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Noise and Vibration Assessment Duckhorn Vineyards Winery Major Modification P19-00097-MOD

DUCKHORN VINEYARDS WINERY NOISE AND VIBRATION ASSESSMENT

Napa County, California

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Prepared for:

Mr. Sean Sullivan
General Counsel
Duckhorn Winery Company
1201 Dowdell Lane
St. Helena, CA 94574

Prepared by:

Carrie J. Janello
Michael S. Thill

ILLINGWORTH & RODKIN, INC.
Acoustics • Air Quality
429 E. Cotati Avenue
Cotati, CA 94931
(707) 794-0400

Project: 22-067

Introduction

This report summarizes the assessment of noise and vibration impacts attributable to the proposed Use Permit Modifications at the Duckhorn Vineyards Winery, with respect to the regulatory criteria established by the Napa County General Plan and Napa County Noise Ordinance. The report first describes the project and then summarizes existing noise levels in the project vicinity. The applicable regulatory criteria used in the assessment are described, followed by evaluations of project-generated noise levels. A brief discussion of the fundamentals of environmental noise and groundborne vibration is presented in Appendix A for those unfamiliar with acoustical terms or concepts. Appendix B contains figures that display the long-term noise data collected to establish existing noise levels at receptors in the project vicinity.

Project Description

The winery is located at 1000 Lodi Lane in St. Helena, California. Currently, total Production Area of the Facility is +/- 30,877 square feet (sf) and the Accessory Area is +/-11,313 sf, yielding an Accessory-to-Production area ratio of +/-37%. The Facility is currently permitted to produce 160,000 gallons of wine per year (gpy), of which 50,000 gpy was permitted prior to adoption of the Napa County Winery Definition Ordinance (WDO). All existing hospitality activities occur within the existing Estate House and on its attached covered porch, as well as the landscaped gardens proximate to the Estate House. Currently, the Facility is permitted up to 45 full-time, five part-time, and six seasonal employees. This application proposes the removal/demolition of the Tank Shed and three Chais, the development of a new winery building (the West Winery), and expansion of the Estate House. No other changes to the size and occupancy of the Facility structures are proposed as part of this Application.

Specifically, the applicant requests approval of the following Use Permit Modifications:

- Increasing annual wine production from 160,000 gyp to up to 300,000 gyp. This increase in production will fully conform to the WDO.

- Development of a new +/-58,042 sf winery (West Winery) located on the western portion of the property. The West Winery will house +/- 54,722 sf of production space and +/- 3,320 sf of office and other accessory space. A +/-6,600 sf covered work area will be integrated into the structure.

- The ground level Accessory Space of the West Winery will be used for temporary Hospitality Activities during the development/remodeling of the Estate House and other portions of the eastern property.

- Demolition of the existing Tank Shed, Chai 1 and 2, Chai 3, and Chai 4 on the eastern portion of the property.

- A +/- 8,839 sf expansion of the existing Estate House on the eastern portion of the property. The +/-18,162 total sf structure will house +/-17,810 sf of Accessory Space, including offices and hospitality space, and +/-352 sf of Production Space. The expansion will be no closer to the centerline of Silverado Trail than the existing Estate House, and further than the existing structures proposed for removal.

- Daily Tours & Tastings would increase from up to 82 persons per day to up to a maximum of 219 persons per day, all of which would be "By Appointment Only." This request combines the existing pre-WDO "Public Tasting" entitlement (maximum of 30 persons per day) with the total daily "By Appointment Only" (189 persons per day) request.

- A modified Marketing Plan that includes:

    - Private Tour & Tasting for up to 20 persons, 200 times annually (modifying the existing entitlement of 120 times annually).

    - Wine with Food Pairing for up to 25 persons, 40 times annually (modifying the existing entitlement of 36 times annually).

    - Large Events for up to 400 persons, three times annually (modifying the existing entitlement of up to 600 persons, twice annually).

    - Auction-related Event for up to 250 persons, once annually (modifying the existing entitlement of twice annually).

    - New Medium Events for up to 60 persons, 40 times annually.

- Addition of activities in conformity with AB 2004 (Evans Bill) on the Estate House porch and the landscaped gardens west of the Estate House.

- All approved hospitality activities, including those consistent with AB 2004, will occur temporarily within the West Winery ground floor accessory space and outdoor areas proximate to the West Winery during redevelopment of the Estate House and its vicinity. Upon approved occupancy of the redeveloped Estate House, all hospitality activities will be reestablished on the east side of the property. The West Winery accessory space will then serve its proposed long-term administrative use.

The proposed development will result in a total of +/-79,392 sf of Production space and +/-23,120 sf of Accessory space, for a total winery square footage of +/-102,512 sf. The proposal will reduce the overall winery Accessory-to-Production Ratio from the existing 37% to 29%. No changes to the existing employee numbers are proposed.

Existing Noise Environment

Illingworth & Rodkin, Inc. (I&R) quantified the existing noise environment in the project vicinity through a noise monitoring survey, which included three long-term (LT-1, LT-2, and LT-3) and three short-term (ST-1, ST-2, and ST-3) noise measurements. The noise monitoring survey began Thursday, June 9, 2022, and ended Tuesday, June 14, 2022. Noise measurements were made using Larson Davis Model LxT1 Integrating Sound Level Meters (SLMs) set at "slow" response. The sound level meters were equipped with PCB Model 377B02 1/2" free-field, prepolarized condenser microphones fitted with windscreens. The sound level meters were calibrated prior to the noise measurements using a Larson Davis Model CAL200 acoustical calibrator. The response of the system was checked after each measurement session and was always found to be within 0.2 dBA. At the completion of monitoring, the noise data were obtained from the SLM using the

Larson Davis G4 software program. All instrumentation used during the noise survey met the requirements of the American National Standards Institute (ANSI) SI 4-1983 for Type I use. Weather conditions were generally good for the purposes of noise monitoring.

Figure 1 is an aerial image showing the noise monitoring locations selected for the noise survey and displays the nearest residential receptor locations analyzed for potential noise impacts. Note, the noise-sensitive receptors shown in Figure 1 are limited to existing residences and hotels/inns in the project vicinity. Other wineries surrounding the project site are not considered noise-sensitive since they would include similar noise-generating sources; wineries are considered industrial uses.

Long-term noise measurement LT-1 was made approximately 100 feet from the centerline of Silverado Trail near the intersection with Lodi Lane. Noise levels measured at this location were primarily the result of local traffic along Silverado Trail and would be representative of the existing noise environment experienced at the nearby residences and inn located to the east on Glass Mountain (R1 to R5). A review of these data indicates that hourly equivalent noise levels (L_{eq}) ranged from 55 to 65 dBA L_{eq} during daytime hours between 7:00 a.m. and 10:00 p.m. and from 49 to 62 dBA L_{eq} during nighttime hours between 10:00 p.m. and 7:00 a.m. The calculated day-night average noise level ranged from 62 dBA L_{dn} on Saturday to 65 dBA L_{dn} on Friday.

Long-term noise measurement LT-2 was made near the existing tasting room at the rear of the Estate House. Noise levels measured at this location were primarily the result of intermittent driveway traffic noise, voices from the tasting room, and the fountain located in the garden. This receptor represented existing daily tasting room ambient noise levels, which ranged from 40 to 45 dBA. A review of these data indicates that hourly equivalent noise levels (L_{eq}) ranged from 41 to 63 dBA L_{eq} during daytime hours between 7:00 a.m. and 10:00 p.m. and from 38 to 51 dBA L_{eq} during nighttime hours between 10:00 p.m. and 7:00 a.m. The calculated day-night average noise level ranged from 52 dBA L_{dn} on Saturday to 53 dBA L_{dn} on Friday.

Long-term noise measurement LT-3 was made in the northwest corner of the project site, near the location of the proposed West Winery building. Noise levels measured at this location were primarily the result of distant traffic noise, wind, and birds. This receptor represented existing ambient conditions of receptors to the west (R5 through R8). A review of these data indicates that hourly equivalent noise levels (L_{eq}) ranged from 37 to 53 dBA L_{eq} during daytime hours between 7:00 a.m. and 10:00 p.m. and from 35 to 51 dBA L_{eq} during nighttime hours between 10:00 p.m. and 7:00 a.m. The calculated day-night average noise level ranged from 48 to 49 dBA L_{dn} on Saturday and Sunday and ranged from 50 to 53 dBA L_{dn} on Friday and Monday. Appendix B contains graphical summaries of the noise data collected at LT-1, LT-2, and LT-3.

