

Highland East Industrial Warehouse

Noise Impact Analysis Report

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Table of Contents

EXECUTIVE SUMMARY	I
1 INTRODUCTION	1-1
1.1 Report Organization	1-1
2 PROJECT DESCRIPTION	2-1
2.1 Project Location.....	2-1
2.1.1 Site Land Use and Zoning.....	2-1
2.1.2 Surrounding Land Uses.....	2-1
2.2 Existing Site Description and Operations	2-3
2.3 Proposed Site Development and Operations	2-3
2.3.1 Site Layout and Building Description.....	2-5
2.3.2 Site Access and parking.....	2-5
2.3.3 Project Operations.....	2-5
2.4 Project Construction	2-7
3 NOISE AND VIBRATION FUNDAMENTALS.....	3-1
3.1 Defining Noise.....	3-1
3.1.1 Sound Production.....	3-1
3.1.2 Measuring Sound	3-1
3.1.3 Characterizing Sound.....	3-2
3.1.4 Sound Propagation.....	3-4
3.1.5 Noise Effects on Humans.....	3-4
3.1.6 Ground-borne Vibration and Noise.....	3-5
4 ENVIRONMENTAL AND REGULATORY SETTING	4-1
4.1 Project Location and Site Description.....	4-1
4.2 Existing Noise Environment.....	4-1
4.2.1 Ambient Noise Levels At Project Site	4-1
4.2.2 Noise Sensitive Receptors	4-7
4.3 Federal, State, and Local Noise Regulations	4-7
4.3.1 Federal Noise and Vibration Regulations	4-7
4.3.2 State Noise and Vibration REgulations	4-7
4.3.3 California Department of Transportation	4-8
4.3.4 Local Noise Regulations.....	4-9
5 NOISE IMPACT ANALYSIS	5-1
5.1 Thresholds of Significance	5-1
5.2 Noise Impact Analysis Methodology.....	5-1
5.2.1 Construction Noise and Vibration	5-1
5.2.2 Operational Noise.....	5-4
5.2.3 Ground-borne Vibration.....	5-6
5.3 Temporary Construction Noise and Vibration IMpacts	5-8
5.3.1 Temporary Construction Noise Levels	5-8
5.3.2 Temporary Construction Vibration Levels	5-10
5.4 Operational Noise IMpacts	5-12
5.4.1 On-Site Noise Generation Analysis	5-12
5.4.2 Off-Site Operational Noise Levels	5-18

5.5 Airport-Related Noise	5-18
6 OTHER NOISE AND VIBRATION EFFECTS.....	6-1
6.1 Review Standards	6-1
6.2 Land Use Compatibility – Exterior Noise Exposure	6-1
6.3 Interior Noise Level Compatibility	6-1
7 REPORT PREPARERS AND REFERENCES.....	7-1
7.1 References	7-1

List of Tables

Table 2-1: Summary of Land Uses Surrounding the Project Site.....	2-3
Table 2-2: Project Trip Generation Rates	2-6
Table 2-3: Project Construction Activity, Duration, and Typical Equipment	2-7
Table 3-1: Typical Noise Levels	3-3
Table 4-1: Summary of Measured Long-Term Ambient Noise Levels Near Project Site (dBA)	4-4
Table 4-2: Summary of Measured Short-Term Ambient Noise Levels at and near Project Site.....	4-4
Table 4-3: Measured Short-Term Ambient Noise Levels At Typical Warehouse (dBA)	4-6
Table 4-4: Vibration Threshold Criteria for Building Damage.....	4-8
Table 4-5: Vibration Threshold Criteria for Human Response	4-8
Table 4-6: City of Highland Interior Noise Standards.....	4-14
Table 4-7: City of Highland Exterior Noise Standards.....	4-14
Table 4-8: Community Noise and Land Use Compatibility Guidelines.....	4-15
Table 5-1: Modeled Construction Noise Receptors	5-2
Table 5-2: Distance Between Construction Work Areas and Modeled Noise Receptors	5-4
Table 5-3: Project Noise Source – Reference and Hourly L_{eq} Noise Levels	5-7
Table 5-4: Potential Ground-borne Vibration Levels	5-7
Table 5-5: Construction Noise Levels at Modeled Noise Receptors	5-8
Table 5-6: Summary of Predicted Construction Vibration Levels.....	5-11
Table 5-7: Summary of Distance Between Project Noise Source and Property Line Receptors.....	5-14
Table 5-8: Comparison of Project Noise Levels to County Exterior Stationary Noise Standards.....	5-15
Table 5-9: Project Consistency with Applicable General Plan Noise Policies	5-16

List of Figures

Figure 2-1: Aerial View of Project Site	2-2
Figure 2-2: Site Plan	2-4
Figure 4-1: Ambient Noise Monitoring Locations	4-3
Figure 5-1: Modeled Construction Noise Receptors	5-3
Figure 5-2: Operational Noise Sources and Property Line Receptor Locations.....	5-13

Appendices

Appendix A: Ambient Noise Monitoring Data
Appendix B: Construction Noise and Vibration Estimates
Appendix C: Operational Noise Level Estimates

List of Acronyms, Abbreviations, and Symbols	
Acronym / Abbreviation	Full Phrase or Description
ADA	Americans with Disabilities Act
ALUC	Airport Land Use Commission
ALUCP	Airport Land Use Compatibility Plan
APN	Assessor's Parcel Number
CalEEMod	California Emission Estimator Model
CALGreen	California Green Building Standards Code
Caltrans	California Department of Transportation
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
D	Distance
dB	Decibel (unweighted)
dBA	Decibels, A-Weighted
DNL / L _{dn}	Day-Night Noise Level
FHWA	Federal Highway Works Administration
FTA	Federal Transit Administration
HUD	U.S. Department of Housing and Urban Development
HVAC	Heating, Ventilation, and Air Conditioning
Hz	Hertz
I	Interstate
In/sec	Inches per Second
kH	Kilohertz
L _{eq}	Average / Equivalent Noise Level
L _{max}	Maximum Noise Level
L _{min}	Minimum Noise Level
LT	Long-term
MEP	Mechanical, Electrical, and Plumbing
MPH	Miles per Hour
OITC	Outside-Indoor Transmission Class
OPR	Office of Planning and Research
Pa	Pascals
PCE	Passenger Car Equivalents
PRC	Public Resources Code

List of Acronyms, Abbreviations, and Symbols	
Acronym / Abbreviation	Full Phrase or Description
PPV	Peak Particle Velocity (inches/second)
R	Receiver
RCNM	Roadway Construction Noise Model
ROW	Right-of-Way
Report	Noise and Vibration Impact Analysis Report (this document)
SBIAA	San Bernardino International Airport Authority
ST	Short-term
STC	Sound Transmission Class
UF	Usage Factor
VdB	Velocity Decibels
§	Section
%	Percent

EXECUTIVE SUMMARY

This Noise Impact Analysis Report (“**Report**”) evaluates and documents noise levels associated with the construction and operation of the proposed CHIPT Highland 2010, L.P., Highland West Industrial Building Project (proposed “**Project**”) at the southeast corner of the intersection of West 5th Street and Central Avenue, in the southwest part of the City of Highland, San Bernardino County, California 92346.

This Report is intended to assist the California Environmental Quality Act (“**CEQA**”) Lead Agency (City of Highland) with its review of the proposed Project’s potential noise and vibration impacts in compliance with the State CEQA Statutes and Guidelines, particularly in respect to the noise and vibration issues identified in Appendix G of the State CEQA Guidelines.

S.1 PROPOSED PROJECT DESCRIPTION

CHIPT Highland 210, L.P is proposing to consolidate 11 parcels into 6 parcels, demolish four small existing structures, and construct a single new industrial warehouse building. The building would have approximately 146,670 square feet of warehousing use, which includes approximately 6,000 square feet of office space, on approximately 6.93 acres in the City of Highland. The proposed building would be located on an irregularly shaped property at the southeast corner of the intersection of West 5th Street and Central Avenue, approximately 0.4 miles north of San Bernardino International Airport (“**SBIA**”) and approximately 0.9 miles west of the Interstate 210.

The proposed warehouse building would be constructed in a north-south orientation and feature 21 truck docks on its eastern façade, set behind 10-foot-tall concrete screening walls. Truck access would be provided along West 5th Street, at the northeast corner of the site, and along East 3rd Street, at the southeast corner of the site. Onsite truck movements would occur along the eastern portion of the site. Parking spaces for commuter vehicles (e.g., cars and pick-up trucks) would be present on the east and west sides of the proposed warehouse.

The proposed Project would involve construction and operational activities that would generate noise from construction equipment, on- and off-site vehicle and truck trips, truck dock loading and unloading activities (including cargo handling equipment use), and heating, ventilation, and air conditioning (“**HVAC**”) equipment. Construction activities are anticipated to last approximately 13 months and could begin as early as 2023. The building could operate 24-hours per day, 7 days per week.

S.2 POTENTIAL CONSTRUCTION NOISE AND VIBRATION IMPACTS

The proposed Project’s construction noise and vibration levels were estimated using the Federal Highway Administration’s Roadway Construction Noise Model (“**RCNM**”), Version 1.1. The RCNM is a computer program that uses empirical data and sound propagation principles to predict noise levels associated with a variety of construction equipment and operations. The equipment assumptions used in this Report are based on, and consistent with, the CalEEMod construction phasing, equipment usage, and operating schedules used to evaluate the proposed Project’s potential construction air quality impacts (MIG, 2023).

The RCNM was used to model noise levels at 11 different receptor locations that could be impacted by the project’s construction noise levels. Construction noise was modeled to reflect both worst-case and typical construction noise levels. As estimated using the RCNM, the modeled worst-case construction noise level at any residential receptor location would be 81.8 dBA L_{eq} . This would occur at the

residence located adjacent to the northwest corner of the Project site, across West 5th Street, during the Project's grading phase. During typical construction periods, construction noise levels would not exceed 76 dBA L_{eq} at any residence on West 5th Street.

The City's Municipal Code does not establish numeric standards for construction noise levels (e.g., 90 dBA L_{eq}). Construction activities are exempt from the City's noise standards (Section 8.50.060.L) but are limited to the hours of 7 AM to 6 PM Monday thru Saturday by the City's General Plan (Goal 7.3, Action 1), with no construction activities performed during city or federal observed holidays (Section 15.48.020.A). Potential construction noise level increases at the sensitive residential and preschool land uses, when compared to the existing ambient noise environment, could range from less than 1.0 dBA L_{eq} to 16.6 dBA L_{eq} higher than existing conditions, depending on the construction activities undertaken. This temporary increase in daytime exterior noise levels would represent an approximate doubling to tripling of perceived loudness at sensitive receptor locations for a short duration (i.e., site preparation, grading, and paving activities would last approximately 3 months out of the Project's 12-month long construction schedule). The proposed Project would comply with the City Municipal Code's permissible construction activity time period requirements and would not result in prolonged temporary construction noise levels that exceed an applicable standard. This impact would be less than significant; however, to reduce the potential for construction activities to annoy sensitive residential receptors or otherwise result in a nuisance, MIG recommends the Project incorporate Best Management Practices (BMPs) to control potential construction noise levels. These BMPs would further reduce the less than significant nature of the Project's temporary construction noise levels and ensure temporary construction activities do not annoy or otherwise result in a nuisance at nearby residential areas.

Vibrational construction activities could take place as close as approximately 15 feet from commercial buildings and 120 feet from residential buildings. The use of a vibratory roller at these distances would have the potential to generate worst-case ground-borne vibration levels of approximately 0.368 inches per second peak particle velocity (in/sec PPV) at commercial buildings and 0.036 in/sec PPV at residential buildings, which would be perceptible per Caltrans' criteria for human annoyance from continuous vibration sources; however, at no point during construction would Project equipment generate groundborne vibration that has the potential to damage the structural integrity of any buildings near the Project site. Since the proposed Project would not generate vibration levels that would be perceptible to receptors for a prolonged amount of time or generate ground-borne vibration levels that would damage structures, it would not generate excessive ground-borne vibration or ground-borne noise levels. This impact would be less than significant.

S.3 POTENTIAL OPERATIONAL NOISE IMPACTS

Once constructed, the proposed Project would generate noise from on-site and off-site activities. On-site activities would include vehicle travel and parking, truck travel, maneuvering, and idling, HVAC equipment operations, and other miscellaneous activities such as refuse collection, small, electric-powered forklifts and pallet jacks, and landscaping equipment. Off-site noise activities would include vehicle travel on West 5th Street and East 3rd Street used to access the site.

The proposed Project could generate worst-case combined hourly noise levels of approximately 53.6 dBA L_{eq} at adjacent residential property lines and 62.5 dBA L_{eq} at adjacent commercial property lines. These noise levels would not exceed the City's exterior noise standard for residential (60 dBA L_{eq} daytime / 55 dBA L_{eq} nighttime) or commercial (70 dBA L_{eq} daytime / and 65 dBA L_{eq} nighttime) land uses, nor would the Project result in interior noise levels at any residential or commercial building that exceed City standards. This impact would be less than significant.

The proposed Project's design and estimated noise levels would be consistent with City's General Plan Noise Element policies pertaining to noise. The proposed Project's truck dock bays would be inset along the northern perimeter of the warehouse building, behind 8-foot-tall concrete screening walls. The warehouse building and concrete screening walls would visually screen and shield noise from the loading docks from impacting adjacent residential and commercial property lines.

The proposed Project would generate off-site vehicle trips that would be distributed onto West 5th Street and East 3rd Street and potentially increase noise levels along travel routes. Caltrans considers a doubling of total traffic volume to result in a three (3) dBA increase in traffic-related noise levels. The proposed Project would not double traffic volumes on any local roadway and, therefore, would not result in a substantial off-site increase in noise levels.

The proposed Project would not result in excessive operational vibration levels because it does not involve the use of large or vibration-inducing equipment near off-site structures during operations.

S.4 AIRPORT NOISE-RELATED IMPACTS

The proposed Project is located approximately 0.4 miles north of the nearest runway associated with the San Bernardino International Airport (SBIA). An airport land use compatibility plan has not been prepared for the SBIA; however, according to the City's zoning map, the proposed Project site is located within SBIA Safety Zone D and E, which has low to negligible risk. The City's Municipal Code (Section 16.40.410) establishes that warehouses are compatible with these safety zones and acceptable without safety-related conditions. Noise contours prepared for the Eastgate Air Cargo Facility Final Environmental Assessment indicates the southern part of the proposed Project site (the part of the site within approximately 100 feet of the right-of-way boundary for East 3rd Street) is within the airport's future 65 CNEL noise zone, which was developed assuming approximately 240 average daily and 87,617 total annual aircraft operations in 2024. The Project is not a noise-sensitive land use that would be prohibited within the potential 65 CNEL noise contour associated with the SBIA. There are no outdoor uses associated with the Project in the potential 65 CNEL contour area other than parking areas, and standard exterior-to-interior noise attenuation would result in interior noise levels that are less than 45 CNEL. Therefore, the proposed Project would not expose people working in the Project area to excessive airport-related noise levels.

S.5 OTHER NOISE AND VIBRATION EFFECTS

The California Supreme Court in *California Building Industry Association v. Bay Area Air Quality Management District*, 62 Cal.4th 369 (2015) ruled that CEQA review is focused on a project's impact on the environment "and not the environment's impact on the project." Per this ruling, a Lead Agency is not required to analyze how existing conditions might impact a project's future users or residents; however, a Lead Agency may elect to disclose information relevant to a project even if it not is considered an impact under CEQA. Furthermore, the City's General Plan Noise Element set noise standards for receiving land uses which require evaluation for consistency and compliance even if such evaluation is not required by CEQA.

The proposed Project is not a noise-sensitive land use. As a warehousing land use, elevated interior noise levels are not likely to interfere with speech or other communications. Workers and customers are unlikely to expect or require quiet conditions and the site plan does not include any large outdoor open space or exterior use areas intended for respite or relaxation. For these reasons, the proposed Project

would not be exposed to unacceptable exterior noise levels that exceed City General Plan acceptable noise and land use compatibility standards (70 CNEL for office uses and 75 CNEL for industrial uses).

The proposed building's northern façade would be subjected to noise levels of approximately 68.4 dBA CNEL. Standard construction techniques and materials for new commercial/industrial buildings are commonly accepted to provide a minimum exterior to interior noise attenuation (i.e., reduction) of 30 to 32 dBA with all windows and doors closed, which would result in interior noise levels of approximately 38 dBA L_{eq} for occupied rooms fronting West 5th Street or East 3rd Street. Thus, with standard construction techniques, the proposed Project would satisfy interior building code noise requirements.

S.6 RECOMMENDED NOISE CONTROL MEASURES

The proposed Project would not result in any substantial temporary or permanent increases in noise levels that exceed City of Highland standards. In addition, there are no noise and land use compatibility issues associated with the Project site or its design. Mitigation measures and other noise and land use compatibility recommendations are not required for the proposed Project.

Although temporary construction noise levels would be less than significant, MIG recommends the following BMPs be incorporated into the Project to reduce the potential for construction activities to annoy or otherwise result in a nuisance to adjacent sensitive residential receptors.

Construction Noise Control Best Management Practices. To reduce the potential for construction activities to annoy or result in a temporary noise nuisance to adjacent residential receptors, the Applicant and/or its designated contractor, contractor's representatives, or other appropriate personnel shall:

- *Notify Adjacent Land Use of Construction Activities.* This notice shall be provided at least one week prior to the start of any construction activities, describe the construction noise control best management practices to be implemented by the Project, and include the name and phone number of a designated contact for the Applicant and the City of Highland responsible for handling construction-related noise complaints. This notice shall be provided to the owner/occupants of all occupied properties within 250 feet of the Project site.
- *Restrict work hours/equipment noise.* All work shall be subject to the requirements in City Code Section 15.48.020.A and General Plan Goal 7.3, Action 1. Construction activities, including deliveries, shall only occur during the hours of 7:00 AM to 6:00 PM, Monday through Saturday. Construction activities shall be prohibited on Sundays and City- and Federal-observed holidays. The Applicant and/or its contractor shall post a sign at all entrances to the construction site informing contractors, subcontractors, construction workers, etc. of this requirement.
- *Construction equipment selection, use, and noise control measures.* The following measures shall apply during construction activities:
 - Contractors shall use the smallest size equipment capable of safely completing work activities.
 - Construction staging shall occur as far away from the residential properties on West 5th Street as possible.
 - All stationary noise-generating equipment such as pumps, compressors, and welding machines shall be located as far from the residential properties on West 5th Street as possible.

- Heavy equipment engines shall be covered, and exhaust pipes shall include a muffler in good working condition.
- Pneumatic tools shall include a noise suppression device on the compressed air exhaust.
- The Applicant and/or his contractor shall connect to existing electrical service at the site to avoid the use of stationary power generators. This measure shall be subject to the approval of the local electric utility.
- No radios or other amplified sound devices shall be audible beyond the property line of the construction site.

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1 INTRODUCTION

CHIPT (the “**Applicant**”) has applied to the City for a major design review, major variance, and tentative parcel map for its proposed Highland East Industrial Warehouse Building Project. The proposed Project would be located approximately centrally between Central Avenue and Palm Avenue and bounded by West 5th Street to the north and 3rd Street to the south. The Project would include the development of a new industrial warehouse structure consisting of approximately 243,323 square feet of building space with 34 truck loading docks.

MIG, Inc. (“**MIG**”) has prepared this Noise Impact Analysis Report (Report) to evaluate the potential construction and operations-related noise impacts of the proposed Project. MIG has prepared this Report using project-specific information contained in the applicant’s submittal to the City for the approvals listed above. Where necessary, MIG has supplemented available information with standardized sources of information, such as model assumptions pertaining to construction equipment activity levels. In general, this Report evaluates the potential “worst-case” conditions associated with the proposed Project’s construction and operational noise levels.

This Report is intended for use by the City to assess the potential noise and vibration impacts of the proposed Project in compliance with the California Environmental Quality Act (CEQA; PRC §21000 et seq.) and the State CEQA Guidelines (14 CCR §15000 et seq.), particularly in respect to the noise and vibration issues identified in Appendix G of the State CEQA Guidelines.

1.1 REPORT ORGANIZATION

This Report is organized as follows:

- **Chapter 1, Introduction**, explains the contents of this Report and its intended use.
- **Chapter 2, Project Description**, provides an overview of construction and operational activities associated with the proposed Project.
- **Chapter 3, Noise Fundamentals**, provides pertinent background information on the measurement, propagation, and characterization of noise levels.
- **Chapter 4, Environmental and Regulatory Setting**, describes the existing noise and setting of the proposed Project and provides information on the federal, state, and local regulations that govern the Project setting and potential noise impacts.
- **Chapter 5, CEQA Noise and Vibration Impact Analysis**, identifies the potential operational noise impacts of the proposed Project and evaluates these effects in accordance with Appendix G of the State CEQA Guidelines.
- **Chapter 6, Other Noise and Vibration Effects**, discloses other potential noise and vibration issues, such as incompatible or otherwise adverse existing environmental conditions that may affect the proposed Project and/or the proposed Project’s ability to comply with applicable noise or vibration standards.
- **Chapter 7, Report Preparers and References**, list the individuals involved, and the references used, in the preparation of this Report.

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2 PROJECT DESCRIPTION

The following describes the Building and activities proposed by the Project.

2.1 PROJECT LOCATION

The proposed Project would be located approximately centrally between Central Avenue and Palm Avenue and bounded by West 5th Street to the north and 3rd Street to the south, in the southwestern part of the City of Highland, San Bernardino County. The Project site is a developed, approximately 11.09-acre, irregularly shaped area that consist of 24 parcels of land (Assessor's Parcel Numbers 1192-631-09, -10, -11, -12, -13, -14, -22, -23, -24, -25, -26, -27, and -28 and 1192-641-08, -09, -10, -11, -15, -16, -17, -18, -19, -20, and -21). The site is adjacent to the City's southern boundary (with the City of San Bernardino) and is bound by West 5th Street to the north, East 3rd Street to the south, existing land uses to the west (a crematorium and a tavern), and American Rentals Storage Yard to the east (see Figure 2-1: Aerial View of Project Site).

The Project site is located approximately 0.43 miles north of San Bernardino International Airport and approximately 0.9 miles west of the Interstate 210 (I-210).¹

2.1.1 SITE LAND USE AND ZONING

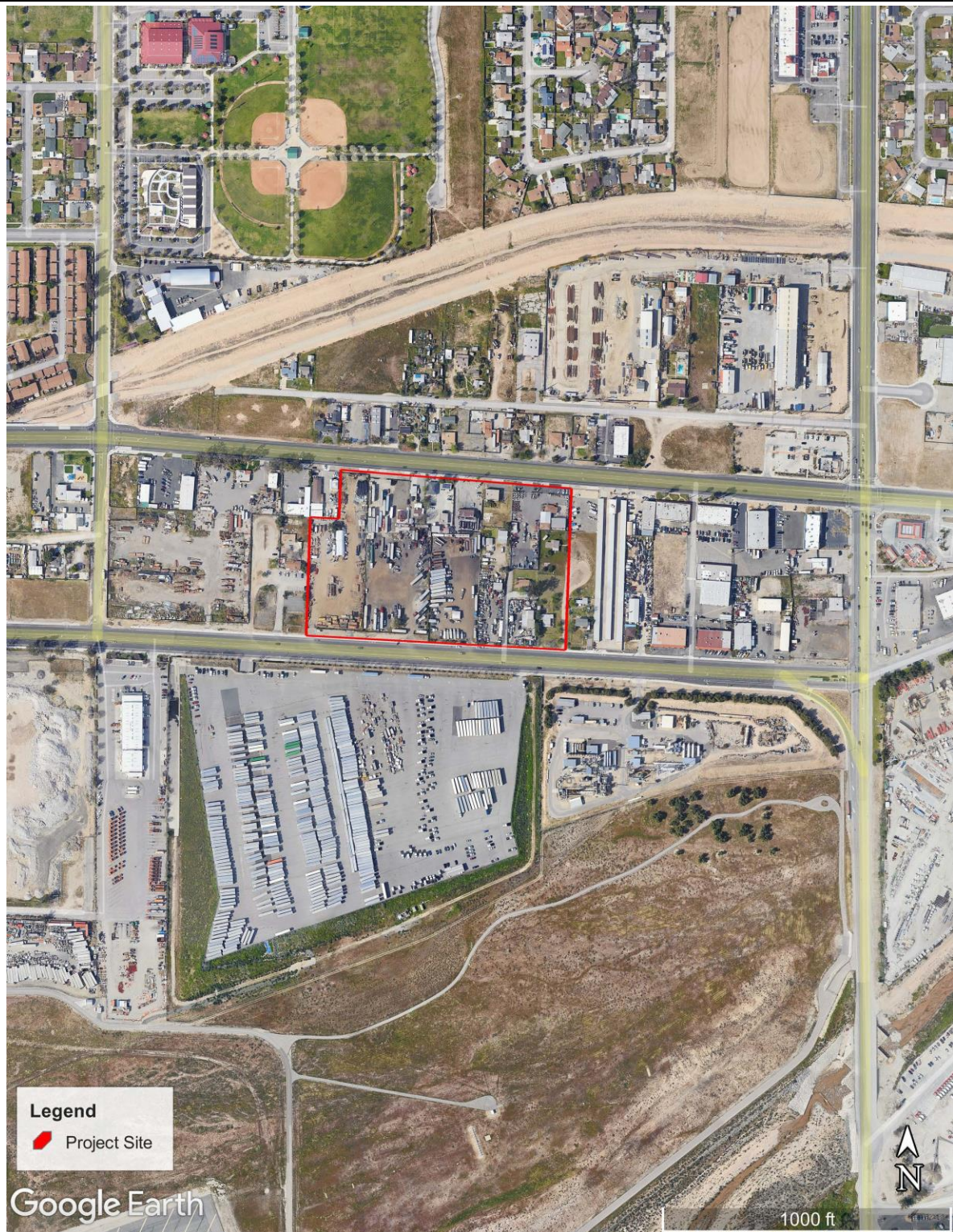
The City's General Plan designates the Project site as Business Park (City of Highland, 2006, Figure 2-2). The City's Zoning Map also designates the Project site as Business Park (City of Highland, 2012). Per the zoning map, the Project site is within San Bernardino International Airport Overlay Zone D and E, which carries low to negligible airport-related safety risks (see Section 4.2.1.1).

2.1.2 SURROUNDING LAND USES

In general, the proposed Project site is surrounded by a mix of vacant, residential, commercial, and light industrial land uses located in the City of Highland and the City of San Bernardino. The land uses surrounding the Project site are summarized in Table 2-1, and include:

- **North:** Land uses to the north, across West 5th Street, include a mix of vacant, non-conforming residential, and commercial/light industrial uses. These land uses are also present north of Meines Street. A planned segment of the Streater Steet Multi-Use Trail abuts the rear of the properties located on Meines Street (City of Highland, 2022).
- **South:** Land uses to the south, across East 3rd Street, include maintenance and storage yards associated with engineering and logistical/transportation businesses. These land uses are located in the City of San Bernardino.
- **East:** The land use that borders the Project site to the east is an equipment rental office (American Rentals).
- **West:** The land uses that border the Project site to the west include a crematory (Arrowhead Aftercare Cremation Center) and bar/restaurant (Third Street Tavern).

¹ The listed distances are as measured between the Project's property line and the airport's nearest runway centerline and estimated I-210 right-of-way.

Figure 2-1: Aerial View of Project Site

Source: MIG 2023

Table 2-1: Summary of Land Uses Surrounding the Project Site			
Direction	Land Use Description^(A)	Zoning	General Plan
North (Across West 5 th Street)	Vacant, Non-conforming Residential, Commercial, Light Industrial	Industrial	Industrial
South (Across East 3 rd Street)	Maintenance and Storage Yards (in the City of San Bernardino)	Specific Plan, Public Facilities	Specific Plan, Public/Quasi-Public
East (Bordering the Site)	Commercial	Business Park	Business Park
West (Bordering the Site)	Commercial	Business Park	Business Park
Source: City of Highland, 2006 and 2012, City of San Bernardino, 2005 and 2021.			
(A) Only land uses in the immediate vicinity of the Project site are described. Land uses across East 3 rd Street are located in the City of San Bernardino.			

Schools and education facilities located within 1,000 feet of the Project site include the Highland Head Start located approximately 765 feet west of the Project site (across Central Avenue) and the Sam J. Racadio Library and Environmental Learning Center (a County of San Bernardino facility) located approximately 900 feet northwest of the site. The Highland Community Park is also located approximately 735 feet north of the site.

