Dozer	2	82	40	50	0.5	82	81
					Combined at 50 feet	**91**	**87**
					Combined at Receptor 435 feet	**72**	**68**

Phase: Site Preparation

Equipment	Quantity	Reference (dBA) 50 ft Lmax	Usage Factor[1]	Distance to Receptor (ft)	Ground Effects	Noise Level (dBA) Lmax	Leq
Tractor	4	84	40	50	0.5	84	86
Dozer	3	82	40	50	0.5	82	83
					Combined at 50 feet	**86**	**88**
					Combined at Receptor 435 feet	**67**	**69**
					Combined at Receptor 450 feet	**67**	**69**
					Combined at Receptor 500 feet	**66**	**68**
					Combined at Receptor 530 feet	**66**	**67**

Phase: Grading

Equipment	Quantity	Reference (dBA) 50 ft Lmax	Usage Factor[1]	Distance to Receptor (ft)	Ground Effects	Noise Level (dBA) Lmax	Leq
Grader	1	85	40	50	0.5	85	81
Dozer	1	82	40	50	0.5	82	78
Tractor	2	84	40	50	0.5	84	83
Scraper	2	84	40	50	0.5	84	83
Excavator	2	81	40	50	0.5	81	80
					Combined at 50 feet	**90**	**88**
					Combined at Receptor 435 feet	**72**	**70**
					Combined at Receptor 450 feet	**71**	**69**
					Combined at Receptor 500 feet	**70**	**68**
					Combined at Receptor 530 feet	**70**	**68**

Phase:Building Construction

Equipment	Quantity	Reference (dBA) 50 ft Lmax	Usage Factor[1]	Distance to Receptor (ft)	Ground Effects	Noise Level (dBA) Lmax	Leq
Man Lift	3	75	20	50	0.5	75	73
Crane	1	81	16	50	0.5	81	73
Generator	1	81	50	50	0.5	81	78
Tractor	3	84	40	50	0.5	84	85
Welder / Torch	1	74	40	50	0.5	74	70
					Combined at 50 feet	**87**	**86**
					Combined at Receptor 435 feet	**69**	**67**

Phase: Paving

Equipment	Quantity	Reference (dBA) 50 ft Lmax	Usage Factor[1]	Distance to Receptor (ft)	Ground Effects	Noise Level (dBA) Lmax	Leq
Paver	2	77	50	50	0.5	77	77
Roller	2	80	20	50	0.5	80	76
All Other Equipment > 5 HP	2	85	50	50	0.5	85	85
					Combined at 50 feet	**87**	**86**
					Combined at Receptor 435 feet	**68**	**67**

Phase:Architectural Coating

Equipment	Quantity	Reference (dBA) 50 ft Lmax	Usage Factor[1]	Distance to Receptor (ft)	Ground Effects	Noise Level (dBA) Lmax	Leq
Compressor (air)	1	78	40	50	0.5	78	74
					Combined at 50 feet	**78**	**74**
					Combined at Receptor 435 feet	**59**	**55**

Sources: RCNM

[1]- Percentage of time that a piece of equipment is operating at full power.

dBA – A-weighted Decibels
Lmax- Maximum Level
Leq- Equivalent Level

Construction Traffic Noise Calculator

Construction Phase	One-Way Worker Trip/Day	One Way Vendor Trip/Day	One Way Hauling Trip Number	Total
Demolition	15	0	311	326
Site Preparation	17.5	0	0	17.5
Grading	20	0	37.7	57.7
Building Construction	83.9	32.8	0	116.7
Paving	15	0	0	15
Architectural Coating	16.8	0	0	16.8
Maximum				**117**

Phase Number	Phase Name	Number of Days
1	Demolition	20
2	Site Preparation	10
3	Grading	30
4	Building Construction	200
5	Paving	20
6	Architectural Coating	35

Speed	MT Factor	HT Factor
25	12.6	39.8
30	8.9	26.3
35	7.1	19.1
40	5.8	15.1
45	5	12.9
50	4.5	11.5
	4.1	10.4
55	3.7	9.6
60	3.5	8.9
65	10.8	23