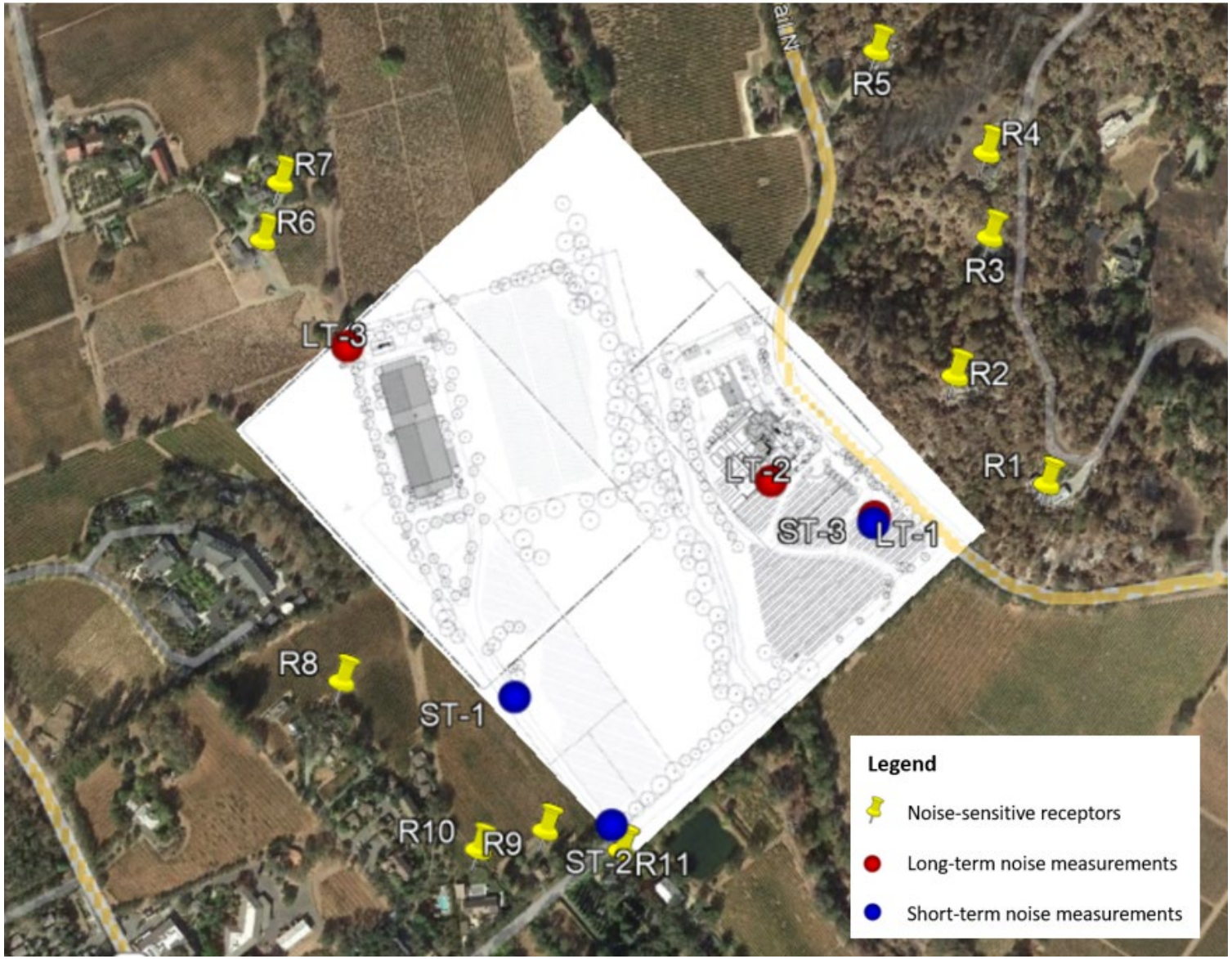
Short-term noise measurement ST-1 quantified existing operations on the vineyard, including workers and landscaping tools, as well as local traffic noise along Lodi Lane. Measurements were made on Tuesday, June 14, 2022, between 11:50 a.m. and noon. ST-1 was representative of existing receptor R8. Nearby traffic generated noise levels ranging from 52 to 58 dBA, and vineyard workers generated noise levels of 58 to 59 dBA. The average equivalent noise level was 53 dBA $L_{eq(10\text{-}min)}$ at ST-1.

Short-term noise measurement ST-2 was made at the intersection of Lodi Lane and the West Winery driveway. This location was chosen to represent the noise environment at the nearby

residences located along Lodi Lane (R9 through R11). Noise sources documented at this location included traffic along Lodi Lane (59 to 68 dBA), a single jet flyover (66 dBA), and intermittent landscaping activities (52 to 56 dBA). The average equivalent noise level was 54 dBA $L_{eq(10\text{-}min)}$.

Short-term noise measurement ST-3 was made near LT-1 at the intersection of Lodi Lane and Silverado Trail. The primary noise source at ST-3 was Silverado Trail. Heavy trucks along Silverado Trail generated noise levels ranging from 66 to 74 dBA, while passenger cars generated noise levels ranging from 57 to 65 dBA. The average equivalent noise level was 61 dBA $L_{eq(10\text{-}min)}$.

FIGURE 1 Aerial Image Showing Project Site, Noise Monitoring Locations, and Nearby Noise-Sensitive Receptors



Source: Google Earth, 2022.

Regulatory Criteria

2008 Napa County General Plan

The Community Character Element of the 2008 Napa County General Plan sets forth goals and policies to protect people from exposure to excessive noise. Goals and policies contained in this document that are relevant to this project are as follows:

> **Goal CC-7:** Accept those sounds which are part of the County's agricultural character while protecting the people of Napa County from exposure to excessive noise.
>
> **Goal CC-8:** Place compatible land uses where high noise levels already exist and minimize noise impacts by place new noise-generating uses in appropriate areas.
>
> **Policy CC-35:** The noises associated with agriculture, including agricultural processing, are considered an acceptable and necessary part of the community character of Napa County, and are not considered to be undesirable provided that normal and reasonable measures are taken to avoid significantly impacting adjacent uses.
>
> **Policy CC-37:** The County shall seek to limit excessive noise impacts of recreational uses—including motorboats, shooting ranges, motorcycles, and other noise-producing equipment— through the enforcement of applicable laws (such as requirements for mufflers) and limits on the location and/or extent of such uses.
>
> **Policy CC-38:** The following are the County's standards for maximum exterior noise levels for various types of land uses established in the County's Noise Ordinance. Additional standards are provided in the Noise Ordinance for construction activities (i.e., intermittent or temporary noise).

EXTERIOR NOISE LEVEL STANDARDS
(LEVELS NOT TO BE EXCEEDED MORE THAN 30 MINUTES IN ANY HOUR)

Land Use Type	Time Period	Noise Level (dBA) by Noise Zone Classification		
		Rural	Suburban	Urban
Single-Family Homes and Duplexes	10 p.m. to 7 a.m.	45	45	50
	7 a.m. to 10 p.m.	50	55	60
Multiple Residential 3 or More Units Per Building (Triplex +)	10 p.m. to 7 a.m.	45	50	55
	7 a.m. to 10 p.m.	50	55	60
Office and Retail	10 p.m. to 7 a.m.	60		
	7 a.m. to 10 p.m.	65		
Industrial and Wineries	Anytime	75		

a) For the purposes of implementing this policy, standards for residential uses shall be measured at the housing unit in areas subject to noise levels in excess of the desired levels shown above.

b) Industrial noise limits are intended primarily for use at the boundary of industrial zones rather than for noise reduction at the industrial use.

c) Where projected noise levels for a given location are not included in this Element, site-specific noise modeling may need to be conducted in order to apply the County's Noise policies.

d) For further information, see the County Noise Ordinance.

Policy CC-48: Where proposed commercial or industrial land uses are likely to produce noise levels exceeding the standards contained in this Element at existing or planned noise-sensitive uses, an acoustical analysis shall be required as part of the environmental review process so that noise mitigation may be included in the project design.

Policy CC-49: Consistent with the County's Noise Ordinance, ensure that reasonable measures are taken such that temporary and intermittent noise associated with construction and other activities does not become intolerable to those in the area. Construction hours shall be limited per the requirements of the Noise Ordinance. Maximum acceptable noise limits at the sensitive receptor are defined in Policies CC-35, CC-36, and CC-37.

Napa County Noise Ordinance

The Napa County Noise Ordinance Sections 8.16.060 and 8.17.070 provide maximum permissible dwelling interior sound levels and maximum permissible exterior levels, respectively.

Section 8.16.060 Interior Noise Standards

A. Maximum Permissible Dwelling Interior Sound Levels. The interior noise standards for residential dwelling units generated by noise sources outside the dwelling unit, as presented in Table 8.16.060 shall apply, unless otherwise specifically indicated, within all such dwelling units.