2.2 EXISTING SITE DESCRIPTION AND OPERATIONS

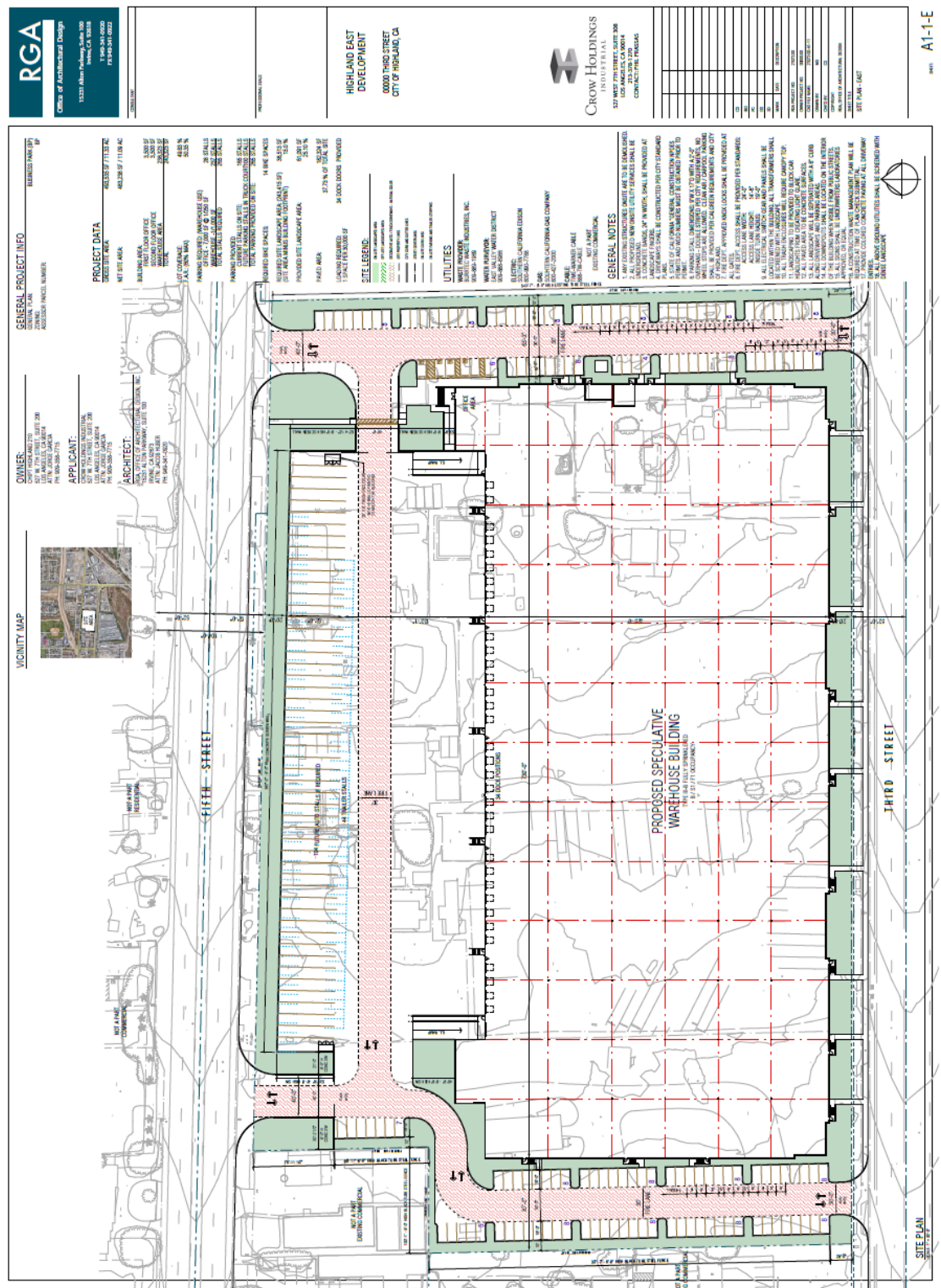
The Project site was previously occupied by a tire shop, a truck and trailer repair business, a truck driving school, an equipment rental business, and residential buildings. There was approximately 19,469 square feet of total building space at the Project site, which was demolished in 2022. The site is currently vacant and undeveloped.

The previous existing operations at the Project site generated approximately 305 total daily vehicle trips, with 19 and 20 of these trips occurring during the AM and PM peak hours, respectively. Of the 305 daily vehicle trips generated by the existing uses at the Project site, 242 were passenger vehicles and 63 were truck trips (Urban Crossroads, 2022). Existing truck trips consisted of a mix of 2-axle (39.7%), 3-axle (12.7%) and 4-axle (47.6%) trucks (Urban Crossroads 2022).

2.3 PROPOSED SITE DEVELOPMENT AND OPERATIONS

The proposed Project would involve the development of a new, approximately 243,323 square foot industrial warehouse building that would be used for warehousing purposes. Approximately 7,000 square feet of the building's total area would consist of office space. The entire approximately 11.09-acre Project site would be graded; the portions of the Project site not developed with the Building would either be hardscaped (e.g., parking or sidewalks) or landscaped. The site plan for the proposed Project is shown in Figure 2-2.

Figure 2-2: Site Plan



Source: RGA Office of Architectural Design 2023

2.3.1 SITE LAYOUT AND BUILDING DESCRIPTION

The proposed rectangular Building would reach a height of approximately 48 feet above ground level. The long axis of the building, like the Project site, would be oriented east to west and would primarily front West 5th Street. The office portions of the Building would be in the southeast and southwest corners of the Building.

The Building's northern façade would include 34 truck docks that would be set back from the Project site's northern property line 186 feet, and screened from view by 8-foot-tall concrete walls at the north, east, and west ends of the dock area (i.e., specifically on the northern end of the Project site; not along the western and eastern project property lines). The Building's eastern facade would be set back from Project site's property line by a minimum of 63 feet, the western façade would be set back a minimum of 87 feet, and the southern façade would be set back from the property line by a minimum of 20 feet.

Employee parking areas would be located on the east and west sides of the Project site and trailer parking areas would be located on the north side of the Project site. Landscaping would buffer the perimeter of the site.

2.3.2 SITE ACCESS AND PARKING

Access to the Project site would be provided via two new driveways on West 5th Street, one new driveway on East 3rd Street, and one upgraded driveway on East 3rd Street. The driveways on West 5th Street would provide gated access to the 34 truck docks on the north side of the Building. The two driveways on East 3rd Street would provide access to the employee parking areas on the eastern and western sides of the Building (165 total parking spaces). The proposed Project includes 44 truck trailer parking stalls at the north side of the Project site. On-site circulation would be provided via drive aisles on the eastern and western side of the Building (running from West 5th Street to East 3rd Street) and on the northern side of the Building.

2.3.3 PROJECT OPERATIONS

The proposed Project is considered a speculative industrial warehouse building because tenants/end users have not been identified. In general, industrial warehouse buildings generate noise and vibration from sources such as on- and off-site vehicle trips, on-site truck maneuvering, loading, and unloading activities, on-site parking, and other on-site operations. With regards to potential Project operations that could generate noise and vibration, this Report assumes:

- **Hours of Operation:** The Project could operate up to 24 hours per day, 7 days per week. Employee shift changes would occur in the morning (approximately 7 to 8 AM), afternoon (approximately 3 PM to 4 PM), and nighttime (approximately 11 PM to 12 AM), with most employees working a daytime shift.
- **Vehicle Trip Generation:** The proposed Project's trip generation potential, as estimated in the Trip Generation Assessment prepared for the Project, is summarized in Table 2-2 (Urban Crossroads, 2023). As shown in Table 2-2, the proposed Project would result in the net increase of 111 total vehicle trips per day, including 28 passenger vehicle trips and 83 truck trips. The closest highway / freeway to the Project site is the I-210, which can be accessed via West 5th Street on- and off-ramps located approximately 0.7 to 0.8 miles east of the site. In addition, the I-10 can be accessed via Alabama Street ramps approximately 2.7 to 2.8 miles south of the intersection of East 3rd Street and Alabama Street (approximately 3.0 to 3.1 miles total road travel distance from the Project site). Based on the location of the truck entryways, it

was assumed 100% of the Project's traffic (inbound and outbound) would travel to the site via West 5th Street (for direct connection to the I-210). The Project site plan indicates that the driveways along West 5th Street would be used for truck ingress and egress, while passenger vehicles would access the site via the driveways on East 3rd Street.

- **Mechanical Equipment:** The Project would include the use of heating, ventilation, and air conditioning (HVAC) equipment for space heating and cooling purposes. This equipment would be centrally located over the building's office spaces.

Table 2-2: Project Trip Generation Rates				
Vehicle Type	AM Peak Hour	PM Peak Hour	Average Daily Trips	
			Number	Percent
Proposed Project				
Passenger Cars	36	36	270	64.9%
Truck Trips				
2-axle	0	1	24	5.8%
3-axle	1	2	30	7.2%
4-axle	3	4	92	22.1%
Subtotal ^(A)	4	7	146	35.1%
Total Project Trips	40	43	416	100.0%
Existing Conditions				
Passenger Cars	16	17	242	79.3%
Truck Trips				
2-axle	1	2	25	8.2%
3-axle	0	0	8	2.6%
4-axle	2	1	30	9.8%
Subtotal ^(A)	3	3	63	20.7%
Total Existing Trips	19	20	305	100%
Net Change in Vehicle Trips				
Passenger Cars	20	19	28	6.7%
Truck Trips				
2-axle	-1	-1	-1	-0.2%
3-axle	1	2	22	5.3%
4-axle	1	3	62	14.9%
Subtotal ^(A)	1	4	83	20.0%
Total Net Change	21	23	111	100%
Source: Urban Crossroad 2022, Table 1 and Table 3				
(A) Totals may not equal due to rounding.				

2.4 PROJECT CONSTRUCTION

The applicant anticipates the construction of the proposed Project could begin as early as the 3rd quarter of 2023 and take approximately 13 months to complete. The development of the approximately 11.09-acre site and the construction of the approximately 243,323 square feet industrial warehouse building would require site preparation, grading, trenching, building construction, paving, and architectural coating phases/activities. Soil would be balanced on site. The proposed Project is anticipated to require varying types of equipment throughout the different construction phases including, but not limited to, bulldozers, backhoes, loaders, graders, cranes, and forklifts. Table 2-3 summarizes the proposed Project's construction phasing and the typical pieces of heavy-duty, off-road construction equipment that could be used during each phase.

Table 2-3: Project Construction Activity, Duration, and Typical Equipment		
Construction Activity	Duration (Days)^(A)	Typical Equipment Used^(B)
Site Preparation	20	Dozer, Tractor/Loader/Backhoe
Grading	20	Backhoe, Dozer, Excavator, Grader
Trenching	60	Trencher, Backhoe
Building Construction	140	Backhoe, Crane, Forklift, Generator Set, Welder
Paving	10	Paver, Paving Equipment, Roller
Architectural Coating	25	Air Compressor
Source: MIG, 2023		
(A) Days refers to total active workdays in the construction phase, not calendar days.		
(B) The typical equipment list does not reflect all equipment that would be used during the construction phase. Not all equipment would operate eight hours per day each workday.		

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3 NOISE AND VIBRATION FUNDAMENTALS

3.1 DEFINING NOISE

“Sound” is a vibratory disturbance created by a moving or vibrating source and is capable of being detected. For example, airborne sound is the rapid fluctuation of air pressure above and below atmospheric pressure. “Noise” may be defined as unwanted sound that is typically construed as loud, unpleasant, unexpected, or undesired by a specific person or for a specific area.

3.1.1 SOUND PRODUCTION

Sound has three properties: frequency (or pitch), amplitude (or intensity or loudness), and duration. Pitch is the height or depth of a tone or sound and depends on the frequency of the vibrations by which it is produced. Sound frequency is expressed in terms of cycles per second, or Hertz (Hz). Humans generally hear sounds with frequencies between 20 and 20,000 Hz and perceive higher frequency sounds, or high pitch noise, as louder than low-frequency sound or sounds low in pitch. Sound intensity or loudness is a function of the amplitude of the pressure wave generated by a noise source combined with the reception characteristics of the human ear. Atmospheric factors and obstructions between the noise source and receptor also affect the loudness perceived by the receptor.

The frequency, amplitude, and duration of a sound all contribute to the effect on a listener, or receptor, and whether or not the receptor perceives the sound as “noisy” or annoying. Despite the ability to measure sound, human perceptibility is subjective, and the physical response to sound complicates the analysis of its impact on people. People judge the relative magnitude of sound sensation in subjective terms such as “noisiness” or “loudness.”

3.1.2 MEASURING SOUND

Sound pressure levels are typically expressed on a logarithmic scale in terms of decibels (dB). A dB is a unit of measurement that indicates the relative amplitude (i.e., intensity or loudness) of a sound, with 0 dB corresponding roughly to the threshold of hearing for the healthy, unimpaired human ear. Since decibels are logarithmic units, an increase of 10 dBs represents a ten-fold increase in acoustic energy, while 20 dBs is 100 times more intense, 30 dBs is 1,000 times more intense, etc. In general, there is a relationship between the subjective noisiness or loudness of a sound and its intensity, with each 10 dB increase in sound level perceived as approximately a doubling of loudness. Due to the logarithmic basis, decibels cannot be directly added or subtracted together using common arithmetic operations:

$$50 \text{ decibels} + 50 \text{ decibels} \neq 100 \text{ decibels}$$

Instead, the combined sound level from two or more sources must be combined logarithmically. For example, if one noise source produces a sound power level of 50 dBA, two of the same sources would combine to produce 53 dB as shown below.

$$10 * 10 \log \left(10^{\left(\frac{50}{10}\right)} + 10^{\left(\frac{50}{10}\right)} \right) = 53 \text{ decibels}$$

In general, when one source is 10 dB higher than another source, the quieter source does not add to the sound levels produced by the louder source because the louder source contains ten times more sound energy than the quieter source.

3.1.3 CHARACTERIZING SOUND

Although humans generally can hear sounds with frequencies between 20 and 20,000 Hz most of the sound humans are normally exposed to do not consist of a single frequency, but rather a broad range of frequencies perceived differently by the human ear. In general, humans are most sensitive to the frequency range of 1,000–8,000 Hz and perceive sounds within that range better than sounds of the same amplitude in higher or lower frequencies. Instruments used to measure sound, therefore, include an electrical filter that enables the instrument's detectors to replicate human hearing. This filter known as the "A-weighting" or "A-weighted sound level" filters low and very high frequencies, giving greater weight to the frequencies of sound to which the human ear is typically most sensitive. Most environmental measurements are reported in dBA, meaning decibels on the A-scale. A list of common noise sources and their associated A-weighted noise level is provided in Table 3-1. Other weightings include the B-, C-, and D-weighting, but these scales are not commonly used for environmental noise because human annoyance correlates well with the A-weighting and these weighting scales are not incorporated in typical environmental noise descriptors

Sound levels are usually not steady and vary over time. Therefore, a method for describing either the average character of the sound or the statistical behavior of the variations over a period of time is necessary. The continuous equivalent noise level (" L_{eq} ") descriptor is used to represent the average character of the sound over a period of time. The L_{eq} represents the level of steady-state noise that would have the same acoustical energy as the sum of the time-varying noise measured over a given time period. L_{eq} is useful for evaluating shorter time periods over the course of a day. The most common L_{eq} averaging period is hourly, but L_{eq} can describe any series of noise events over a given time period.

Variable noise levels are the values that are exceeded for a portion of the measured time period. Thus, the L_{01} , L_{05} , L_{25} , L_{50} , and L_{90} descriptors represent the sound levels exceeded 1%, 5%, 25%, 50%, and 90% of the time the measurement was performed. The L_{90} value usually corresponds to the background sound level at the measurement location.

When considering environmental noise, it is important to account for the different responses people have to daytime and nighttime noise. In general, during the nighttime, background noise levels are generally quieter than during the daytime but also more noticeable because household noise decreases as people begin to retire and sleep. Accordingly, a variety of methods for measuring noise have been developed. The California General Plan Guidelines for Noise Elements identifies the following common metrics for measuring noise (OPR, 2017):

- **L_{dn} or DNL (Day-Night Average Level):** The average equivalent A-weighted sound level during a 24-hour day, divided into a 15-hour daytime period (7:00 AM to 10:00 PM) and a 9-hour nighttime period (10:00 PM to 7:00 AM). A 10 dB "penalty" is added to measure nighttime noise levels when calculating the 24-hour average noise level. For example, a 45-dBA nighttime sound level (e.g., at 2:00 AM) would contribute as much to the overall day-night average as a 55-dBA daytime sound level (e.g., at 7:00 AM).
- **CNEL (Community Noise Equivalent Level):** The CNEL descriptor is similar to DNL, except that it includes an additional 5 dBA penalty for noise events that occur during the evening time period (7:00 PM to 10:00 PM). For example, a 45-dBA evening sound level (e.g., at 8:00 PM) would contribute as much to the overall day-night average as a 50-dBA daytime sound level (e.g. at 8:00 AM).

Table 3-1: Typical Noise Levels		
Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	110	Rock Band
Jet flyover at 1,000 feet	105	
	100	
Gas lawn mower at 3 feet	95	
	90	
Diesel truck at 50 feet at 50 mph	85	Food blender at 3 feet
	80	Garbage disposal at 3 feet
Noise urban area, daytime	75	
Gas lawnmower, 100 feet	70	Vacuum cleaner at 10 feet
Commercial area	65	Normal speech at 3 feet
Heavy traffic at 300 feet	60	
	55	Large business office
Quiet urban daytime	50	Dishwasher next room
	45	
Quiet urban nighttime	40	Theater, large conference room
Quiet suburban nighttime	35	
	30	Library
Quite rural nighttime	25	Bedroom at night
	20	
	15	Broadcast/recording studio
	10	
	5	
Typical threshold of human hearing	0	Typical threshold of human hearing
Source: Caltrans, 2013		

The artificial penalties imposed during DNL and CNEL calculations are intended to account for a receptor's increased sensitivity to noise levels during quieter nighttime periods. As such, the DNL and CNEL metrics are usually applied when describing longer-term ambient noise levels because they account for all noise sources over an extended period of time and account for the heightened sensitivity of people to noise during the night. In contrast, the L_{eq} metric is usually applied to shorter reference periods where sensitivity is presumed to remain generally the same.

Federal and State agencies have established noise and land use compatibility guidelines that use averaging approaches to noise measurement. The State Department of Aeronautics and the California Commission on Housing and Community Development have adopted the CNEL for evaluating community noise exposure levels.

3.1.4 SOUND PROPAGATION

The energy contained in a sound pressure wave dissipates and is absorbed by the surrounding environment as the sound wave spreads out and travels away from the noise generating source. The strength of the source is often characterized by its “sound power level.” Sound power level is independent of the distance a receiver is from the source and is a property of the source alone. Knowing the sound power level of an idealized source and its distance from a receiver, sound pressure level at the receiver point can be calculated based on geometrical spreading and attenuation (noise reduction) as a result of distance and environmental factors, such as ground cover (asphalt vs. grass or trees), atmospheric absorption, and shielding by terrain or barriers.

For an ideal “point” source of sound, such as mechanical equipment, the energy contained in a sound pressure wave dissipates and is absorbed by the surrounding environment as the sound wave spreads out in a spherical pattern and travels away from the point source. Theoretically, the sound level attenuates, or decreases, by 6 dB with each doubling of distance from the point source. In contrast, a “line” source of sound, such as roadway traffic or a rail line, spreads out in a cylindrical pattern and theoretically attenuates by 3 dB with each doubling of distance from the line source; however, the sound level at a receptor location can be modified further by additional factors. The first is the presence of a reflecting plane such as the ground. For hard ground, a reflecting plane typically increases A-weighted sound pressure levels by 3 dB. If some of the reflected sound is absorbed by the surface, this increase will be less than 3 dB. Other factors affecting the predicted sound pressure level are often lumped together into a term called “excess attenuation.” Excess attenuation is the amount of additional attenuation that occurs beyond simple spherical or cylindrical spreading. For sound propagation outdoors, there is almost always excess attenuation, producing lower levels than what would be predicted by spherical or cylindrical spreading. Some examples include attenuation by sound absorption in air; attenuation by barriers; attenuation by rain, sleet, snow, or fog; attenuation by grass, shrubbery, and trees; and attenuation from shadow zones created by wind and temperature gradients. Under certain meteorological conditions, like fog and low-level clouds, some of these excess attenuation mechanisms are reduced or eliminated due to noise reflection.

3.1.5 NOISE EFFECTS ON HUMANS

Noise effects on human beings are generally categorized as:

- Subjective effects of annoyance, nuisance, and/or dissatisfaction
- Interference with activities such as speech, sleep, learning, or relaxing
- Physiological effects such as startling and hearing loss

Most environmental noise levels produce subjective or interference effects; physiological effects are usually limited to high noise environments such as industrial manufacturing facilities or airports.

Predicting the subjective and interference effects of noise is difficult due to the wide variation in individual thresholds of annoyance and past experiences with noise; however, an accepted method to determine a person’s subjective reaction to a new noise source is to compare it to the existing environment without the noise source, or the “ambient” noise environment. In general, the more a new noise source exceeds the ambient noise level, the more likely it is to be considered annoying and to disturb normal activities.

Under controlled conditions in an acoustical laboratory, the trained, healthy human ear is able to discern 1-dB changes in sound levels when exposed to steady, single-frequency (“pure-tone”) signals in the mid-frequency (1,000–8,000 Hz) range. In typical noisy environments, changes in noise of 1 to 2 dB are

generally not perceptible. However, it is widely accepted that people can begin to detect sound level increases of 3 dB in typical noisy environments. Further, a 5-dB increase is generally perceived as a distinctly noticeable increase, and a 10-dB increase is generally perceived as a doubling of loudness that would almost certainly cause an adverse response from community noise receptors.

When exposed to high noise levels, humans may suffer hearing damage. Sustained exposure to high noise levels (e.g., 90 dBs for hours at a time) can cause gradual hearing loss, which is usually temporary, whereas sudden exposure to a very high noise level (e.g., 130 to 140 dBs) can cause sudden and permanent hearing loss. In addition to hearing loss, noise can cause stress in humans and may contribute to stress-related diseases, such as hypertension, anxiety, and heart disease (Caltrans, 2013).

3.1.6 GROUND-BORNE VIBRATION AND NOISE

Vibration is the movement of particles within a medium or object such as the ground or a building. Vibration may be caused by natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves, landslides) or humans (e.g., explosions, machinery, traffic, trains, construction equipment). Vibration sources are usually characterized as continuous, such as factory machinery, or transient, such as explosions.

As is the case with airborne sound, ground-borne vibrations may be described by amplitude and frequency; however, unlike airborne sound, there is no standard way of measuring and reporting amplitude. Vibration amplitudes can be expressed in terms of velocity (inches per second) or discussed in dB units to compress the range of numbers required to describe vibration. Vibration impacts to buildings are usually discussed in terms of peak particle velocity (PPV) in inches per second (in/sec). PPV represents the maximum instantaneous positive or negative peak of a vibration signal and is most appropriate for evaluating the potential for building damage. Vibration can impact people, structures, and sensitive equipment. The primary concern related to vibration and people is the potential to annoy those working and residing in the area. Vibration with high enough amplitudes can damage structures (such as crack plaster or destroy windows). Ground-borne vibration can also disrupt the use of sensitive medical and scientific instruments, such as electron microscopes. Potential human annoyance associated with ground-borne velocity is typically assessed using velocity decibel (VdB) notation.

Ground-borne noise is noise generated by vibrating building surfaces such as floors, walls, and ceilings that radiate noise inside buildings subjected to an external source of vibration. The vibration level, the acoustic radiation of the vibrating element, and the acoustical absorption of the room are all factors that affect potential ground-borne noise generation.

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4 ENVIRONMENTAL AND REGULATORY SETTING

This chapter provides information on the environmental and regulatory noise setting of the proposed Project.

4.1 PROJECT LOCATION AND SITE DESCRIPTION

The proposed Project would be located on developed light industrial/commercial land in the southwestern part of the City of Highland. Refer to Section 0 for a description of the Project site and its surroundings.

4.2 EXISTING NOISE ENVIRONMENT

The City's General Plan Noise element identifies that transportation-related noise sources, including traffic on major highways and arterials and activities associated with the San Bernardino International Airport and Redlands Municipal Airport, are the predominant contributor to the City's noise environment. Non-transportation noise sources associated with residential, commercial, and industrial land uses in the City, as well as mineral extraction processes outside of the City, can also contribute to the local noise environment. (County of Highland, 2006, pp. 7-16, 7-17, and 7-19). The proposed Project is located along West 5th Street and East 3rd Street. Traffic noise modeling conducted for the City's General Plan indicated that traffic noise levels are predicted to generally be above 65 CNEL (City of Highland, 2006, Figure 7-2; City of San Bernardino, 2020, Figure HZ-8A). Both West 5th Street and East 3rd Street as designated truck routes per the City's General Plan Circulation Element (City of Highland, 2006, Figure 3-4).

In addition to traffic noise, the Project site is located approximately 1.4 miles north of San Bernardino International Airport. The Project site is located within the SBIA influence area (San Bernardino County, 2020, Figure HZ-9); however, official noise contours are not available for this airport (see Section 4.2.1.1). The Project site is also located approximately 3.8 miles northwest of the Redlands Municipal Airport. It is not located within the Redlands Municipal Airport influence area nor any noise contour zone associated with the airport (San Bernardino County, 2003, Figure 2A; 2020, Figure HZ-9).

4.2.1 AMBIENT NOISE LEVELS AT PROJECT SITE

MIG conducted ambient noise level monitoring in proximity of the proposed Project from approximately 9 AM on Tuesday, June 7, 2022 to approximately 2 PM on Wednesday, June 8, 2022 (see Appendix A). Although this monitoring was originally designed to estimate noise levels at an adjacent property (the western CHIPT industrial warehouse building on Central Avenue and 3rd Street), noise levels measured during this monitoring are considered representative of the conditions at the proposed Project site. The ambient noise levels were digitally measured and stored using three (3) Larson Davis SoundTrack LxT sound level meters that meet American National Standards Institute requirements for a Type 1 integrating sound level meter. Each sound meter was calibrated immediately before and after the monitoring period using a reference one kilohertz (1kHz) check frequency and 114 dB sound pressure level and found to be operating within normal parameters for sensitivity. Measurements were continuously collected over the sample period in 1-minute intervals. This interval was selected to capture short-term noise events and increases in noise levels above typical background conditions. Weather conditions during the monitoring were generally clear and sunny during the daytime and clear and cool during the nighttime. Temperatures ranged from the low 60's (overnight) to the low 90's (in the later afternoon). Winds were generally light and variable and ranged

from calm conditions during the nighttime and morning to approximately 5 to 10 miles per hour (mph) during the daytime.

The ambient noise monitoring conducted for this Report included one (1) long-term (LT) and six (6) short-term (ST) measurement at locations selected to:

- Provide direct observations and measurements of existing noise sources at and in the vicinity of the proposed Project;
- Determine typical ambient noise levels at and in the vicinity of the proposed Project; and
- Evaluate potential Project noise levels at nearby sensitive receptors (see Section 4.2.1.2).

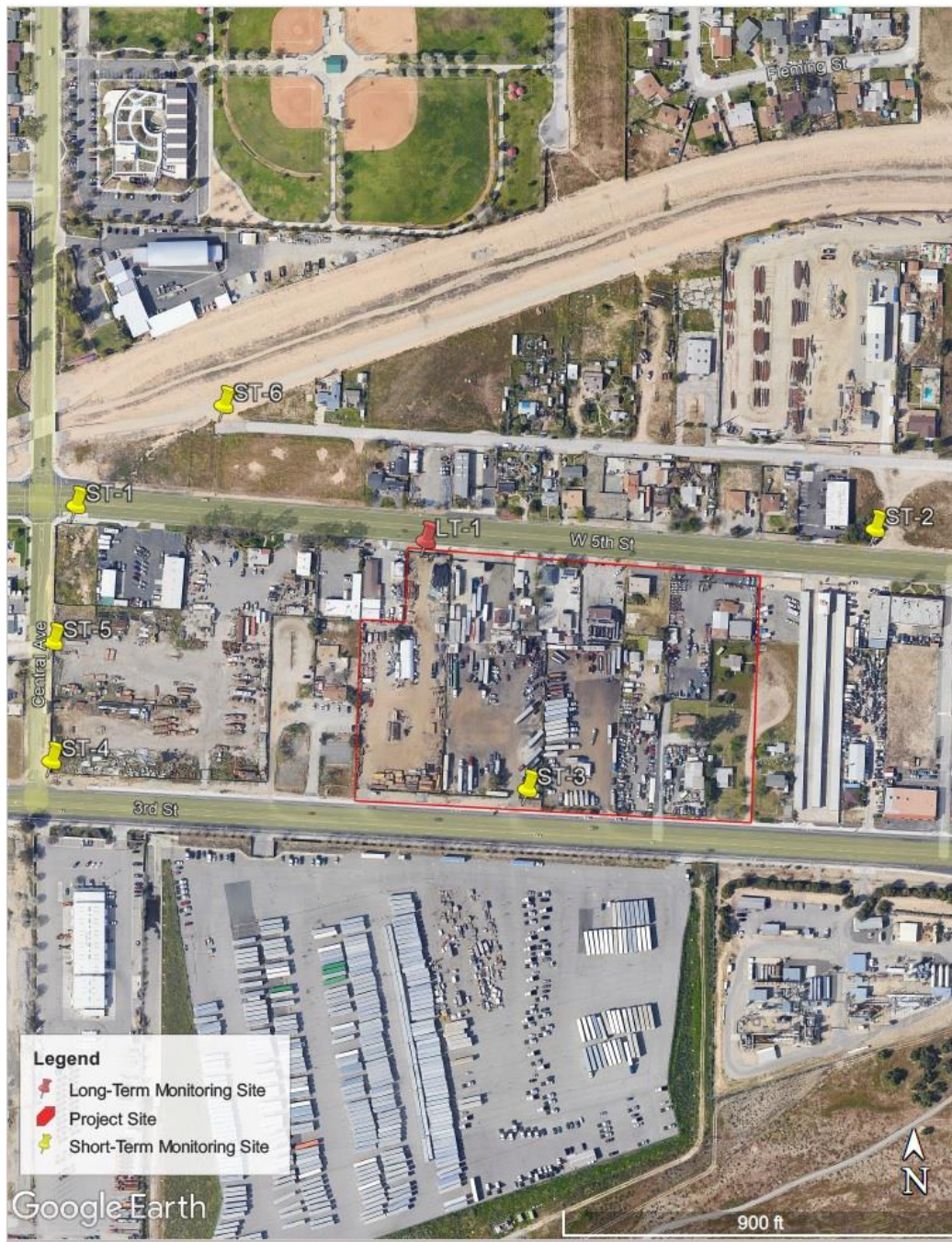
The ambient noise monitoring locations are described below and shown on Figure 4-1: Ambient Noise Monitoring Locations.