Roadway	Speed	Existing Volume	MT Factor	HT Factor
Massachusetts Avenue	35	1,110	7.1	19.1

	Worker Trip/Day	Vendor Trip/Day	Hauling Trip Number	Total	Overlap?
Demolition	**15**	**0**	**5,941**	5956	
Site Preparation	**18**	**0**	**0**	18	
Grading	**20**	**0**	**721**	741	
Building Construction	**84**	**430**	**0**	514	
Paving	**15**	**0**	**0**	15	
Architectural Coating	**17**	**0**	**0**	17	

Overlap? **N**
Total Equivalent Vehicles **5,956**
Noise Increase (dBA) **8.0**

Chosen Phase **Building Construction**
Total Equivalent Vehicles **514**
Noise Increase (dBA) **1.7**

APPENDIX C

FHWA TRAFFIC NOISE MODEL PRINTOUTS

TABLE Existing -01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/27/2025
ROADWAY SEGMENT: Roberta Street East of Kansas Street
NOTES: Massachusetts Point - Existing

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 2290 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 15 SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 57.50

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL	70 CNEL	65 CNEL	60 CNEL	55 CNEL
	0.0	0.0	0.0	113.4

TABLE Existing -02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/27/2025
ROADWAY SEGMENT: Kansas Street South of Roberta Street
NOTES: Massachusetts Point - Existing

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 2300 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 15 SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 57.52

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	113.9

TABLE Existing -03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/27/2025
ROADWAY SEGMENT: Kansas Street South of Massachusetts Avenue
NOTES: Massachusetts Point - Existing

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 3490 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 25 SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 58.84

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	59.6	172.9

TABLE Existing -04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/27/2025
ROADWAY SEGMENT: Massachusetts Avenue East of Kansas Street
NOTES: Massachusetts Point - Existing

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1110 SPEED (MPH): 30 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES			
	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 15 SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 52.75

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	0.0

TABLE Existing -05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/27/2025
ROADWAY SEGMENT: Massachusetts Avenue East of Chicago Avenue
NOTES: Massachusetts Point - Existing

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 390 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 15 SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 49.81

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	0.0

TABLE Existing -06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/27/2025
ROADWAY SEGMENT: Chicago Avenue North of Massachusetts Avenue
NOTES: Massachusetts Point - Existing

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 18730 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 25 SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.56

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	129.8	403.4	1273.3

TABLE Existing -07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/27/2025
ROADWAY SEGMENT: Chicago Avenue between Massachusetts Avenue and 3rd Street
NOTES: Massachusetts Point - Existing

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 18730 SPEED (MPH): 40 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 25 SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.56

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	129.8	403.4	1273.3

TABLE Existing -08
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/27/2025
ROADWAY SEGMENT: Chicago Avenue South of 3rd Street
NOTES: Massachusetts Point - Existing

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 17760 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 25 SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.32

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL	70 CNEL	65 CNEL	60 CNEL	55 CNEL
	0.0	123.3	382.6	1207.4

TABLE Existing -09
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/27/2025
ROADWAY SEGMENT: 3rd Street West of Chicago Street
NOTES: Massachusetts Point - Existing

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 14210 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 25 SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.36

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	99.8	306.5	966.2

TABLE Existing -10
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/27/2025
ROADWAY SEGMENT: 3rd Street East of Chicago Street
NOTES: Massachusetts Point - Existing

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 17850 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 25 SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.35

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	123.9	384.5	1213.5

TABLE Existing With Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/27/2025
ROADWAY SEGMENT: Roberta Street East of Kansas Street
NOTES: Massachusetts Point - Existing With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 2330 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 15 SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 57.57

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	115.4

TABLE Existing With Project-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/27/2025
ROADWAY SEGMENT: Kansas Street South of Roberta Street
NOTES: Massachusetts Point - Existing With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 2340 SPEED (MPH): 35 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 15 SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 57.59