TABLE 8.16.060 Interior Noise Limits

Noise Zone	Type of Land Use	Time Interval	Allowable Interior Noise Level (dBA)
All	Residential	10:00 p.m. – 7:00 a.m.	55 dBA
		7:00 a.m. – 10:00 p.m.	60 dBA

B. No person shall operate or cause to be operated within a dwelling unit any source of sound or allow the creation of any noise, which causes the noise level, when measured inside a neighboring receiving dwelling unit, to exceed:

1. The noise standard as specified in Table 8.16.060 above for a cumulative period of more than five minutes in any hour; or

2. The noise standard plus five dB for a cumulative period of more than one minute in any hour; or

3. The noise standard plus ten dB or the maximum measured ambient, for any period of time.

Section 8.16.070 Exterior Noise Limits

A. Maximum Permissible Sound Levels by Receiving Land Use.

1. The noise standard for the various categories of land use identified by the noise control officer, as presented in Tables 8.16.060 and 8.16.070 shall, unless otherwise specifically indicated, apply to all such property within a designated zone.

2. No person shall operate, or cause to be operated, any source of sound at any location within the unincorporated area of the county, or allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such person, which causes the noise level, when measured on any other property, either incorporated or unincorporated, to exceed:

    a. The noise standard for that land use as specified in Table 8.16.070 for a cumulative period of more than thirty minutes in any hour (equivalent to the L_{50} noise metric); or

    b. The noise standard plus five dB for a cumulative period of more than fifteen minutes in any hour (equivalent to the L_{25} noise metric); or

    c. The noise standard plus ten dB for a cumulative period of more than five minutes in any hour (equivalent to the L_{08} noise metric); or

    d. The noise standard plus fifteen dB for a cumulative period of more than one minute in any hour (equivalent to the L_{02} noise metric);

    e. The noise standard plus twenty dB or the maximum measured ambient level, for any period of time (equivalent to the L_{max} noise metric).

3. If the measured ambient noise level differs from that permissible within any of the first four noise limit categories above, the allowable noise exposure standard shall be the ambient noise level.

4. If the measurement location is on a boundary between two different zones, the sound level limit applicable to the quieter noise zone shall apply.

5. Wherever possible, the ambient noise level shall be measured at the same location along the property line utilized in subsection (A)(2) with the alleged offending noise

source inoperative. If the intruding noise source is continuous and cannot reasonably be discontinued or stopped for a time period sufficient to measure the ambient noise level, the ambient noise level may be determined by traveling away from the noise source to a point where a steady-state decibel reading is achieved. If this test is not possible, the noise level measured while the source is in operation shall be compared directly to the noise level standards.

B. Correction for Character of Sound. In the event the alleged offensive noise, as judged by the noise control officer, contains a steady, audible tone such as a whine, screech or hum, or is a repetitive noise such as hammering or riveting, or contains music or speech, the standard limits set forth in Tables 8.16.060 and 8.16.070 shall be reduced by five dB, but not lower than forty-five.

TABLE 8.16.070 Exterior Noise Limits (Levels not to be exceeded more than 30 minutes in any hour)

		Noise Level (dBA) Noise Zone Classification[1]		
Receiving Land Use Category	**Time Period**	**Rural**	**Suburban**	**Urban**
Residential Single and Double	10:00 p.m. – 7:00 a.m.	45 dBA	45 dBA	50 dBA
	7:00 a.m. – 10:00 p.m.	50 dBA	55 dBA	60 dBA
Residential Multiple and Country	10:00 p.m. – 7:00 a.m.	45 dBA	50 dBA	55 dBA
	7:00 a.m. – 10:00 p.m.	50 dBA	55 dBA	60 dBA
Commercial	10:00 p.m. – 7:00 a.m.	60 dBA		
	7:00 a.m. – 10:00 p.m.	65 dBA		
Industrial, including wineries	Anytime	75 dBA		

[1] The classification of different areas of the county in terms of environmental noise zones shall be determined by the NCO, based upon assessment of county noise survey data. Industrial noise limits are intended primarily for use at the boundary of industrial zones rather than for noise reduction within the zone.

Section 8.16.080 Specific Types of Noise Prohibited

A. Noise Disturbance Prohibited. No person shall unnecessarily make, continue or cause to be made or continued any noise disturbance.

B. Specific Prohibitions. The following acts, and the causing or permitting thereof, are declared to be in violation of this chapter:

2. Construction or Demolition.

a. Operating or causing the operation of any tools or equipment used in construction, drilling, repair, alteration or demolition work between the hours of seven p.m. and seven a.m., such that the sound therefrom creates a noise disturbance across a residential or commercial real property line, except for emergency work of public service utilities or by variance issued by the appropriate authority. This subsection

shall not apply to the use of domestic power tools, as specified in subsection (B)(3) of this section.

b. Noise Restrictions at Affected Properties. Where technically and economically feasible, construction activities shall be conducted in such a manner that the maximum noise levels at affected properties will not exceed those listed in the following schedule:

TABLE 8.16.080 Noise Limits for Construction Activities

	Residential	**Commercial**	**Industrial**
Daily: 7:00 a.m. to 7:00 p.m.	75 dBA	80 dBA	85 dBA
Daily 7:00 p.m. to 7:00 a.m.	60 dBA	65 dBA	70 dBA

3. Domestic Power Tools – Machinery.

   a. Operating or permitting the operation of any mechanically powered saw, sander, drill, grinder, lawn or garden tool, or similar tool between ten p.m. and seven a.m. so as to create a noise disturbance across a residential or commercial real property line;

   b. Any motor, machinery or pump, such as swimming pool equipment, etc., shall be sufficiently enclosed or muffled and maintained so as not to create a noise disturbance in accordance with subsection (A) of Section 8.16.060 or subsection (A) of 8.16.070.

4. Loading and Unloading. Loading, unloading, opening, closing or other handling of boxes, crates, containers, building materials, garbage cans or similar objects between the hours of ten p.m. and six a.m. in such a manner as to cause a noise disturbance across a residential real property line or at any time to violate the provisions of subsection (A) of Section 8.16.060 or subsection (A) of Section 8.16.070.

5. Loudspeakers, Amplified Sound. Using or operating for any purpose any loudspeaker, loudspeaker system or similar device, such that the sound therefrom creates a noise disturbance, or at any time violates the provisions of subsection (A) of Section 8.16.060 or subsection (A) of Section 8.16.070, except for any activity for which a variance has been issued by the NCO.

6. Powered Motor Vehicles. Operating or permitting the operation of powered model vehicles so as to create a noise disturbance across a residential or commercial real property line or at any time to violate the provisions of subsection (A) of Section 8.16.060 or subsection (A) of Section 8.16.070.

7. Radios, Television Sets, Musical Instruments and Similar Devices. Operating, playing or permitting the operation or playing of any radio, television set, phonograph, drum, musical instrument, or similar device which produces or reproduces sound in such a manner as to create a noise disturbance, or at any time to violate the provisions of

subsection (A) of Section 8.16.060 or subsection (A) of Section 8.16.070, except for activities for which a variance has been issued by the NCO.

Section 8.16.090 Exemptions to Noise Regulations

D. Exemptions from Exterior Noise Standards. The provisions of Table 8.16.070 shall not apply to activities covered by the following sections:

1. Street sales;
2. Animals;
3. Construction/demolition;
4. Domestic power tools, machinery;
5. Tampering.

Noise Impact Analysis

Land uses that surround the project site include agriculture (wineries and vineyards), rural residences, and hotels/inns. The residential use areas and hotels/inns are considered the most sensitive to noise.

The demolition and construction of the project would increase noise levels in the site vicinity over a temporary basis. Permanent noise producing activities associated with the project include new vehicles accessing the winery, new production equipment and activities, and additional events proposed at the site. Each of these noise-producing activities are described and evaluated below:

Temporary Construction Noise

The project would result in a temporary increase in noise levels during demolition and construction of the winery. Construction activities would primarily include construction of the West Winery building, alteration of the Estate House, replacement of the crush canopy, reconfiguration of the garden, and removal of existing Tank Shed, Chai 1&2, Chai 3, Chai 4, and the Garden Shed. All construction activities would be conducted in compliance with the Napa County Noise Ordinance (Napa County Code Chapter 8.16). As such, construction activities would be limited to daylight hours (between 7:00 a.m. and 7:00 p.m. on weekdays). Additionally, all construction equipment would be properly muffled and include backup alarms adjusted to the lowest allowable levels.

Noise impacts resulting from construction depend upon the noise generated by various pieces of construction equipment, the timing and duration of noise-generating activities, and the distance between construction noise sources and noise-sensitive areas. Construction noise impacts primarily result when construction activities occur during noise-sensitive times of the day (e.g., early morning, evening, or nighttime hours), the construction occurs in areas immediately adjoining noise-sensitive land uses, or when construction lasts over extended periods of time.