- **LT-1** was near the northern side Project site, approximately 60 feet south of the centerline of West 5th Street and approximately 885 feet east of the centerline of Central Avenue. Ambient noise levels at this location were measured from approximately 9:00 AM on Tuesday, June 7, 2022, to 2:10 PM on Wednesday, June 8, 2022. The ambient noise levels measured at LT-1 are representative of the typical noise levels in the northern part of Project site, as well as the typical daily noise exposure level along West 5th Street in the vicinity of the Project.
- **ST-1** was at the southeast corner of the Central Avenue and West 5th Street intersection. Ambient noise levels at this location were measured from approximately 9:40 AM to 10:40 AM on Tuesday, June 7, 2022, and from approximately 10:30 AM to 11:30 AM on Wednesday, June 8, 2022. The ambient noise levels measured at ST-1 are representative of the typical daytime noise levels in the vicinity of the intersection of Central Avenue and West 5th Street.
- **ST-2** was in front of the vacant property at 27180 West 5th Street. Ambient noise levels at this location were measured from approximately 10:50 AM to 11:50 AM on Tuesday, June 7, 2022, and from approximately 12:45 PM to 1:45 PM on Wednesday, June 8, 2022. The ambient noise levels measured at ST-2 are representative of the noise levels at existing properties on the north side of West 5th Street.
- **ST-3** was on the south side of the Project site, approximately 50 feet north of the centerline of E 3rd Street. Ambient noise levels at this location were measured from approximately 12:00 PM to 1:00 PM on Tuesday, June 7, 2022. The ambient noise levels measured at ST-3 are representative of the typical noise levels in the southern part of the Project site and along East 3rd Street.
- **ST-4** was at the northeast corner of the Central Avenue and 3rd Street intersection, approximately 25 feet from the centerline of Central Avenue and 55 feet from the centerline of East 3rd Street. Ambient noise levels at this location were measured from approximately 1:05 PM to 2:05 PM on Tuesday, June 7, 2022. The ambient noise levels measured at location ST-4 representative of the typical daytime noise levels in the vicinity of the intersection of Central Avenue and West 5th Street.
- **ST-5** was approximately 25 feet from the centerline of Central Avenue and approximately 325 feet south of the centerline of West 5th Street. Ambient noise levels at this location were measured from 9:30 AM to 10:30 PM on Wednesday, June 8, 2022. The ambient noise levels

measured at location ST-5 are representative of noise levels along Central Avenue, away from West 5th Street and East 3rd Avenue.

- **ST-6** was at the west end of Meines Street, north of the Project site, approximately 200 feet north of the centerline of West 5th Street. Ambient noise levels at this location were measured from 12:45 PM to 1:45 PM on Wednesday, June 8, 2022. The ambient noise levels measured at location ST-6 are representative of noise levels at residential receptors on Meines Street.

Figure 4-1: Ambient Noise Monitoring Locations



Source: MIG 2023

Table 4-1 and Table 4-2 summarize the results of the LT and ST ambient noise monitoring conducted for this Report. Refer to Appendix A for detailed ambient noise monitoring results.

Table 4-1: Summary of Measured Long-Term Ambient Noise Levels Near Project Site (dBA)							
Day / Site	Total Hours Monitored	L _{min}	L _{max}	Measured Noise Level ^(A)			
				Daytime (7 AM to 7 PM)	Evening (7 PM to 10 PM)	Nighttime (10 PM to 7 AM)	24-Hour CNEL ^(B)
Tuesday, June 7, 2022, to Wednesday, June 8, 2022							
LT-1	24 hours	37.3	95.2	63.5 – 66.6	61.7 – 66.4	55.1 – 66.0	68.4
Source: MIG (See Appendix A)							
(A) Values are the lowest and highest measured hourly L _{eq} values during the listed time period.							
(B) CNEL data is presented for a full 24-hour monitoring period (9 AM on June 7, 2022, to 9 AM on June 8, 2022).							

Table 4-2: Summary of Measured Short-Term Ambient Noise Levels at and near Project Site									
Day / Site	Duration	L _{min}	L _{max}	Measured Noise Level (dBA)					
				L _{eq}	L _{1.6}	L _{8.3}	L ₂₅	L ₅₀	L ₉₀
Tuesday, June 7, 2022 (9:40 AM to 10:40 AM)									
ST-1	1 Hour	44.1	83.5	66.3	75.9	71.2	66.0	60.5	51.5
LT-1	1 Hour	40.3	81.4	63.9	71.8	68.9	64.8	60.1	52.7
Tuesday, June 7, 2022 (10:50 AM to 11:50 AM)									
ST-2	1 Hour	44.1	86.5	68.2	78.0	73.1	70.2	68.0	62.0
LT-1	1 Hour	39.5	80.6	63.9	72.6	68.8	64.5	59.5	47.1
Tuesday, June 7, 2022(12:00 PM to 1:00 PM)									
ST-3	1 Hour	42.4	83.5	68.0	76.4	72.7	68.8	64.3	54.8
LT-1	1 Hour	37.3	80.5	63.8	71.9	68.6	64.9	60.3	49.2
Tuesday, June 7, 2022 (1:05 PM to 2:05 PM)									
ST-4	1 Hour	42.8	91.7	68.3	77.4	73.0	68.1	63.6	55.7
LT-1	1 Hour	38.8	80.6	63.8	72.1	68.7	64.8	60.0	48.4
Wednesday, June 8, 2022 (9:30 AM to 10:30 AM)									
ST-5	1 Hour	39.9	80.4	58.4	68.9	63.5	58.4	55.8	51.5
LT-1	1 Hour	40.2	79.5	62.9	71.3	67.7	63.9	58.9	48.4

Table 4-2: Summary of Measured Short-Term Ambient Noise Levels at and near Project Site									
Day / Site	Duration	L _{min}	L _{max}	Measured Noise Level (dBA)					
				L _{eq}	L _{1.6}	L _{8.3}	L ₂₅	L ₅₀	L ₉₀
Wednesday, June 8, 2022 (10:30 AM to 11:30 AM)									
ST-1	1 Hour	43.3	90.0	68.0	78.6	72.8	68.7	66.3	60.9
LT-1	1 Hour	39.9	85.1	64.1	73.3	68.8	64.5	59.2	50.0
Wednesday, June 8, 2022 (11:40 AM to 12:40 PM)									
ST-6	1 Hour	41.5	71.4	52.9	59.7	57.2	55.2	53.5	50.5
LT-1	1 Hour	47.1	81.4	64.4	72.6	68.9	65.2	60.9	54.2
Wednesday, June 8, 2022 (12:45 PM to 1:45 PM)									
ST-2	1 Hour	43.6	90.3	68.5	78.1	73.6	70.9	68.6	62.4
LT-1	1 Hour	40.9	82.2	63.8	72.6	68.7	64.4	59.5	49.4
Source: MIG (See Appendix A)									

As shown in Table 4-1 and Table 4-2, the measured ambient noise levels at and near the Project site are consistently above approximately 62 dBA L_{eq} during the daytime and evening hours, and above 55 dBA during nighttime hours. Measured noise levels were higher along East 3rd Street (ST-3, ST-4) than West 5th Street (LT-1, ST-1, ST-2, and ST-6) due to higher traffic volumes. The 24-hour noise exposure level at LT-1 was 68.4 dBA CNEL, which is generally consistent with future traffic volumes predicted along West 5th Street in the City's General Plan (see Section 4.2).

Based on observations during the monitoring, vehicle traffic on West 5th Street and East 3rd Street was the predominant noise source near the Project site, with industrial and commercial land use activities and occasional aircraft overflights also contributing to the noise environment.

4.2.1.1 Airport Noise Levels

As described in Section 0, the proposed Project is located approximately 0.4 miles north of the nearest runway associated with the SBIA. An airport land use compatibility plan has not been prepared for the SBIA (City of Highland, 2006). The airport has experienced growth in recent years, particularly in air cargo operations and in 2021, there approximately 49,000 total landings and takeoffs at the airport (SBIAA, 2021). According to the City's zoning map, the proposed Project site is located within SBIA Safety Zone D and E, which has low to negligible risk. Warehouses are compatible within this safety zone pursuant to Municipal Code Table 16.40.410A (City of Highland, 2022). Noise contours prepared for the Eastgate Air Cargo Facility Final Environmental Assessment indicates the southern part of the proposed Project site (the part of the site within approximately 100 feet of the right-of-way boundary for East 3rd Street) is within the airport's future 65 CNEL noise zone, which was developed assuming approximately 240 average daily and 87,617 total annual aircraft operations in 2024 (SBIAA, 2019, Table 4-21 and Figure 4-8). The remainder of the site is located within the 60 CNEL contour. The SBD International Airport maintains a Good Neighbor Program that tracks aircraft noise complaints. Between April and June 2022, there were 49 total aircraft noise comments submitted to the airport from 12 households in Highland (SBIAA, 2022).

The proposed Project site is also located approximately 3.8 miles northwest of the nearest runway associated with Redlands Municipal Airport; however, the Project site is not located within any airport

influence area or noise contour zone associated with this airport (City of Redlands, 2003 and Coffman Associates, 2015).

4.2.1.2 Discussion of Ambient Noise Levels at an Existing Warehouse/Business Park Use

In addition to collecting ambient noise data at the Project site, MIG conducted ambient noise level monitoring at an existing, approximately 80,000 square-foot warehouse/business park use located at 1900 East Alessandro Boulevard in the City of Riverside. This noise monitoring was conducted from approximately 8:30 AM to 3:00 PM on Tuesday, July 28, 2020, following the same procedures described in Section 4.2.1. Measurements were continuously collected over the sample period in 1-minute intervals. This interval was selected to capture short-term noise events and increases in noise levels above typical background conditions. Weather conditions during the monitoring were generally clear and sunny, with temperatures ranging from the low 80's (in the morning) to the high 90's (in the later afternoon). Winds were generally calm. The ambient noise monitoring included two (2) ST measurements at locations selected to:

- Provide direct observations and measurements of existing noise sources at and in the vicinity of the existing 80,000 square foot warehouse; and
- Determine typical ambient noise levels at and in the vicinity of the proposed Project; and

The existing warehouse ambient noise monitoring locations were generally located approximately 90 feet and 385 feet from the site's entrance, approximately 50 feet from drive aisles/maneuvering areas, and approximately 115 feet from building façade/truck dock doors. Based on observations made during the ambient noise monitoring, the noise environment at a warehouse is a function of intermittent site usage, with noise levels increasing during truck unloading and loading activities and returning to background levels when truck docks are not in use. Table 4-3 summarizes the results of the existing warehouse ambient noise monitoring conducted previously by MIG. Refer to Appendix A for detailed ambient noise monitoring results.

Table 4-3: Measured Short-Term Ambient Noise Levels At Typical Warehouse (dBA)									
Day / Site	Duration	L _{min}	L _{max}	Measured Noise Level (dBA)					
				L _{eq}	L _{1.6}	L _{8.3}	L ₂₅	L ₅₀	L ₉₀
Tuesday, July 28, 2020 ^(A)									
WH-1	5.5 Hours	42.9	88.5	62.8	71.0	66.2	62.7	60.2	58.1
WH-2	5.5 Hours	41.9	89.6	59.9	69.4	64.9	58.9	55.1	51.9
Specific Site/Truck Activity Noise Levels at 50 Feet									
Main Engine Idling		60.8	63.2	61.6	63.1	62.9	61.6	61.3	61.1
Main Engine Acceleration		52.7	77.5	67.1	77.1	72.1	66.7	56.9	54.4
Truck Passby (5 to 10 mph)		62.8	72.9	66.7	72.2	70.5	67.5	64.6	63.4
Air Brake Release		63.4	73.8	64.8	70.9	65.1	64.6	63.9	63.6
Two Trucks Maneuvering and Idling (8 minutes)		56.4	79.5	68.2	74.9	71.6	68.7	66.6	63.3
Source: MIG (See Appendix A)									
(A) Measurements occurred from 8:30 AM to 3:00 PM. WH-1 was located approximately 385 feet from the gated warehouse entrance and WH-2 was located 90 feet from the gated warehouse entrance. Both sites were situated approximately 50 feet from the main drive aisle providing access to truck loading/unloading docks and approximately 100 feet from the building façade/truck dock doors.									

4.2.2 NOISE SENSITIVE RECEPTORS

Noise sensitive land uses and receptors are buildings or areas where unwanted sound or increases in sound may have an adverse effect on people or land uses. The City's General Plan identifies that the City considers residential dwellings and institutional uses such as hospitals, convalescent homes, and churches to be sensitive noise receptors and requires that activities conducted in proximity to these facilities must consider the noise output and ensure they don't create unacceptable noise levels that may unduly affect noise-sensitive uses (City of Highland, 2006, p. 7-4). The noise sensitive receptors near the proposed Project site include:

- Single- and multi-family residences located to the north (across West 5th Street and on Meines Street):
 - The closest single-family receptor is located approximately 110 feet north of the Project site, across West 5th Street. The closest single-family residential receptors on Meines Street is located 310 feet north of the Project site. Each of these receptors is located on land zoned and designated by the City for industrial uses and, therefore, are non-conforming residential uses.
 - The closest multi-family residential receptor is located 950 feet northwest of the Project site, across the intersection of Central Avenue and West 5th Street.
- Institutional uses located to the north (across West 5th Street) and west (across Central Avenue) of the site, including:
 - Highland Head Start Preschool located approximately 765 feet west of the Project site across Central Avenue.
 - San J. Racadio Library and Environmental Learning Center located approximately 900 feet northwest of the Project site.

4.3 FEDERAL, STATE, AND LOCAL NOISE REGULATIONS

4.3.1 FEDERAL NOISE AND VIBRATION REGULATIONS

There are no federal noise and vibration regulations that directly apply to the proposed Project.

4.3.2 STATE NOISE AND VIBRATION REGULATIONS

4.3.2.1 California Building Standards Code

The California Building Standards Code is contained in Title 24 of the California Code of Regulations and consists of 11 different parts that set various construction and building requirements. Part 2, California Building Code, Section 1206, Sound Transmission, establishes sound transmission standards for interior walls, partitions, and floor/ceiling assemblies. Specifically, Section 1206.4 establishes that interior noise levels attributable to exterior noise sources shall not exceed 45 dBA DNL or CNEL (as set by the local General Plan) in any habitable room.

The California Green Building Standards (CALGreen) Code is Part 11 to the California Building Standards Code. Chapter 5, Nonresidential Mandatory Standards, Section, establishes additional standards for interior noise levels:

1. Section 5.507.4.1.1 sets forth that buildings exposed to a noise level of 65 dB L_{eq} (1-hour) during any hour of operation shall have exterior wall and roof-ceiling assemblies exposed to the noise source meeting a composting sound transmission class (STC) rating of at least 45 (or an outdoor indoor transmission class (OITC) of 35, with exterior windows of a minimum STC of 40.
2. Section 5.507.4.2 sets forth that wall and roof assemblies for buildings exposed to a 65 dBA L_{eq} pursuant to Section 5.507.4.1.1, shall be constructed to provide an interior noise environment attributable to exterior sources that does not exceed 50 dBA L_{eq} in occupied areas during any hour of operation. This requirement shall be documented by preparing an acoustical analysis documenting interior sound levels prepared by personnel approved by the architect or engineer of record.

4.3.3 CALIFORNIA DEPARTMENT OF TRANSPORTATION

Caltrans' Transportation and Construction Vibration Guidance Manual provides a summary of vibration human responses and structural damage criteria that have been reported by researchers, organizations, and governmental agencies (Caltrans, 2020b). These thresholds are summarized in Table 4-4 and Table 4-5.

Table 4-4: Vibration Threshold Criteria for Building Damage		
Structural Integrity	Maximum PPV (in/sec)	
	Transient	Continuous
Historic and some older buildings	0.50	0.12 to 0.2
Older residential structures	0.50	0.30
New residential structures	1.00	0.50
Modern industrial and commercial structures	2.00	0.50
Source: Caltrans, 2020b		

Table 4-5: Vibration Threshold Criteria for Human Response		
Human Response	Maximum PPV (in/sec)	
	Transient	Continuous
Slightly perceptible	0.035	0.012
Distinctly perceptible	0.24	0.035
Strongly perceptible	0.90	0.10
Severe/Disturbing	2.0	0.7 (at 2 Hz) to 0.17 (at 20 Hz)
Very disturbing	--	3.6 (at 2 Hz) to 0.4 (at 20 Hz)
Source: Caltrans, 2020b		

4.3.4 LOCAL NOISE REGULATIONS

4.3.4.1 City of Highland Municipal Code

Municipal Code Chapter 8.50 implements the goals and objectives of the City's General Plan Noise Element, establishes community-wide noise standards, and regulates excess noise that may be detrimental to citizen's health, safety, welfare, and quality of life. The Municipal Code includes the following standards that would be applicable to the proposed Project:

- Section 8.50.030 (Prohibited Acts) sets forth certain activities are unlawful, including:
 - Sounding any horn or signal device on any automobile, motorcycle, bus or other motor vehicle in any other manner or circumstance(s) or for any other purpose than required or permitted by the Vehicle Code or other state laws (Section 8.50.030.1).
 - Racing the engine of any motor vehicle while the vehicle is not in motion, except when necessary to do so in the course of repairing, adjusting or testing the same (Section 8.50.030.2).
 - Operating or permitting the use of any motor vehicle on any public right-of-way or public place or on private property within a residential zone for which the exhaust muffler, intake muffler or any other noise abatement device has been modified or changed in a manner such that the noise emitted by the motor vehicle is increased above that emitted by the vehicle as originally manufactured (Section 8.50.030.3).
 - The intentional sounding or permitting the sounding outdoors of any fire, burglar, or civil defense alarm, siren, whistle, or any motor vehicle burglar alarm, except for emergency purposes or for testing, unless such alarm is terminated within 15 minutes of activation (Section 8.50.030.5).
 - Creating excessive noise adjacent to any school, church, court or library while the same is in use, or adjacent to any hospital or care facility, which unreasonably interferes with the workings of such institution, or which disturbs or unduly annoys patients in the hospital, provided conspicuous signs are displayed, clearly visible to the motoring public, indicating the presence of a school, institution of learning, church, court or hospital (Section 8.50.030.6).
 - Making or knowingly and unreasonably permitting to be made any unreasonably loud, unnecessary or unusual noise that disturbs the comfort, repose, health, peace and quiet or which causes discomfort or annoyance to any reasonable person of normal sensitivity. The characteristics and conditions that may be considered in determining whether this section has been violated include, but are not limited to, the following: the level of noise, whether the nature of the noise is usual or unusual, whether the origin of the noise is natural or unnatural, the level of the background noise, the proximity of the noise to sleeping facilities, the nature and zoning of the area(s) within which the noise emanates, the density of the inhabitation of the area within which the noise emanates, the time of day or night the noise occurs, the duration of the noise, and whether the noise is produced by a commercial or noncommercial activity (Section 8.50.030.7).
- Section 8.50.050 (Controlled Hours of Operation) sets forth it is unlawful for any person to engage certain activities at a time other than between the hours of 5 AM and 10 PM on any day

in an industrial zone, and between the hours of 7 AM and 10 PM on any day in all other zones. These activities include, but are not limited to:

- Load or unload any vehicle, or operate or permit the use of dollies, carts, forklifts, or other wheeled equipment that causes any impulsive sound, raucous or unnecessary noise within 1,000 feet of a residence.
- Operate or permit the use of domestic power tools, machinery, or any other equipment or tool in any garage, workshop, house or any other structure.
- Operate or permit the use of gasoline or electric-powered leaf blowers such as commonly used by gardeners and other persons for cleaning lawns, yards, driveways, gutters and other property.
- Operate or permit the use of privately operated street/parking lot sweepers or vacuums, except that emergency work and/or work necessitated by unusual conditions may be performed with the written consent of the code enforcement officer.
- Operate or permit the use of electrically operated compressor(s), fan(s) and other similar device(s).
- Operate or permit the use of pile driver(s), steam or gasoline shovel(s), pneumatic hammer(s), steam or electric hoist(s) or other similar device(s).
- Operate or permit the use of any motor vehicle with a gross vehicle weight rating in excess of 10,000 pounds, or of any auxiliary equipment attached to such a vehicle, including but not limited to refrigerated truck compressors, for a period longer than 15 minutes in any hour while the vehicle is stationary and on a public right-of-way or public space, except when movement of said vehicle is restricted by other traffic.
- Load, unload, open, close or otherwise handle garbage cans, recycling bins or other similar objects between the hours of 10:00 p.m. and 7:00 a.m. the following morning, except city-permitted trash collection.
- Section 8.50.060 (Exemptions) specifies certain activities and sources are not subject to the provisions of Municipal Code Chapter 8.50, including, but not limited to:
 - Those noise events in the community (e.g., airport noise, arterial traffic noise, railroad noise) that are more accurately measured by application of the general plan noise element policy, utilizing the community noise equivalent level (CNEL) method (Section 8.50.060.A);
 - Construction, repair or excavation work performed pursuant to a valid written agreement with the city or any of its political subdivisions, which agreement provides for noise mitigation measures (Section 8.50.060.L); and
 - Any activity, to the extent regulation thereof has been preempted by state or federal law (Section 8.50.060.M).

Municipal Code Chapter 15.48 establishes the following hours of operations for construction activities:

- Construction activities shall not commence prior to 7 AM and construction activity shall terminate no later than 7 PM Monday through Saturday with no construction activities performed during city or federal observed holidays. Exceptions to this include emergency construction activities,

construction activities with prior approval by the building official, and construction activities not regulated by the City of Highland (Section 15.48.020.A and 15.48.020.B).

- Construction activities are defined to mean any constructing, modification, repair, renovation, or alteration of any component of a new or existing structure or parcel, including delivery of materials or equipment and site improvements such as, but not limited to grading, flatwork, roads, walls, drains, utilities, or parking lots that do or do not require a permit from the City (Section 15.48.010).

Municipal Code Chapter 16.48 establishes performance standards for existing and proposed development projects which have the capability of impacting the surrounding neighborhood. The Municipal Code includes the following standards that would be applicable to the proposed Project:

- Mechanical and electrical equipment, including air conditioners, pumps, transformers, and heating and ventilation equipment shall be located and operated in a manner that does not materially disturb adjacent uses and activities (Section 16.48.110).
- No uses shall be allowed to create steady-state, earth-borne oscillation which is continuous and occurring more frequently than 100 times per minute on adjacent properties. The ground vibration caused by moving vehicles, trains, aircraft, or temporary construction or demolition is exempted from these limits (Section 16.48.160).

4.3.4.2 City of Highland General Plan

The City's General Plan Noise Element identifies noise issues within the City and establishes goals and policies to minimize noise conflicts and further public health, safety, and welfare (City of Highland, 2006). The City's Noise Element is close related to the General Plan Airport Element, which addresses issues related to the SBIA and Redlands Municipal Airport, including noise. The following goals and policies from the Noise Element may be applicable to the proposed Project:

- Goal 7.1: Protect sensitive land uses and citizens of Highland from annoying and excessive noise through diligent planning and regulation.
 - Policy 1: Enforce the City's Noise Control Ordinance consistent with health and quality of life goals and employ effective techniques of noise abatement through such means as a noise ordinance, building codes and subdivision and zoning regulations.
 - Policy 2: Encourage the use of site planning and architectural techniques such as alternative building orientation and walls combined with landscaping to mitigate noise to levels consistent with interior and exterior noise standards.
 - Policy 3: Require mitigation where sensitive uses are to be placed along transportation routes to ensure compliance with interior and exterior noise standards.
 - Policy 4: Consider the compatibility of proposed land uses with the noise environment when preparing, revising or reviewing development proposals.
 - Policy 5: Prevent the siting of sensitive uses in areas in excess of established 65 dBA CNEL without appropriate mitigation. Special attention should be paid to potential development within the 65 dBA CNEL noise contour of the San Bernardino International Airport and mining operations of the Santa Ana River.

- Policy 6: Work with San Bernardino International Airport Authority to ensure that future airport planning activities encourage consistency with adopted City land use plans and minimize impacts on Highland's economic development opportunities and quality of life.
- Policy 7: Require that site-specific noise studies be conducted by a qualified acoustic consultant utilizing acceptable methodologies while reviewing the development of sensitive land uses or development that has the potential to impact sensitive land uses. Also require a site-specific noise study if the proposed development could potentially violate the noise provisions of the General Plan or City ordinance.
- Action 1: Coordinate with school districts to ensure that schools are located and designed so that: interior noise in classrooms does not exceed 45 CNEL noise exposure does not exceed 65 CNEL at classroom buildings; and noise exposure does not exceed 70 CNEL on playgrounds and athletic fields.
- Action 2: Coordinate with the San Bernardino International Airport Authority to minimize flight patterns over the City.
- Action 3: When site and architectural design features cannot sufficiently reduce adverse noise levels, or cannot be economically provided, require the provision of noise barriers/berms, provided that noise barriers: are sufficiently massive to prevent significant noise transmission and high enough to shield receiver from noise source; noise barriers exhibit a minimum acceptable density of four pounds per square foot (equivalent to 3/4-inch plywood): contain no cracks or openings; and minimize the effect of flanking by bending the barrier back from the noise source at the end of the barrier.
- Action 4: Require landscaping treatment to be provided in conjunction with noise barriers to provide visual relief and to reduce aesthetic impacts.
- Action 6: Maintain a noise complaint file to document areas of excessive noise in the City.
- Goal 7.2: Encourage the reduction of noise from transportation-related noise sources such as automobile and truck traffic.
 - Policy 3: Require that development generating increased traffic and subsequent increases in the ambient noise level adjacent to noise-sensitive land uses provide appropriate mitigation measures.
 - Policy 4: Minimize truck traffic through residential neighborhoods. Encourage the development of alternative transportation modes such as bicycle paths and pedestrian walkways to minimize the number of automobile trips and noise.
 - Action 1: Maintain roadways so that the paving is in good condition to reduce noise-generating cracks, bumps and potholes.
 - Action 4: Consider the effects of truck routes, truck traffic, posted speed limits and future motor vehicle volumes on noise levels adjacent to transportation routes when planning improvements to the circulation system.
- Goal 7.3: Protect residents from the effects of "spill over" or nuisance noise.
 - Policy 2: Prohibit new industrial uses from exceeding commercial or residential stationary-source noise standards at the most proximate land uses, as appropriate. (Industrial noise

- may spill over to proximate industrial uses so long as the combined noise does not exceed the appropriate industrial standards.)
- Policy 3: Require that construction activities employ feasible and practical techniques to minimize noise impacts on adjacent uses. Particular emphasis shall be placed on the restriction of hours in which work other than emergency work may occur.
 - Action 1: As a condition of approval, limit non-emergency construction activities adjacent to existing noise-sensitive uses to daylight hours between 7:00 a.m. and 6:00 p.m. Discourage construction on weekends or holidays except in the case of construction proximate to schools where these operations could disturb the classroom environment.
 - Action 3: Encourage the use of portable noise barriers for heavy equipment operations performed within 100 feet of existing residences or make applicant provide evidence as to why the use of such barriers is infeasible.
- Goal 11.1: Reduce exposure of people to aircraft noise and overflights, and ensure adequate public notification through buyer awareness measures.
 - Policy 1: Limit the development of sensitive land uses located within the 65 decibel (dB) Community Noise Equivalent Level (CNEL) contour.
 - Policy 2: Require acoustical analysis and noise mitigation measures for sensitive land uses, especially residential uses, in areas significantly impacted by noise.
 - Policy 3: Ensure compliance of new development with noise standards in the Code of Federal Regulations and California Airport Noise Regulations.
 - Policy 4: Ensure adherence to standards in the California Building Code (CBC) that govern acceptable interior noise levels associated with exterior airport noise sources.
 - Policy 5: Participate in planning activities relative to the location and activity of airports and minimize negative impacts on economic development objectives and quality of life in the City.
 - Action 1: Disseminate the latest information on noise mitigation through site planning review and construction techniques.
 - Action 2: Review and respond aggressively to any proposals involving new flight patterns, more intense operations over the City, or relocation or extension of runways that would create the potential for noise impacts on sensitive land uses within the City.
 - Action 3: Work with the San Bernardino International Airport Authority to encourage restrictions on hours of operation to minimize noise impacts.

The City's Noise Element includes the following interior, exterior, and noise/land use compatibility standards for land uses in the City (per Goals 7.1, 7.2, and 7.3). These standards are recreated herein this Report as Table 4-6, Table 4-7, and Table 4-8, respectively.