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	115.9

TABLE Existing With Project-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/27/2025
ROADWAY SEGMENT: Kansas Street South of Massachusetts Avenue
NOTES: Massachusetts Point - Existing With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 3550 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 25 SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 58.91

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	60.4	175.8

TABLE Existing With Project-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/27/2025
ROADWAY SEGMENT: Massachusetts Avenue East of Kansas Street
NOTES: Massachusetts Point - Existing With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1550 SPEED (MPH): 30 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 15 SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 54.20

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	54.6

TABLE Existing With Project-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/27/2025
ROADWAY SEGMENT: Massachusetts Avenue East of Chicago Avenue
NOTES: Massachusetts Point - Existing With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 400 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES			
	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 15 SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 49.92

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	0.0

TABLE Existing With Project-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/27/2025
ROADWAY SEGMENT: Chicago Avenue North of Massachusetts Avenue
NOTES: Massachusetts Point - Existing With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 18740 SPEED (MPH): 40 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 25 SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.56

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	129.8	403.6	1274.0

TABLE Existing With Project-07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/27/2025
ROADWAY SEGMENT: Chicago Avenue between Massachusetts Avenue and 3rd Street
NOTES: Massachusetts Point - Existing With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 19450 SPEED (MPH): 40 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 25 SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.72

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	134.6	418.8	1322.3

TABLE Existing With Project-08
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/27/2025
ROADWAY SEGMENT: Chicago Avenue South of 3rd Street
NOTES: Massachusetts Point - Existing With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 17770 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 25 SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.33

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	123.4	382.8	1208.1

TABLE Existing With Project-09
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/27/2025
ROADWAY SEGMENT: 3rd Street West of Chicago Street
NOTES: Massachusetts Point - Existing With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 14210 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 25 SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.36

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	99.8	306.5	966.2

TABLE Existing With Project-10
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/27/2025
ROADWAY SEGMENT: 3rd Street East of Chicago Street
NOTES: Massachusetts Point - Existing With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 18710 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 25 SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.55

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	129.6	403.0	1272.0

TABLE Background (Year 2027)-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/27/2025
ROADWAY SEGMENT: Roberta Street East of Kansas Street
NOTES: Massachusetts Point - Background (Year 2027)

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 2380 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 15 SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 57.67

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	117.8

TABLE Background (Year 2027)-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/27/2025
ROADWAY SEGMENT: Kansas Street South of Roberta Street
NOTES: Massachusetts Point - Background (Year 2027)

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 2390 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 15 SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 57.69

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	118.3

TABLE Background (Year 2027)-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/27/2025
ROADWAY SEGMENT: Kansas Street South of Massachusetts Avenue
NOTES: Massachusetts Point - Background (Year 2027)

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 3730 SPEED (MPH): 35 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 25 SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 59.13

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	63.0	184.5

TABLE Background (Year 2027)-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/27/2025
ROADWAY SEGMENT: Massachusetts Avenue East of Kansas Street
NOTES: Massachusetts Point - Background (Year 2027)

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1260 SPEED (MPH): 30 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 15 SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 53.30

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL	70 CNEL	65 CNEL	60 CNEL	55 CNEL
	0.0	0.0	0.0	0.0

TABLE Background (Year 2027)-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/27/2025
ROADWAY SEGMENT: Massachusetts Avenue East of Chicago Avenue
NOTES: Massachusetts Point - Background (Year 2027)

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 400 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 15 SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 49.92

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	0.0

TABLE Background (Year 2027)-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/27/2025
ROADWAY SEGMENT: Chicago Avenue North of Massachusetts Avenue
NOTES: Massachusetts Point - Background (Year 2027)

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 21060 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 25 SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 68.06

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	145.3	453.4	1431.7

TABLE Background (Year 2027)-07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/27/2025
ROADWAY SEGMENT: Chicago Avenue between Massachusetts Avenue and 3rd Street
NOTES: Massachusetts Point - Background (Year 2027)

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 20850 SPEED (MPH): 40 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 25 SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 68.02

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	143.9	448.9	1417.4

TABLE Background (Year 2027)-08
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/27/2025
ROADWAY SEGMENT: Chicago Avenue South of 3rd Street
NOTES: Massachusetts Point - Background (Year 2027)