Section 8.16.080 of the County's Noise Ordinance limits construction noise levels occurring between the hours of 7:00 a.m. and 7:00 p.m. to 75 dBA at residential properties, to 80 dBA at commercial properties, and to 85 dBA at industrial properties. For construction activities occurring between 7:00 p.m. and 7:00 a.m., construction noise is limited to 60 dBA at residential properties, to 65 dBA at commercial properties, and to 70 dBA at industrial properties.

Construction activities would include excavation, site preparation, grading, building construction, paving, and architectural coating. During each phase of construction, there would be a different mix of equipment operating, and noise levels would vary by phase and vary within phases, based on the amount of equipment in operation and the location at which the equipment is operating. The hauling of excavated materials and construction materials would generate truck trips on local roadways as well.

Construction activities can generate considerable amounts of noise, especially during earth-moving activities when heavy equipment is used. Typical hourly average construction-generated noise levels would be expected to range from 77 to 89 dBA L_{eq}, as measured at a distance of 50 feet from the center of the site during busy construction periods when all pertinent equipment is present at the site (Table 1, Column 3). When the minimum required equipment is present at the site, noise levels would typically range from 71 to 83 dBA L_{eq} at a distance of 50 feet from the center of the site. Maximum instantaneous noise levels produced by individual pieces of construction equipment would typically range from about 70 to 90 dBA L_{max} at 50 feet (Table 2). Construction noise levels attenuate at a rate of about 6 dBA per doubling of distance between the noise source and receptor.

Table 3 summarizes the anticipated range of construction noise levels at receptors in the project vicinity. The calculations are estimated from the center of the nearest construction activity. The receptors to the east (R1 through R5) would be closest to the demolition and renovation activities occurring around the Estate House, while receptors to the west (R6 though R11) would be closest to the construction of the West Winery building. Hourly average noise levels produced by construction and demolition activities on the project site would range from typically 42 to 68 dBA L_{eq} at the nearest noise-sensitive receptors. All construction and demolition activities would be below 75 dBA at the nearest residences surrounding the site.

Additionally, the nearest winery is approximately 530 feet from construction activities on the project site. At this distance, construction noise levels would range from 57 to 69 dBA L_{eq} when all pertinent equipment is operating and from 51 to 63 dBA L_{eq} when the minimum pieces of equipment are operating. All construction and demolition activities would be below 80 dBA at the nearest winery in the project vicinity.

TABLE 1 Typical Ranges of Construction Noise Levels at 50 Feet, L_{eq} (dBA)

	Domestic Housing		Office Building, Hotel, Hospital, School, Public Works		Industrial Parking Garage, Religious Amusement & Recreations, Store, Service Station		Public Works Roads & Highways, Sewers, and Trenches	
	I	**II**	**I**	**II**	**I**	**II**	**I**	**II**
Ground Clearing	83	83	84	84	84	83	84	84
Excavation	88	75	89	79	89	71	88	78
Foundations	81	81	78	78	77	77	88	88
Erection	81	65	87	75	84	72	79	78
Finishing	88	72	89	75	89	74	84	84

I - All pertinent equipment present at site.
II - Minimum required equipment present at site.

Source: US E.P.A., Legal Compilation on Noise, Vol. 1, p. 2-104, 1973.

TABLE 2 Construction Equipment 50-Foot Noise Emission Limits

Equipment Category	L_{max} Level (dBA)[1,2]	Impact/Continuous
Arc Welder	73	Continuous
Auger Drill Rig	85	Continuous
Backhoe	80	Continuous
Bar Bender	80	Continuous
Boring Jack Power Unit	80	Continuous
Chain Saw	85	Continuous
Compressor[3]	70	Continuous
Compressor (other)	80	Continuous
Concrete Mixer	85	Continuous
Concrete Pump	82	Continuous
Concrete Saw	90	Continuous
Concrete Vibrator	80	Continuous
Crane	85	Continuous
Dozer	85	Continuous
Excavator	85	Continuous
Front End Loader	80	Continuous
Generator	82	Continuous
Generator (25 KVA or less)	70	Continuous
Gradall	85	Continuous
Grader	85	Continuous
Grinder Saw	85	Continuous
Horizontal Boring Hydro Jack	80	Continuous
Hydra Break Ram	90	Impact
Impact Pile Driver	105	Impact
Insitu Soil Sampling Rig	84	Continuous
Jackhammer	85	Impact
Mounted Impact Hammer (hoe ram)	90	Impact
Paver	85	Continuous
Pneumatic Tools	85	Continuous
Pumps	77	Continuous
Rock Drill	85	Continuous
Scraper	85	Continuous
Slurry Trenching Machine	82	Continuous
Soil Mix Drill Rig	80	Continuous
Street Sweeper	80	Continuous
Tractor	84	Continuous
Truck (dump, delivery)	84	Continuous
Vacuum Excavator Truck (vac-truck)	85	Continuous
Vibratory Compactor	80	Continuous
Vibratory Pile Driver	95	Continuous
All other equipment with engines larger than 5 HP	85	Continuous

Notes:

[1] Measured at 50 feet from the construction equipment, with a "slow" (1 sec.) time constant.

[2] Noise limits apply to total noise emitted from equipment and associated components operating at full power while engaged in its intended operation.

[3] Portable Air Compressor rated at 75 cfm or greater and that operates at greater than 50 psi.

TABLE 3 Estimated Construction Noise Levels at Nearest Receptors

Receptors	Calculated Hourly Average Noise Levels, L_{eq} (dBA)										
	R1 (865ft)	**R2 (565ft)**	**R3 (770ft)**	**R4 (915ft)**	**R5 (930ft)**	**R6 (690ft)**	**R7 (775ft)**	**R8 (830ft)**	**R9 (1,310ft)**	**R10 (1,335ft)**	**R11 (1,440ft)**
Ground Clearing	58-59	62-63	59-60	58-59	58-59	60-61	69-60	59-60	55-56	55-56	54-55
Excavation	46-64	50-68	47-65	46-64	46-64	48-66	47-65	47-65	43-61	43-61	42-60
Foundations	52	56	53	52	52	54	53	53	49	49	48
Erection	47-59	51-63	48-60	47-59	47-59	49-61	48-60	48-60	44-56	44-56	43-55
Finishing	49-64	53-68	50-65	49-64	49-64	51-66	50-65	50-65	46-61	46-61	45-60

Vehicle Traffic and Parking Lot Activities

Under project conditions, the winery would include two driveways: the west driveway and the east driveway. Both driveways are located along Lodi Lane.

The project's traffic impact study, prepared by W-Trans and dated June 10, 2021, analyzed the potential traffic impacts of the project during the PM peak hour on Friday and Saturday at two intersections: Silverado Trail/Lodi Lane and St Helena Highway/Lodi Lane. According to the study, the proposed project would increase peak hour trips by 41 and 46 trips on Fridays during non-harvest and harvest seasons, respectively, and by 57 and 64 trips on Saturdays during non-harvest and harvest seasons, respectively.

By adding the project trips to the existing peak hour volumes, the existing plus project traffic scenario was calculated. The existing peak hour volumes were compared to the existing volumes along each roadway segment included in the traffic study. The calculated noise level increase due to project traffic volumes would be less than 1 dBA L_{dn} or less along each segment during the peak PM hour on Fridays and Saturdays. The proposed project would not result in a substantial permanent noise level increase of 3 dBA L_{dn} or more.

The project would not include alterations to the parking lot at the Estate House; however, 31 new parking spots would be added at the West Winery building along the western and southern building façades. New parking lot noise along the western portion of the site would be produced by vehicle circulation, engine starts, and door slams, which typically produce noise levels that range from 53 to 63 dBA at 50 feet. The project's contribution to parking lot noise would only impact the noise-sensitive receptors to the west, which include R6 through R11. R1 through R5 would be more than 1,400 feet from the new parking spaces, with the Estate House facility and Silverado Trail traffic noise located between the parking spaces and the receptors. These noise sources closer to the eastern receptors would mask the operations at the West Winery.

Table 4 summarizes the noise levels at the receptors west of the project site due to new traffic noise occurring at the West Winery building.

TABLE 4 Estimated Parking Lot Noise Levels at Nearest Receptors to the West

Receptor	Distance from Parking Lot to Receptors	Estimated Noise Levels
R6	655 feet	31 to 41 dBA
R7	750 feet	30 to 40 dBA
R8	625 feet	31 to 41 dBA
R9	1,090 feet	26 to 36 dBA
R10	1,125 feet	26 to 36 dBA
R11	1,210 feet	25 to 35 dBA

The West Winery parking spaces will be used by employees, and intermittent trips would likely coincide with arrival prior to a work shift, during breaks, and during departure following a work shift. Therefore, these types of noise sources could occur for 30 minutes or more in a single hour. This would represent worst-case scenario. According to the County's Noise Ordinance, parking lot noise generated at the site should be at or below 45 dBA during nighttime hours and at or below 50 dBA during daytime hours at residential receptors for noise sources that occur for a period of more than 30 minutes in any given hour. The estimated parking lot noise levels at the nearest

receptors would be below the County's thresholds during daytime and nighttime hours. Additionally, the nearest winery would be about 385 feet from the parking area, and at this distance, parking lot noise would range from 35 to 45 dBA, which would be well below the County's 75 dBA threshold for industrial land uses.