Table 4-6: City of Highland Interior Noise Standards	
Land Use	Interior Noise Standard (dBA CNEL)
Residential	45
Educational/Churches, Other Institutional Uses	45
General Offices	50
Retail Stores, Restaurants	55
Manufacturing, Warehousing	65
Agricultural	55
Sand and Gravel Operations	75
Source: City of Highland 2006, Table 7.1	

Table 4-7: City of Highland Exterior Noise Standards		
Land Use	Time Interval	Exterior Noise Standard (dBA CNEL)
Residential	Daytime (7 AM to 10 PM)	60
	Nighttime (10 PM to 7 AM)	55
Agricultural/Equestrian	Daytime (7 AM to 10 PM)	65
	Nighttime (10 PM to 7 AM)	60
Commercial	Daytime (7 AM to 10 PM)	70
	Nighttime (10 PM to 7 AM)	65
Manufacturing/Industrial	Anytime	75
Open Space	Anytime	75
Source: City of Highland 2006, Table 7.2		

Table 4-8: Community Noise and Land Use Compatibility Guidelines

Land Use Category	Community Noise Equivalent Level (in dBA, CNEL)			
	Normally Acceptable Noise Limit	Conditionally Acceptable Noise Limit	Normally Unacceptable Noise Limit	Conditionally Unacceptable Noise Limit
Residential – Low Density Single Family Dwellings, Duplexes and Mobile Homes	55	70	75	75+
Residential – Multiple Family Dwellings	65	70	75	75+
Transient Lodging – Hotels and Motels	65	70	80	80+
Schools, Libraries, Churches, Hospitals, Nursing Homes	70	70	80	80+
Auditoriums, Concert Halls, Amphitheaters	--	70	70+	--
Sports Arenas, Outdoor Spectator Sports	--	75	75+	--
Playground, Neighborhood Parks	70	--	75	75+
Golf Course, Riding Stables, Water Recreation, Cemeteries	75	--	80	80+
Commercial and Office Buildings	70	77.5	--	77.5+
Industrial, Manufacturing, Utilities, Agriculture	75	80	--	80+
Land Use Compatibility Interpretation:				
Normally Acceptable:	Specific land use is satisfactory based upon the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.			
Conditionally Acceptable:	New construction or development should be undertaken only after a detailed analyses of noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply system or air conditioning will normally suffice. Outdoor environment will seem noisy.			
Normally Unacceptable:	New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made with needed noise insulation features included in the design. Outdoor areas must be shielded.			
Clearly Unacceptable:	New construction or development should generally not be undertaken. Construction cost to make the indoor environment acceptable would be prohibitive and the outdoor environment would not be usable.			
Source: City of Highland, 2006, Table 7.3.				

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5 NOISE IMPACT ANALYSIS

This chapter evaluates the potential for the proposed Project to result in direct and indirect changes to the existing noise and vibration environment in the vicinity of the Project area. Refer to Chapter 6 for information and disclosures about the existing noise and vibration environment's effect and overall compatibility on the proposed Project.

5.1 THRESHOLDS OF SIGNIFICANCE

In accordance with Appendix G of the State CEQA Guidelines, the proposed Project could result in potentially significant impacts related to noise and vibration if it would:

- Generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of the standards established in:
 - City Municipal Code Chapter 8.50 (Noise Control), 15.48 (Hours of Operation for Construction Activities), or Section 16.48 (Performance Standards); or
 - General Plan Noise Element Interior Noise Standards (see Table 4-6), Exterior Noise Standards (see Table 4-7), or applicable policies and actions (see Section 4.3.4.2); or
- Generate excessive ground-borne vibration or ground-borne noise levels in excess of the standards established in:
 - City Municipal Code Section 16.48.160 (Vibration); or
- Expose people residing or working in the Project area to excessive airport-related noise levels.

5.2 NOISE IMPACT ANALYSIS METHODOLOGY

The construction and operation of the proposed Project would generate noise and vibration. This section describes the Project's noise sources and the methodologies used to estimate potential Project noise and vibration levels.

5.2.1 CONSTRUCTION NOISE AND VIBRATION

As described in Section 2.4 and shown in Table 2-3, the proposed Project would generate construction noise from the following sources:

- Heavy equipment operations throughout the Project area. Some heavy equipment would consist of mobile equipment such as a loader, excavator, etc. that would move around work areas; other equipment would consist of stationary equipment (e.g., air compressors) that would generally operate in a fixed location until work activities are complete. Heavy equipment generates noise from engine operation, mechanical systems and components (e.g., fans, gears, propulsion of wheels or tracks), and other sources such as back-up alarms. Mobile equipment generally operates at different loads, or power outputs, and produce higher or lower noise levels depending on the operating load. Stationary equipment generally operates at a steady power output that produces a constant noise level.
- Vehicle trips, including worker, vendor, and haul truck trips. These trips would occur on the roads that provide access to the Project site, primarily West 5th Street.

Since Project-specific construction equipment information is not available at this time, potential construction-related noise impacts can only be evaluated based on the typical construction activities associated with a typical industrial warehousing development project. This Report estimates heavy-duty construction equipment noise levels using the FHWA's Roadway Construction Noise Model (RCNM), Version 2.0. The RCNM is a computer program that uses empirical data and sound propagation principles to predict noise levels associated with a variety of construction equipment and operations. The equipment assumptions used in this Report are based on, and consistent with, the CalEEMod construction phasing, equipment usage, and operating schedules used to evaluate the proposed Project's potential construction air quality impacts (MIG, 2023).

The RCNM was used to model noise levels at eleven (11) different receptor locations that could be impacted by the project's construction noise levels. The locations of the modeled construction noise receptors are summarized in Table 5-1 and shown in Figure 5-1.

Table 5-1: Modeled Construction Noise Receptors		
RCNM Receptor ID	Receptor Type	Location
R01	Residence	27014 West 5th Street
R02	Commercial	27056 West 5th Street
R03	Residence	27060 West 5th Street
R04	Residence	27080 West 5th Street
R05	Residence	27112 West 5th Street
R06	Residence	27124 West 5th Street
R07	Residence	27136 West 5th Street
R08	Residence	27140 West 5th Street
R09	Commercial	26998 3rd Street
R10	Commercial	27007 West 5th Street
R11	Commercial	27015 West 5th Street

Construction noise was modeled for two scenarios:

- Worst Case Construction Noise Levels:** This scenario models potential short-term construction equipment operations along the Project site's property lines. Such operations are assumed to occur during the Project's site preparation, grading, and paving phases. This scenario represents the shortest distance between potential Project construction activities and modeled noise receptors.
- Typical Construction Noise Levels:** This scenario models typical, sustained construction equipment noise levels from the geographic center of the likely work areas at the site. For site preparation and grading phases, typical construction equipment noise levels were modeled from the center of the Project site. For all other phases, typical construction equipment noise levels were modeled from the center of the site on the east and west sides of the proposed building. Typical paving activities were not modeled since these activities would not occur throughout the site like other construction activities.

The RCNM input distance between the closest edge of the work area to the modeled construction noise receptors is shown in Table 5-2.

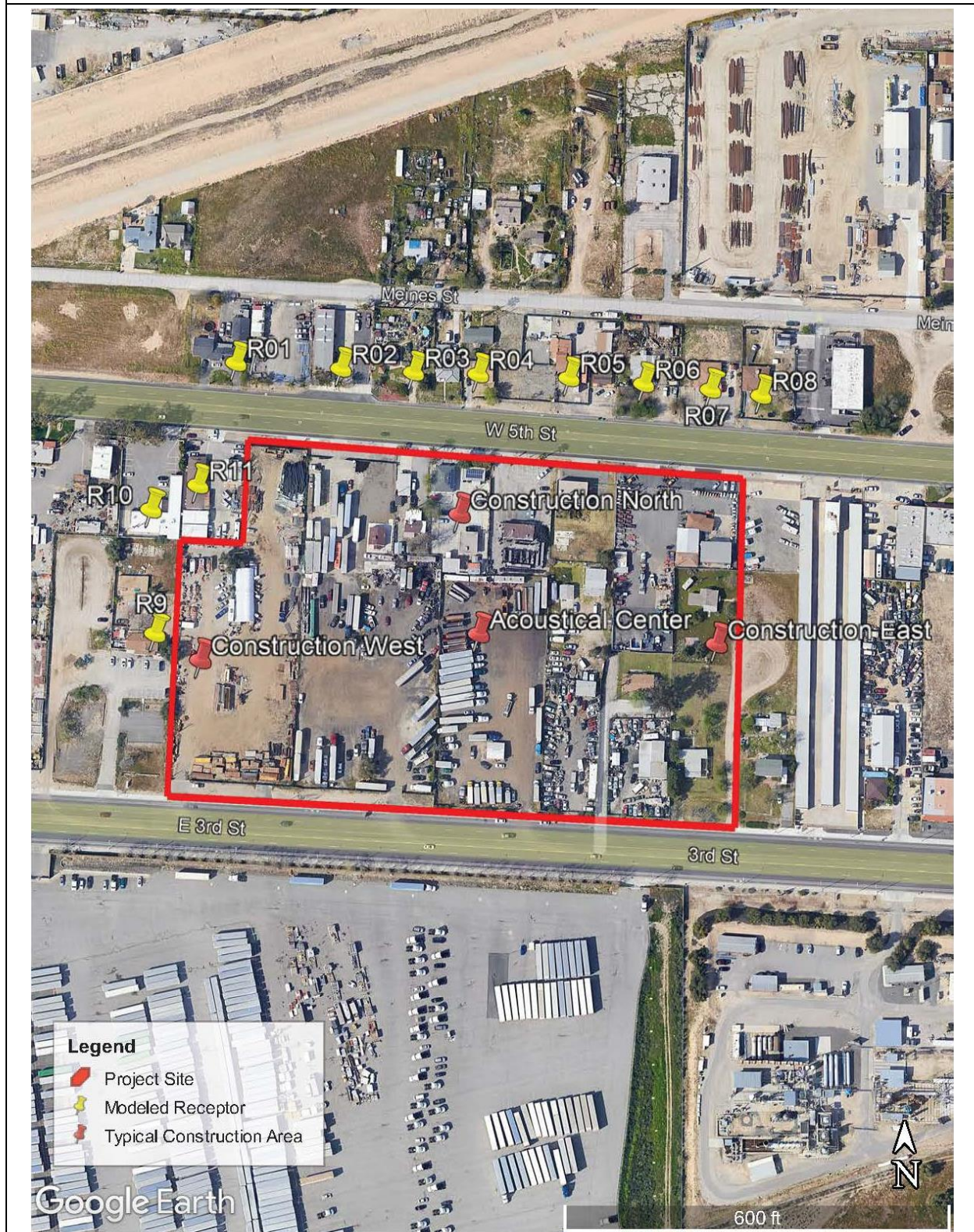
Figure 5-1: Modeled Construction Noise Receptors

Table 5-2: Distance Between Construction Work Areas and Modeled Noise Receptors											
Construction Activity	Modeled Receptor / Distance to Construction Activity^{(A),(B)}										
	R01	R02	R03	R04	R05	R06	R07	R08	R09	R10	R11
Site Preparation (Worst Case)	110	110	115	120	125	125	125	125	35	60	75
Site Preparation (Typical)	445	310	245	230	285	365	455	525	495	500	425
Grading (Worst Case)	110	110	115	120	125	125	125	125	35	60	75
Grading (Typical)	445	310	245	230	285	365	455	525	495	500	425
Trenching	420	305	255	260	320	410	410	410	80	245	270
Building Construction	495	395	345	340	380	445	430	440	130	285	295
Paving	420	305	255	260	320	410	410	410	80	245	270
Architectural Coating	495	395	345	340	380	445	430	440	130	285	295
Source: MIG, 2023 (see Appendix B)											
(A) Worst case distances are measured between the Project property line and the receptor property line.											
(B) Typical distances are measured between the center of the site (site preparation and grading) or the east and west parts of the site (trenching, building foundations, building construction, building MEP, and architectural coating) and the receptor property line or building façade.											

Refer to Appendix B for RCNM modeling input details.

5.2.2 OPERATIONAL NOISE

Once constructed, the proposed Project would generate noise from the following activities:

- Off-site vehicle travel on West 5th Street and East 3rd Street. The proposed Project would generate 28 total daily passenger car trips and 83 total daily truck trips (equal to 111 total vehicle trips and 257 total passenger car equivalent (PCE) trips (Urban Crossroads, 2023).² Passenger vehicles would access the site from East 3rd Street and trucks would access the site from West 5th Street.
- On-site passenger car travel along the site driveways and perimeter road/fire lane along the east and west of the site, automobile parking, and other miscellaneous automobile noise sources such as doors closing and engine start-up and revving. For passenger vehicles, site access was assumed to occur via the east and west entrances on East 3rd Street. On-site automobile travel is assumed to occur at low speeds (15 mph).
- On-site truck travel along the site drive aisle to loading dock areas, truck maneuvering into and out of loading docks, and other miscellaneous sources such as engine start-up and revving, cab door closing, and release of compressed air from truck brake systems. For trucks, site access was assumed to occur via the east and west entrances on West 5th Street. Similar to automobiles, on-site truck travel is assumed to occur at low speeds (no more than 15 mph).

² PCE trips reflect the impact of large trucks, buses, and recreational vehicles on traffic flow. By their size alone, these vehicles occupy the same space as two or more passenger cars. In addition, the time it takes for them to accelerate and slow down is much longer than for passenger cars, and varies depending on the type of vehicle and number of axles. A PCE factor of 1.5, 2.0, and 3.0 was applied to the 2-, 3-, and 4-axle trucks, respectively, that were associated with the proposed Project (Urban Crossroads, 2023).

According to the trip generation assessment prepared for the Project, truck trips are assumed to consist of 2-axle trips (39.7% of all truck trips), 3-axle trips (12.7% of all truck trips) large, heavy-duty 4-axle or more truck trips (47.6% of all truck trips). On-site idling was assumed to occur for up to 15 minutes per loading/unloading operation.

- Cargo Management (i.e., forklifts) operations at truck docks. The proposed project would incorporate up to 29 electric-powered forklifts, pallet jacks and other material handling equipment during operation as described in Section 2.3.3. Forklift operation and backup alarm was assumed to occur at each truck dock for approximately 30 minutes per loading/unloading operation.
- Rooftop mounted HVAC units, assumed to be rated at 5 tons and generally located in the center of the office portions of the proposed building. Each unit would be fully concealed behind a parapet or enclosure that would reduce potential HVAC unit noise levels.
- Other miscellaneous noise sources, such as landscaping equipment, garbage collection services, and other miscellaneous site operations (e.g., occasional electric power jack or pallet lift). These noise sources would be intermittent and would not substantially change overall Project noise levels. Therefore, these noise sources are not discussed further in this Report.

5.2.2.1 Operational Noise Level Estimates

The proposed Project's operational noise levels were estimated using standard theoretical equations for predicting environmental noise levels (Caltrans, 2013). For an ideal point source of sound, the energy contained in a sound pressure wave dissipates and is absorbed by the surrounding environment as the sound wave spreads out in a spherical pattern and travels away from the point source. Theoretically, the sound level attenuates, or decreases, by 6 dB with each doubling of distance from the point source. The change in noise levels between two distances can be calculated according to Equation 1 as follows:

$$\text{Equation 1}$$
$$dBA2 = dBA1 + 20\log (D1/D2)$$

Where:

- dBA1 = Known noise level, such as a reference noise level
- D1 = Distance associated with dBA1
- dBA2 = Noise level at distance 2
- D2 = Distance associated with dBA2

For an ideal line source of sound, the energy contained in a sound pressure wave dissipates and is absorbed by the surrounding environment as the sound wave spreads out in a cylindrical pattern from the source. Theoretically, the sound level attenuates, or decreases, by 3 dB with each doubling of distance from the line source. The change in noise levels between two distances can be calculated according to Equation 2 as follows:

$$\text{Equation 2}$$

$$dBA2 = dBA1 + 10 \log (D1/D2)$$

Where:

- dBA1 = Known noise level, such as a reference noise level
- D1 = Distance associated with dBA1
- dBA2 = Noise level at distance 2
- D2 = Distance associated with dBA2

For noise sources that do not operate continuously (e.g., vehicles and trucks that travel on-site, park, and then cease to generate noise), the average, hourly noise level associated with variable (i.e., non-steady) noise source can be calculated using Equation 3 as follows:

$$\text{Equation 3}$$

$$\text{Hourly } L_{eq} = 10 * \log (P_h) * 10^{(L_p/10)}$$

Where:

- P_h = Percentage or fraction of hour the noise is generated
- L_p = The noise level generated during the partial hour (P_h)

Finally, the total combined sound pressure level from multiple, identical sources of noise at a receiver location can be calculated using Equation 4 as follows:

$$\text{Equation 4}$$

$$SPL_{Total} = SPL_1 + 10 * \log (N)$$

Where:

- SPL_1 = Sound pressure level of one source
- N = Number of identical sources to be added

Reference and potential hourly average noise levels associated with the proposed Project's noise sources are summarized in Table 5-3. All reference noise levels are presented at a distance of three (3) feet from the source.

5.2.3 GROUND-BORNE VIBRATION

Project construction activities would involve the use of large equipment capable of generating ground-borne vibrations. Since Project-specific construction equipment information is not available at this time, potential construction-related vibration impacts can only be evaluated based on the typical construction activities associated with a typical business park / warehousing development. Table 5-4 presents the estimated, worst-case vibration levels that could occur from the operation of the typical large and/or vibration-inducing construction equipment used to develop a business park / warehousing land use project. The equipment assumptions used in this Report are based on, and consistent with, the CalEEMod construction phasing, equipment usage, and operating schedules used to evaluate the proposed Project's potential construction air quality impacts (MIG, 2023).

Table 5-3: Project Noise Source – Reference and Hourly L_{eq} Noise Levels			
Noise Source	Reference dBA^(A)	Duration^(B)	Hourly L_{eq}^(C)
Automobile Trips			
<i>Low speed travel (15 mph)/parking</i>	55	30 seconds	34.2
<i>Door closing</i>	90	1 second	54.4
<i>Engine start and revving</i>	90	10 seconds	64.4
<i>Total Combined Noise Level</i>			64.9
On-Site Truck Trip			
<i>Low speed travel (15 mph)</i>	96	30 seconds	75.2
<i>Maneuvering (w/ backup alarm)</i>	100	150 seconds	86.2
<i>Air brake release</i>	98	3 seconds	67.2
<i>Main engine idling</i>	86	900 seconds	80
<i>Door closing</i>	90	2 second	57.4
<i>Engine start and revving</i>	100	10 seconds	74.4
<i>Forklift operation</i>	70	1800 seconds	67.0
<i>Forklift backup alarm</i>	100	90 seconds	84.0
<i>Total Combined Noise Level</i>			89.4
Truck Entrance Way			
<i>Warehouse Noise Measurement</i>	71.4	3,600 seconds	71.4
HVAC Unit			
<i>Operation (5-ton, with parapet wall)</i>	80	2,400 seconds	68.2
Source: MIG (See Appendix C, Sheet 1)			
(A) Reference dBA is based on a distance of 3 feet.			
(B) Duration is used to estimate the percentage of time the noise is generated per Equation 3 (out of 3,600 seconds in an hour).			
(C) Hourly L _{eq} estimated using Equation 3.			

Table 5-4: Potential Ground-borne Vibration Levels					
Equipment	PPV^(A) (Inches/Second) at Distance				
	25 Feet	50 Feet	100 Feet	150 Feet	200 Feet
Vibratory Roller	0.21	0.098	0.046	0.029	0.021
Large Bulldozer	0.089	0.042	0.019	0.012	0.009
Small Bulldozer	0.03	0.001	0.001	0.00	0.000
Loaded Truck	0.076	0.035	0.017	0.011	0.008
Jackhammer	0.035	0.016	0.008	0.005	0.004
(A) Estimated PPV calculated as: $PPV(D) = PPV(ref) \cdot (25/D)^{1.3}$ where PPV(D)= Estimated PPV at distance; PPVref= Reference PPV at 25 ft; D= Distance from equipment to receiver; and n= ground attenuation rate (1.3 for competent soils).					

5.3 TEMPORARY CONSTRUCTION NOISE AND VIBRATION IMPACTS

The proposed Project's short-term construction-related noise and vibration levels using project-specific information and standard noise and vibration estimation methodologies recommended by Caltrans, the FHWA, and FTA (see Section 5.2.1). The results of this modeling, and a discussion regarding the significance of the Project's construction noise and vibration levels, are provided below.

5.3.1 TEMPORARY CONSTRUCTION NOISE LEVELS

Table 5-5 summarizes modeled construction equipment noise levels at residential and non-residential receptors in the vicinity of the Project site for each anticipated Project construction activity.

Table 5-5: Construction Noise Levels at Modeled Noise Receptors												
Construction Activity	Days	Estimated Noise Level (dBA L_{eq}) ^{(A),(B)}										
		R01	R02	R03	R04	R05	R06	R07	R08	R09	R10	R11
Site Preparation (Worst Case)	3	78.2	78.2	77.8	77.4	77.1	77.1	77.1	77.1	88.1	83.4	81.5
Site Preparation (Typical)	20	66.0	69.2	71.2	71.8	69.9	67.8	65.8	64.6	65.1	65.0	66.4
Grading (Worst Case)	3	81.8	81.8	81.5	81.1	80.7	80.7	80.7	80.7	91.8	87.1	85.2
Grading (Typical)	20	69.7	72.8	74.9	75.4	73.6	71.4	69.5	68.3	68.8	68.7	70.1
Trenching (Typical)	60	67.8	70.6	72.2	72.0	70.2	68.0	68.0	68.0	82.2	72.5	71.7
Building Construction	140	66.7	68.7	69.9	70.0	69.0	67.7	68.0	67.8	78.3	71.5	71.2
Paving (Worst Case)	10	60.1	62.9	64.5	64.3	62.5	60.3	60.3	60.3	74.5	64.8	64.0
Architectural Coating (Typical)	25	53.8	55.7	56.9	57.0	56.1	54.7	55.0	54.8	65.4	58.6	58.3
Source: MIG, 2022 (see Appendix B)												
(A) Worst case distances are measured between the Project property line and the receptor property line.												
(B) Typical distances are measured between the center of the site (site preparation and grading) or the east and west parts of the site (trenching, building foundations, building construction, building MEP, and architectural coating) and the receptor property line or building façade.												

.As shown in Table 5-5, the Project's construction noise levels could reach up to 81.8 dBA L_{eq} at residential receptors, and 91.8 dBA L_{eq} at adjacent commercial receptor locations.

- Residential Receptors (R01, R03, R04, R05, R06, R07, R08):** The modeled worst-case construction noise level at any residential receptor location would be 81.8 dBA L_{eq} . This would occur at the residence located northwest of the Project site (R01), across West 5th Street, during the Project's grading phase. During typical construction periods, construction noise levels would not exceed 76 dBA at any residence on West 5th Street. The estimated temporary increase in daytime noise levels at residential receptor locations could temporarily, under worst-case conditions, be approximately 9.0 dBA L_{eq} to 16.6 dBA L_{eq} (see Table 4-1 and Table 4-2), with the highest increases occurring at R1 during the grading phase and the lowest increases occurring at R5 to R9 during the site preparation phase. Under typical conditions, the temporary increase in daytime noise levels at residential receptors could range from less than 1.0 dBA L_{eq} during the architectural coating phase to approximately 10.2 dBA L_{eq} during the grading phase.

- **Commercial Receptors (R02, R09, R10, R11):** The modeled worst-case construction noise level at any commercial receptor would be 91.8 dBA L_{eq} . This would occur at the Third Street Tavern adjacent to the Project site (R09) during the Project's grading phase. During typical construction periods, construction noise levels would not exceed 72 dBA at the adjacent crematory (R10) or air conditioning contractor (R11), 79 dBA at the adjacent tavern (R9), and 73 dBA at the drywall contractor across West 5th Street (R02). The estimated temporary increase in daytime noise levels at commercial receptor locations could temporarily, under worst-case conditions, be approximately 8.0 dBA L_{eq} to 32.9 dBA L_{eq} (see Table 4-2), with the highest increases occurring at the tavern (R9). Under typical conditions, the temporary increase in daytime noise levels could range from less than 1.0 dBA L_{eq} during architectural coating to 13.1 dBA L_{eq} during building construction. Commercial receptors are not considered sensitive receptors because they lack sensitive outdoor use areas where occupants could be exposed to construction noise levels.

The noise level estimates summarized above are based on peak equipment usage during each construction phase. As construction progresses within each phase, less equipment is usually required to perform activities and, therefore, less equipment noise is generated.

The City's Municipal Code does not establish numeric standards for construction noise levels (e.g., 90 dBA L_{eq}). Construction activities are exempt from the City's noise standards (Section 8.50.060.L) but are limited to the hours of 7 AM to 6 PM Monday thru Saturday by the City's General Plan (Goal 7.3, Action 1), with no construction activities performed during city or federal observed holidays (Section 15.48.020.A). Potential construction noise level increases at the sensitive residential land uses, when compared to the existing ambient noise environment, could range from less than 1.0 to up to 16.6 dBA higher than existing conditions, depending on the construction activities undertaken. This temporary increase in daytime exterior noise levels would represent an approximate doubling to tripling of perceived loudness at sensitive receptor locations for a short duration (i.e., site preparation, grading, and paving activities would last approximately 3 months out of the Project's 12-month long construction schedule). The proposed Project would comply with the City Municipal Code's permissible construction activity time period requirements and would not result in prolonged temporary construction noise levels that exceed an applicable standard. This impact would be less than significant.

To further reduce the Project's less than significant construction noise levels, and to reduce the potential for construction activities to interfere or annoy adjacent receptors or otherwise result in a nuisance, MIG recommends the Project incorporate the following Best Management Practices to control potential construction noise levels.

Construction Noise Control Best Management Practices. To reduce the potential for construction activities to annoy or result in a temporary noise nuisance to adjacent residential receptors, the Applicant and/or its designated contractor, contractor's representatives, or other appropriate personnel shall:

- *Notify Adjacent Land Use of Construction Activities.* This notice shall be provided at least one week prior to the start of any construction activities, describe the construction noise control best management practices to be implemented by the Project, and include the name and phone number of a designated contact for the Applicant and the City of Highland responsible for handling construction-related noise complaints. This notice shall be provided to the owner/occupants of all occupied properties within 250 feet of the Project site.
- *Restrict work hours/equipment noise.* All work shall be subject to the requirements in City Code Section 15.48.020.A and General Plan Goal 7.3, Action 1. Construction activities, including deliveries, shall only occur during the hours of 7:00 AM to 6:00 PM, Monday through Saturday. Construction activities shall be prohibited on Sundays and City- and Federal-observed holidays. The Applicant and/or its contractor shall post a sign at all entrances to the construction site informing contractors, subcontractors, construction workers, etc. of this requirement.
- *Construction equipment selection, use, and noise control measures.* The following measures shall apply during construction activities:
 - Contractors shall use the smallest size equipment capable of safely completing work activities.
 - Construction staging shall occur as far away from the residential properties on West 5th Street as possible.
 - All stationary noise-generating equipment such as pumps, compressors, and welding machines shall be located as far from the residential properties on West 5th Street as possible.
 - Heavy equipment engines shall be covered, and exhaust pipes shall include a muffler in good working condition.
 - Pneumatic tools shall include a noise suppression device on the compressed air exhaust.
 - The Applicant and/or his contractor shall connect to existing electrical service at the site to avoid the use of stationary power generators. This measure shall be subject to the approval of the local electric utility.
 - No radios or other amplified sound devices shall be audible beyond the property line of the construction site.

5.3.2 TEMPORARY CONSTRUCTION VIBRATION LEVELS

The potential for ground-borne vibration and noise is typically greatest when vibratory or large equipment such as rollers, impact drivers, or bulldozers are in operation. For the proposed Project, these types of equipment would primarily operate during site preparation, grading, and paving work. This equipment would, at worst-case and for very limited period of times, operate adjacent to the site's property lines and within approximately 15 feet of the crematory building façade to the west of the site, approximately 25 feet of the Third Street Tavern building façade to the west of the site, approximately 55

feet to the CSR Inc contractor building façade to the west of the site, and approximately 120 feet from the closest residence to the north of the site; however, most construction activities would take place hundreds of feet away from these building locations.³ A summary of predicted worst-case construction vibration levels is presented in Table 5-6.

Table 5-6: Summary of Predicted Construction Vibration Levels			
Scenario / Receptor	Estimated Duration	Maximum PPV, Vibratory Roller (inches/second)^(A)	Maximum PPV, Typical Equipment (inches/second)^(A)
Worst-Case Construction (15 feet from crematory building to the west)	1 day	0.368	0.156
Worst-Case Construction (25 feet from tavern to the west)	1 day	0.210	0.089
Worst-Case Construction (55 feet from contractor building to the west)	1 day	0.088	0.037
Worst-Case Construction (120 feet from residence to the north)	1 week	0.036	0.015
Source: FTA, 2018 and MIG (see Appendix B).			
(A) Values represent highest estimated ground-borne vibration level for vibratory roller and typical construction equipment (see Appendix B).			

As shown in Table 5-6, the proposed Project's construction activities would have the potential to generate worst-case ground-borne vibration levels up to 0.368 in/sec PPV at non-residential buildings to the west of the site. These vibration levels are associated with the operation of a vibratory roller at the Project's western boundary. All other equipment operating along the western boundary would generate groundborne vibration levels up to 0.156 in/sec PPV. Potential typical and worst-case vibration levels at adjacent commercial buildings to the west would be above Caltrans' strongly perceptible threshold for human annoyance from continuous vibration sources (0.10 in/sec PPV; see Table 4-5); however, at no point would potential vibration levels at adjacent commercial building façades exceed Caltrans' thresholds for potential damage to modern industrial and commercial structures (0.50 in/sec PPV, see Table 4-4). Similarly, potential typical (0.015 in/sec PPV) and worst case (0.036 in/sec PPV) vibration levels at the closest residential building across West 5th Street would exceed Caltrans' slightly and distinctly perceptible thresholds for human annoyance from continuous vibration sources (0.01 in/sec PPV and 0.035 in/sec PPV, respectively; see Table 4-5) but would not exceed Caltrans' thresholds for potential damage to older residential structures (0.3 in/sec PPV, see Table 4-5).