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 20680 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 25 SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.99

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	142.8	445.2	1405.9

TABLE Background (Year 2027)-09
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/27/2025
ROADWAY SEGMENT: 3rd Street West of Chicago Street
NOTES: Massachusetts Point - Background (Year 2027)

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 19960 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 25 SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.83

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	138.0	429.8	1356.9

TABLE Background (Year 2027)-10
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/27/2025
ROADWAY SEGMENT: 3rd Street East of Chicago Street
NOTES: Massachusetts Point - Background (Year 2027)

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 23910 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 25 SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 68.62

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
57.2	164.4	514.5	1625.2

TABLE Background With Project (Year 2027)-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/27/2025
ROADWAY SEGMENT: Roberta Street East of Kansas Street
NOTES: Massachusetts Point - Background With Project (Year 2027)

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 2420 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 15 SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 57.74

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	119.8

TABLE Background With Project (Year 2027)-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/27/2025
ROADWAY SEGMENT: Kansas Street South of Roberta Street
NOTES: Massachusetts Point - Background With Project (Year 2027)

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 2430 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 15 SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 57.76

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	120.2

TABLE Background With Project (Year 2027)-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/27/2025
ROADWAY SEGMENT: Kansas Street South of Massachusetts Avenue
NOTES: Massachusetts Point - Background With Project (Year 2027)

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 3790 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 25 SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 59.20

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	63.9	187.5

TABLE Background With Project (Year 2027)-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/27/2025
ROADWAY SEGMENT: Massachusetts Avenue East of Kansas Street
NOTES: Massachusetts Point - Background With Project (Year 2027)

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1700 SPEED (MPH): 30 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 15 SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 54.60

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	59.5

TABLE Background With Project (Year 2027)-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/27/2025
ROADWAY SEGMENT: Massachusetts Avenue East of Chicago Avenue
NOTES: Massachusetts Point - Background With Project (Year 2027)

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 410 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 15 SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 50.03

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	0.0

TABLE Background With Project (Year 2027)-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/27/2025
ROADWAY SEGMENT: Chicago Avenue North of Massachusetts Avenue
NOTES: Massachusetts Point - Background With Project (Year 2027)

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 21070 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 25 SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 68.07

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	145.4	453.6	1432.4

TABLE Background With Project (Year 2027)-07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/27/2025
ROADWAY SEGMENT: Chicago Avenue between Massachusetts Avenue and 3rd Street
NOTES: Massachusetts Point - Background With Project (Year 2027)

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 21720 SPEED (MPH): 40 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 25 SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 68.20

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	149.8	467.6	1476.5

TABLE Background With Project (Year 2027)-08
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/27/2025
ROADWAY SEGMENT: Chicago Avenue South of 3rd Street
NOTES: Massachusetts Point - Background With Project (Year 2027)

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 20690 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 25 SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.99

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	142.9	445.5	1406.5

TABLE Background With Project (Year 2027)-09
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/27/2025
ROADWAY SEGMENT: 3rd Street West of Chicago Street
NOTES: Massachusetts Point - Background With Project (Year 2027)

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 19960 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 25 SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.83

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	138.0	429.8	1356.9

TABLE Background With Project (Year 2027)-10
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/27/2025
ROADWAY SEGMENT: 3rd Street East of Chicago Street
NOTES: Massachusetts Point - Background With Project (Year 2027)

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 24770 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 25 SITE CHARACTERISTICS: HARD

