15010-15100 Nelson Avenue

City of Industry, CA

ENVIRONMENTAL NOISE STUDY

13 June 2023

Prepared for:

Michael Johnson
Nelson Avenue Owner LP
19700 S Vermont Avenue Suite #101
Torrance, CA 90502
MJohnson@omprop.com

Montana Kanen
Nelson Avenue Owner LP
19700 S Vermont Avenue Suite #101
Torrance, CA 90502
MKanen@omprop.com

Prepared by:

Salter
Maya Vazquez – Consultant mvazquez@salter-inc.com
Ethan Salter – Vice President esalter@salter-inc.com

Salter Project 22-0620

INTRODUCTION

This report summarizes our environmental noise study of future loading dock activities from the proposed warehouse facility at 15010-15100 Nelson Avenue. The proposed project is located southwest of Nelson Avenue East and northeast of Valley Boulevard and the Union Pacific Railroad line running parallel to Valley Boulevard in City of Industry, California. The City of La Puente is to the north of Nelson Avenue. The purpose of the study was to determine whether estimated loading dock truck activity, construction noise and vibration, and traffic noise impacts from the proposed facility will meet the relevant requirements of the City General Plan Noise Element and Noise Ordinance.

EXECUTIVE SUMMARY

- Noise from the project's loading docks will increase existing DNL noise levels at noise-sensitive receiver locations by about 1 dB. An increase of 2 dB or less is not expected to be noticeable and is not considered significant.
- Noise from off-site traffic would not result in a significant increase in noise levels at existing adjacent properties.
- Given the 585-foot distance from the project warehouse building to the nearest residential area, construction noise and vibration is not expected to impact residential receivers if the recommended mitigations are implemented (i.e., construction limited to hours outlined in the Municipal Code, etc.).
- "Single-event" noise levels (e.g., backup alarm, truck brakes, etc.), are expected to comply with City of Industry Noise Element criteria for such noise sources at the nearest noise-sensitive residential receivers to the north.

REPORT ORGANIZATION

This report contains the following sections:

- Project Site
- Acoustical Criteria
- Existing Noise Environment
- Noise Impact Assessment
    - Construction Noise
    - Loading Dock and Intra-Project Traffic Noise (Parking Lot)
    - Tenant HVAC Equipment Noise

PROJECT SITE

The proposed project will have a total lot area of approximately 8.79 acres, located in the 15000 block of Nelson Avenue. It is bounded by Nelson Avenue to the north, Valley Boulevard to the south, and the Union Pacific Railroad line parallel to Valley Boulevard in the City of Industry.

The warehouse building will be approximately 147,730 square feet with 22 loading docks. The site is adjacent to existing warehouse facilities to the east and west. Noise-sensitive residential receivers are located across Nelson Avenue to the north about 585-feet away from the warehouse building.

ACOUSTICAL CRITERIA

City of Industry and City of La Puente General Plans (Safety Elements)

Nelson Avenue is the boundary between the jurisdictions of Industry and La Puente, California, such that the project site is in Industry and the residential area across Nelson Avenue is in La Puente. This report considers both jurisdictions when establishing the proper criteria for potentially significant contributions to the noise environment.

The Safety Element of the City of Industry General Plan (Chapter 4, Section 4.2.6 Noise and Land Use Compatibility) and La Puente Community Safety Element (Page CS-14) both contain land use compatibility guidelines for environmental noise in the communities. Table 1, below, summarizes these guidelines for residential and industrial land uses[1] in terms of CNEL[2] or DNL[3]. The definitions of each category follow below the table.

---

[1] City of Industry: Table 4 of the Safety Element, page 4-7. La Puente: Figure CS-6 of the Safety Element, page CS-20.

[2] Community Noise Equivalent Level (CNEL) – A descriptor for the 24-hour A-weighted average noise level. The CNEL concept accounts for the increased acoustical sensitivity of people to noise during the evening and nighttime hours. Sound levels during the hours from 7 pm to 10 pm are penalized 5 dB; sound levels during the hours from 10 pm to 7 am are penalized 10 dB. A 10-dB increase in sound level is perceived by people to be a doubling of loudness.

[3] Day-Night Average Sound Level (DNL) – A descriptor established by the U.S. Environmental Protection Agency to describe the average day-night level with a penalty applied to noise occurring during the nighttime hours (10 pm - 7 am) to account for the increased sensitivity of people during sleeping hours. Also noted as Ldn. The difference between CNEL and DNL is often less than 1 dB.