Truck Deliveries

Maximum noise levels generated by medium trucks (box type and delivery) at a distance of 50 feet would be expected to range from 60 to 65 dBA when traveling at constant speeds and from 65 to 70 dBA when stopping/starting and maneuvering. The Estate House renovations would include a new loading dock along the eastern façade and a replacement Crush Canopy. Additionally, the West Winery building would include truck deliveries at the covered receiving area located at the center of the building and along the northern façade.

Table 5 summarizes the noise levels at the receiving residential land uses due to truck deliveries, assuming worst-case conditions, which would occur along the eastern façade of the Estate House (R1 through R5), along the northern façade of the West Winery building (R6 and R7), and at the center breezeway of the West Winery building (R8 through R11). Note, all truck deliveries occurring within the breezeway of the West Winery building would be partially shielded by the building. Conservatively, a 12 dBA attenuation was assumed for these receptors (R8 through R11).

TABLE 5 Estimated Truck Delivery Noise Levels at Nearest Receptors

Receptor	Distance from Nearest Truck Delivery Area to Receptors	Estimated Noise Levels	
		During Constant Speeds	During Stopping/Starting & Maneuvering
R1	770 feet	36 to 41 dBA	41 to 46 dBA
R2	500 feet	40 to 45 dBA	45 to 50 dBA
R3	760 feet	36 to 41 dBA	41 to 46 dBA
R4	925 feet	35 to 40 dBA	40 to 45 dBA
R5	1,015 feet	34 to 39 dBA	39 to 44 dBA
R6	500 feet[a]	40 to 45 dBA[a]	45 to 50 dBA[a]
R7	575 feet[s]	39 to 44 dBA[a]	44 to 49 dBA[a]
R8	885 feet	23 to 28 dBA[b]	28 to 33 dBA[b]
R9	1,365 feet	Below 20 to 24 dBA[b]	24 to 29 dBA[b]
R10	1,390 feet	Below 20 to 24 dBA[b]	24 to 29 dBA[b]
R11	1,505 feet	Below 20 to 23 dBA[b]	23 to 28 dBA[b]

[a] Distances and estimated noise levels calculated at the distances for receptors R6 and R7 were assuming truck deliveries along the northern building façade of the West Winery building. For production deliveries, which would only occur in the breezeway of the West Winery building, noise levels generated by truck deliveries would reduce by a minimum of 14 dBA.

[b] A conservative attenuation of 12 dBA was applied to these receptors due to the partial shielding from the West Winery building.

In a given hour, it is assumed that truck deliveries would occur for more than 15 minutes, but less than 30 minutes, falling into the L_{25} noise limit of 55 dBA during daytime hours and 50 dBA during nighttime hours. While it is assumed that truck deliveries would be limited to daytime hours only, the estimated noise levels due to truck deliveries would meet the daytime and nighttime standards established in the County's Noise Ordinance. The nearest winery is about 490 feet from

the delivery area at the West Winery building. At this distance, noise levels due to truck deliveries would be below 40 dBA under constant speeds and during maneuvering. These levels would be below the County's threshold of 75 dBA for industrial uses.

For the proposed project, all production deliveries at the West Winery building would occur in the breezeway at the center of the building. While occasional deliveries would potentially occur along the northern façade, these deliveries would be limited to supplies and equipment. Noise levels in Table 5 represent worst-case scenario. As noted above, for production deliveries occurring in the breezeway, noise levels due to trucks operating under constant speeds and during maneuvering would be less than 40 dBA at receptors R6 and R7.

Production Activities

Winery operations would typically start at 7:00 a.m. and conclude at 4:00 p.m.; however, during harvest, winery operations could occur at any time during a 24-hour period. Winery operations produce the following type and range of noise levels at nearby receptors:

<u>Mechanical Equipment</u>

Mechanical equipment associated with the Estate House would not change under project conditions; however, mechanical equipment is shown in a small room along the eastern façade of the West Winery building. Other equipment of note would include a structure with an electrical fire pump and wastewater treatment system; trash and water pump enclosures; and an emergency generator pad. All of these are located to the north of the West Winery building.

Mechanical equipment (e.g., refrigeration equipment and air compressors) are conservatively assumed to operate under constant conditions during daytime and nighttime hours. Sound level information for a Daikin Air-Cooled Scroll Compressor Chiller was provided by the applicant for the proposed project. At a distance of 30 feet, the proposed chiller would generate noise levels of about 65 dBA. A Ingersoll Rand Industrial Technologies air compressor has been selected for the West Winery building. According to the specifications provided for the air compressor, noise levels a standard enclosure would range from 65 to 74 dBA at a distance of about 5 feet. Being in close proximity, the combined noise level for the chiller and the air compressor would be 65 to 66 dBA at 30 feet.

Located along the eastern building façade, receptors R6 through R8 and R10 would be shielded by the West Winery building. Conservatively, 20 dBA attenuation is assumed for these receptors. Table 6 summarizes the noise levels at the receiving residential land uses due to mechanical equipment located along the eastern façade of the West Winery building.

TABLE 6 Estimated Mechanical Equipment Noise Levels at Nearest Receptors to the West

Receptor	Distance from Mechanical Equipment Rooms to Receptors	Estimated Noise Levels
R6	780 feet	< 20 dBA[a]
R7	765 feet	< 20 dBA[a]
R8	835 feet	< 20 dBA[a]
R9	1,225 feet	33 to 34 dBA
R10	1,270 feet	< 20 dBA[a]
R11	1,365 feet	32 to 33 dBA

[a] A conservative attenuation of 20 dBA was applied to these receptors due to shielding from the West Winery building.

This mechanical equipment would operate continuously during daytime and nighttime hours, falling within the L_{50} thresholds of 45 dBA during nighttime hours and 50 dBA during daytime hours at residential receptors. The estimated noise levels due to mechanical equipment along the eastern façade of the West Winery building would meet the daytime and nighttime standards established in the County's Noise Ordinance. Additionally, receptors R1 through R5 would be more than 1,400 feet from the mechanical equipment, and at this distance, noise levels would be at or below 33 dBA, which meets the daytime and nighttime thresholds. The nearest winery would be shielded by mechanical equipment noise by the West Winery building. The County's thresholds for industrial uses would not be exceeded.

The proposed project would include an emergency generator located northeast of the West Winery building. Sound attenuated enclosures for C27 and C32 generator sets have been selected for the proposed project. The total noise exposure would be 75 dBA at a distance of 23 feet. Located to the north of the West Winery building, receptors R8 through R10 would be shielded by the West Winery building. Conservatively, 20 dBA attenuation is assumed for these receptors. Table 7 summarizes the noise levels at the receiving residential land uses due to the emergency generator located northeast of the West Winery building.

TABLE 7 Estimated Emergency Generator Noise Levels at Nearest Receptors to the West

Receptor	Distance from Emergency Generator to Receptors	Estimated Noise Levels
R6	500 feet	48 dBA
R7	540 feet	48 dBA
R8	1,155 feet	21 dBA[a]
R9	1,585 feet	< 20 dBA[a]
R10	1,635 feet	< 20 dBA[a]
R11	1,725 feet	38 dBA

[a] A conservative attenuation of 20 dBA was applied to these receptors due to shielding from the West Winery building.

Emergency generators are typically tested monthly for a period of one hour between 7:00 a.m. and 10:00 p.m. It is assumed that the County's thresholds would not apply during emergency conditions when the generators may run continuously during daytime and nighttime hours. During the testing periods, the threshold would apply and would fall into the L_{50} threshold category of 50 dBA during daytime hours only. The estimated noise levels due to the emergency generator located to the north of the West Winery building would meet the daytime standards established in the County's Noise

Ordinance. Additionally, receptors R1 through R5 would be more than 1,550 feet from the emergency generator, and at this distance, noise levels would be at or below 38 dBA, which meets the daytime thresholds. At a distance of 690 feet from the generator pad, the nearest winery would be exposed to noise levels up to 46 dBA, which would meet the threshold for industrial uses.