Although construction activities could generate perceptible vibrations when work occurs adjacent to commercial structures and within approximately 120 feet of residences, these vibrations would not be excessive because they would be intermittent (lasting only a few hours each day), temporary (lasting a few days at worst), occur during the daytime (i.e., would not interfere with evening or nighttime use of residences), and would not result in physical damage to any building or structure. For these reasons, the proposed Project would not generate excessive construction-related ground-borne vibration or noise levels. This impact would be less than significant.

³ The worst-case distance between potential vibration generating work areas and nearby building façades is as measured from the edge of paved/hardscaped areas to the building façade. Landscape buffer areas are not assumed to involve vibratory equipment operations.

5.4 OPERATIONAL NOISE IMPACTS

Once constructed, the proposed Project would generate noise from on-site and off-site activities. On-site activities would include vehicle and truck travel, HVAC operations, and other miscellaneous site maintenance and operations activities. Off-site noise activities would include vehicle and truck travel on West 5th Street and East 3rd Street. These noise sources are described in Section 5.2.2.

5.4.1 ON-SITE NOISE GENERATION ANALYSIS

The proposed Project's potential noise levels were estimated using the reference and calculated hourly L_{eq} noise levels identified in Table 5-3 above, adjusted for distance (between the noise source and property line) and activity levels (e.g., number of automobile trips, trucks idling, etc.). In general, the estimated noise levels are theoretical predictions; they do not account for potential reflection or partial shielding, atmospheric or ground absorption, or other excess attenuation factors. For multiple noise sources such as cars parking, trucks idling, HVAC units, etc., noise levels were modeled from a single location to conservatively aggregate noise levels from an area (i.e., overestimate noise levels coming from any single point). For the purposes of this analysis, the Project's noise sources (HVAC units, parking areas, drive aisles, and truck dock bays) were treated as stationary noise sources. Although the noise generated from parking areas, drive aisles, and truck dock bays is primarily generated by cars and trucks (mobile sources) and not stationary sources, this analysis conservatively compares noise from these sources against the City's exterior stationary source noise standards because noise from these areas would generally come from a fixed location (e.g., an idling truck, a parked car, etc.). In addition, it is assumed that all on-site travel would occur at slow speed (15 mph or less), and due to the short distance traveled on-site (as little as approximately 200 feet to some dock locations), on-site truck travel would be similar to a stationary source (as compared to a trucks travelling on West 5th Street or East 3rd Street). Project noise levels were estimated at eight (8) representative property line receptor locations surrounding the site, as shown in Figure 5-2. Only Project noise sources within 700 feet of a noise receptor that had a direct line of sight to the receptor were included in the noise prediction estimates. The distance between property line receptor locations and the Project's noise sources is shown in Table 5-7.

Figure 5-2: Operational Noise Sources and Property Line Receptor Locations

Table 5-7: Summary of Distance Between Project Noise Source and Property Line Receptors

Project Noise Source	Distance in Feet Between Noise Source and Property Line Receptors ^(A)							
	R01 Residential	R02 Commercial	R03 Residential	R04 Residential	R05 Residential	R06 Commercial	R07 Commercial	R08 Commercial
Truck Entrance 1	110	115	305	560	690	--(B)	110	375
Truck Entrance 2	--(B)	640	420	180	100	270	--(B)	--(B)
Drive Aisle 1	230	215	330	550	680	--(B)	--(B)	90
Drive Aisle 2	430	320	200	315	420	--(B)	--(B)	370
Drive Aisle 3	--(B)	615	400	220	210	100	--(B)	700
Docks 1-4	300	250	310	515	635	650	--(B)	170
Docks 5 -11	350	270	270	450	560	570	--(B)	240
Docks 12-18	440	340	250	360	460	460	--(B)	350
Docks 19 -25	530	410	265	295	380	360	--(B)	455
Docks 26 - 32	625	500	315	255	310	255	--(B)	560
Docks 33 - 34	690	560	370	250	270	180	--(B)	630
Parking Area 1	--(B)	--(B)	--(B)	--(B)	--(B)	--(B)	20	20
Parking Area 2	--(B)	--(B)	--(B)	--(B)	--(B)	20	--(B)	--(B)
Office HVAC	--(B)	640	450	300	295	135	--(B)	700

(A) The Project includes several distinct parking areas, truck dock bays, and HVAC equipment locations (see Appendix C). The listed distance reflects the closest distance between the listed noise source and the property line receptor.

(B) “—” indicates noise source does not contribute to noise levels at the property line receptor because it is more than 700 feet away from the receptor or the receptor is shielded from the noise source by the proposed warehouse building.

The following discusses the key assumptions made to estimate potential Project noise levels at noise receptor locations:

- *Truck entrances:* Truck entrances would be located on West 5th Street. Truck entrances include truck turns into and out of the facility and are assumed to produce an average hourly noise level of approximately 71.4 dBA at a distance of 3 feet (see Table 5-3).
- *On-site passenger car parking:* Parking areas were assumed to require vehicle travel/maneuvering, doors closing, and engine start/revving activities that would produce an average hourly noise level of approximately 64.9 dBA at a distance of 3 feet (see Table 5-3). Only parking areas with a potential direct line of sight to receptor locations were evaluated. Parking areas were assumed to be fully occupied.
- *On-site truck travel:* Each on-site truck trip was assumed to travel at low speed (no more than 15 mph) and produce an average hourly noise level of 75.2 dBA at a distance of 3 feet (see Table 5-3). Truck travel lanes would include the West 5th Street driveways. The amount of peak on-site truck travel activity (seven (7) total trips in the peak hour periods) was determined from the Project's Trip Generation Assessment (Urban Crossroads, 2023).
- *On-site truck maneuvering and idling and cargo management:* Loading dock areas were assumed to require truck travel and maneuvering, back-up alarms, air brake release, and other related activities that would produce an average hourly noise level of approximately 87.9 dBA

at a distance of 3 feet (see Table 5-3). Dock areas would face towards residential receptors, which would have property lines located at least 240 feet to the north of the docks. Dock areas would be located approximately 180 feet from adjacent commercial property lines to the northwest. The docks would not have a direct line of sight to most receptors due to an 8-foot-tall screening wall surrounding the dock. Each dock area was assumed to be occupied by one (1) truck each hour. The 8-foot-tall concrete screening wall was assumed to provide 0 dBA of attenuation/no screening (for R06 and R08), 6.6 dBA of attenuation (for R01, R02, and R03), or 5 dBA of attenuation (for R04 and R05).

- **HVAC units:** HVAC units were assumed to operate for 40 minutes of each hour and produce an average hourly noise level of 71.4 dBA at a distance of 3 feet. HVAC units would be located behind a parapet wall that would provide at least 5 dB of attenuation. HVAC units would be located in the center of the office space area.

5.4.1.1 Compliance with City Exterior Noise Standards

The Project's stationary source, energy-averaged hourly noise levels at modeled receptor locations are summarized in Table 5-8.

Table 5-8: Comparison of Project Noise Levels to County Exterior Stationary Noise Standards								
Project Noise Source	Estimated Noise Level at Property Line Receptor							
	R01 Residential	R02 Commercial	R03 Residential	R04 Residential	R05 Residential	R06 Commercial	R07 Commercial	R08 Commercial
Truck Entrance 1	40.1	39.7	31.3	26.0	24.2	--(A)	40.1	29.5
Truck Entrance 2	--(A)	24.8	28.5	35.8	40.9	32.3	--(A)	--(A)
Drive Aisle 1	46.0	46.6	42.8	38.4	36.6	--(A)	--(A)	45.7
Drive Aisle 2	40.5	43.1	47.2	43.2	40.7	--(A)	--(A)	33.4
Drive Aisle 3	--(A)	37.4	41.2	46.4	46.8	53.2	--(A)	36.3
Docks 1-4	42.8	44.4	42.5	39.7	37.9	37.6	--(A)	54.3
Docks 5 -11	41.4	43.7	43.7	40.8	38.9	38.8	--(A)	51.3
Docks 12-18	39.5	41.7	44.4	42.8	40.7	40.7	--(A)	48.0
Docks 19 -25	37.8	40.1	43.9	44.5	42.3	42.8	--(A)	45.8
Docks 26 - 32	36.4	38.3	42.4	45.8	44.1	45.8	--(A)	44.0
Docks 33 - 34	35.6	37.4	41.0	45.9	45.3	48.8	--(A)	42.9
Parking Area 1	--(A)	--(A)	--(A)	--(A)	--(A)	--(A)	58.4	58.4
Parking Area 2	--(A)	--(A)	--(A)	--(A)	--(A)	58.4	--(A)	-
Office HVAC	--(A)	26.7	29.7	33.2	33.4	40.2	--(A)	25.9
Total Combined Noise Level	51.3	52.9	53.6	53.7	52.7	60.3	58.4	62.5
Exterior Daytime Standard ^(B)	60	70	60	60	60	70	70	70
Exterior Nighttime Standard ^(B)	55	65	55	55	55	65	65	65
Standard Exceeded?	No	No	No	No	No	No	No	No
Source: MIG (See Appendix C, Sheet 2)								
(A) “—” indicates noise source does not contribute to noise levels at the property line receptor because it is more than 700 feet away from the receptor or the receptor is shielded from the noise source by the proposed warehouse building.								
(B) See Table 4-7.								

As shown in Table 5-8, the proposed Project's stationary noise sources would not generate noise levels that exceed the City's exterior noise standards for residential or commercial land uses. Truck operations would not exceed the City's standards at residential receptor locations (to the north) because the proposed Project's truck dock bays would be set a minimum of 250 feet from residential property lines and shielded from residential receptors by an 8-foot-tall concrete screening wall. This impact would be less than significant.

5.4.1.2 Compliance with City Interior Noise Standards

As shown in Table 5-8, the proposed Project would not generate noise levels that exceed the City's exterior noise standards for residential or commercial land uses. The maximum estimated hourly L_{eq} values at residential receptor property lines (R01, R03, R04, R05) would be 53.6 dBA L_{eq} . Typical residential-type construction achieves a minimum of 15 to 20 dBA of exterior-to-interior noise reduction, which would be sufficient to ensure the City's interior 45 CNEL standard (see Table 4-6) is met inside nearby residential. The maximum estimated hourly L_{eq} values at a commercial property line (R02, R06, R07, and R08) would be 62.5 dBA L_{eq} . Typical commercial-type construction also achieves a minimum of 15 to 20 dBA of exterior-to-interior noise reduction which would be sufficient to ensure the City's interior 55 CNEL standard (see Table 4-6) is met inside adjacent commercial buildings. This impact would be less than significant.

5.4.1.3 Compliance with City of Highland General Plan

The Project's consistency with the applicable policies of the City's General Plan Noise Element is summarized in Table 5-9.

Table 5-9: Project Consistency with Applicable General Plan Noise Policies	
General Plan Noise Element Goal/Policy	Consistency Analysis
Goal 7.1: Protect sensitive land uses and citizens of Highland from annoying and excessive noise through diligent planning and regulation.	
Policy 1: Enforce the City's Noise Control Ordinance consistent with health and quality of life goals and employ effective techniques of noise abatement through such means as a noise ordinance, building codes and subdivision and zoning regulations.	Consistent. As discussed in Section 5.4.1.1 and Section 5.4.1.2, the proposed Project would not generate noise levels that exceed the City's exterior or interior noise standards.
Policy 2: Encourage the use of site planning and architectural techniques such as alternative building orientation and walls combined with landscaping to mitigate noise to levels consistent with interior and exterior noise standards.	Consistent. The proposed Project's truck dock bays would be along the northern perimeter of the warehouse building, behind 8-foot-tall concrete screening walls. The building would screen the docks from shared commercial property lines, and the concrete walls would screen docks from shared commercial property lines and residential uses to the north (across West 5 th Street).
Policy 4: Consider the compatibility of proposed land uses with the noise environment when preparing, revising or reviewing development proposals.	Consistent. As discussed in Section 6.2, the Project is not a noise-sensitive land use and would be located in an area that meets the City's 75 CNEL normally acceptable noise and land use compatibility limit for industrial land uses.

Table 5-9: Project Consistency with Applicable General Plan Noise Policies	
General Plan Noise Element Goal/Policy	Consistency Analysis
Policy 7: Require that site-specific noise studies be conducted by a qualified acoustic consultant utilizing acceptable methodologies while reviewing the development of sensitive land uses or development that has the potential to impact sensitive land uses. Also require a site-specific noise study if the proposed development could potentially violate the noise provisions of the General Plan or City ordinance.	Consistent. As described in Chapter 5 of this Report, the noise impact analysis prepared for the proposed Project indicates the Project comply with applicable City standard related to noise and would not result in a significant noise impact on any noise sensitive land use.
Goal 7.2: Encourage the reduction of noise from transportation-related noise sources such as automobile and truck traffic	
Policy 3: Require that development generating increased traffic and subsequent increases in the ambient noise level adjacent to noise-sensitive land uses provide appropriate mitigation measures.	Consistent. As described in Section 5.4.2, the proposed Project would not generate a substantial increase in traffic or traffic-related noise levels on West 5 th Street or East 3 rd Street.
Goal 7.3: Protect residents from the effects of “spill over” or nuisance noise.	
Policy 2: Prohibit new industrial uses from exceeding commercial or residential stationary-source noise standards at the most proximate land uses, as appropriate. (Industrial noise may spill over to proximate industrial uses so long as the combined noise does not exceed the appropriate industrial standards.)	Consistent. As discussed in Section 5.4.1.1 and Section 5.4.1.2, the proposed Project would not generate noise levels that exceed the City’s exterior or interior noise standards at adjacent residential or commercial land uses.
Policy 3: Require that construction activities employ feasible and practical techniques to minimize noise impacts on adjacent uses. Particular emphasis shall be placed on the restriction of hours in which work other than emergency work may occur	Consistent. As discussed in Section 5.3.1, the proposed Project would not result in significant construction noise impacts at any sensitive noise receptor. Best management practices are recommended for inclusion in the Project to reduce the potential for construction noise levels to annoy or interfere with adjacent land uses.

Table 5-9: Project Consistency with Applicable General Plan Noise Policies	
General Plan Noise Element Goal/Policy	Consistency Analysis
Action 1: As a condition of approval, limit non-emergency construction activities adjacent to existing noise-sensitive uses to daylight hours between 7:00 a.m. and 6:00 p.m. Discourage construction on weekends or holidays except in the case of construction proximate to schools where these operations could disturb the classroom environment	Consistent. The proposed Project would comply with the requirements in City Code Section 15.48.020.A and General Plan Goal 7.3, Action 1. Construction activities, including deliveries, shall only occur during the hours of 7:00 AM to 6:00 PM, Monday through Saturday. Construction activities shall be prohibited on Sundays and City- and Federal-observed holidays. Recommended best management practices would require the applicant and/or its contractor to post a sign at all entrances to the construction site informing contractors, subcontractors, construction workers, etc. of this requirement.
Action 3: Encourage the use of portable noise barriers for heavy equipment operations performed within 100 feet of existing residences or make applicant provide evidence as to why the use of such barriers is infeasible	Consistent. As shown in Table 5-2, the proposed Project would not involve construction activities within 100 feet of an existing residential sensitive use area or other noise-sensitive land uses.

5.4.2 OFF-SITE OPERATIONAL NOISE LEVELS

The proposed Project would generate vehicle trips that would be distributed onto the local roadway system and potentially increase noise levels along travel routes. Caltrans considers a doubling of total traffic volume to result in a three (3) dBA increase in traffic-related noise levels (Caltrans, 2013). If the proposed Project would not result in a doubling of traffic volumes on the local roadway system, it would not result in a substantial permanent increase in traffic-related noise levels.

The proposed Project would result in a net increase in trip generation equal to 111 total vehicle trips, or approximately 257 PCE trips, on a daily basis, which would be distributed onto West 5th Street and East 3rd Street (Urban Crossroads, 2023). Although average daily traffic (ADT) volumes on West 5th Street and East 3rd Street were not collected for the Project, recent traffic noise modeling for the San Bernardino Countywide Plan indicates 3rd street has a minimum ADT volume of several thousand vehicles (County of San Bernardino, 2020, Appendix J). West 5th Street is assumed to have a higher ADT due to its direct connection to the I-210. The addition of Project trips to these roadways would not result in a doubling of traffic volumes or a substantial change in off-site traffic noise levels. This impact would be less than significant.

5.5 AIRPORT-RELATED NOISE

As described in Section 4.2.1.1, the proposed Project is located approximately 0.4 miles north of the nearest runway associated with the SBIA. An airport land use compatibility plan has not been prepared for the SBIA (City of Highland, 2006); however, according to the City's zoning map, the proposed Project site is located within SBIA Safety Zone D and E, which has low to negligible risk. Additionally, the City's Municipal Code (Section 16.40.410) establishes that warehouses are compatible with these safety zones and acceptable without safety-related conditions. Noise contours prepared for the Eastgate Air Cargo

Facility Final Environmental Assessment indicates the southern part of the proposed Project site (the part of the site within approximately 100 feet of the right-of-way boundary for East 3rd Street) is within the airport's future 65 CNEL noise zone, which was developed assuming approximately 240 average daily and 87,617 total annual aircraft operations in 2024 (SBIAA, 2019, Table 4-21 and Figure 4-8). The remainder of the site is within the 60 CNEL contour. The project is not a noise-sensitive land use that would be prohibited within the potential 65 CNEL noise contour associated with the SBIA. There are no outdoor uses associated with the Project in the potential 65 CNEL contour area other than parking, and standard exterior-to-interior noise attenuation would result in interior noise levels that are less 45 CNEL. Therefore, the proposed Project would not expose people working in the Project area to excessive airport-related noise levels.

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6 OTHER NOISE AND VIBRATION EFFECTS

The California Supreme Court in *California Building Industry Association v. Bay Area Air Quality Management District*, 62 Cal.4th 369 (2015) ruled that CEQA review is focused on a project's impact on the environment "and not the environment's impact on the project." Per this ruling, a Lead Agency is not required to analyze how existing conditions might impact a project's future users or residents; however, a Lead Agency may elect to disclose information relevant to a project even if it not is considered an impact under CEQA. Furthermore, the City's General Plan Noise Element set noise standards for receiving land uses which require evaluation for consistency and compliance even if such evaluation is not required by CEQA.

This chapter discusses the existing noise environment and the degree to which the existing environment is compatible and consistent with City goals, policies, and standards for the proposed Project's noise environment.

6.1 REVIEW STANDARDS

The existing noise environment described in Section 4.2 is reviewed against the following goals, policies and standards set by the General Plan Noise Element. Would the Project:

- Expose people living or working in the project area to existing noise levels that exceed the standards established in:
 - General Plan Noise Element Community Noise and Land Use Compatibility Guidelines (see Table 4-8); or
 - The California Building Code.

6.2 LAND USE COMPATIBILITY – EXTERIOR NOISE EXPOSURE

The City's General Plan Noise Element establishes 70 CNEL as the normally acceptable noise exposure limit for office land uses and 75 CNEL as the normally acceptable noise exposure limit for industrial land uses (see Table 4-8). As described in Section 4.2.1, the 24-hour CNEL value at LT-1 was determined to be 68.4 dBA CNEL (see Table 4-1), with short-term hourly ambient noise levels in the vicinity of the site also generally near or above 65 dBA L_{eq} (see Table 4-2). The proposed Project is not a noise-sensitive land use. As warehousing land use, elevated interior noise levels are not likely to interfere with speech or other communications. Workers and customers are unlikely to expect or require quiet conditions and the site plan does not include any large outdoor open space or exterior use areas intended for respite or relaxation. For these reasons, the proposed Project would not be exposed to unacceptable exterior noise levels that exceed City General Plan noise and land use compatibility standards.

6.3 INTERIOR NOISE LEVEL COMPATIBILITY

Part 2, California Building Code, Section 1206.4 establishes that interior noise levels attributable to exterior noise sources shall not exceed 45 dBA DNL or CNEL (as set by the local General Plan) in any habitable room. In addition, Chapter 5 of the California Green Building Standards Code sets forth that buildings exposed to a noise level of 65 CNEL (where noise contours are available) or 65 dBA L_{eq} (1-hour where noise levels are not available) shall: 1) have exterior wall and roof-ceiling assemblies exposed to the noise source that meeting a composite STC rating of at least 50 (or a composite OITC) rating no less than 40, with exterior windows of a minimum STC of 40 or OITC 30 (Section 5.507.4.1); or 2) provide an interior

noise environment attributable to exterior sources that does not exceed 50 dBA Leq in occupied areas during any hour of operation. In addition, County Code Section 83.01.080 (h) sets forth that warehousing areas shall be sound attenuated to meet an interior sound level of 65 dBA.

As described above, the proposed building's northern façade would be subjected to noise levels of approximately 68.4 dBA CNEL. Standard construction techniques and materials for new commercial/industrial buildings are commonly accepted to provide a minimum exterior to interior noise attenuation (i.e., reduction) of 30 to 32 dBA with all windows and doors closed, which would result in interior noise levels of approximately 38 dBA Leq for occupied rooms fronting West 5th Street or East 3rd Street.⁴ Thus, with standard construction techniques, the proposed Project would satisfy interior building code noise requirements.

4 The U.S. Department of Housing and Urban Development (HUD) Noise Guidebook and supplement (2009a, 2009b) includes information on noise attenuation provided by building materials and different construction techniques. As a reference, a an exterior wall consisting solely of 4 x 8 x 16, 3-cell lightweight concrete masonry units with a density of 17 pounds per block has an STC rating of 40. This reduction may be slightly lower (2-3 dBs) for traffic noise due to the specific frequencies associated with traffic noise.

7 REPORT PREPARERS AND REFERENCES

This Report was prepared by MIG under contract to CHIPT Highland 210, L.P. This report reflects the independent, objective, professional opinion of MIG. The following individuals were involved in the preparation and review of this Report:

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7.1 REFERENCES

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APPENDIX A: Ambient Noise Monitoring Data

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Highland East Industrial Building Project
Highland, CA
Appendix: Ambient Noise Monitoring Data
Prepared by MIG, June 2022

TABLE 1: SUMMARY OF SITE LT1 NOISE MONITORING DATA												
Date	Time	Duration	Leq	CNEL	Lmin	Lmax	L(01)	L(08)	L(16)	L(25)	L(50)	L(90)
6/7/2022	9:00 AM	1 hour	65.1	65.1	45.2	85.0	73.4	69.6	67.2	65.3	61.5	56.9
6/7/2022	10:00 AM	1 hour	63.5	63.5	40.3	79.8	71.9	68.2	66.1	64.4	59.7	48.4
6/7/2022	11:00 AM	1 hour	64.2	64.2	39.1	82.2	73.2	69.1	66.4	64.6	59.5	47.2
6/7/2022	12:00 PM	1 hour	63.8	63.8	37.3	80.5	71.9	68.6	66.4	64.9	60.3	49.3
6/7/2022	1:00 PM	1 hour	63.8	63.8	38.8	80.6	72.1	68.6	66.4	64.6	59.8	49.0
6/7/2022	2:00 PM	1 hour	66.5	66.5	41.4	92.8	77.1	70.3	67.3	65.5	61.1	50.7
6/7/2022	3:00 PM	1 hour	65.1	65.1	39.8	85.4	74.0	69.6	67.3	65.6	61.1	50.3
6/7/2022	4:00 PM	1 hour	65.7	65.7	45.0	85.7	73.9	70.1	68.2	66.7	62.5	53.7
6/7/2022	5:00 PM	1 hour	66.6	66.6	45.7	88.6	75.2	70.8	68.8	67.5	63.3	53.6
6/7/2022	6:00 PM	1 hour	65.4	65.4	42.8	90.2	74.8	69.8	67.4	65.9	60.8	51.2
6/7/2022	7:00 PM	1 hour	62.6	67.6	43.1	77.0	70.9	67.7	65.2	63.6	58.4	49.3
6/7/2022	8:00 PM	1 hour	66.4	71.4	39.8	95.2	77.9	70.5	65.5	63.4	58.3	47.8
6/7/2022	9:00 PM	1 hour	61.7	66.7	41.5	81.1	70.8	66.8	64.1	62.2	56.3	46.0
6/7/2022	10:00 PM	1 hour	61.0	71.0	39.7	80.5	70.0	66.2	63.3	61.3	55.9	49.5
6/7/2022	11:00 PM	1 hour	58.6	68.6	41.8	75.9	68.3	64.4	60.9	57.5	49.3	45.1
6/8/2022	12:00 AM	1 hour	57.5	67.5	40.7	78.9	68.4	62.7	58.0	54.5	48.0	43.6
6/8/2022	1:00 AM	1 hour	55.1	65.1	39.7	74.0	65.7	60.8	55.7	51.4	44.5	42.0
6/8/2022	2:00 AM	1 hour	56.0	66.0	40.3	75.6	66.3	61.7	56.9	53.4	47.2	44.4
6/8/2022	3:00 AM	1 hour	59.6	69.6	40.5	89.8	71.6	63.6	57.7	54.1	47.7	44.2
6/8/2022	4:00 AM	1 hour	59.9	69.9	45.1	81.2	70.6	64.9	60.9	57.6	50.9	46.7
6/8/2022	5:00 AM	1 hour	63.1	73.1	45.8	79.8	72.2	68.4	65.8	63.5	56.7	48.7
6/8/2022	6:00 AM	1 hour	64.6	74.6	45.3	79.6	72.7	69.5	67.4	65.9	60.7	49.9
6/8/2022	7:00 AM	1 hour	66.0	66.0	46.1	84.0	74.1	70.9	68.6	67.2	62.3	51.8
6/8/2022	8:00 AM	1 hour	66.3	66.3	45.6	90.8	76.7	70.4	67.4	65.7	61.3	51.2
6/8/2022	9:00 AM	1 hour	63.8	63.8	40.2	83.4	72.7	68.4	66.1	64.3	59.5	49.4
6/8/2022	10:00 AM	1 hour	63.2	63.2	39.9	79.5	71.6	68.2	66.0	64.1	58.5	48.8
6/8/2022	11:00 AM	1 hour	64.3	64.3	40.1	85.1	73.5	68.7	66.4	64.7	59.8	51.6
6/8/2022	12:00 PM	1 hour	64.5	64.5	43.1	81.1	72.8	69.2	66.8	65.2	60.9	53.7
Daytime (7 AM to 7 PM)			65.3	--	37.3	92.8	74.5	69.8	67.4	65.8	61.2	52.0
Evening (7 PM to 10 PM)			64.1	--	39.8	95.2	74.6	68.6	65.0	63.1	57.8	47.9
Nighttime (10 PM to 7 AM)			60.5	--	39.7	89.8	70.1	65.6	62.5	60.2	54.3	46.8
	24-hour CNEL		--	68.4	24-hour DNL		67.9	-	-	-	-	-

Highland East Industrial Building Project
Highland, CA
Appendix: Ambient Noise Monitoring Data
Prepared by MIG, June 2022

TABLE 2: SUMMARY OF SHORT-TERM NOISE MONITORING DATA												
Site	Date	Time	Duration	Leq	Lmin	Lmax	L(01)	L(08)	L(16)	L(25)	L(50)	L(90)
ST-1	6/7/2022	9:40 AM	1 hour	66.3	44.1	83.5	75.9	71.2	68.4	66.0	60.5	51.5
ST-2	6/7/2022	10:50 AM	1 hour	68.1	46.1	84.4	77.8	73.3	70.2	67.7	61.4	51.0
ST-3	6/7/2022	12:00 PM	1 hour	68.0	42.4	83.5	76.4	72.7	70.4	68.8	64.3	54.8
ST-4	6/7/2022	1:05 PM	1 hour	68.3	42.8	91.7	77.4	73.0	69.9	68.1	63.6	55.7
ST-5	6/8/2022	9:30 AM	1 hour	58.4	39.9	80.4	68.9	63.5	58.4	55.8	51.9	45.9
ST-1	6/8/2022	10:32 AM	1 hour	68.0	43.3	90.0	78.6	72.8	68.7	66.3	60.9	52.5
ST-6	6/8/2022	11:40 AM	1 hour	52.9	41.5	71.4	59.7	57.2	55.2	53.5	50.5	46.5
ST-2	6/8/2022	12:45 PM	1 hour	68.5	43.6	90.3	78.1	73.6	70.9	68.6	62.4	51.8