Table 1: Summary of Land Use Compatibility for Community Noise Environments

Jurisdiction of Origin	Land Use Category	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
La Puente	Residential Low-Density[4], Single-family, Duplex, Mobile Homes	≤60	60-65	65-75	>75
Industry	Industrial, Manufacturing, Utilities, Agricultural	≤75	70-80	>75	--

Normally Acceptable: *Specified 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 analysis of the noise reduction requirements is made and the needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems pr air conditioning will normally suffice.*

Normally Unacceptable: *New construction or development should generally be discouraged. If new construction does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.*

Clearly Unacceptable: *New construction or development generally should not be undertaken.*

California Department of Transportation (CalTrans) Construction Vibration Criteria

The California Department of Transportation[5] (Caltrans) provides vibration design criteria for two potential scenarios: human perception and construction damage. Their informational tables are included below as guidelines for potential project vibration levels. “Transient” vibrations are classified as impulsive events that are short in duration (e.g., debris falling, blasting). “Continuous” vibrations are more sustained vibration events over longer periods of time (e.g., jackhammering, drilling). Table 2 describes the human response to different levels of ground-borne vibration for transient and continuous events.

[4] Per General Plan Noise Ordinance Objective N-1.4, Policy P4, the criterion for single-family residential back yards is 60 dB CNEL/DNL.

5 Transportation and Construction Vibration Guidance Manual September 2013 (DOT Document).

Table 2: Guideline Vibration Annoyance Potential Threshold Criteria[6]

Human Response	Maximum PPV[7] (in/sec)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Barely perceptible	0.04	0.01
Distinctly perceptible	0.25	0.04
Strongly perceptible	0.90	0.10
Severe	2.00	0.40

Table 3 provides a guideline for vibration criteria to assess the damage potential from ground vibration induced by construction equipment. Thresholds for continuous vibrations are lower than those for transient vibrations and are therefore considered more "conservative". These are standard significance thresholds used in the industry to determine impacts of ground borne vibrations on structures.

Table 3: Guideline Vibration Damage Potential Threshold Criteria[8]

Structure and Condition	Maximum PPV (in/sec)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Extremely fragile historic buildings, ruins, ancient monuments	0.12	0.08
Fragile buildings	0.20	0.10
Historic and some old buildings	0.50	0.25
Older residential structures	0.50	0.30
New residential structures	1.00	0.50
Modern industrial/commercial buildings	2.00	0.50

The immediately adjacent properties are all modern industrial or commercial buildings. Across Nelson Avenue to the north are existing single-family residences. Based on Table 3, we have applied the more stringent residential criteria of 1.0 PPV for transient events and 0.50 PPV for continuous events.

6 This is Table 20 from the DOT document.

7 (PPV): Peak Particle Velocity.

8 This is Table 19 of the DOT document.

State of California CEQA Guidelines and Impact Criteria

The California Environmental Quality Act (CEQA) contains guidelines to evaluate the significance of noise attributable to a proposed project. This would include (but not limited to) added traffic noise, mechanical equipment noise, and construction noise. CEQA asks the following applicable questions. Would the project result in:

- *Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?*
- *Generation of excessive ground borne vibration or ground borne noise levels?*
- *For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public-use airport, would the project expose people residing or working in the project area to excessive noise levels?*

CEQA does not define the noise level increase that is considered substantial. Typically, the local general plan would establish limits with respect to allowable noise and vibration increases. However, both pertinent jurisdictions' General Plans do not contain numerical standards of significance for noise increases. For the items above, noise level increases of less than 3 dBA are generally considered less-than-significant. Substantial adverse community response would be expected only for increases of 5 dBA or more.

EXISTING NOISE ENVIRONMENT

Project Site Description

To quantify the existing site noise environment, two monitors continuously measured noise levels along the project property lines to the north and south between 16 and 18 November 2022. **Table 4** shows a summary of the measured data. **Figure 1**, attached, shows the approximate measurement locations.

Table 4: Measured Environmental Noise Levels

Site	Location	DNL (dB)
LT-1	Nelson Avenue, approximately 12-feet above grade	71
LT-2	Valley Boulevard and Railroad, approximately 12-feet above grade	79

NOISE IMPACT ASSESSMENT

Site Noise Context

After thorough analysis of the data collected from each monitor (locations shown in **Figure 1**), it was determined that the 8 dB difference between the measured DNL values of the two monitors was due to the significantly different noise environments on the opposite sides of the project site. LT-1 quantified the noise levels of the existing truck facility operations among the typical residential activity noise along Nelson Avenue, while LT-2's noise environment was dominated by traffic noise of Valley Boulevard and freight train noise from the railroad directly adjacent to the project property line to the southwest.

The increased DNL value at LT-2 was due to the occasional freight trains that rode along the tracks and sounded its horn, which in some recorded instances approached 90 dB at approximately 55 feet. Because these measurements were simultaneous, we were able to determine in our detailed data analysis that these louder train events did not significantly affect noise levels at the LT-1 monitor location on Nelson Avenue due to distance attenuation and shielding provided by existing structures.

FUTURE LOADING DOCK AND INTRA-PROJECT TRAFFIC NOISE ESTIMATES

Future Loading Dock Calculation Methodology

Operational noise from the proposed facility is expected to consist primarily of tractor-trailers accessing loading dock areas. To estimate truck noise at the proposed facility, we referenced recently measured noise levels at a distribution facility elsewhere in California which involved semi-trucks similar in size to those that are expected to access the proposed project's facility.