Maintenance and Forklift Operations

Maintenance and forklift operations would produce intermittent noise depending on the exact nature of the operation. While operations would likely occur throughout the day and night, maintenance and forklift operations are expected to fall within the category of more than 15 minutes in a given hour (L_{25}). Backup alarms (or beepers), which are repetitive and irritating by design, will also produce noise during these activities. Based on experience with other winery operations, L_{25} noise levels from these operations may reach 67 dBA at 50 feet. These activities would mostly occur within the West Winery building: in the barrel storage area on the southern portion of the building, in the tank cellar on the northern portion of the building, and in the covered receiving breezeway area. Therefore, maintenance and forklift operations would be partially shielded. Conservatively, 12 dBA attenuation was applied to all surrounding receptors to the west. Additionally, the replacement Crush Canopy at the Estate House would potentially extended existing operations to 24 hours a day, and forklifts would be used at the Crush Canopy to unload the trucks. Table 8 summarizes the noise levels at the receiving residential land uses due to the operations of maintenance and forklift activities located at the Crush Canopy (R1 through R5) and within the West Winery building (R6 through R11).

TABLE 8 Estimated Noise Levels Due to Maintenance and Forklift Operations at Nearest Receptors

Receptor	Distance from Center of the Crush Canopy or West Winery Building to Receptors	Estimated Noise Levels
R1	925 feet	42 dBA
R2	625 feet	45 dBA
R3	795 feet	43 dBA
R4	925 feet	42 dBA
R5	1,000 feet	41 dBA
R6	670 feet	33 dBA[a]
R7	765 feet	31 dBA[a]
R8	840 feet	31 dBA[a]
R9	1,310 feet	27 dBA[a]
R10	1,345 feet	26 dBA[a]
R11	1,435 feet	26 dBA[a]

[a] A conservative attenuation of 12 dBA was applied to these receptors due to shielding from the West Winery building.

Maintenance and forklift operations would not exceed the daytime L_{25} threshold of 55 dBA or the nighttime L_{25} threshold of 50 dBA at the nearest receptors to the west. Additionally, receptors R1 through R5 would be exposed to forklift operations at or below 45 dBA, which meets the daytime and nighttime thresholds. The nearest winery would be 485 feet from the center of the West Winery building, and at this distance, maintenance and forklift operations would be at or below 35 dBA, meeting the County's 75 dBA threshold for industrial uses.

Seasonal Crush Activities

Crush activities typically occur for a period of about six to eight weeks per year; however, such activities may not occur on a daily basis during this timeframe. Crush-related activities are expected to primarily occur at the Crush Canopy at the Estate House on the eastern portion of the site and within the breezeway at the center of the West Winery building. While the Crush Canopy is currently at the site, the new capacity for the winery would potentially increase operations to 24 hours a day, which would potentially expose receptors R1 through R5 to extended crush activity noise. Trucks would access the covered work area from the north, and grape bins would be unloaded with a forklift. All grapes would be crushed and pressed, and the juice would be pumped into fermentation tanks.

The majority of the noise sources associated with crush activities would primarily include the operation of hoppers, presses, de-stemmers, separators, crushers, air compressors, forklifts, conveyors, etc. Average noise levels resulting from the crush are typically constant on an hourly basis, producing average noise levels of 64 dBA and discrete maximum noise events of 70 to 80 dBA at 50 feet from the center of operations, assuming no attenuation.

Table 9 summarizes the noise levels at the receiving residential land uses due to the crush activities located at the Crush Canopy at the Estate House (R1 through R5) and within the breezeway of the West Winery building (R6 through R11). Therefore, receptors R6 through R11 would be partially shielded by the intervening building façades. Conservatively, 12 dBA attenuation is assumed for all western receptors.

TABLE 9 Estimated Noise Levels Due to Crush Activities at Nearest Receptors

Receptor	Distance from Center of the Crush Canopy at the Estate House or the Crush Pad at the West Winery Building to Receptors	Estimated Hourly Average Noise Levels	Range of Maximum Noise Levels
R1	925 feet	39 dBA	45 to 55 dBA
R2	625 feet	42 dBA	48 to 58 dBA
R3	795 feet	40 dBA	46 to 56 dBA
R4	925 feet	39 dBA	45 to 55 dBA
R5	1,000 feet	38 dBA	44 to 54 dBA
R6	650 feet	30 dBA[a]	36 to 46 dBA[a]
R7	740 feet	29 dBA[a]	35 to 45 dBA[a]
R8	1,035 feet	26 dBA[a]	32 to 42 dBA[a]
R9	1,500 feet	23 dBA[a]	29 to 39 dBA[a]
R10	1,535 feet	22 dBA[a]	28 to 39 dBA[a]
R11	1,650 feet	22 dBA[a]	28 to 38 dBA[a]

[a] A conservative attenuation of 12 dBA was applied to these receptors due to shielding from the West Winery building.

Crush activities would not exceed the daytime L_{50} threshold of 50 dBA or the nighttime L_{50} threshold of 45 dBA at the nearest receptors or the daytime L_{max} threshold of 70 dBA or the nighttime L_{max} threshold of 65 dBA at the nearest receptors. At a distance of approximately 570 feet, the nearest winery would be exposed to hourly average noise levels up to 43 dBA and maximum noise levels

ranging from 49 to 59 dBA, meeting the thresholds for industrial uses of 75 dBA L_{50} and 95 dBA L_{max}.

Bottling Activities

Typically, mobile trucks are used for bottling at the covered outdoor work areas, such as the breezeway at the West Winery and the Crush Canopy at the Estate House. Bottling trucks would be positioned as close to the main winery production doors as possible, with the entire bottling process occurring within the truck. Bottling produces fairly continuous noise levels throughout any given hour of operation. Previous studies at similar wineries have resulted in sound level measurements of mobile (truck based) and fixed bottling lines producing approximately 67 dBA at 50 feet.

Table 10 summarizes the noise levels at the receiving residential land uses due to bottling activities located at the Crush Canopy at the Estate House (R1 through R5) and at the breezeway of the West Winery building (R6 through R11). Therefore, receptors R6 through R11 would be partially shielded by the West Winery building. Conservatively, 12 dBA attenuation is assumed for these receptors.

TABLE 10 Estimated Noise Levels Due to Bottling Activities at Nearest Receptors

Receptor	Distance from Building Façades Near the Crush Canopy at the Estate House or the Crush Pad at the West Winery Building to Receptors	Estimated Hourly Average Noise Levels
R1	930 feet	42 dBA
R2	610 feet	45 dBA
R3	780 feet	43 dBA
R4	935 feet	42 dBA
R5	1,000 feet	41 dBA
R6	650 feet	33 dBA[a]
R7	740 feet	32 dBA[a]
R8	1,035 feet	29 dBA[a]
R9	1,500 feet	26 dBA[a]
R10	1,535 feet	25 dBA[a]
R11	1,650 feet	25 dBA[a]

[a] A conservative attenuation of 12 dBA was applied to these receptors due to shielding from the West Winery building.

Bottling activities would not exceed the daytime L_{50} threshold of 50 dBA or the nighttime L_{50} threshold of 45 dBA at the nearest receptors. At a distance of approximately 570 feet, the nearest winery would be exposed to hourly average noise levels up to 46 dBA, meeting the thresholds for industrial uses of 75 dBA L_{50}.

Tastings and Special Events

The Duckhorn Vineyards Winery currently has daily tours and tastings, wine with food pairings, large events, and auction-related events. Under project conditions, the applicant proposed the following modifications:

- Daily, by appointment only, Tour & Tastings: up to 20 persons, 200 times annually, which is an increase from 120 times annually

- Wine with Food Pairings: up to 25 persons, 40 times annually, which is a reduction from 36 times annually

- Large Events: up to 400 persons, three times annually, which is a reduction in persons from up to 600 and an increase in frequency from twice annually

- Auction-related Events: up to 250 persons, once annually, which is a reduction from twice annually

Additionally, new Medium Events are proposed, which would include up to 60 persons, 40 times annually. The tasting room hours would be between 10:00 a.m. and 4:00 p.m., and Events would occur between 9:00 a.m. and 10:00 p.m. No daily tastings or special events would occur during nighttime hours. Additionally, no amplified speech or music are proposed as part of the proposed project.

Typical sources of noise during all daily tastings and special events would include raised conversation and non-amplified background music. For small- to moderate-sized winery events, raised conversation typically generates noise levels of 64 dBA at a distance of 50 feet, and non-amplified background music typically generates noise levels of 57 dBA at a distance of 50 feet. The cumulative duration of noise from daily tastings and special events would occur for more than 30 minutes in a given hour, falling into the L_{50} category of applicable regulatory thresholds. At 50 feet, the combined noise level of raised conversation and non-amplified background music would be 65 dBA, assuming free-field conditions.