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 68.77

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
58.8	170.2	533.0	1683.7

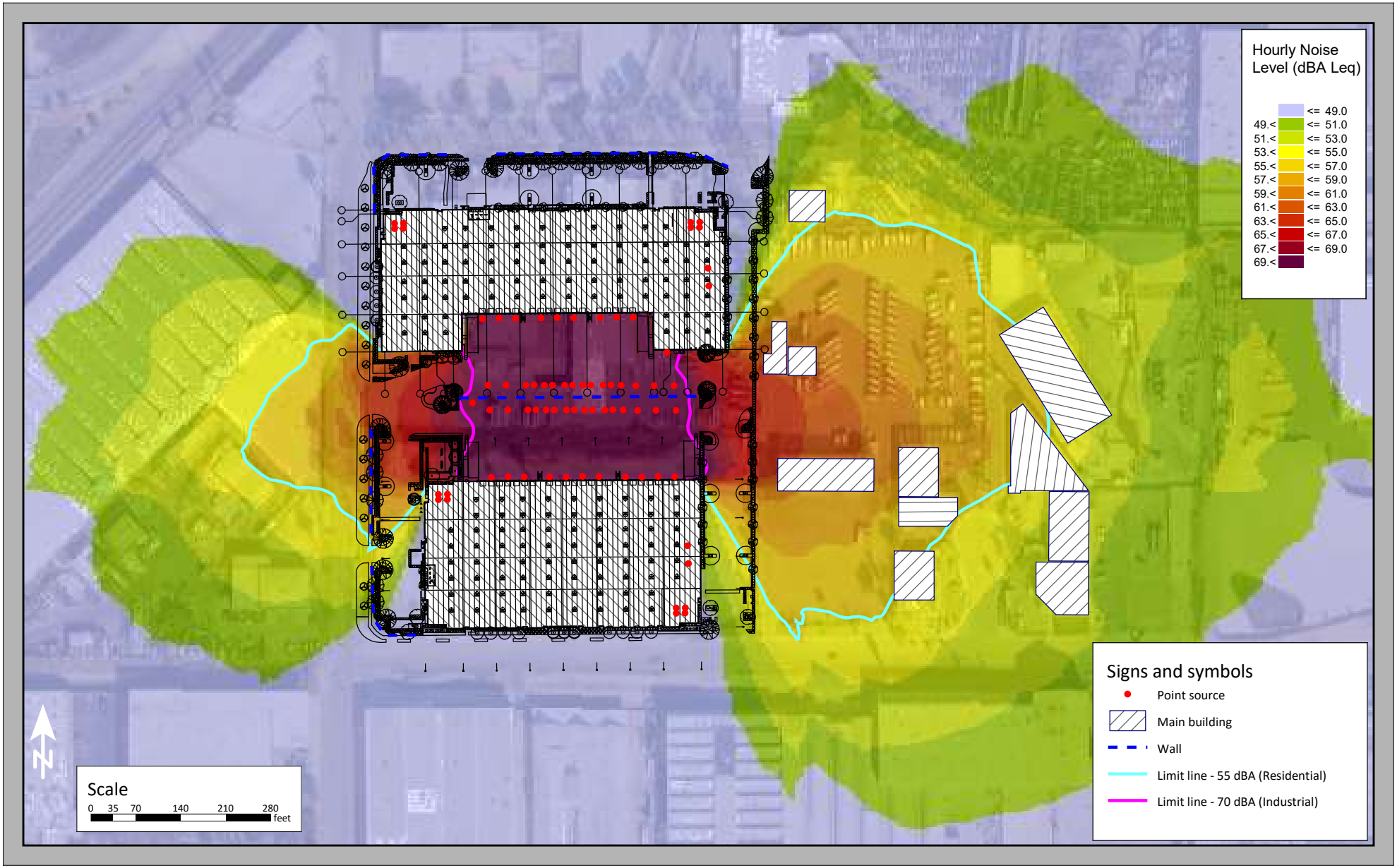
APPENDIX D

OPERATIONAL NOISE LEVEL CALCULATIONS

Massachusetts Point Warehouse

Project No. ESL2201.103

Project Operational Noise Levels - Daytime

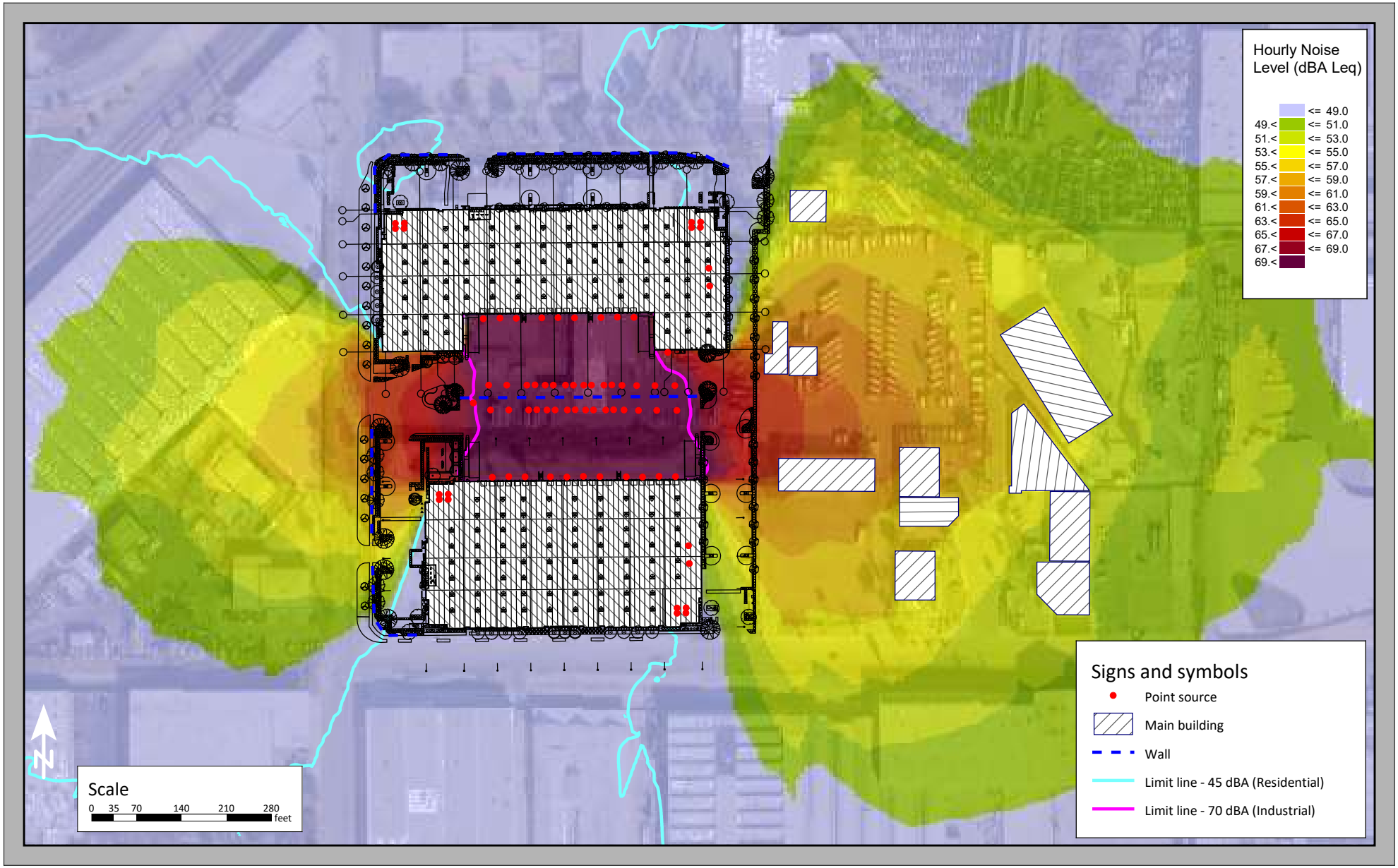


C:\Users\MAbushanab\OneDrive - LSA Associates\Documents\Desktop\SoundPLAN\ESL2201.103 - Massachusetts Pt Warehouse\Day.sgs - last edit 5/16/2025

Massachusetts Point Warehouse

Project No. ESL2201.103

Project Operational Noise Levels - Night



C:\Users\MAbushanab\OneDrive - LSA Associates\Documents\Desktop\SoundPLAN\ESL2201.103 - Massachusetts Pt Warehouse\Night.sgs - last edit 5/16/2025