Calculations for resulting noise levels due to on-site truck and car trip generation durations and activities were based on the measurements at this local distribution facility with ancillary information provided to us for that project in 2018.

Based on the assumptions described below, estimated noise levels were then compared to applicable criteria to determine if noise from the proposed facility would exceed the Cities' noise goals (described above) at adjacent residences.

Traffic volumes for the proposed project were referenced from a previous project of similar size, provided by Ganddini Group Inc. for Nelson Avenue Owner LP's 5010 Azusa Canyon Road City of Irwindale project, dated 12 July 2019. Their study estimated that 248 truck trips would occur at the facilities throughout the 24 hours of operation. Nelson Avenue Owner LP provided us with the Traffic Impact Analysis document, which describes the total daily truck trips and the partial distribution over the peak AM and PM hours. Other hours of the day were extrapolated accordingly based on vehicular distribution of another comparable project in the San Gabriel Valley.

Intra-Project Traffic Methodology

Intra-project traffic noise will consist of traffic noise associated with future warehouse employee vehicles within the designated parking lots. To estimate vehicle noise at the employee parking lots, we reference the Ganddini provided car traffic volumes for the Irwindale project.

Noise Source Analysis and Assumptions

Future Loading Docks

Our analysis estimated future noise from the facility based on the following assumptions discussed with the client via email, and per the overall site plan:

1. Trucks will enter and exit the site from the single driveway off Nelson Avenue, from the north.
2. Non-truck noises associated with loading/unloading activity (i.e., forklifts, rolling doors, carts, pallet crushing, items dropping), are assumed to be located near the dock doors and are included in our analysis.
3. An average truck trip (not including unloading/loading) is estimated to last for a cumulative period of about 2 minutes and be at least 650 feet from the nearest residential property line.
4. Trucks occupy the loading dock in their loading area that is nearest to noise-sensitive receiver (Residents across Nelson Avenue, to the north of the building).
5. Total number of loading docks: 22
6. Number and distribution of truck trips is based on the Ganddini traffic impact analysis, with approximately 248 per 24-hour period (continuous 24/7 operation) distributed as follows:
    - AM Peak is 7-9 AM- 15%
    - 9-4 PM -60%
    - PM Peak is 4 PM - 6 PM -13%
    - 6 PM - 10 PM 10%
    - 10 PM -7 AM 2%
7. The existing buildings (at a height of approximately 18 feet) on the adjacent neighboring property obstruct the direct line of sight to all but six of the proposed project's loading docks from the northern residents, providing substantial shielding its truck operation noise. Because of this, there is a great reduction in the level of meaningful impact on the residential receivers' sound environment to the north.
8. Having measured operations at a local representative loading dock site, a typical truck "trip" consists of the following events (estimated sound levels based on measurements at similar facilities):
    a. Truck passby (arrival, departure): 69 dBA at 30 feet
    b. Truck airbrakes: 72 dBA at 25 feet

c. Truck backup alarm: 79 dBA at 30 feet

d. Brief idle before engine shutoff: 70 dBA at 25 feet

e. Truck engine ignition and airbrakes: 71 dBA at 25 feet

f. Truck accelerating from stop: 74 dBA at 25 feet

g. Truck trip reference heights[9] (above grade)

   i. Passby, brief idle, acceleration, and ignition: 8 feet

   ii. Back-up beeper and airbrake: 2.5 feet

Intra-Project Traffic Noise

Our analysis estimated future noise from the facility parking lots is based on the following assumptions:

9. Employees will enter and exit the site from the driveway from the north (via Nelson Avenue).
10. Once on site, vehicles will travel an average 15 miles per hour or less.
11. Vehicles will be spread out evenly amongst the seven parking areas.
12. An average vehicle trip is estimated to last for a cumulative period of about 2 minutes and be at least 90 feet from the nearest residential property line.
13. Similar percentages were assumed for intra-project vehicle trips in the project parking lots as were truck trips, as shown in the distribution below.
    - AM Peak is 7 AM - 9 AM- 15%
    - 9 AM – 4 PM -60%
    - PM Peak is 4 PM -6 PM -13%
    - 7 PM - 10 PM 10%
    - 10 PM - 6 AM 2%

[9] Truck source heights excerpted from Caltrans Technical Noise Supplement document (TeNS) document dated October 1998.