TABLE 3: SUMMARY OF LONG-TERM NOISE MONITORING DATA (for Comparison to ST sites)												
Site	Date	Time	Duration	Leq	Lmin	Lmax	L(01)	L(08)	L(16)	L(25)	L(50)	L(90)
LT-1	6/7/2022	9:40 AM	1 hour	63.9	40.3	81.4	71.8	68.9	66.6	64.8	60.1	52.7
LT-1	6/7/2022	10:50 AM	1 hour	63.9	39.5	80.6	72.6	68.8	66.3	64.5	59.5	47.1
LT-1	6/7/2022	12:00 PM	1 hour	63.8	37.3	80.5	71.9	68.6	66.4	64.9	60.3	49.2
LT-1	6/7/2022	1:05 AM	1 hour	63.8	38.8	80.6	72.1	68.7	66.5	64.8	60.0	48.4
LT-1	6/8/2022	9:30 AM	1 hour	62.9	40.2	79.5	71.3	67.7	65.7	63.9	58.9	48.4
LT-1	6/8/2022	10:30 AM	1 hour	64.1	39.9	85.1	73.3	68.8	66.4	64.5	59.2	50.0
LT-1	6/8/2022	11:40 AM	1 hour	64.4	47.1	81.4	72.6	68.9	66.7	65.2	60.9	54.2
LT-1	6/8/2022	12:45 PM	1 hour	63.8	40.9	82.2	72.6	68.7	66.1	64.4	59.5	49.4

Summary

File Name on Meter HighST01.001.s
File Name on PC LxTse_0003790-20220607 090000-HighST01.001.ldbin
Serial Number 0003790
Model SoundExpert® LxT
Firmware Version 2.402
User
Location
Job Description
Note

Measurement

Description CHI Highlands ST01
Start 2022-06-07 09:00:00
Stop 2022-06-07 14:07:48
Duration 05:07:48.1
Run Time 05:07:48.1
Pause 00:00:00.0

Pre-Calibration 2022-06-07 08:48:32
Post-Calibration 2022-06-07 14:08:25
Calibration Deviation 0.03 dB

Overall Settings

RMS Weight A Weighting
Peak Weight Z Weighting
Detector Slow
Preamplifier PRMLxT1L
Microphone Correction Off
Integration Method Linear
OBA Range Low
OBA Bandwidth 1/1 and 1/3
OBA Frequency Weighting A Weighting
OBA Max Spectrum Bin Max
Overload 122.7 dB

	A	C	Z
Under Range Peak	79.3	76.3	81.3 dB
Under Range Limit	24.3	25.4	31.6 dB
Noise Floor	15.2	16.3	22.4 dB

	First	Second	Third
Instrument Identification	MIG		

Results

LAeq 67.9
LAE 110.5
EA 12.592 mPa²h

LZpeak (max)	2022-06-07 09:17:25	123.2 dB
LASmax	2022-06-07 09:25:10	96.1 dB
LASmin	2022-06-07 09:01:51	21.0 dB
SEA	148.6 dB	

	Exceedance Counts	Duration
LAS > 85.0 dB	8	29.3 s
LAS > 115.0 dB	0	0.0 s
LZpeak > 135.0 dB	0	0.0 s
LZpeak > 137.0 dB	0	0.0 s
LZpeak > 140.0 dB	0	0.0 s

Community Noise	Ldn	LDay 07:00-22:00	LNight 22:00-07:00	Lden
	67.9	67.9	-99.9	67.9

LCeq	78.8 dB
LAeq	67.9 dB
LCeq - LAeq	11.0 dB
LAleq	74.7 dB
LAeq	67.9 dB
LAleq - LAeq	6.8 dB

	A		C	
	dB	Time Stamp	dB	Time Stamp
Leq	67.9		78.8	
LS(max)	96.1	2022/06/07 9:25:10		
LS(min)	21.0	2022/06/07 9:01:51		
LPeak(max)				

Overload Count	26
Overload Duration	58.8 s
OBA Overload Count	512
OBA Overload Duration	2440.9 s

Statistics	
LA 1.70	76.4 dB
LA 8.30	71.6 dB
LA 16.70	68.9 dB
LA 25.00	66.7 dB
LA 50.00	60.2 dB
LA 90.00	47.5 dB

Calibration History			
Preamp	Date	dB re. 1V/Pa	6.3
Direct	2020-01-28 06:13:43	-26.38	5.49
Direct	2020-01-27 13:00:51	-29.00	9.03
PRMLxT1L	2022-06-07 14:08:23	-28.97	66.53
PRMLxT1L	2022-06-07 08:48:30	-29.00	68.79

PRMLxT1L	2022-05-18 12:58:50	-29.04	58.54
PRMLxT1L	2022-05-18 08:46:41	-29.04	45.65
PRMLxT1L	2022-05-17 15:05:06	-29.13	54.98
PRMLxT1L	2022-05-17 10:52:22	-29.08	54.10
PRMLxT1L	2022-05-17 09:33:24	-29.12	53.93
PRMLxT1L	2022-05-17 08:18:39	-29.10	55.82
PRMLxT1L	2022-05-03 09:49:03	-29.13	67.69
PRMLxT1L	2022-05-03 09:34:56	-28.99	59.49
PRMLxT1L	2022-05-03 09:18:49	-29.14	83.45
Unknown	2019-12-01 17:09:04	-28.99	24.90

Summary

File Name on Meter HighST02.001.s
File Name on PC LxTse_0003790-20220608 093000-HighST02.001.ldbin
Serial Number 0003790
Model SoundExpert® LxT
Firmware Version 2.402
User
Location
Job Description
Note

Measurement

Description CHI Highlands ST02
Start 2022-06-08 09:30:00
Stop 2022-06-08 13:50:48
Duration 04:20:48.0
Run Time 04:20:48.0
Pause 00:00:00.0

Pre-Calibration 2022-06-08 09:10:19
Post-Calibration 2022-06-08 13:51:15
Calibration Deviation 0.01 dB

Overall Settings

RMS Weight	A Weighting		
Peak Weight	Z Weighting		
Detector	Slow		
Preamplifier	PRMLxT1L		
Microphone Correction	Off		
Integration Method	Linear		
OBA Range	Low		
OBA Bandwidth	1/1 and 1/3		
OBA Frequency Weighting	A Weighting		
OBA Max Spectrum	Bin Max		
Overload	122.7 dB		
	A	C	Z
Under Range Peak	79.3	76.3	81.3 dB
Under Range Limit	24.3	25.4	31.6 dB
Noise Floor	15.2	16.3	22.4 dB
	First	Second	Third
Instrument Identification	MIG		

Results

LAeq 65.5
LAE 107.5
EA 6.200 mPa²h

LZpeak (max)	2022-06-08 11:33:50	123.2 dB
LASmax	2022-06-08 13:43:49	90.3 dB
LASmin	2022-06-08 11:38:32	32.4 dB
SEA	141.0 dB	

	Exceedance Counts	Duration
LAS > 85.0 dB	4	11.7 s
LAS > 115.0 dB	0	0.0 s
LZpeak > 135.0 dB	0	0.0 s
LZpeak > 137.0 dB	0	0.0 s
LZpeak > 140.0 dB	0	0.0 s

Community Noise	Ldn	LDay 07:00-22:00	LNight 22:00-07:00	Lden
	65.5	65.5	-99.9	65.5

LCeq	77.9 dB
LAeq	65.5 dB
LCeq - LAeq	12.3 dB
LAleq	69.1 dB
LAeq	65.5 dB
LAleq - LAeq	3.5 dB

	A		C	
	dB	Time Stamp	dB	Time Stamp
Leq	65.5		77.9	
LS(max)	90.3	2022/06/08 13:43:49		
LS(min)	32.4	2022/06/08 11:38:32		
LPeak(max)				

Overload Count	5
Overload Duration	10.1 s
OBA Overload Count	327
OBA Overload Duration	1591.3 s

Statistics

LA 1.70	75.4 dB
LA 8.30	69.6 dB
LA 16.70	65.8 dB
LA 25.00	62.3 dB
LA 50.00	53.4 dB
LA 90.00	45.8 dB

Calibration History

Preamp	Date	dB re. 1V/Pa	6.3
Direct	2020-01-28 06:13:43	-26.38	5.49
Direct	2020-01-27 13:00:51	-29.00	9.03
PRMLxT1L	2022-06-08 13:51:13	-28.95	63.57
PRMLxT1L	2022-06-08 09:10:17	-28.96	81.41

PRMLxT1L	2022-06-07 14:08:23	-28.97	66.53
PRMLxT1L	2022-06-07 08:48:30	-29.00	68.79
PRMLxT1L	2022-05-18 12:58:50	-29.04	58.54
PRMLxT1L	2022-05-18 08:46:41	-29.04	45.65
PRMLxT1L	2022-05-17 15:05:06	-29.13	54.98
PRMLxT1L	2022-05-17 10:52:22	-29.08	54.10
PRMLxT1L	2022-05-17 09:33:24	-29.12	53.93
PRMLxT1L	2022-05-17 08:18:39	-29.10	55.82
PRMLxT1L	2022-05-03 09:49:03	-29.13	67.69
Unknown	2019-12-01 17:09:04	-28.99	24.90

Summary

File Name on Meter High_LT.001.s
File Name on PC LxT_0005064-20220607 083000-High_LT.001.ldbin
Serial Number 0005064
Model SoundTrack LxT®
Firmware Version 2.402
User
Location
Job Description
Note

Measurement

Description CHI Highlands LT
Start 2022-06-07 08:30:00
Stop 2022-06-08 14:10:05
Duration 29:40:05.500
Run Time 29:40:05.500
Pause 00:00:00.0

Pre-Calibration 2022-06-07 08:11:03
Post-Calibration 2022-06-08 14:11:15
Calibration Deviation 0.07 dB

Overall Settings

RMS Weight A Weighting
Peak Weight Z Weighting
Detector Slow
Preamplifier PRMLxT1L
Microphone Correction Off
Integration Method Linear
OBA Range Low
OBA Bandwidth 1/1 and 1/3
OBA Frequency Weighting Z Weighting
OBA Max Spectrum Bin Max
Overload 122.5 dB

	A	C	Z
Under Range Peak	79.0	76.0	81.0
Under Range Limit	24.2	25.3	31.4
Noise Floor	15.1	16.1	22.2

	First	Second	Third
Instrument Identification	MIG Noise Meter #1	2635 N. First Street, Ste. 114	San Jose, CA 95134

Results

LAeq 63.9
LAE 114.2
EA 29.273 mPa²h

EA8	7.893 mPa ² h	
EA40	39.467 mPa ² h	
LZpeak (max)	2022-06-08 08:40:38	115.7 dB
LASmax	2022-06-07 20:18:36	95.2 dB
LASmin	2022-06-07 12:04:20	37.3 dB
SEA	-99.9 dB	

	Exceedance Counts	Duration
LAS > 85.0 dB	13	33.5 s
LAS > 115.0 dB	0	0.0 s
LZpeak > 135.0 dB	0	0.0 s
LZpeak > 137.0 dB	0	0.0 s
LZpeak > 140.0 dB	0	0.0 s

Community Noise	Ldn	LDay 07:00-22:00	LNight 22:00-07:00
	67.9	64.8	60.5

LCeq	72.0 dB
LAeq	63.9 dB
LCeq - LAeq	8.1 dB
LAlaq	65.9 dB
LAeq	63.9 dB
LAlaq - LAeq	2.0 dB

	A		C
	dB	Time Stamp	dB
Leq	63.9		72.0
LS(max)	95.2	2022/06/07 20:18:36	
LS(min)	37.3	2022/06/07 12:04:20	
LPeak(max)			

Overload Count	0
Overload Duration	0.0 s
OBA Overload Count	1298
OBA Overload Duration	4583.0 s

Dose Settings		
Dose Name	OSHA-1	OSHA-2
Exchange Rate	5	5 dB
Threshold	90	80 dB
Criterion Level	90	90 dB
Criterion Duration	8	8 h

Results		
Dose	0.03	0.17 %
Projected Dose	0.01	0.04 %
TWA (Projected)	22.0	34.4 dB
TWA (t)	31.5	43.8 dB
Lep (t)	69.6	69.6 dB

Statistics

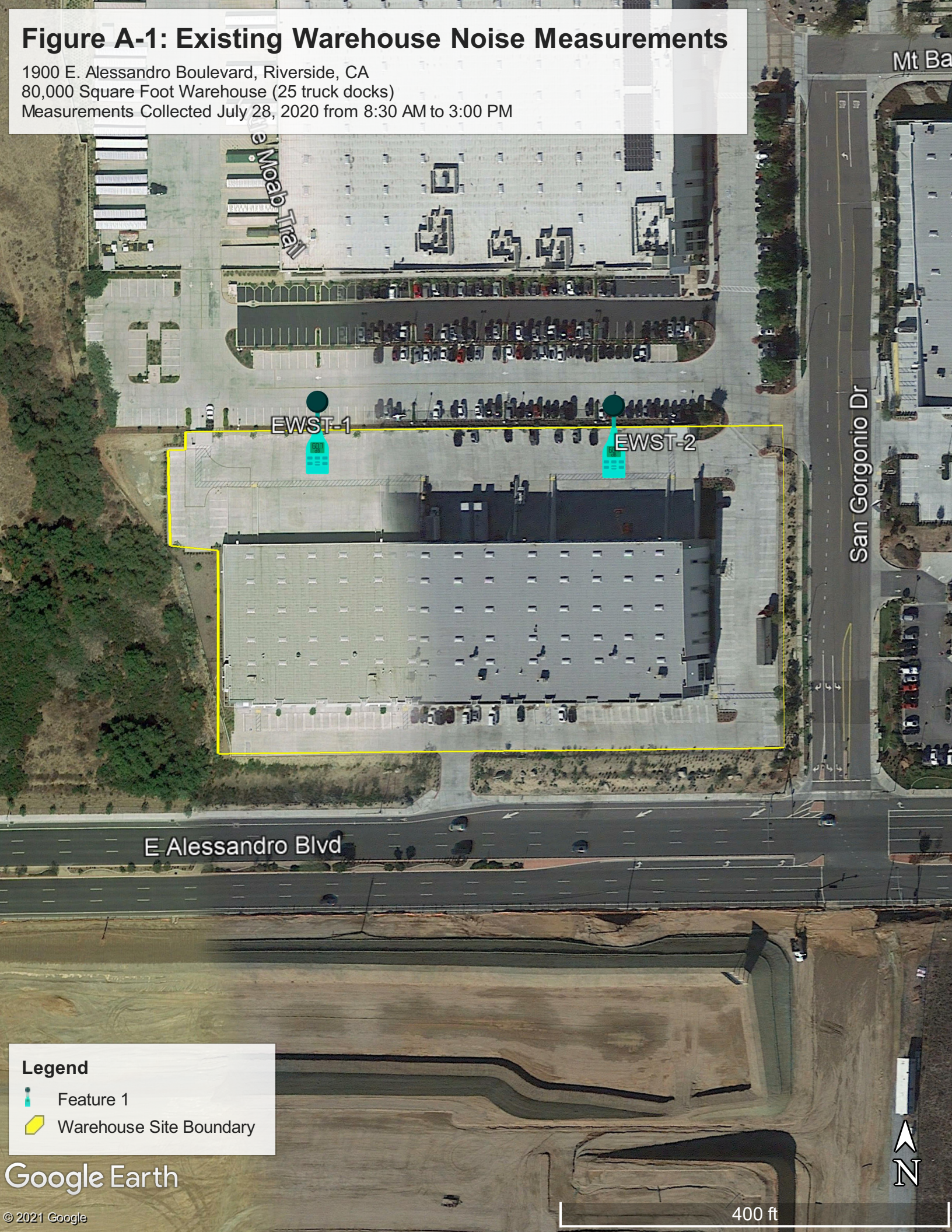
LA 1.70	72.2 dB
LA 8.30	68.2 dB
LA 16.70	65.8 dB
LA 25.00	63.8 dB
LA 50.00	56.4 dB
LA 90.00	44.2 dB

Calibration History

Preamp	Date	dB re. 1V/Pa
Direct	2020-01-28 05:43:54	-28.63
PRMLxT1L	2022-06-08 14:11:13	-28.73
PRMLxT1L	2022-06-07 08:11:01	-28.80
PRMLxT1L	2022-05-18 13:25:41	-28.81
PRMLxT1L	2022-05-16 12:46:27	-28.83
PRMLxT1L	2022-05-03 09:01:14	-28.89
PRMLxT1L	2022-05-03 07:05:42	-28.90
PRMLxT1L	2022-04-06 00:22:11	-28.83
PRMLxT1L	2022-04-05 19:25:24	-28.82
PRMLxT1L	2022-04-02 23:03:52	-28.79
PRMLxT1L	2022-04-02 19:10:24	-28.84
PRMLxT1L	2022-04-02 17:43:08	-28.78

Figure A-1: Existing Warehouse Noise Measurements

1900 E. Alessandro Boulevard, Riverside, CA
80,000 Square Foot Warehouse (25 truck docks)
Measurements Collected July 28, 2020 from 8:30 AM to 3:00 PM



Legend

- Feature 1
- Warehouse Site Boundary

Rustin Avenue Logistics Center Project
Riverside, CA
Appendix: Ambient Noise Monitoring Data
Prepared by MIG, August 2020

TABLE 3: SUMMARY OF EAST ALESSANDRO BOULEVARD WAREHOUSE ST-1 NOISE MONITORING DATA											
Date	Time	Duration	Leq	Lmin	Lmax	L(1.6)	L(8.3)	L(25)	L(50)	L(66.6)	L(90)
7/28/2020	8:30 AM	30 minutes	63.0	44.7	82.0	71.5	66.2	62.9	60.5	59.6	58.4
7/28/2020	9:00 AM	1-hour	65.5	43.1	88.5	73.6	69.3	64.9	62.7	62.1	61.2
7/28/2020	10:00 AM	1-hour	61.1	43.3	81.3	69.0	65.4	62.9	56.2	54.4	52.8
7/28/2020	11:00 AM	1-hour	55.2	42.9	79.1	64.4	60.1	54.4	50.2	48.8	47.3
7/28/2020	12:00 PM	1-hour	60.4	43.3	84.2	69.5	63.1	60.1	57.6	56.4	55.3
7/28/2020	1:00 PM	1-hour	64.8	45.4	80.6	71.4	67.7	64.9	63.5	62.6	61.6
7/28/2020	2:00 PM	1-hour	62.9	45.5	86.7	72.3	66.3	62.0	59.6	58.4	56.2
	Daytime (7 AM to 7 PM)		62.8	42.9	88.5	71.0	66.2	62.7	60.2	59.2	58.1

TABLE 4: SUMMARY OF EAST ALESSANDRO BOULEVARD WAREHOUSE ST-2 NOISE MONITORING DATA											
Date	Time	Duration	Leq	Lmin	Lmax	L(1.6)	L(8.3)	L(25)	L(50)	L(66.6)	L(90)
7/28/2020	8:50 AM	10 minutes	54.8	44.7	74.2	65.0	60.3	52.0	48.8	47.9	47.1
7/28/2020	9:00 AM	1-hour	63.1	42.1	89.0	73.0	68.2	61.4	57.6	56.3	55.2
7/28/2020	10:00 AM	1-hour	57.0	42.7	79.5	65.2	61.7	56.8	53.1	51.5	50.4
7/28/2020	11:00 AM	1-hour	55.8	41.9	78.0	64.0	60.9	55.4	51.7	49.7	47.1
7/28/2020	12:00 PM	1-hour	59.4	43.0	81.7	68.2	65.3	58.2	54.5	53.0	51.5
7/28/2020	1:00 PM	1-hour	62.4	46.0	89.6	73.0	67.1	60.2	56.2	55.1	54.2
7/28/2020	2:00 PM	1-hour	60.1	45.3	78.2	67.3	64.6	61.2	57.3	56.1	51.2
	Daytime (7 AM to 7 PM)		59.9	41.9	89.6	69.4	64.9	58.9	55.1	53.7	51.9

Summary				
File Name on Meter	Lxt_Data.002			
	SLM_0005065_Lxt_Data_00			
File Name on PC	2.00.ldbin			
Serial Number	0005065			
Model	SoundTrack LxT®			
Firmware Version	2.402			
User				
Location				
Job Description				
Note				
Measurement				
	1_1900 Alessandro - Industrial Site Ambient			
Description	Noise Monitoring			
Start	2020-07-28 08:30:00			
Stop	2020-07-28 15:00:11			
Duration	06:30:11.3			
Run Time	06:30:11.3			
Pause	00:00:00.0			
Pre Calibration	2020-07-28 08:20:56			
Post Calibration	2020-07-28 15:01:21			
Calibration Deviation	-0.19 dB			
Overall Settings				
RMS Weight	A Weighting			
Peak Weight	A Weighting			
Detector	Slow			
Preamp	PRMLxT1L			
Microphone Correction	Off			
Integration Method	Exponential			
OBA Range	Normal			
OBA Bandwidth	1/1 and 1/3			
OBA Freq. Weighting	A Weighting			
OBA Max Spectrum	At LMax			
Overload	122.1 dB			
	A	C	Z	
Under Range Peak	78.7	75.7	80.7 dB	
Under Range Limit	25.2	25.8	31.4 dB	
Noise Floor	16.1	16.7	22.3 dB	
Results				
LASeq	62.8 dB			
LASE	106.4 dB			
EAS	4.902 mPa²h			
EAS8	6.030 mPa²h			
EAS40	30.150 mPa²h			
LASpeak (max)	2020-07-28 09:21:31	105.9 dB		
LASmax	2020-07-28 09:21:32	88.5 dB		
LASmin	2020-07-28 11:14:26	42.9 dB		
SEA	-99.9 dB			

LAS > 120.0 dB (Exceedance Counts / Duration)	0	0.0 s
LAS > 120.0 dB (Exceedance Counts / Duration)	0	0.0 s
LASpeak > 120.0 dB (Exceedance Counts / Duration)	0	0.0 s
LASpeak > 140.0 dB (Exceedance Counts / Duration)	0	0.0 s
LASpeak > 140.0 dB (Exceedance Counts / Duration)	0	0.0 s

	LDay 07:00-22:00		22:00-07:00	LDay 07:00-19:00		19:00-22:00	22:00-07:00	
Community Noise	Ldn	22:00	07:00	Lden	19:00	22:00	07:00	dB
	62.8	62.8	-99.9	62.8	62.8	-99.9	-99.9	

LCSeq	71.7 dB
LASeq	62.8 dB
LCSeq - LASeq	9.0 dB
LAleq	66.2 dB
LAeq	62.8 dB
LAleq - LAeq	3.4 dB

A		C		Z	
	Time dB Stamp		Time dB Stamp		Time dB Stamp
Leq	62.8				
LS(max)	88.5 2020/07/28 9:21:32				
LS(min)	42.9 2020/07/28 11:14:26				
LPeak(max)	105.9 2020/07/28 9:21:31				

# Overloads	0
Overload Duration	0.0 s
# OBA Overloads	0
OBA Overload Duration	0.0 s

Dose Settings		
Dose Name	OSHA-1	OSHA-2
Exchange Rate	5	5 dB
Threshold	90	80 dB
Criterion Level	90	90 dB
Criterion Duration	8	8 h

Results		
Dose	-99.9	0.04 %
Projected Dose	-99.9	0.06 %
TWA (Projected)	-99.9	35.9 dB
TWA (t)	-99.9	34.4 dB
Lep (t)	61.9	61.9 dB

Statistics	
LAS1.66	72.3 dB
LAS8.33	65.2 dB
LAS25.00	62.2 dB
LAS50.00	53.3 dB
LAS66.66	50.2 dB
LAS90.00	46.7 dB

Calibration History		
Preamp	Date	dB re. 1V/Pa
Direct	2020-01-28 06:05:01	-28.5
PRMLxT1L	2020-07-28 15:01:19	-28.4
PRMLxT1L	2020-07-28 08:20:53	-28.2
PRMLxT1L	2020-07-28 08:14:12	-28.3
PRMLxT1L	2020-07-27 13:43:14	-28.9
PRMLxT1L	2020-07-26 19:45:35	-28.9
PRMLxT1L	2020-07-26 15:38:13	-28.9
PRMLxT1L	2020-07-25 19:09:22	-28.3
PRMLxT1L	2020-07-24 17:12:03	-28.3
PRMLxT1L	2020-07-08 08:30:09	-28.4
PRMLxT1L	2020-04-09 07:57:48	-28.4
PRMLxT1L	2020-02-04 13:33:06	-28.2
Unknown	2018-11-13 08:29:15	-28.3
Unknown	2018-11-05 14:21:01	-28.3
Unknown	2018-06-27 10:46:33	-28.0
Unknown	2018-06-27 10:46:16	-28.0

Summary			
File Name on Meter	Lxt_Data.001		
File Name on PC	SLM_0003790_Lxt_Data_001.00.ldbin		
Serial Number	0003790		
Model	SoundExpert® LxT		
Firmware Version	2.402		
User			
Location			
Job Description			
Note			

Measurement			
Description	2_1900 Alessandro - Industrial Site Ambient Noise Monitoring		
Start	2020-07-28 08:50:00		
Stop	2020-07-28 15:07:51		
Duration	06:17:51.8		
Run Time	06:17:51.8		
Pause	00:00:00.0		
Pre Calibration	2020-07-28 08:35:18		
Post Calibration	2020-07-28 15:09:12		
Calibration Deviation	-0.24 dB		

Overall Settings				
RMS Weight	A Weighting			
Peak Weight	A Weighting			
Detector	Slow			
Preamp	PRMLxT1L			
Microphone Correction	Off			
Integration Method	Exponential			
OBA Range	Normal			
OBA Bandwidth	1/1 and 1/3			
OBA Freq. Weighting	A Weighting			
OBA Max Spectrum	At LMax			
Overload	122.7 dB			
	A	C	Z	
Under Range Peak	79.3	76.3	81.3 dB	
Under Range Limit	24.3	25.4	31.6 dB	
Noise Floor	15.2	16.3	22.4 dB	

Results			
LASeq	60.4 dB		
LASE	103.9 dB		
EAS	2.737 mPa²h		
LASpeak (max)	2020-07-28 13:41:04	108.6 dB	
LASmax	2020-07-28 13:41:05	89.6 dB	
LASmin	2020-07-28 11:59:53	41.9 dB	
SEA	-99.9 dB		

LAS > 120.0 dB (Exceedance Counts / Duration)	0	0.0 s
LAS > 120.0 dB (Exceedance Counts / Duration)	0	0.0 s
LASpeak > 120.0 dB (Exceedance Counts / Duration)	0	0.0 s
LASpeak > 140.0 dB (Exceedance Counts / Duration)	0	0.0 s
LASpeak > 140.0 dB (Exceedance Counts / Duration)	0	0.0 s

	LDay 07:00-22:00			LNight 22:00-07:00	LDay 07:00-19:00			LEvening 19:00-22:00	LNight 22:00-07:00	
Community Noise	Ldn	60.4	60.4	Lden	60.4	60.4	60.4	60.4	60.4	dB

LCSeq	71.9 dB
LASeq	60.4 dB
LCSeq - LASeq	11.5 dB
LAleq	63.4 dB
LAeq	60.4 dB
LAleq - LAeq	3.1 dB

A		C		Z	
dB	Stamp	dB	Stamp	dB	Stamp
Leq	60.4				
LS(max)	89.6 2020/07/2				
LS(min)	41.9 2020/07/2				
LPeak(max)	108.6 2020/07/2				

# Overloads	0
Overload Duration	0.0 s
# OBA Overloads	0
OBA Overload Duration	0.0 s

Statistics	
LAS1.66	69.5 dB
LAS8.33	61.5 dB
LAS25.00	55.9 dB
LAS50.00	51.7 dB
LAS66.66	49.7 dB
LAS90.00	46.6 dB

Calibration History

		dB re. 1V/Pa
Preamp	Date	
Direct	2020-01-28 06:13:43	-26.4
Direct	2020-01-27 13:00:51	-29.0
PRMLxT1L	2020-07-28 15:09:11	-29.0
PRMLxT1L	2020-07-28 08:35:16	-28.7
PRMLxT1L	2020-07-27 16:20:52	-28.3
PRMLxT1L	2020-07-26 15:54:05	-28.2
PRMLxT1L	2020-07-24 17:27:34	-28.8
PRMLxT1L	2020-05-29 07:48:09	-28.8
PRMLxT1L	2020-05-29 07:47:21	-28.8
PRMLxT1L	2020-02-04 13:20:24	-28.8
PRMLxT1L	2020-01-28 06:21:08	-28.7
PRMLxT1L	2020-01-28 05:50:07	-26.4
PRMLxT1L	2020-01-27 15:10:32	-26.4
Unknown	2019-12-01 17:09:04	-29.0

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APPENDIX B: Construction Noise and Vibration Estimates

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Roadway Construction Noise Model (RCNM).Version 1.1

Report dat 12/13/2022

Case Descr SitePrep_typical

---- Receptor #1 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
R02	Residential	55	55	55

Description	Impact Device	Equipment			
		Spec	Actual	Receptor	Estimated
		Lmax Usage(%) (dBA)	Lmax (dBA)	Distance (feet)	Shielding (dBA)
Dozer	No	40	81.7	445	0
Dozer	No	40	81.7	445	0
Tractor	No	40	84	445	0
Tractor	No	40	84	445	0

Results

[illegible]

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
R03	Commercial	55	55	55

Description	Impact	Usage(%)	Equipment			
			Spec	Actual	Receptor	Estimated
			Lmax (dBA)	Lmax (dBA)	Distance (feet)	Shielding (dBA)
Dozer	No	40		81.7	310	0
Dozer	No	40		81.7	310	0
Tractor	No	40	84		310	0
Tractor	No	40	84		310	0

Results

[illegible]

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
R04	Residential	55	55	55

Description	Impact Device	Equipment				
		Usage(%)	Spec	Actual	Receptor	Estimated
			Lmax	Lmax	Distance	Shielding
			(dBA)	(dBA)	(feet)	(dBA)
Dozer	No	40		81.7	245	0
Dozer	No	40		81.7	245	0
Tractor	No	40	84		245	0
Tractor	No	40	84		245	0

Results

[illegible]

[illegible]

---- Receptor #4 ----

Descriptor	Land Use	Daytime	Evening	Night
R05	Residential	55	55	55

Description	Impact Device	Equipment			
		Spec	Actual	Receptor	Estimated
		Lmax Usage(%) (dBA)	Lmax (dBA)	Distance (feet)	Shielding (dBA)
Dozer	No	40	81.7	230	0
Dozer	No	40	81.7	230	0
Tractor	No	40	84	230	0
Tractor	No	40	84	230	0

Results

[illegible]

*Calculated Lmax is the Loudest value.