A tasting room is shown on the lower level of the West Winery building. While no outdoor areas at the West Winery building are identified on the site plan, there is open space to the east of the West Winery building that could be used for outdoor events. Assuming worst-case conditions, special events could occur outdoors at the covered verandas adjacent to the tasting rooms and at the outdoor terrace, all located at the rear of the Estate House. Without amplified music and speech, all indoor events at the West Winery building and the Estate House are assumed to have enough shielding from the building façades such that noise levels would not be audible at the receiving property lines of receptors surrounding the site. Therefore, this study focuses on outdoor events only.

Tables 11 and 12 summarize the noise levels at the receiving residential land uses due to outdoor events located along the eastern façade of the West Winery building and along the western façade of the Estate House, respectively. While most event activities would be shielded from receptors R1 through R5 by the Estate House structure, the covered veranda does wrap around the structure where the receptors would have some direct exposure. Further, there would be some direct line-of-sight from the outdoor area east of the West Winery building to the surrounding receptors. Conservatively, no attenuation is assumed for any receptor.

TABLE 11 Estimated Noise Levels at Nearest Receptors Due to Outdoor Daily Tastings and Special Events Occurring at the West Winery Building

Receptor	Distance from the Center of the Nearest Outdoor Area to Receptors	Estimated Hourly Average Noise Levels
R1	1,685 feet	34 dBA
R2	1,420 feet	36 dBA
R3	1,530 feet	35 dBA
R4	1,610 feet	35 dBA
R5	1,535 feet	35 dBA
R6	750 feet	41 dBA
R7	805 feet	41 dBA
R8	950 feet	39 dBA
R9	1,335 feet	36 dBA
R10	1,395 feet	36 dBA
R11	640 feet	36 dBA

TABLE 12 Estimated Noise Levels at Nearest Receptors Due to Outdoor Daily Tastings and Special Events Occurring at the Estate House

Receptor	Distance from the Center of the Nearest Outdoor Area to Receptors	Estimated Hourly Average Noise Levels
R1	725 feet	42 dBA
R2	500 feet	45 dBA
R3	770 feet	41 dBA
R4	925 feet	39 dBA
R5	1,070 feet	38 dBA
R6	1,560 feet	35 dBA
R7	1,585 feet	35 dBA
R8	1,440 feet	36 dBA
R9	1,310 feet	36 dBA
R10	1,470 feet	35 dBA
R11	1,260 feet	37 dBA

Noise sources generated by outdoor daily tastings and special events would not exceed the daytime L_{50} threshold of 50 dBA at the nearest surrounding noise-sensitive receptors. All daily tastings and special events held inside the winery buildings would have no prohibitions, provided that doors and windows remain closed. The nearest winery would be 640 feet from the outdoor event area at the West Winery building, which would result in noise exposure of 43 dBA, which would meet the 75 dBA threshold for industrial uses.

Temporary Construction Vibration

The construction of the project may generate perceptible vibration when heavy equipment or impact tools (e.g., jackhammers, hoe rams) are used. Construction activities would include demolition, site preparation work, foundation work, and new building framing and finishing. Pile driving equipment, which can cause excessive vibration, is not expected to be required for the proposed project.

The California Department of Transportation recommends a vibration limit of 0.5 in/sec PPV for buildings structurally sound and designed to modern engineering standards, which typically consist of buildings constructed since the 1990s. Conservative vibration limits of 0.3 in/sec PPV has been used for buildings that are found to be structurally sound but where structural damage is a major concern (see Table A3 provided in the Appendix of this report for further explanation). For historical buildings or buildings that are documented to be structurally weakened, a cautious limit of 0.08 in/sec PPV is often used to provide the highest level of protection.

No historical buildings have been identified within 200 feet of the project site. All buildings surrounding the project site would be subject to the conservative 0.3 in/sec PPV threshold.

Table 13 presents typical vibration levels that could be expected from construction equipment at a distance of 25 feet. Project construction activities, such as drilling, the use of jackhammers, rock drills and other high-power or vibratory tools, and rolling stock equipment (tracked vehicles, compactors, etc.), may generate substantial vibration in the immediate vicinity. Jackhammers typically generate vibration levels of 0.035 in/sec PPV, and drilling typically generates vibration levels of 0.09 in/sec PPV at a distance of 25 feet.

Vibration levels would vary depending on soil conditions, construction methods, and equipment used. Table 13 also summarizes the distance to the 0.3 in/sec PPV threshold for buildings of conventional construction materials. The building located closest to the proposed construction activity sites would be more than 300 feet from the boundary. At this distance, vibration levels would be below 0.014 in/sec PPV. Therefore, construction activities at the winery property would not exceed the State of California's 0.3 in/sec PPV for buildings of conventional materials and would not result in damage.

TABLE 13 Vibration Source Levels for Construction Equipment

Equipment		PPV at 25 ft. (in/sec)	Minimum Distance to Meet 0.3 in/sec PPV (feet)
Clam shovel drop		0.202	18
Hydromill (slurry wall)	in soil	0.008	1
	in rock	0.017	2
Vibratory Roller		0.210	19
Hoe Ram		0.089	9
Large bulldozer		0.089	9
Caisson drilling		0.089	9
Loaded trucks		0.076	8
Jackhammer		0.035	4
Small bulldozer		0.003	<1

Source: Transit Noise and Vibration Impact Assessment Manual, Federal Transit Administration, Office of Planning and Environment, U.S. Department of Transportation, September 2018, as modified by Illingworth & Rodkin, Inc., September 2022.

CEQA Initial Study Checklist Questions

The California Environmental Quality Act (CEQA) includes qualitative guidelines for determining the significance of environmental noise impacts. The CEQA Initial Study checklist questions are addressed below:

(a) 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?

The project would not result in a substantial temporary increase in noise levels during construction of the West Winery building or the demolition, renovation or replacement of identified buildings at the existing winery. All construction activities would be conducted in compliance with the Napa County Noise Ordinance (Napa County Code Chapter 8.16) and would not exceed the 75 dBA construction noise limit at affected residential properties. ***Less-than-Significant Impact.***

The project would not result in a substantial permanent increase in noise levels during operation of the winery. Noise levels produced by vehicles accessing the winery, production equipment and activities, daily tastings and special events would comply with the Napa County noise limits. ***Less-than-Significant Impact.***

(b) Generation of excessive groundborne vibration or groundborne noise levels?

Construction would occur more than 300 feet from the nearest surrounding structures, and pile driving is not proposed as a method of construction. At a distance of 300 feet, groundborne vibration from construction is anticipated to generate vibration levels no greater than 0.014 in/sec PPV. These vibration levels would be well below the conservative 0.3 in/sec PPV vibration limit recommended by the California Department of Transportation for buildings that are found to be structurally sound but where structural damage is a major concern. In addition, such low levels of vibration would not be perceptible by persons at rest. ***No Impact****.*

(c) 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, if the project would expose people residing or working in the project area to excessive noise levels?

The winery is neither within the boundaries of an airport land use compatibility planning area nor within two miles of any public or private airport or airstrip. The proposed project would not expose people to excessive noise levels associated with air traffic. ***No Impact****.*

Summary of Results

In summary, the project would not result in a substantial temporary increase in noise levels or produce excessive groundborne vibration levels during construction activities. Project operations were found to comply with the applicable Napa County noise limits, and no substantial permanent increase in noise levels was identified. The winery is located in a compatible noise environment, and the proposed project would not expose persons to excessive noise levels associated with air traffic.

Appendix A – Noise and Vibration Fundamentals

Fundamentals of Environmental Noise

Noise may be defined as unwanted sound. Noise is usually objectionable because it is disturbing or annoying. The objectionable nature of sound could be caused by its *pitch* or its *loudness*. *Pitch* is the height or depth of a tone or sound, depending on the relative rapidity (*frequency*) of the vibrations by which it is produced. Higher pitched signals sound louder to humans than sounds with a lower pitch. *Loudness* is intensity of sound waves combined with the reception characteristics of the ear. Intensity may be compared with the height of an ocean wave in that it is a measure of the amplitude of the sound wave.

In addition to the concepts of pitch and loudness, there are several noise measurement scales which are used to describe noise in a particular location. A *decibel (dB)* is a unit of measurement which indicates the relative amplitude of a sound. The zero on the decibel scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Sound levels in decibels are calculated on a logarithmic basis. An increase of 10 decibels represents a ten-fold increase in acoustic energy, while 20 decibels is 100 times more intense, 30 decibels is 1,000 times more intense, etc. There is a relationship between the subjective noisiness or loudness of a sound and its intensity. Each 10 decibel increase in sound level is perceived as approximately a doubling of loudness over a fairly wide range of intensities. Technical terms are defined in Table A1.

There are several methods of characterizing sound. The most common in California is the *A-weighted sound level (dBA).* This scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Representative outdoor and indoor noise levels in units of dBA are shown in Table A2. Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events. This *energy-equivalent sound/noise descriptor* is called L_{eq}. The most common averaging period is hourly, but L_{eq} can describe any series of noise events of arbitrary duration.