Estimated Future Noise Levels

We have combined both existing and future project-generated noise sources. Future project sources include the proposed loading dock noise, rooftop HVAC equipment, parking areas, and estimated traffic contribution, while the existing noise sources are the existing traffic. Logarithmically, adding expected noise contribution to the existing noise environment would result in a noise level of approximately DNL 72 dBA from all contributing noise sources upon the project's completion:

DNL **36**[a] dB [HVAC] + DNL **44**[b] dB [employee lot] + DNL **52**[c] dB [trucks] = DNL **53**[d] dB [future noise level at receivers]

a = cumulative building rooftop HVAC noise
b = employee parking lot noise
c = loading dock truck noise

d = cumulative future project sources

DNL **71**[e] dB [existing traffic] + DNL **53**[e] dB [combined future sources] **=** DNL **72**[f] dB [future noise level at receivers]

e = measured at project site, see **Figure 1**
e = determined from loading docks + HVAC noise + parking lots
f = calculated

See **Appendix A** for additional information on decibel mathematics.

We evaluated the following noise sources from the proposed project on the surrounding environment:

- Potential rooftop mechanical equipment noise
- Short-term construction noise and vibration
- Project-related traffic increases

We have drawn the following conclusions from the analysis:

The following summarizes the portion of the CEQA checklist pertaining to noise.

Would the project result in generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project exceeding standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

A: Permanent Increase in Noise Levels due to Project-Generated Noise

It is anticipated that the potential office spaces located on the two northern corners of the building will be mechanically ventilated. Based on previous projects of similar design, we have assumed the use of up to four typical 5-ton package rooftop units located above each office (a total of eight units). No outdoor mechanical equipment has been specified at this time. Specific equipment will be confirmed during the design phase.

Preliminary sound power level data provided from a similarly sized project with similar 5-ton outdoor package fan units indicates that combined noise from these units sums to approximately DNL 36 dB at the nearest property lines, assuming the units operate continuously for 24-hour operation. The rooftop parapet is assumed to provide acoustical shielding to nearby neighbors because they would break line-of-sight to the nearest receivers.

Depending on the final equipment placement, as well as any specific parapets, barriers, and shielding provided by buildings (which would reduce noise levels at the property lines), noise levels may vary. We do not expect the noise contribution to be significant in these aspects.

B: Predicted Permanent Increase in Noise Levels due Project Traffic Volumes

It has been communicated by the team that the projected truck trips per day will be approximately 104 truck trips in the AM and 144 trips in the PM. Overall, the project would result in a net increase in daily trips by 248, amounting to an overall traffic noise DNL increase of approximately 1 dB. Therefore, this would not result in a significant increase in noise levels at existing adjacent properties.

C: Temporary Increase in Noise Levels due to Construction

Construction activities will likely include the use of heavy equipment for grading and other activities, through completion of buildings and landscaping. Heavy trucks would travel to, from, and within the site hauling soil, equipment, and building materials. Smaller equipment, such as jack hammers, pneumatic tools, and saws could also be used throughout the demolition and construction phases in various areas. The noise and vibration associated with these activities would be generated within the entire project area.

Based on our experience with similar projects' construction methods and phasing, our preliminary understanding and assumptions of expected equipment is shown in Table 5. Reference levels for construction equipment are listed in Table 6, both at the reference distance of 50-feet and at 585-feet, the distance from the closest edge of the warehouse building to the residences across Nelson Avenue. The 585-foot noise levels were calculated using the inverse square law method of calculation (i.e., a 6-dB per doubling of distance from a source to a receiver). The closest possible area of construction to residences in La Puente is approximately 55 feet away from the nearest residential property line.

Table 5: List of Typical Construction Equipment

Phase	Equipment
Demolition	Concrete/Industrial Saws, Excavators, Rubber-Tired Dozers, Tractors/Loaders/Backhoes
Site Preparation	Graders, Rubber-Tired Dozers, Tractors/Loaders/Backhoes
Grading/Excavation	Excavators, Drill Rig for Shoring Beams (Caisson Drilling), Rubber-Tired Dozers, Tractors/Loaders/Backhoes
Trenching	Tractor/Loader/Backhoe, Excavators
Building Exterior	Cranes, Forklifts, Generator Sets, Tractors/Loaders/Backhoes, Welders
Building Interior/ Architectural Coating	Air Compressors, Aerial Lift
Paving/Landscaping/ Site Concrete	Cement and Mortar Mixers, Paving Equipment, Rollers, Tractors/Loaders/Backhoes

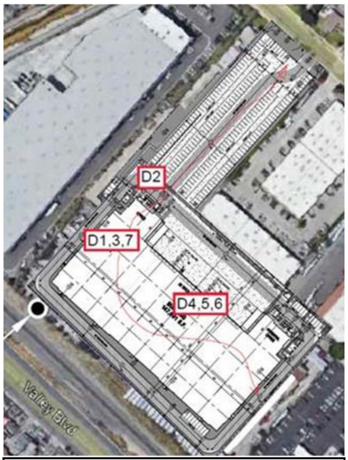
Table 6: Typical Construction Equipment Reference Noise Levels[10]

Equipment	Published Maximum Instantaneous L_{max} Noise Level (dBA at 50 feet)	Estimated Maximum Instantaneous L_{max} Noise Level (dBA at 585 feet)
Aerial Lift	83	62
Air Compressors	81	60
Cement and Mortar Mixers	85	64
Concrete/Industrial Saws	76	55
Cranes	83	62
Drill Rig for Shoring Beams (Caisson Drilling)	85	64
Excavators	85	64
Forklifts	83	62
Generator Sets	81	60
Graders	85	64
Paving Equipment	89	68
Rollers	74	53
Rubber-Tired Dozers	85	64
Tractors/Loaders/Backhoes	84	63
Welders	73	52

Actual construction noise levels will vary based on distance from the receiver and shielding from adjacent buildings and construction elements, as well as the specific phase or activity being performed.