---- Receptor #5 ----

Descriptor	Land Use	Daytime	Evening	Night
R06	Residential	55	55	55

Description	Impact	Usage(%)	Equipment			
			Spec	Actual	Receptor	Estimated
			Lmax (dBA)	Lmax (dBA)	Distance (feet)	Shielding (dBA)
Dozer	No	40		81.7	285	0
Dozer	No	40		81.7	285	0
Tractor	No	40	84		285	0
Tractor	No	40	84		285	0

Results

[illegible]

*Calculated Lmax is the Loudest value.

---- Receptor #6 ----

Description	Land Use	Daytime	Evening	Night
R07	Residential	55	55	55

Description	Impact Device	Equipment				
		Usage(%)	Spec	Actual	Receptor	Estimated
			Lmax (dBA)	Lmax (dBA)	Distance (feet)	Shielding (dBA)
Dozer	No	40		81.7	365	0
Dozer	No	40		81.7	365	0
Tractor	No	40	84		365	0
Tractor	No	40	84		365	0

Results

[illegible]

[illegible]

---- Receptor #7 ----

Descriptor	Land Use	Daytime	Evening	Night
R08	Residential	55	55	55

Description	Impact Device	Equipment			
		Spec	Actual	Receptor	Estimated
		Lmax Usage(%) (dBA)	Lmax (dBA)	Distance (feet)	Shielding (dBA)
Dozer	No	40	81.7	455	0
Dozer	No	40	81.7	455	0
Tractor	No	40	84	455	0
Tractor	No	40	84	455	0

Results

[illegible]

*Calculated Lmax is the Loudest value.

---- Receptor #8 ----

Description Land Use		Daytime	Evening	Night
R09	Residential	55	55	55

Description	Impact	Device	Equipment				
			Usage(%)	Spec	Actual	Receptor	Estimated
				Lmax (dBA)	Lmax (dBA)	Distance (feet)	Shielding (dBA)
Dozer	No	40		81.7	525	0	
Dozer	No	40		81.7	525	0	
Tractor	No	40	84		525	0	
Tractor	No	40	84		525	0	

Results

[illegible]

*Calculated Lmax is the Loudest value.

---- Receptor #9 ----

Description Land Use		Daytime	Evening	Night
R12	Commercial	55	55	55

Description	Impact Device	Usage(%)	Equipment			
			Spec	Actual	Receptor	Estimated
			Lmax (dBA)	Lmax (dBA)	Distance (feet)	Shielding (dBA)
Dozer	No	40		81.7	495	0
Dozer	No	40		81.7	495	0
Tractor	No	40	84		495	0
Tractor	No	40	84		495	0

Results

[illegible]

Tractor		64.1	60.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		64.1	60.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total		64.1	65.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #10 ----

		Baselines (dBA)					
Description Land Use		Daytime	Evening	Night			
R13	Commercial	55	55	55			
		Equipment					
		Impact		Spec	Actual	Receptor	Estimated
		Device	Usage(%)	Lmax	Lmax	Distance	Shielding
Description				(dBA)	(dBA)	(feet)	(dBA)
Dozer		No	40		81.7	500	0
Dozer		No	40		81.7	500	0
Tractor		No	40	84		500	0
Tractor		No	40	84		500	0

Results

		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer		61.7	57.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		61.7	57.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		64	60	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		64	60	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total		64	65	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #11 ----

		Baselines (dBA)					
Description Land Use		Daytime	Evening	Night			
R01	Commercial	55	55	55			
					Equipment		
				Spec	Actual	Receptor	Estimated
		Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)	
Dozer	No		40		81.7	425	0
Dozer	No		40		81.7	425	0
Tractor	No		40	84		425	0
Tractor	No		40	84		425	0

Results

		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer		63.1	59.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		63.1	59.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		65.4	61.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		65.4	61.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total		65.4	66.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Report dat 12/13/2022
Case Descr SitePrep_worstcase

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
R02	Residential	55	55	55

Results															
Calculated (dBA)			Noise Limits (dBA)						Noise Limit Exceedance (dBA)						
Equipment	*Lmax	Leq	Day	Evening			Night			Day	Evening			Night	
			Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	
Dozer	74.8	70.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Dozer	74.8	70.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Tractor	77.2	73.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Tractor	77.2	73.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Total	77.2	78.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
*Calculated Lmax is the Loudest value.															

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
R03	Commercial	55	55	55

Results														
Calculated (dBA)			Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer	74.8	70.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	74.8	70.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	77.2	73.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	77.2	73.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	77.2	78.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
*Calculated Lmax is the Loudest value.														

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
R04	Residential	55	55	55

[illegible]

[illegible]

---- Receptor #4 ----

Results

---- Receptor #5 ----

Results

---- Receptor #6 ----

Results

[illegible]

---- Receptor #7 ----

[illegible]

---- Receptor #8 ----

[illegible]

---- Receptor #9 ----

[illegible]

Tractor		87.1	83.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		87.1	83.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total		87.1	88.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #10 ----

		Baselines (dBA)												
Description	Land Use	Daytime	Evening	Night										
R13	Commercial	55	55	55										

		Equipment												
		Impact	Spec	Actual	Receptor	Estimated								
Description		Device	Usage(%)	Lmax (dBA)	Lmax (dBA)	Distance (feet)	Shielding (dBA)							
Dozer		No	40		81.7	60	0							
Dozer		No	40		81.7	60	0							
Tractor		No	40	84		60	0							
Tractor		No	40	84		60	0							

Results

		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer		80.1	76.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		80.1	76.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		82.4	78.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		82.4	78.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total		82.4	83.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #11 ----

		Baselines (dBA)												
Description	Land Use	Daytime	Evening	Night										
R01	Commercial	55	55	55										

		Equipment												
		Impact	Spec	Actual	Receptor	Estimated								
Description		Device	Usage(%)	Lmax (dBA)	Lmax (dBA)	Distance (feet)	Shielding (dBA)							
Dozer		No	40		81.7	75	0							
Dozer		No	40		81.7	75	0							
Tractor		No	40	84		75	0							
Tractor		No	40	84		75	0							

Results

		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer		78.1	74.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		78.1	74.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		80.5	76.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		80.5	76.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total		80.5	81.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report dat 12/13/2022
Case Descr Grading_typical

		---- Receptor #1 ----								
		Baselines (dBA)								
Descriptor Land Use		Daytime	Evening	Night						
R02	Residential	55	55	55						
		Equipment								
		Impact	Spec	Actual	Receptor	Estimated				
		Device	Usage(%)	Lmax	Lmax	Distance				
Description				(dBA)	(dBA)	(feet)				
						Shielding				
						(dBA)				
Dozer		No	40		81.7	445				
Tractor		No	40	84		445				
Tractor		No	40	84		445				
Tractor		No	40	84		445				
Grader		No	40	85		445				
Grader		No	40	85		445				
Grader		No	40	85		445				
		Results								
		Calculated (dBA)		Noise Limits (dBA)			Noise Limit Exceedance (dBA)			
				Day	Evening	Night	Day	Evening	Night	
		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	
Equipment		62.7	N/A	58.7	N/A	N/A	N/A	N/A	N/A	
Dozer		65	61	N/A	N/A	N/A	N/A	N/A	N/A	
Tractor		65	61	N/A	N/A	N/A	N/A	N/A	N/A	
Tractor		65	61	N/A	N/A	N/A	N/A	N/A	N/A	
Grader		66	62	N/A	N/A	N/A	N/A	N/A	N/A	
Grader		66	62	N/A	N/A	N/A	N/A	N/A	N/A	
Grader		66	62	N/A	N/A	N/A	N/A	N/A	N/A	
Total		66	69.7	N/A	N/A	N/A	N/A	N/A	N/A	
*Calculated Lmax is the Loudest value.										

		---- Receptor #2 ----									
		Baselines (dBA)									
Description	Land Use	Daytime	Evening	Night							
R03	Commercial	55	55	55							
		Equipment									
		Impact	Spec	Actual	Receptor	Estimated					
Description	Device	Usage(%)	Lmax (dBA)	Lmax (dBA)	Distance (feet)	Shielding (dBA)					
Dozer	No	40		81.7	310	0					
Tractor	No	40	84		310	0					
Tractor	No	40	84		310	0					
Tractor	No	40	84		310	0					
Grader	No	40	85		310	0					
Grader	No	40	85		310	0					
Grader	No	40	85		310	0					
		Results									
		Calculated (dBA)		Noise Limits (dBA)				Noise Limit Exceedance (dBA)			
				Day	Evening	Night		Day	Evening	Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer		65.8	61.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		68.2	64.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		68.2	64.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		68.2	64.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader		69.2	65.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader		69.2	65.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader		69.2	65.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total		69.2	72.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
*Calculated Lmax is the Loudest value.											

		---- Receptor #3 ----				
		Baselines (dBA)				
Description	Land Use	Daytime	Evening	Night		
R04	Residential	55	55	55		
		Equipment				
		Impact	Spec	Actual	Receptor	Estimated
Description		Device	Usage(%)	Lmax (dBA)	Lmax (dBA)	Distance (feet)
Dozer		No	40		81.7	245
Tractor		No	40	84		245
						0
						0

Results													
Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
		Day		Evening		Night		Day		Evening		Night	
*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
67.9	63.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
70.2	66.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
70.2	66.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
70.2	66.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
71.2	67.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
71.2	67.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
71.2	67.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
71.2	74.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Description	Impact Device	Usage(%)	Equipment		Receptor Distance (feet)	Estimated Shielding (dBA)
			Spec	Actual		
			Lmax (dBA)	Lmax (dBA)		
Dozer	No	40		81.7	230	0
Tractor	No	40	84		230	0
Tractor	No	40	84		230	0
Tractor	No	40	84		230	0
Grader	No	40	85		230	0
Grader	No	40	85		230	0
Grader	No	40	85		230	0

Equipment	*Lmax	Leq	Day		Evening		Night		Day		Evening		Night	
			Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer	68.4	64.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	70.7	66.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	70.7	66.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	70.7	66.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	71.7	67.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	71.7	67.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	71.7	67.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	71.7	75.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Description	Impact Device	Usage(%)	Equipment		Receptor Distance (feet)	Estimated Shielding (dBA)
			Spec	Actual		
			Lmax (dBA)	Lmax (dBA)		
Dozer	No	40		81.7	285	0
Tractor	No	40	84		285	0
Tractor	No	40	84		285	0
Tractor	No	40	84		285	0
Grader	No	40	85		285	0
Grader	No	40	85		285	0
Grader	No	40	85		285	0

[illegible]

Grader		69.9	65.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total		69.9	73.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #6 ----

Description Land Use		Baselines (dBA)							
		Daytime	Evening	Night					
R07	Residential	55	55	55					
		Equipment							
		Impact		Spec	Actual	Receptor	Estimated		
Description		Device	Usage(%)	Lmax (dBA)	Lmax (dBA)	Distance (feet)	Shielding (dBA)		
Dozer		No		40		81.7	365	0	
Tractor		No		40	84		365	0	
Tractor		No		40	84		365	0	
Tractor		No		40	84		365	0	
Grader		No		40	85		365	0	
Grader		No		40	85		365	0	
Grader		No		40	85		365	0	

Results

		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)				
				Day	Evening		Night			Day	Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Dozer		64.4		60.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		66.7		62.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		66.7		62.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		66.7		62.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader		67.7		63.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader		67.7		63.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader		67.7		63.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total		67.7		71.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #7 ----

Descriptor Land Use		Baselines (dBA)					
		Daytime	Evening	Night			
R08	Residential	55	55	55			
		Equipment					
		Impact		Spec Lmax	Actual Lmax	Receptor Distance	
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)	
Dozer	No	40			81.7	455	0
Tractor	No		40	84		455	0
Tractor	No		40	84		455	0
Tractor	No		40	84		455	0
Grader	No		40	85		455	0
Grader	No		40	85		455	0
Grader	No		40	85		455	0

Results

		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)				
				Day	Evening		Night			Day	Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Dozer		62.5		58.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		64.8		60.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		64.8		60.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		64.8		60.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader		65.8		61.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader		65.8		61.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader		65.8		61.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total		65.8		69.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #8 ----

		Baselines (dBA)						
Descriptor	Land Use	Daytime	Evening	Night				
R09	Residential	55	55	55				
					Equipment			
				Spec	Actual	Receptor	Estimated	
		Impact		Lmax	Lmax	Distance	Shielding	
Description		Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)	
Dozer		No		40		81.7	525	0
Tractor		No		40	84		525	0
Tractor		No		40	84		525	0

Results													
Calculated (dBA)			Noise Limits (dBA)						Noise Limit Exceedance (dBA)				
			Evening			Night			Evening			Night	
*Lmax	Leq	Day Lmax	Leq	Lmax	Leq	Lmax	Leq	Day Lmax	Leq	Lmax	Leq	Lmax	Leq
	61.2	57.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	63.6	59.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	63.6	59.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	63.6	59.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	64.6	60.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	64.6	60.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	64.6	60.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	64.6	68.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
*Calculated Lmax is the Loudest value.													

Total 65 68.7 N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A

*Calculated Lmax is the Loudest value.

---- Receptor #11 ----

Baselines (dBA)
Daytime Evening Night
R01 Commercial 55 55 55

Description	Impact Device	Usage(%)	Equipment		Receptor Distance (feet)	Estimated Shielding (dBA)
			Spec Lmax (dBA)	Actual Lmax (dBA)		
Dozer	No	40		81.7	425	0
Tractor	No	40	40	84	425	0
Tractor	No	40	40	84	425	0
Tractor	No	40	40	84	425	0
Grader	No	40	40	85	425	0
Grader	No	40	40	85	425	0
Grader	No	40	40	85	425	0

Equipment	Calculated (dBA)		Results						Noise Limit Exceedance (dBA)					
			Noise Limits (dBA)											
			Day		Evening		Night		Day		Evening		Night	
	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer	63.1	59.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	65.4	61.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	65.4	61.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	65.4	61.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	66.4	62.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	66.4	62.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	66.4	62.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	66.4	70.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report dat 12/13/2022
Case Descr Grading_worstcase

---- Receptor #1 ----

Description Land Use		Baselines (dBA)			Equipment		
		Daytime	Evening	Night			
R02	Residential	55	55	55			
					Spec	Actual	Receptor
					Lmax	Lmax	Distance
					(dBA)	(dBA)	(feet)
					Estimated		
					Shielding		
Description	Device	Usage(%)					(dBA)
Dozer	No	40			81.7		110
Tractor	No	40	84				110
Tractor	No	40	84				110
Tractor	No	40	84				110
Grader	No	40	85				110
Grader	No	40	85				110
Grader	No	40	85				110

Results

		Calculated (dBA)			Noise Limits (dBA)				Noise Limit Exceedance (dBA)														
		Day			Evening				Night				Day			Evening				Night			
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq				
Dozer		74.8	N/A	70.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A				
Tractor		77.2	73.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A				
Tractor		77.2	73.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A				
Tractor		77.2	73.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A				
Grader		78.2	74.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A				
Grader		78.2	74.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A				
Grader		78.2	74.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A				
Total		78.2	81.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A				
*Calculated Lmax is the Loudest value.																							

Results													
Calculated (dBA)			Noise Limits (dBA)						Noise Limit Exceedance (dBA)				
			Evening			Night			Evening			Night	
*Lmax	Leq	Day Lmax	Leq	Lmax	Leq	Lmax	Leq	Day Lmax	Leq	Lmax	Leq	Lmax	Leq
74.4		70.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
76.8		72.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
76.8		72.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
76.8		72.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
77.8		73.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
77.8		73.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
77.8		73.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
77.8		81.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
*Calculated Lmax is the Loudest value.													

Results													
Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
		Day		Evening		Night		Day		Evening		Night	
*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
74.1	70.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
76.4	72.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
76.4	72.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
76.4	72.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
77.4	73.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
77.4	73.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
77.4	73.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
77.4	81.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
*Calculated Lmax is the Loudest value.													

[illegible]

Grader		77	73.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total		77	80.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #6 ----

Baselines (dBA)				
Descriptor	Land Use	Daytime	Evening	Night
R07	Residential	55	55	55

		Equipment				
	Impact		Spec	Actual	Receptor	Estimated
	Device	Usage(%)	Lmax (dBA)	Lmax (dBA)	Distance (feet)	Shielding (dBA)
Description						
Dozer	No	40		81.7	125	0
Tractor	No	40	84		125	0
Tractor	No	40	84		125	0
Tractor	No	40	84		125	0
Grader	No	40	85		125	0
Grader	No	40	85		125	0
Grader	No	40	85		125	0

Results

Calculated (dBA)				Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
Equipment	*Lmax	Leq	Day	Leq	Lmax	Leq	Night	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	
			Lmax												
Dozer	73.7	69.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Tractor	76	72.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Tractor	76	72.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Tractor	76	72.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Grader	77	73.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Grader	77	73.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Grader	77	73.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Total	77	80.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

*Calculated Lmax is the Loudest value.

---- Receptor #7 ----

Baselines (dBA)				
Descriptor	Land Use	Daytime	Evening	Night
R08	Residential	55	55	55

		Equipment				
	Impact		Spec	Actual	Receptor	Estimated
	Device	Usage(%)	Lmax (dBA)	Lmax (dBA)	Distance (feet)	Shielding (dBA)
Description						
Dozer	No	40		81.7	125	0
Tractor	No	40	84		125	0
Tractor	No	40	84		125	0
Tractor	No	40	84		125	0
Grader	No	40	85		125	0
Grader	No	40	85		125	0
Grader	No	40	85		125	0

Results

		Calculated (dBA)			Noise Limits (dBA)					Noise Limit Exceedance (dBA)				
		Day			Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Dozer		73.7	69.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		76	72.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		76	72.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		76	72.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader		77	73.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader		77	73.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader		77	73.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total		77	80.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #8 ----

Baselines (dBA)				
Descriptor	Land Use	Daytime	Evening	Night
R09	Residential	55	55	55

			Equipment			
	Impact		Spec	Actual	Receptor	Estimated
	Device	Usage(%)	Lmax (dBA)	Lmax (dBA)	Distance (feet)	Shielding (dBA)
Description						
Dozer	No	40		81.7	125	0
Tractor	No	40	84		125	0
Tractor	No	40	84		125	0

Results													
Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
		Day		Evening		Night		Day		Evening		Night	
*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
73.7	69.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
76	72.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
76	72.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
76	72.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
77	73.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
77	73.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
77	73.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
77	80.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
*Calculated Lmax is the Loudest value.													

Descriptor Land Use		Baselines (dBA)		
		Daytime	Evening	Night
R12	Commercial	55	55	55

Results													
Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
		Day		Evening		Night		Day		Evening		Night	
*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
	84.8	80.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	87.1	83.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	87.1	83.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	87.1	83.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	88.1	84.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	88.1	84.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	88.1	84.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	88.1	91.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
*Calculated Lmax is the Loudest value.													

Descriptor Land Use		Baselines (dBA)		
		Daytime	Evening	Night
R13	Commercial	55	55	55

[illegible]

Total	83.4	87.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
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*Calculated Lmax is the Loudest value.

		---- Receptor #11 ----													
		Baselines (dBA)													
Description	Land Use	Daytime	Evening	Night											
		R01	Commercial												
		55	55	55											
		Equipment													
Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)									
Dozer	No	40		81.7	75	0									
Tractor	No	40	84		75	0									
Tractor	No	40	84		75	0									
Tractor	No	40	84		75	0									
Grader	No	40	85		75	0									
Grader	No	40	85		75	0									
Grader	No	40	85		75	0									
		Results													
		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer		78.1	74.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		80.5	76.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		80.5	76.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		80.5	76.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader		81.5	77.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader		81.5	77.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader		81.5	77.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total		81.5	85.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		* Calculated Lmax is the Loudest value.													

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM), Version 1.1

Report dat 6/7/2023

Case Descr Trenching

---- Receptor #1 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
R02	Residential	55	55	55

Description	Impact Device	Usage(%)	Equipment		Receptor Distance (feet)	Estimated Shielding (dBA)
			Spec	Actual		
			Lmax (dBA)	Lmax (dBA)		
Tractor	No	40	84	420	0	
Tractor	No	40	84	420	0	
Tractor	No	40	84	420	0	
Excavator	No	40	85	420	0	

Results

[illegible]

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
R03	Commercial	55	55	55

Description	Impact Device	Equipment		Receptor Distance (feet)	Estimated Shielding (dBA)
		Spec	Actual		
		Lmax Usage(%) (dBA)	Lmax (dBA)		
Tractor	No	40	84	305	0
Tractor	No	40	84	305	0
Tractor	No	40	84	305	0
Excavator	No	40	85	305	0

Results

[illegible]

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
R04	Residential	55	55	55

Description	Impact Device	Equipment		Receptor Distance (feet)	Estimated Shielding (dBA)
		Spec	Actual		
		Lmax Usage(%) (dBA)	Lmax (dBA)		
Tractor	No	40	84	255	0
Tractor	No	40	84	255	0
Tractor	No	40	84	255	0
Excavator	No	40	85	255	0

Results

[illegible]

[illegible]

---- Receptor #4 ----

Description	Land Use	Daytime	Evening	Night
R05	Residential	55	55	55

[illegible]

---- Receptor #5 ----

Description	Land Use	Daytime	Evening	Night
R06	Residential	55	55	55

[illegible]

---- Receptor #6 ----

Description	Land Use	Daytime	Evening	Night
R07	Residential	55	55	55

[illegible]

Tractor	65.7	61.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	65.7	61.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	65.7	61.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	66.7	62.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	66.7	68	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #7 ----

		Baselines (dBA)						
Description	Land Use	Daytime	Evening	Night				
R08	Residential	55	55	55				
					Equipment			
				Spec	Actual	Receptor	Estimated	
		Impact			Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)		
Tractor	No		40	84	410	0		
Tractor	No		40	84	410	0		
Tractor	No		40	84	410	0		
Excavator	No		40	85	410	0		

Results

		Calculated (dBA)		Noise Limits (dBA)								Noise Limit Exceedance (dBA)			
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Tractor		65.7	61.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		65.7	61.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		65.7	61.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator		66.7	62.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total		66.7	68	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #8 ----

		Baselines (dBA)						
Description	Land Use	Daytime	Evening	Night				
R09	Residential	55	55	55				
					Equipment			
				Spec	Actual	Receptor	Estimated	
		Impact			Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)		
Tractor	No		40	84		410	0	
Tractor	No		40	84		410	0	
Tractor	No		40	84		410	0	
Excavator	No		40	85		410	0	

Results

		Calculated (dBA)		Noise Limits (dBA)								Noise Limit Exceedance (dBA)			
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Tractor		65.7	61.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		65.7	61.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		65.7	61.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator		66.7	62.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total		66.7	68	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #9 ----

		Baselines (dBA)					
Description	Land Use	Daytime	Evening	Night			
R12	Commercial	55	55	55			
					Equipment		
				Spec	Actual	Receptor	Estimated
		Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)	
Tractor	No		40	84		80	0
Tractor	No		40	84		80	0
Tractor	No		40	84		80	0
Excavator	No		40	85		80	0

Results

		Calculated (dBA)		Noise Limits (dBA)								Noise Limit Exceedance (dBA)			
				Day		Evening		Night		Day		Evening		Night	

Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Tractor	79.9	75.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	79.9	75.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	79.9	75.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	80.9	76.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	80.9	82.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #10 ----

		Baselines (dBA)					
Description	Land Use	Daytime	Evening	Night			
R13	Commercial	55	55	55			
		Equipment					
		Impact	Spec	Actual	Receptor	Estimated	
Description	Device	Usage(%)	Lmax (dBA)	Lmax (dBA)	Distance (feet)	Shielding (dBA)	
Tractor	No	40	84	84	245	0	
Tractor	No	40	84	84	245	0	
Tractor	No	40	84	84	245	0	
Excavator	No	40	85	85	245	0	

Results

		Calculated (dBA)			Noise Limits (dBA)						Noise Limit Exceedance (dBA)			
Equipment	*Lmax	Leq	Day	Lmax	Leq	Evening	Lmax	Leq	Night	Lmax	Leq	Evening	Lmax	Leq
Tractor	70.2	66.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	70.2	66.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	70.2	66.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	71.2	67.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	71.2	72.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #11 ----

		Baselines (dBA)					
Description	Land Use	Daytime	Evening	Night			
R01	Commercial	55	55	55			
		Equipment					
		Impact	Spec	Actual	Receptor	Estimated	
Description	Device	Usage(%)	Lmax (dBA)	Lmax (dBA)	Distance (feet)	Shielding (dBA)	
Tractor	No	40	84	84	270	0	
Tractor	No	40	84	84	270	0	
Tractor	No	40	84	84	270	0	
Excavator	No	40	85	85	270	0	

Results

		Calculated (dBA)			Noise Limits (dBA)						Noise Limit Exceedance (dBA)			
Equipment	*Lmax	Leq	Day	Lmax	Leq	Evening	Lmax	Leq	Night	Lmax	Leq	Evening	Lmax	Leq
Tractor	69.4	65.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	69.4	65.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	69.4	65.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	70.4	66.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	70.4	71.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 12/13/2022

Case Description: Building Construction

---- Receptor #1 ----

		Baselines (dBA)			
Description Land Use		Daytime	Evening	Night	
R02	Residential	55	55	55	

		Equipment				
		Spec	Actual	Receptor	Estimated	
		Lmax	Lmax	Distance	Shielding	
Description	Impact	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Crane	No	16		80.6	495	0
Gradall	No	40		83.4	495	0
Gradall	No	40		83.4	495	0
Tractor	No	40	84		495	0
Tractor	No	40	84		495	0
Generator	No	50		80.6	495	0
Welder / Torch	No	40		74	495	0

Results

		Calculated (dBA)		Noise Limits (dBA)				Noise Limit Exceedance (dBA)						
				Day		Evening		Night	Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Crane		60.6	52.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Gradall		63.5	59.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Gradall		63.5	59.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		64.1	60.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		64.1	60.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Generator		60.7	57.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Welder / Torch		54.1	50.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total		64.1	66.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)			
Description Land Use		Daytime	Evening	Night	
R03	Commercial	55	55	55	

		Equipment				
		Spec	Actual	Receptor	Estimated	
		Lmax	Lmax	Distance	Shielding	
Description	Impact	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Crane	No	16		80.6	395	0
Gradall	No	40		83.4	395	0
Gradall	No	40		83.4	395	0
Tractor	No	40	84		395	0
Tractor	No	40	84		395	0
Generator	No	50		80.6	395	0
Welder / Torch	No	40		74	395	0

Results

		Calculated (dBA)		Noise Limits (dBA)				Noise Limit Exceedance (dBA)						
				Day		Evening		Night	Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Crane		62.6	54.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Gradall		65.4	61.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Gradall		65.4	61.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		66	62.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		66	62.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Generator		62.7	59.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Welder / Torch		56	52.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total		66	68.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

		Baselines (dBA)			
Description Land Use		Daytime	Evening	Night	
R04	Residential	55	55	55	

		Equipment				
		Spec	Actual	Receptor	Estimated	
		Lmax	Lmax	Distance	Shielding	
Description	Impact	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Crane	No	16		80.6	345	0

Results																	
Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)									
		Day		Evening				Night		Day		Evening				Night	
*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq		
63.8	55.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
66.6	62.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
66.6	62.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
67.2	63.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
67.2	63.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
63.9	60.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
57.2	53.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
67.2	69.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
*Calculated Lmax is the Loudest value.																	

Results													
Calculated (dBA)			Noise Limits (dBA)					Noise Limit Exceedance (dBA)					
Day			Evening					Night			Night		
*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
63.9	55.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
66.7	62.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
66.7	62.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
67.3	63.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
67.3	63.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
64	61	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
57.3	53.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
67.3	70	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
*Calculated Lmax is the Loudest value.													