Overton Moore Properties provided a preliminary construction equipment schedule with the expected timing of each phase of construction, duration of use of each type of equipment, and the varying locations of major operations on the site, typical for facilities of this type. We considered the published noise levels of equipment listed above in **Table 6**, overlapping of phases, and the varying distances of the construction in relation to the neighboring residences. See the provided location maps below with the corresponding average locations of each piece of equipment.

10 Equipment noise levels are from Section 9, Federal Highway Administration Highway Traffic Noise Construction Noise Handbook (August 2006) and Table 12-2, Transit Noise and Vibration Impact Assessment, United States Department of Transportation, Office of Planning and Environment, Federal Transit Administration, May 2006.



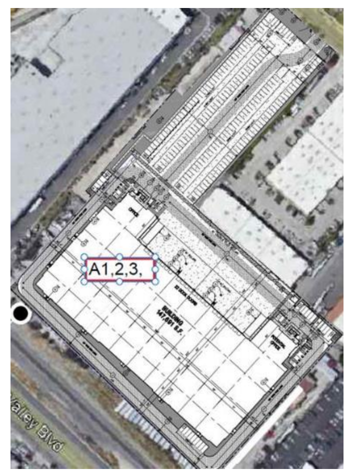
Demolition

Site Preparation

Grading

Construction/Concrete Pours

Paving



Architectural Coating

Where published data for a specific type of equipment was not available, we assumed noise levels equal to an excavator (85 dBA at 50 feet). Calculated maximum noise levels for each phase at the nearest residential property line across Nelson Avenue are as follows.

Table 7: Estimated Average Construction Noise Levels per Phase

Phase Name	Expected Duration	Construction Equipment Planned for Use	Estimated Maximum Simultaneous Average Noise Level (dBA)
Demolition	1.5 months	5 Tractors (D1), 1 Crusher (D2), 2 Dump Trucks (D3), 1 Excavator (D4), 2 Forklifts (D5/D6), 1 Sweeper (D7)	70
Site Preparation	1 week	1 Dump Truck (S1), 1 Tractor (S2), 1 Sweeper (S3), 1 Backhoe (S4)	67
Grading	1.25 months	1 Tractor (G1), 1 Excavator (G2), 1 Grader (G3), 1 Loader (G4), 2 Scrapers (G5), 1 Sweeper (G6), 1 Backhoe (G7)	75
Construction/Concrete Pours	8 months	2 Aerial lifts (B1), 3 Air Compressors (B2), 2 Concrete saws (B3), 1 Crane (B4), 1 Dump Truck (B5), 2 Generators (B7), 1 Forklift (B6), 1 Sweeper (B9), 1 Backhoe (B10), 1 Trencher (B11), 3 Welders (B12)	76
Paving	3 weeks	2 Concrete saws (P1), 1 Dump Truck (P2), 1 Grader (P3), 1 Paver (P4), 1 Plate compactor (P6), 1 Roller (P7), 1 Sweeper (P8), 1 Backhoe (P9)	74
Architectural Coating	1 month	2 Aerial lifts (A1), 1 Generator (A2), 1 Pressure washer (A3), 1 Forklift (A4)	76

The following is a list of measures that could be adopted by the contractor to reduce the impact of construction noise on neighbors:

1. Consistent with the La Puente Municipal Code, all type of construction will be limited to weekdays between the hours of 7:00 a.m. and 8:00 p.m., interior construction only is permissible on Saturdays between the hours of 7:00 a.m. and 8:00 p.m., and no construction is permissible on Sundays or city holidays.
2. Contractors shall utilize “quiet” models of air compressors and other stationary noise sources where technology exists.
3. Internal combustion engine-driven equipment shall be equipped with mufflers which are in good condition and appropriate for the equipment.
4. Stationary noise-generating equipment, such as air compressors and portable power generators, shall be located as far away as possible from adjacent property lines.

5. Staging areas and construction material areas shall be located as far away as feasible from adjacent residences.
6. All unnecessary idling of internal combustion engines should be prohibited.
7. The contractor should designate a superintendent who will be responsible for tracking and responding to any complaints about construction noise. The superintendent will determine the cause of the noise complaint (e.g., starting too early, bad muffler, etc.) and will require that reasonable measures are implemented to correct the problem. The telephone number for the superintendent will be posted at the construction site and included in any construction notices sent to neighbors.

Would the project result in generation of excessive ground-borne vibration or ground-borne noise levels?

A: Permanent Increase in Vibration Levels due to Project-Generated Vibration

The planned use for the site, as warehouse buildings, is not expected to generate significant amounts of ground-borne noise or vibration.

B: Temporary Increase in Vibration Levels due to Construction

The nearest and most sensitive adjacent receivers include residences to the north approximately 585 feet from the most significant area of construction on the project site (the proposed building). Industrial-zoned parcels to the north are assumed to be less sensitive.

Project construction may include activities such as the use of concrete saws, excavation and grading, and the use of rolling stock equipment (tracked vehicles, compactors, etc.). Typical construction vibration levels at 50-feet are listed in Table 7, below. Most of the construction will occur well set back from the property line. As indicated in the criteria section above, the risk of damage to nearby structures may begin to occur at a limit of 1.0 in/sec PPV for transient vibration events and 0.50 PPV for continuous events.

Table 8: Example Construction Vibration Levels[11]

Equipment	PPV at 50 ft. (in/sec)[12]
Vibratory Roller	0.049
Hydraulic Breaker	0.03 to 0.08
Large Bulldozer	0.03
Loaded Trucks	0.03
Excavator	0.03
Caisson/pier drilling	0.03
Jackhammer	0.01
Small Bulldozer	0.001
Crane, Forklift, Bobcat	No significant vibration

Based on the vibration levels shown in **Table 8**, listed construction equipment is not expected to cause structural damage to adjacent properties because project construction is not expected to exceed the thresholds for new residential buildings or commercial/industrial structures as shown above in **Table 3**. Ground borne noise would also not be expected to be significant at these vibration levels.

Loading Dock Future Noise Levels (CNEL/DNL)

We estimated noise levels at local receptors from the sources described in the previous section. To account for future increases in local traffic noise levels, we added 1 dB DNL to measured levels[13] (see **Table 4** above).

Table 9 below summarizes the estimated DNL levels at the closest property plane to the north of the building, under the assumption that the proposed facility have trucking activities 24 hours per day.

11 Table 12-2, Transit Noise and Vibration Impact Assessment, United States Department of Transportation, Office of Planning and Environment, Federal Transit Administration, May 2006.

12 Using a value of n = 1.5 per FTA documentation, where n is the attenuation rate through the ground.

13 The California Department of Transportation assumes a traffic volume increase of three-percent per year, which corresponds to a 1 dB increase in DNL over a ten-year period.

Table 9: Calculated Future Facility Noise at Noise-Sensitive Land Uses: CNEL/DNL, dBA

Scenario	Nearby Receiving Locations	Existing Noise at Receiver (Residences)	Estimated Loading Docks at Receiver	Combined Existing plus Project	Change (dB)
24-hour Operations	North Property Line (Residences across Nelson)	71	53	72	+1 dB

The data shows that loading dock-generated noise is not expected to impact adjacent receivers to the north. The calculated increase in DNL at the nearest property line with the project and future traffic noise levels (near term 2025) will be 1 dB. A change of 2 dB or less is not expected to be noticeable and is not considered significant.

Backup Alarm Maximum Noise Levels

Our calculations of maximum noise levels assume that the trucks operating at the closest docks to the residences will be active at the same proportion as stated above.

Assuming 24-hour operation, backup alarm noise levels could exceed the City's nighttime (10:00pm to 7:00am) criterion of 45 dBA or less with the following conditions:

- The individual backup alarms that are sounded at night are particularly high in volume
- Backup alarms generate noise levels for more than 30 minutes in any nighttime hour

While maximum noise levels from operations would likely be audible at residences to the north during quieter nighttime hours, the Cities' nighttime noise objectives could be met if louder events are limited to less than 30 minutes per hour, or sound barriers are included with the project that obstruct line-of-sight from delivery operations (near unshielded docks) to the nearest residences. The existing buildings along Nelson Avenue provide shielding from most of the loading docks to the residences to the north. We will be glad to discuss this further.

CONCLUSIONS AND COMMENTS

1. Future loading dock-generated noise (due to on-site trucks and vehicles) over a 24-hour operation period is not expected to significantly impact residential receivers to the north. The calculated increase in CNEL/DNL at the nearest noise-sensitive residential receivers with the project and future traffic noise levels will be about 1 dB. A change of 2 dB or less is not considered significant nor is it expected to be noticeable to residents east of the project site.
2. It is our understanding that there are no State or Federal requirements for noise levels of backup alarms except for OSHA, which only requires them to be "significantly louder" than the surrounding environment. Because the background noise levels around most facilities are not known, manufacturers typically increase the alarm volume to compensate.

Best practices to reduce alarm audibility at the facility to be evaluated would be requiring users to limit alarm volume levels, employ signal personnel, lights, and other means to notify people about ongoing truck activities within the facility.