[illegible]

Tractor	66.4	62.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Generator	63	60	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Welder / Torch	56.4	52.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	66.4	69	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #6 ----

		Baselines (dBA)					
Descriptor	Land Use	Daytime	Evening	Night			
R07	Residential	55	55	55			
					Equipment		
				Spec	Actual	Receptor	Estimated
	Impact			Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)	
Crane	No		16		80.6	445	0
Gradall	No		40		83.4	445	0
Gradall	No		40		83.4	445	0
Tractor	No		40	84		445	0
Tractor	No		40	84		445	0
Generator	No		50		80.6	445	0
Welder / Torch	No		40		74	445	0

Results

		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane		61.6		53.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Gradall		64.4		60.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Gradall		64.4		60.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		65		61	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		65		61	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Generator		61.6		58.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Welder / Torch		55		51	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total		65		67.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #7 ----

		Baselines (dBA)					
Descriptor	Land Use	Daytime	Evening	Night			
R08	Residential	55	55	55			
					Equipment		
				Spec	Actual	Receptor	Estimated
	Impact			Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)	
Crane	No		16		80.6	430	0
Gradall	No		40		83.4	430	0
Gradall	No		40		83.4	430	0
Tractor	No		40	84		430	0
Tractor	No		40	84		430	0
Generator	No		50		80.6	430	0
Welder / Torch	No		40		74	430	0

Results

		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane		61.9		53.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Gradall		64.7		60.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Gradall		64.7		60.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		65.3		61.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		65.3		61.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Generator		61.9		58.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Welder / Torch		55.3		51.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total		65.3		68	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #8 ----

		Baselines (dBA)					
Descriptor	Land Use	Daytime	Evening	Night			
R09	Residential	55	55	55			
		Equipment					
		Impact	Spec	Actual	Receptor	Estimated	
Description	Device	Usage(%)	Lmax (dBA)	Lmax (dBA)	Distance (feet)	Shielding (dBA)	

	Results													
	Calculated (dBA)			Noise Limits (dBA)						Noise Limit Exceedance (dBA)				
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane	61.7	53.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Gradall	64.5	60.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Gradall	64.5	60.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	65.1	61.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	65.1	61.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Generator	61.7	58.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Welder / Torch	55.1	51.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	65.1	67.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
*Calculated Lmax is the Loudest value.														

Descriptor	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
R12	Commercial	55	55	55

Description	Impact Device	Usage(%)	Equipment			
			Spec	Actual	Receptor	Estimated
			Lmax (dBA)	Lmax (dBA)	Distance (feet)	Shielding (dBA)
Crane	No	16		80.6	130	0
Gradall	No	40		83.4	130	0
Gradall	No	40		83.4	130	0
Tractor	No	40	84		130	0
Tractor	No	40	84		130	0
Generator	No	50		80.6	130	0
Welder / Torch	No	40		74	130	0

	Calculated (dBA)			Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night		
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	
Crane	72.3		64.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Gradall	75.1		71.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Gradall	75.1		71.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Tractor	75.7		71.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Tractor	75.7		71.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Generator	72.3		69.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Welder / Torch	65.7		61.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Total	75.7		78.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
*Calculated Lmax is the Loudest value.															

Descriptor	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
R13	Commercial	55	55	55

Description	Impact Device	Equipment				Estimated Shielding (dBA)
		Usage(%)	Spec	Actual	Receptor	
			Lmax (dBA)	Lmax (dBA)	Distance (feet)	
Crane	No	16		80.6	285	0
Gradall	No	40		83.4	285	0
Gradall	No	40		83.4	285	0
Tractor	No	40	84		285	0
Tractor	No	40	84		285	0
Generator	No	50		80.6	285	0
Welder / Torch	No	40		74	285	0

[illegible]

Tractor	68.9	64.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	68.9	64.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Generator	65.5	62.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Welder / Torch	58.9	54.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	68.9	71.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #11 ----

Description Land Use		Baselines (dBA)			Equipment					Receptor				
		Daytime	Evening	Night										
R01	Commercial	55	55	55	Impact	Spec	Actual	Receptor	Estimated	Distance	Shielding			
					Device	Usage(%)	Lmax (dBA)	Lmax (dBA)		(feet)	(dBA)			
Crane		No	16					80.6	295		0			
Gradall		No	40					83.4	295		0			
Gradall		No	40					83.4	295		0			
Tractor		No	40	84					295		0			
Tractor		No	40	84					295		0			
Generator		No	50					80.6	295		0			
Welder / Torch		No	40					74	295		0			

Equipment		Calculated (dBA)		Results						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane		65.1	57.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Gradall		68	64	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Gradall		68	64	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		68.6	64.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		68.6	64.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Generator		65.2	62.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Welder / Torch		58.6	54.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total		68.6	71.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM), Version 1.1

Report date 12/13/2022
Case Description Paving

---- Receptor #1 ----														
		Baselines (dBA)												
Description	Land Use	Daytime	Evening	Night										
R02	Residential	55	55	55										
Equipment														
		Spec			Actual	Receptor	Estimated							
		Impact		Lmax	Lmax	Distance	Shielding							
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)								
Paver	No		50		77.2	420	0							
Roller	No		20		80	420	0							
Paver	No		50		77.2	420	0							
Results														
Calculated (dBA)				Noise Limits (dBA)					Noise Limit Exceedance (dBA)					
				Day	Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Paver		58.7	55.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller		61.5	54.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver		58.7	55.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	61.5	60.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----														
		Baselines (dBA)												
Description	Land Use	Daytime	Evening	Night										
R03	Commercial	55	55	55										
Equipment														
		Spec			Actual	Receptor	Estimated							
		Impact		Lmax	Lmax	Distance	Shielding							
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)								
Paver	No		50		77.2	305	0							
Roller	No		20		80	305	0							
Paver	No		50		77.2	305	0							
Results														
Calculated (dBA)				Noise Limits (dBA)					Noise Limit Exceedance (dBA)					
				Day	Evening		Night			Day	Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Paver		61.5	58.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller		64.3	57.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver		61.5	58.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total		64.3	62.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----														
		Baselines (dBA)												
Description	Land Use	Daytime	Evening	Night										
R04	Residential	55	55	55										
Equipment														
		Spec			Actual	Receptor	Estimated							
		Lmax			Lmax	Distance	Shielding							
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)								
Paver	No		50		77.2	255	0							
Roller	No		20		80	255	0							
Paver	No		50		77.2	255	0							
Results														
Calculated (dBA)				Noise Limits (dBA)						Noise Limit Exceedance (dBA)				
				Day	Evening		Night			Day	Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Paver		63.1	60.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller		65.8	58.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver		63.1	60.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	65.8	64.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

		Results													
		Calculated (dBA)			Noise Limits (dBA)					Noise Limit Exceedance (dBA)					
				Day	Evening				Night			Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Paver		58.9	55.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller		61.7	54.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver		58.9	55.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total		61.7	60.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		*Calculated Lmax is the Loudest value.													

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
R09	Residential	55	55	55

		Results												
		Calculated (dBA)			Noise Limits (dBA)						Noise Limit Exceedance (dBA)			
		*Lmax	Leq	Day	Leq	Evening			Lmax	Leq	Day	Evening		
				Lmax		Lmax	Leq	Lmax			Leq	Lmax	Leq	Lmax
Equipment														
Paver		58.9	55.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller		61.7	54.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver		58.9	55.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total		61.7	60.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		*Calculated Lmax is the Loudest value.												

		Baselines (dBA)		
Receptor	Land Use	Daytime	Evening	Night
R12	Commercial	55	55	55

		Results															
		Calculated (dBA)			Noise Limits (dBA)						Noise Limit Exceedance (dBA)						
		*Lmax	Leq	Day Lmax	Leq	Evening			Night Lmax	Leq	Day Lmax	Leq	Evening		Night Lmax	Leq	
						Lmax	Leq	Exceedance					Lmax	Leq			Exceedance
Equipment																	
Paver		73.1	70.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller		75.9	68.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver		73.1	70.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total		75.9	74.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		*Calculated Lmax is the Loudest value.															

Description	Land Use	Baselines (dBA)			Receptor #
		Daytime	Evening	Night	
R13	Commercial	55	55	55	Receptor #10

Description	Impact Device	Usage(%)	Equipment			Estimated Shielding (dBA)
			Spec	Actual	Receptor	
			Lmax (dBA)	Lmax (dBA)	Distance (feet)	
Paver	No	50		77.2	245	0
Roller	No	20		80	245	0
Paver	No	50		77.2	245	0

		Results													
		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Paver		63.4	60.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller		66.2	59.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver		63.4	60.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total		66.2	64.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #11 ----

		Baselines (dBA)		
Descriptor	Land Use	Daytime	Evening	Night
R01	Commercial	55	55	55

		Equipment				
		Impact	Spec	Actual	Receptor	Estimated
		Device	Usage(%)	Lmax (dBA)	Distance (feet)	Shielding (dBA)
Description		No	50		77.2	270
Paver		No	20		80	270
Roller		No	50		77.2	270
Paver		No				

		Results													
		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Paver		62.6	59.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller		65.4	58.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver		62.6	59.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total		65.4	64	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM), Version 1.1

Report dat 12/13/2022

Case Descr ArchitecturalCoating

---- Receptor #1 ----

		Baselines (dBA)												
Description	Land Use	Daytime	Evening	Night										
R02	Residential	55	55	55										
					Equipment									
		Impact		Spec	Actual	Receptor	Estimated							
Description		Device	Usage(%)	Lmax (dBA)	Lmax (dBA)	Distance (feet)	Shielding (dBA)							
Compressor (air)		No	40		77.7	495	0							
					Results									
		Calculated (dBA)			Noise Limits (dBA)					Noise Limit Exceedance (dBA)				
				Day	Evening		Night		Day	Evening		Night		
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	
Compressor (air)		57.8	53.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Total		57.8	53.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
*Calculated Lmax is the Loudest value.														

---- Receptor #2 ----

		Baselines (dBA)												
Description	Land Use	Daytime	Evening	Night										
R03	Commercial	55	55	55										
		Equipment												
				Spec	Actual	Receptor	Estimated							
	Impact			Lmax	Lmax	Distance	Shielding							
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)								
Compressor (air)	No	40		77.7	395	0								
		Results												
	Calculated (dBA)				Noise Limits (dBA)				Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Compressor (air)	59.7	55.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	59.7	55.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
*Calculated Lmax is the Loudest value.														

---- Receptor #3 ----

		Baselines (dBA)																	
Descriptor	Land Use	Daytime	Evening	Night															
R04	Residential	55	55	55															
		Equipment																	
				Spec	Actual	Receptor	Estimated												
Description	Impact			Lmax	Lmax	Distance	Shielding												
	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)													
Compressor (air)		No	40		77.7	345	0												
		Results																	
		Calculated (dBA)			Noise Limits (dBA)					Noise Limit Exceedance (dBA)									
				Day			Evening			Night			Day			Evening			Night
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Compressor (air)		60.9	56.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total		60.9	56.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		*Calculated Lmax is the Loudest value.																	

---- Receptor #4 ----

[illegible]

	Total	61	57	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
*Calculated Lmax is the Loudest value.														
----- Receptor #5 -----														
		Baselines (dBA)												
Description	Land Use	Daytime	Evening	Night										
R06	Residential	55	55	55										
		Equipment												
				Spec	Actual	Receptor	Estimated							
Description	Impact			Lmax	Lmax	Distance	Shielding							
Compressor (air)	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)								
	No	40			77.7	380	0							
Results														
		Calculated (dBA)			Noise Limits (dBA)				Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Compressor (air)	60.1	56.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	60.1	56.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
*Calculated Lmax is the Loudest value.														
----- Receptor #6 -----														
		Baselines (dBA)												
Description	Land Use	Daytime	Evening	Night										
R07	Residential	55	55	55										
		Equipment												
				Spec	Actual	Receptor	Estimated							
Description	Impact			Lmax	Lmax	Distance	Shielding							
Compressor (air)	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)								
	No	40			77.7	445	0							
Results														
		Calculated (dBA)			Noise Limits (dBA)				Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Compressor (air)	58.7	54.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	58.7	54.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
*Calculated Lmax is the Loudest value.														
----- Receptor #7 -----														
		Baselines (dBA)												
Description	Land Use	Daytime	Evening	Night										
R08	Residential	55	55	55										
		Equipment												
				Spec	Actual	Receptor	Estimated							
Description	Impact			Lmax	Lmax	Distance	Shielding							
Compressor (air)	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)								
	No	40			77.7	430	0							
Results														
		Calculated (dBA)			Noise Limits (dBA)				Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Compressor (air)	59	55	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	59	55	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
*Calculated Lmax is the Loudest value.														
----- Receptor #8 -----														
		Baselines (dBA)												
Description	Land Use	Daytime	Evening	Night										
R09	Residential	55	55	55										
		Equipment												
				Spec	Actual	Receptor	Estimated							
Description	Impact			Lmax	Lmax	Distance	Shielding							
Compressor (air)	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)								
	No	40			77.7	440	0							
Results														
		Calculated (dBA)			Noise Limits (dBA)				Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Compressor (air)	58.8	54.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	58.8	54.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
*Calculated Lmax is the Loudest value.														

**Highland East Industrial Building Project
West 5th Street, Highland, CA**

**Appendix B: Construction Vibration Estimates
Prepared by: MIG, Inc.
June 2023**

CHIPT Highland 210, L.P.
Highland East Industrial Building Project
Appendix B: Construction Vibration Estimates
Prepared by MIG, Inc. June 2023

Table 1: Receptor Distances

Receptor	Distance	From
Cremation Center	15	Work Area
Tavern	25	Work Area
Air-con Contractor	55	Work Area
Residence	125	Work Area

Table 2: Equipment Vibration Levels at 15 Feet

Equipment	Reference PPV at 25ft	Reference Lv at 25ft	Estimated PPV at 15ft	Estimated Lv at 15 ft
Small Bulldozer	0.003	58	0.005	64.7
Jackhammer	0.035	79	0.061	85.7
Loaded Truck	0.076	86	0.133	92.7
Large Bulldozer	0.089	87	0.156	93.7
Auger Drill Rig	0.089	87	0.156	93.7
Vibratory Roller	0.21	94	0.368	100.7

Table 3: Equipment Vibration Levels at 25 Feet

Equipment	Reference PPV at 25ft	Reference Lv at 25ft	Estimated PPV at 25ft	Estimated Lv at 25 ft
Small Bulldozer	0.003	58	0.003	58.0
Jackhammer	0.035	79	0.035	79.0
Loaded Truck	0.076	86	0.076	86.0
Large Bulldozer	0.089	87	0.089	87.0
Auger Drill Rig	0.089	87	0.089	87.0
Vibratory Roller	0.21	94	0.210	94.0

Table 4: Equipment Vibration Levels at 55 Feet

Equipment	Reference PPV at 25ft	Reference Lv at 25ft	Estimated PPV at 55ft	Estimated Lv at 55 ft
Small Bulldozer	0.003	58	0.001	47.7
Jackhammer	0.035	79	0.015	68.7
Loaded Truck	0.076	86	0.032	75.7
Large Bulldozer	0.089	87	0.037	76.7
Auger Drill Rig	0.089	87	0.037	76.7
Vibratory Roller	0.21	94	0.088	83.7

Table 5: Equipment Vibration Levels at 125 Feet

Equipment	Reference PPV at 25ft	Reference Lv at 25ft	Estimated PPV at 125ft	Estimated Lv at 125 ft
Small Bulldozer	0.003	58	0.001	37.0
Jackhammer	0.035	79	0.006	58.0
Loaded Truck	0.076	86	0.013	65.0
Large Bulldozer	0.089	87	0.015	66.0
Auger Drill Rig	0.089	87	0.015	66.0
Vibratory Roller	0.21	94	0.036	73.0

APPENDIX C: Operational Noise Level Estimates

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Highland East Industrial Building Project
West 5th Street, Highland, CA

Appendix C: On-Site Operational Noise Level Estimates

Prepared by: MIG, Inc.

June 2023

Contents:

Sheet 1	Reference Noise Level Information
Sheet 2	On-Site Stationary Source Noise Level Estimates (Base Leq Limits)

Highland East Industrial Building Project
West 5th Street, Highland, CA
Appendix C: On-Site Operational Noise Level Estimates

Sheet 1: Reference Noise Level Information

Noise Source	Reference dBA @ 3 Feet	Duration (Seconds)	Estimated Hourly Leq @ 3 Feet
<u>On-site Automobile Trip</u>			
Low speed travel (15 mph)/parking	55	30	34.2
Door closing	90	1	54.4
Engine start/rev	90	10	64.4
Total Combined Noise Level			64.9
<u>On-Site Truck Trip</u>			
Low speed travel (15 mph)	96	30	75.2
Maneuvering (with backup alarm)	100	150	86.2
Air brake release	98	3	67.2
Main engine idling	86	900	80.0
Door closing	90	2	57.4
Engine start/rev	100	20	77.4
Forklift operation	70	1800	67.0
Forklift backup alarm	100	90	84.0
Total Combined Noise Level			89.4
<u>Truck Entrance Way</u>			
Warehouse Noise Measurement	71.4	3600	71.4
<u>HVAC Unit</u>			
Operation (5 Ton), with parapet wall	80	2,400	73.2

Note: Parapet walls are assumed to provide 5 dB of attenuation for HVAC noise levels.

Highland East Industrial Building Project
West 5th Street, Highland, CA
Appendix C: On-Site Operational Noise Level Estimates

Sheet 2: On-Site Stationary Source Noise Level Estimates (Base Leq Limits)

Table 1: Estimated Noise Levels at Property Line North R1						
On-Site Noise Source	Reference Noise Data		Property Line (Single Source)		Property Line (Multiple Sources)	
	Distance	Hourly Leq dBA	Distance	Hourly Leq dBA	No. Sources	Hourly Leq dBA
Truck Entrance 1	3	71.4	110	40.1	1	40.1
Truck Entrance 2	3	71.4	Source does not contribute to noise levels at receptor location.			
Drive Aisle 1	3	75.2	230	37.5	7	46.0
Drive Aisle 2	3	75.2	430	32.1	7	40.5
Drive Aisle 3	3	75.2	Source does not contribute to noise levels at receptor location.			
Docks 1-4	3	89.4	300	42.8	1	42.8
Docks 5-11	3	89.4	350	41.4	1	41.4
Docks 12-18	3	89.4	440	39.5	1	39.5
Docks 19-25	3	89.4	530	37.8	1	37.8
Docks 26-32	3	89.4	625	36.4	1	36.4
Docks 33-34	3	89.4	690	35.6	1	35.6
Parking Area 1	3	64.9	Source does not contribute to noise levels at receptor location.			
Parking Area 2	3	64.9	Source does not contribute to noise levels at receptor location.			
Office HVAC	3	73.2	Source does not contribute to noise levels at receptor location.			
Combined Noise Level						51.3

Table 2: Estimated Noise Levels at Property Line North R2						
On-Site Noise Source	Reference Noise Data		Property Line (Single Source)		Property Line (Multiple Sources)	
	Distance	Hourly Leq dBA	Distance	Hourly Leq dBA	No. Sources	Hourly Leq dBA
Truck Entrance 1	3	71.4	115	39.7	1	39.7
Truck Entrance 2	3	71.4	640	24.8	1	24.8
Drive Aisle 1	3	75.2	215	38.1	7	46.6
Drive Aisle 2	3	75.2	320	34.6	7	43.1
Drive Aisle 3	3	75.2	615	29.0	7	37.4
Docks 1-4	3	89.4	250	44.4	1	44.4
Docks 5-11	3	89.4	270	43.7	1	43.7
Docks 12-18	3	89.4	340	41.7	1	41.7
Docks 19-25	3	89.4	410	40.1	1	40.1
Docks 26-32	3	89.4	500	38.3	1	38.3
Docks 33-34	3	89.4	560	37.4	1	37.4
Parking Area 1	3	64.9	Source does not contribute to noise levels at receptor location.			
Parking Area 2	3	64.9	Source does not contribute to noise levels at receptor location.			
Office HVAC	3	73.2	640	26.7	1	26.7
Combined Noise Level						52.9

Highland East Industrial Building Project
West 5th Street, Highland, CA
Appendix C: On-Site Operational Noise Level Estimates

Sheet 2: On-Site Stationary Source Noise Level Estimates (Base Leq Limits)

Table 3: Estimated Noise Levels at Property Line North R3						
On-Site Noise Source	Reference Noise Data		Property Line (Single Source)		Property Line (Multiple Sources)	
	Distance	Hourly Leq dBA	Distance	Hourly Leq dBA	No. Sources	Hourly Leq dBA
Truck Entrance 1	3	71.4	305	31.3	1	31.3
Truck Entrance 2	3	71.4	420	28.5	1	28.5
Drive Aisle 1	3	75.2	330	34.4	7	42.8
Drive Aisle 2	3	75.2	200	38.7	7	47.2
Drive Aisle 3	3	75.2	400	32.7	7	41.2
Docks 1-4	3	89.4	310	42.5	1	42.5
Docks 5-11	3	89.4	270	43.7	1	43.7
Docks 12-18	3	89.4	250	44.4	1	44.4
Docks 19-25	3	89.4	265	43.9	1	43.9
Docks 26-32	3	89.4	315	42.4	1	42.4
Docks 33-34	3	89.4	370	41.0	1	41.0
Parking Area 1	3	64.9	Source does not contribute to noise levels at receptor location.			
Parking Area 2	3	64.9	Source does not contribute to noise levels at receptor location.			
Office HVAC	3	73.2	450	29.7	1	29.7
Combined Noise Level						53.6

Table 4: Estimated Noise Levels at Property Line North R4						
On-Site Noise Source	Reference Noise Data		Property Line (Single Source)		Property Line (Multiple Sources)	
	Distance	Hourly Leq dBA	Distance	Hourly Leq dBA	No. Sources	Hourly Leq dBA
Truck Entrance 1	3	71.4	560	26.0	1	26.0
Truck Entrance 2	3	71.4	180	35.8	1	35.8
Drive Aisle 1	3	75.2	550	29.9	7	38.4
Drive Aisle 2	3	75.2	315	34.8	7	43.2
Drive Aisle 3	3	75.2	220	37.9	7	46.4
Docks 1-4	3	89.4	515	39.7	1	39.7
Docks 5-11	3	89.4	450	40.8	1	40.8
Docks 12-18	3	89.4	360	42.8	1	42.8
Docks 19-25	3	89.4	295	44.5	1	44.5
Docks 26-32	3	89.4	255	45.8	1	45.8
Docks 33-34	3	89.4	250	45.9	1	45.9
Parking Area 1	3	64.9	Source does not contribute to noise levels at receptor location.			
Parking Area 2	3	64.9	Source does not contribute to noise levels at receptor location.			
Office HVAC	3	73.2	300	33.2	1	33.2
Combined Noise Level						53.7

Highland East Industrial Building Project
West 5th Street, Highland, CA
Appendix C: On-Site Operational Noise Level Estimates

Sheet 2: On-Site Stationary Source Noise Level Estimates (Base Leq Limits)

Table 5: Estimated Noise Levels at Property Line North R5						
On-Site Noise Source	Reference Noise Data		Property Line (Single Source)		Property Line (Multiple Sources)	
	Distance	Hourly Leq dBA	Distance	Hourly Leq dBA	No. Sources	Hourly Leq dBA
Truck Entrance 1	3	71.4	690	24.2	1	24.2
Truck Entrance 2	3	71.4	100	40.9	1	40.9
Drive Aisle 1	3	75.2	680	28.1	7	36.6
Drive Aisle 2	3	75.2	420	32.3	7	40.7
Drive Aisle 3	3	75.2	210	38.3	7	46.8
Docks 1-4	3	89.4	635	37.9	1	37.9
Docks 5-11	3	89.4	560	38.9	1	38.9
Docks 12-18	3	89.4	460	40.7	1	40.7
Docks 19-25	3	89.4	380	42.3	1	42.3
Docks 26-32	3	89.4	310	44.1	1	44.1
Docks 33-34	3	89.4	270	45.3	1	45.3
Parking Area 1	3	64.9	Source does not contribute to noise levels at receptor location.			
Parking Area 2	3	64.9	Source does not contribute to noise levels at receptor location.			
Office HVAC	3	73.2	295	33.4	1	33.4
Combined Noise Level						52.7

Table 6: Estimated Noise Levels at Property Line East R6						
On-Site Noise Source	Reference Noise Data		Property Line (Single Source)		Property Line (Multiple Sources)	
	Distance	Hourly Leq dBA	Distance	Hourly Leq dBA	No. Sources	Hourly Leq dBA
Truck Entrance 1	3	71.4	Source does not contribute to noise levels at receptor location.			
Truck Entrance 2	3	71.4	270	32.3	1	32.3
Drive Aisle 1	3	75.2	Source does not contribute to noise levels at receptor location.			
Drive Aisle 2	3	75.2	Source does not contribute to noise levels at receptor location.			
Drive Aisle 3	3	75.2	100	44.8	7	53.2
Docks 1-4	3	89.4	650	37.6	1	37.6
Docks 5-11	3	89.4	570	38.8	1	38.8
Docks 12-18	3	89.4	460	40.7	1	40.7
Docks 19-25	3	89.4	360	42.8	1	42.8
Docks 26-32	3	89.4	255	45.8	1	45.8
Docks 33-34	3	89.4	180	48.8	1	48.8
Parking Area 1	3	64.9	Source does not contribute to noise levels at receptor location.			
Parking Area 2	3	64.9	20	48.4	10	58.4
Office HVAC	3	73.2	135	40.2	1	40.2
Combined Noise Level						60.3

Highland East Industrial Building Project
West 5th Street, Highland, CA
Appendix C: On-Site Operational Noise Level Estimates

Sheet 2: On-Site Stationary Source Noise Level Estimates (Base Leq Limits)

Table 7: Estimated Noise Levels at Property Line West R7						
On-Site Noise Source	Reference Noise Data		Property Line (Single Source)		Property Line (Multiple Sources)	
	Distance	Hourly Leq dBA	Distance	Hourly Leq dBA	No. Sources	Hourly Leq dBA
Truck Entrance 1	3	71.4	110	40.1	1	40.1
Truck Entrance 2	3	71.4	Source does not contribute to noise levels at receptor location.			
Drive Aisle 1	3	75.2	Source does not contribute to noise levels at receptor location.			
Drive Aisle 2	3	75.2	Source does not contribute to noise levels at receptor location.			
Drive Aisle 3	3	75.2	Source does not contribute to noise levels at receptor location.			
Docks 1-4	3	89.4	Source does not contribute to noise levels at receptor location.			
Docks 5-11	3	89.4	Source does not contribute to noise levels at receptor location.			
Docks 12-18	3	89.4	Source does not contribute to noise levels at receptor location.			
Docks 19-25	3	89.4	Source does not contribute to noise levels at receptor location.			
Docks 26-32	3	89.4	Source does not contribute to noise levels at receptor location.			
Docks 33-34	3	89.4	Source does not contribute to noise levels at receptor location.			
Parking Area 1	3	64.9	20	48.4	10	58.4
Parking Area 2	3	64.9	Source does not contribute to noise levels at receptor location.			
Office HVAC	3	73.2	Source does not contribute to noise levels at receptor location.			
Combined Noise Level						58.4

Table 8: Estimated Noise Levels at Property Line West R8						
On-Site Noise Source	Reference Noise Data		Property Line (Single Source)		Property Line (Multiple Sources)	
	Distance	Hourly Leq dBA	Distance	Hourly Leq dBA	No. Sources	Hourly Leq dBA
Truck Entrance 1	3	71.4	375	29.5	1	29.5
Truck Entrance 2	3	71.4	Source does not contribute to noise levels at receptor location.			
Drive Aisle 1	3	75.2	90	45.7	7	54.1
Drive Aisle 2	3	75.2	370	33.4	7	41.8
Drive Aisle 3	3	75.2	700	27.8	7	36.3
Docks 1-4	3	89.4	170	54.3	1	54.3
Docks 5-11	3	89.4	240	51.3	1	51.3
Docks 12-18	3	89.4	350	48.0	1	48.0
Docks 19-25	3	89.4	455	45.8	1	45.8
Docks 26-32	3	89.4	560	44.0	1	44.0
Docks 33-34	3	89.4	630	42.9	1	42.9
Parking Area 1	3	64.9	20	48.4	10	58.4
Parking Area 2	3	64.9	Source does not contribute to noise levels at receptor location.			
Office HVAC	3	73.2	700	25.9	1	25.9
Combined Noise Level						62.5

Highland East Industrial Building Project
West 5th Street, Highland, CA
Appendix C: On-Site Operational Noise Level Estimates

Sheet 3: Noise Barrier Attenuation Estimates

Table 1: Source/ Property Line Receiver Information									
Noise Source:	Truck Dock Loading Area								
Source Noise Level:	PL=	NA							
Receptor Noise Level:	PL=	NA							
Noise Reduction Level:	PL=	NA							
Source Frequency:	500	Hertz							
Source Grade:	1178.0	Feet	Source Height:		1184.0	Feet			
Receiver Grade:	R1,2,3	1176.0	Feet	R4,5	1182.0	Feet			
Receiver Elevation:	R1,2,3	1181.0	Feet	R4,5	1187.0	Feet			
Barrier Height:		8.0	Feet		8.0	Feet			

Note: "PL" = Property Line

Table 2: Barrier Insertion Loss Summary	
Receiver	Preliminary Barrier Insertion Loss Estimate (dBA)
	Barrier Attenuation
North R1, R2, R3	6.6
North R4, R5	5.0

Table 3: Barrier Attenuation 8-Foot High Wall (R1, R2, R3)								
Receptor	A	B	C	D	D1	D2	H1	H2
Property Line	145.01	105.12	250.02	250	145	105	3.0	5.0

Table 4: Fresnel Number (N ₀) and Barrier Insertion Loss Estimate (R1, R2, R3)				
Receptor	δ (Feet)	λ (Feet)	N ₀	Insertion Loss (dB)
Property Line	0.11	2.30	0.0998	6.6

Table 5: Barrier Attenuation 8-Foot High Wall (R4 and R5)								
Receptor	A	B	C	D	D1	D2	H1	H2
Property Line	145.01	105.00	250.02	250	145	105	-3.0	-1.0

Table 6: Fresnel Number (N ₀) and Barrier Insertion Loss Estimate (R4, R5)				
Receptor	δ (Feet)	λ (Feet)	N ₀	Insertion Loss (dB)
Property Line	0.00	2.30	0.0005	5.0

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