*   *   *

APPENDIX A: FUNDAMENTAL CONCEPTS OF ENVIRONMENTAL NOISE

This section provides background information to aid in understanding the technical aspects of this report.

Three dimensions of environmental noise are important in determining subjective response. These are:

- The intensity or level of the sound
- The frequency spectrum of the sound
- The time-varying character of the sound

Airborne sound is a rapid fluctuation of air pressure above and below atmospheric pressure. Sound levels are usually measured and expressed in decibels (dBA), with 0 dBA corresponding roughly to the threshold of hearing.

The "frequency" of a sound refers to the number of complete pressure fluctuations per second in the sound. The unit of measurement is the cycle per second (cps) or hertz (Hz). Most of the sounds, which we hear in the environment, do not consist of a single frequency, but of a broad band of frequencies, differing in level. The name of the frequency and level content of a sound is its sound spectrum. A sound spectrum for engineering purposes is typically described in terms of octave bands, which separate the audible frequency range (for human beings, from about 20 to 20,000 Hz) into ten segments.

Many rating methods have been devised to permit comparisons of sounds having quite different spectra. Surprisingly, the simplest method correlates with human response practically as well as the more complex methods. This method consists of evaluating all of the frequencies of a sound in accordance with a weighting that progressively de-emphasizes the importance of frequency components below 1000 Hz and above 5000 Hz. This frequency weighting reflects the fact that human hearing is less sensitive at low frequencies and at extreme high frequencies relative to the mid-range.

The weighting system described above is called "A"-weighting, and the level so measured is called the "A-weighted sound level" or "A-weighted noise level." The unit of A-weighted sound level is sometimes abbreviated "dBA." In practice, the sound level is conveniently measured using a sound level meter that includes an electrical filter corresponding to the A-weighting characteristic. All U.S. and international standard sound level meters include such a filter. Typical sound levels found in the environment and in industry are shown in Figure A-1.

Although a single sound level value may adequately describe environmental noise at any instant in time, community noise levels vary continuously. Most environmental noise is a conglomeration of distant noise sources, which results in a relatively steady background noise having no identifiable source. These distant sources may include traffic, wind in trees, industrial activities, etc. and are relatively constant from moment to moment. As natural forces change or as human activity follows its daily cycle, the sound level may vary slowly from hour to hour. Superimposed on this slowly varying background is a succession of identifiable noisy events of brief duration. These may include nearby activities such as single vehicle pass-bys, aircraft flyovers, etc. which cause the environmental noise level to vary from instant to instant.

To describe the time-varying character of environmental noise, statistical noise descriptors were developed. "L10" is the A-weighted sound level equaled or exceeded during 10 percent of a stated time period. The L10 is considered a good measure of the maximum sound levels caused by discrete noise events. "L50" is the A-weighted sound level that equals or exceeded 50 percent of a stated time period; it represents the median sound level. The "L90" is the A-weighted sound level equaled or exceeded during 90 percent of a stated time period and is used to describe the background noise.

As it is often cumbersome to quantify the noise environment with a set of statistical descriptors, a single number called the average sound level or "L_{eq}" is now widely used. The term "L_{eq}" originated from the concept of a so-called equivalent sound level which contains the same acoustical energy as a varying sound level during the same time period. In simple but accurate technical language, the L_{eq} is the average A-weighted sound level in a stated time period. The L_{eq} is particularly useful in describing the subjective change in an environment where the source of noise remains the same but there is change in the level of activity. Widening roads and/or increasing traffic are examples of this kind of situation.

In determining the daily measure of environmental noise, it is important to account for the different response of people to daytime and nighttime noise. During the nighttime, exterior background noise levels are generally lower than in the daytime; however, most household noise also decreases at night, thus exterior noise intrusions again become noticeable. Further, most people trying to sleep at night are more sensitive to noise. To account for human sensitivity to nighttime noise levels, a special descriptor was developed. The descriptor is called the L_{dn} (Day/Night Average Sound Level), which represents the 24-hour average sound level with a penalty for noise occurring at night. The L_{dn} computation divides the 24-hour day into two periods: daytime (7:00 am to 10:00 pm); and nighttime (10:00 pm to 7:00 am). The nighttime sound levels are assigned a 10 dBA penalty prior to averaging with daytime hourly sound levels.

For highway noise environments, the average noise level during the peak hour traffic volume is approximately equal to the L_{dn}.

The effects of noise on people can be listed in three general categories:

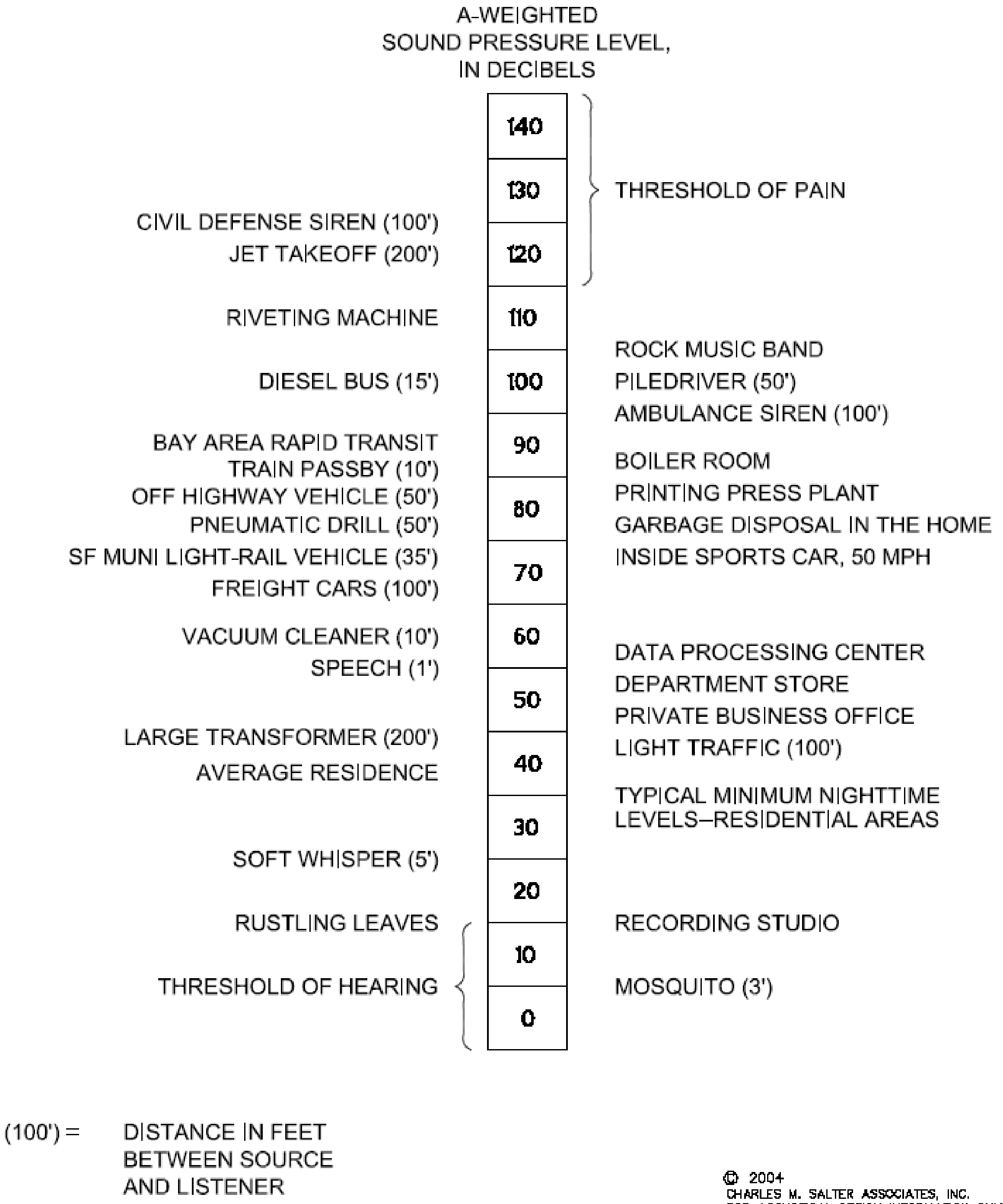
- Subjective effects of annoyance, nuisance, dissatisfaction
- Interference with activities such as speech, sleep, and learning
- Physiological effects such as startle, hearing loss

The sound levels associated with environmental noise usually produce effects only in the first two categories. Unfortunately, there has never been a completely predictable measure for the subjective effects of noise nor of the corresponding reactions of annoyance and dissatisfaction. This is primarily because of the wide variation in individual thresholds of annoyance and habituation to noise over time.

Thus, an important factor in assessing a person's subjective reaction is to compare the new noise environment to the existing noise environment. In general, the more a new noise exceeds the existing, the less acceptable the new noise will be judged.

Regarding increases in noise level, knowledge of the following relationships will be helpful in understanding the quantitative sections of this report:

Except in carefully controlled laboratory experiments, a change of only 1 dBA in sound level cannot be perceived. Outside of the laboratory, a 3 dBA change is considered a just-noticeable difference. A change in level of at least 5 dBA is required before any noticeable change in community response would be expected. A 10 dBA change is subjectively heard as approximately a doubling in loudness and would almost certainly cause an adverse community response.



TYPICAL SOUND LEVELS MEASURED IN THE ENVIRONMENT AND INDUSTRY

FIGURE A1

1107

C
11.25.03

OMP CITY OF INDUSTRY
MEASUREMENT LOCATIONS AND MEASURED NOISE LEVELS

FIGURE 1

Salter # 22-0622

MV/ECS 04.07.23