The scientific instrument used to measure noise is the *sound level meter*. Sound level meters can accurately measure environmental noise levels to within about plus or minus 1 dBA. Various computer models are used to predict environmental noise levels from sources, such as roadways and airports. The accuracy of the predicted models depends upon the distance the receptor is from the noise source. Close to the noise source, the models are accurate to within about plus or minus 1 to 2 dBA.

Since the sensitivity to noise increases during the evening and at night -- because excessive noise interferes with the ability to sleep -- 24-hour descriptors have been developed that incorporate artificial noise penalties added to quiet-time noise events. The *Community Noise Equivalent Level (CNEL)* is a measure of the cumulative noise exposure in a community, with a 5 dB penalty added to evening (7:00 pm - 10:00 pm) and a 10 dB addition to nocturnal (10:00 pm - 7:00 am) noise levels. The *Day/Night Average Sound Level (L_{dn})* is essentially the same as CNEL, with the exception that the evening time period is dropped and all occurrences during this three-hour period are grouped into the daytime period.

Effects of Noise

Sleep and Speech Interference

The thresholds for speech interference indoors are about 45 dBA if the noise is steady and above 55 dBA if the noise is fluctuating. Outdoors the thresholds are about 15 dBA higher. Steady noises of sufficient intensity (above 35 dBA) and fluctuating noise levels above about 45 dBA have been shown to affect sleep. Interior residential standards for multi-family dwellings are set by the State of California at 45 dBA L_{dn}. Typically, the highest steady traffic noise level during the daytime is about equal to the L_{dn} and nighttime levels are 10 dBA lower. The standard is designed for sleep and speech protection and most jurisdictions apply the same criterion for all residential uses. Typical structural attenuation is 12 to 17 dBA with open windows. With closed windows in good condition, the noise attenuation factor is around 20 dBA for an older structure and 25 dBA for a newer dwelling. Sleep and speech interference is therefore possible when exterior noise levels are about 57 to 62 dBA L_{dn} with open windows and 65 to 70 dBA L_{dn} with standard construction if the windows are closed.

Annoyance

Attitude surveys are used for measuring the annoyance felt in a community for noises intruding into homes or affecting outdoor activity areas. In these surveys, it was determined that the causes for annoyance include interference with speech, radio and television, house vibrations, and interference with sleep and rest. The L_{dn} as a measure of noise has been found to provide a valid correlation of noise level and the percentage of people annoyed. People have been asked to judge the annoyance caused by aircraft noise and ground transportation noise. There continues to be disagreement about the relative annoyance of these different sources. When measuring the percentage of the population highly annoyed, the threshold for ground vehicle noise is about 50 dBA L_{dn}. At a L_{dn} of about 60 dBA, approximately 12 percent of the population is highly annoyed. When the L_{dn} increases to 70 dBA, the percentage of the population highly annoyed increases to about 25 to 30 percent of the population. There is, therefore, an increase of about 2 percent per dBA between a L_{dn} of 60 to 70 dBA. Between a L_{dn} of 70 to 80 dBA, each decibel increase, increases by about 3 percent, the percentage of the population highly annoyed. People appear to respond more adversely to aircraft noise. When the L_{dn} is 60 dBA, approximately 30 to 35 percent of the population is believed to be highly annoyed.

TABLE A1 Definition of Acoustical Terms Used in this Report

Term	Definition
Decibel, dB	A unit describing, the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20 micro Pascals.
Sound Pressure Level	Sound pressure is the sound force per unit area, usually expressed in micro Pascals (or 20 micro Newtons per square meter), where 1 Pascal is the pressure resulting from a force of 1 Newton exerted over an area of 1 square meter. The sound pressure level is expressed in decibels as 20 times the logarithm to the base 10 of the ratio between the pressures exerted by the sound to a reference sound pressure (e. g., 20 micro Pascals). Sound pressure level is the quantity that is directly measured by a sound level meter.
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hz and 20,000 Hz. Infrasonic sound are below 20 Hz and Ultrasonic sounds are above 20,000 Hz.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Equivalent Noise Level, L_{eq}	The average A-weighted noise level during the measurement period.
L_{max}, L_{min}	The maximum and minimum A-weighted noise level during the measurement period.
L_{01}, L_{10}, L_{50}, L_{90}	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Day/Night Noise Level, L_{dn} or DNL	The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10:00 pm and 7:00 am.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 5 decibels in the evening from 7:00 pm to 10:00 pm and after addition of 10 decibels to sound levels measured in the night between 10:00 pm and 7:00 am.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

Source: Handbook of Acoustical Measurements and Noise Control, Harris, 1998.

TABLE A2 Typical Noise Levels in the Environment

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	110 dBA	Rock band
Jet fly-over at 1,000 feet		
	100 dBA	
Gas lawn mower at 3 feet		
	90 dBA	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	80 dBA	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawn mower, 100 feet	70 dBA	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	60 dBA	
		Large business office
Quiet urban daytime	50 dBA	Dishwasher in next room
Quiet urban nighttime	40 dBA	Theater, large conference room
Quiet suburban nighttime		
	30 dBA	Library
Quiet rural nighttime		Bedroom at night, concert hall (background)
	20 dBA	
		Broadcast/recording studio
	10 dBA	
	0 dBA	

Source: Technical Noise Supplement (TeNS), California Department of Transportation, September 2013.

Fundamentals of Groundborne Vibration

Ground vibration consists of rapidly fluctuating motions or waves with an average motion of zero. Several different methods are typically used to quantify vibration amplitude. One method is the Peak Particle Velocity (PPV). The PPV is defined as the maximum instantaneous positive or negative peak of the vibration wave. In this report, a PPV descriptor with units of mm/sec or in/sec is used to evaluate construction generated vibration for building damage and human complaints. Table A3 displays the reactions of people and the effects on buildings that continuous vibration levels produce. The guidelines in Table A3 represent syntheses of vibration criteria for human response and potential damage to buildings resulting from construction vibration.

Construction activities can cause vibration that varies in intensity depending on several factors. The use of pile driving and vibratory compaction equipment typically generates the highest construction related groundborne vibration levels. Because of the impulsive nature of such activities, the use of the PPV descriptor has been routinely used to measure and assess groundborne vibration and almost exclusively to assess the potential of vibration to induce structural damage and the degree of annoyance for humans.

The two primary concerns with construction-induced vibration, the potential to damage a structure and the potential to interfere with the enjoyment of life, are evaluated against different vibration limits. Human perception to vibration varies with the individual and is a function of physical setting and the type of vibration. Persons exposed to elevated ambient vibration levels, such as people in an urban environment, may tolerate a higher vibration level.

Structural damage can be classified as cosmetic only, such as paint flaking or minimal extension of cracks in building surfaces; minor, including limited surface cracking; or major, that may threaten the structural integrity of the building. Safe vibration limits that can be applied to assess the potential for damaging a structure vary by researcher. The damage criteria presented in Table A3 include several categories for ancient, fragile, and historic structures, the types of structures most at risk to damage. Most buildings are included within the categories ranging from “Historic and some old buildings” to “Modern industrial/commercial buildings”. Construction-induced vibration that can be detrimental to the building is very rare and has only been observed in instances where the structure is at a high state of disrepair and the construction activity occurs immediately adjacent to the structure.

The annoyance levels shown in Table A3 should be interpreted with care since vibration may be found to be annoying at lower levels than those shown, depending on the level of activity or the sensitivity of the individual. To sensitive individuals, vibrations approaching the threshold of perception can be annoying. Low-level vibrations frequently cause irritating secondary vibration, such as a slight rattling of windows, doors, or stacked dishes. The rattling sound can give rise to exaggerated vibration complaints, even though there is very little risk of actual structural damage.

TABLE A3 Reaction of People and Damage to Buildings from Continuous or Frequent Intermittent Vibration Levels

Velocity Level, PPV (in/sec)	Human Reaction	Effect on Buildings
0.01	Barely perceptible	No effect
0.04	Distinctly perceptible	Vibration unlikely to cause damage of any type to any structure
0.08	Distinctly perceptible to strongly perceptible	Recommended upper level of the vibration to which ruins and ancient monuments should be subjected
0.1	Strongly perceptible	Threshold at which there is a risk of damage to fragile buildings with no risk of damage to most buildings
0.25	Strongly perceptible to severe	Threshold at which there is a risk of damage to historic and some old buildings.
0.3	Strongly perceptible to severe	Threshold at which there is a risk of damage to older residential structures
0.5	Severe - Vibrations considered unpleasant	Threshold at which there is a risk of damage to new residential and modern commercial/industrial structures

Source: Transportation and Construction Vibration Guidance Manual, California Department of Transportation, September 2013.

Appendix B – Long-Term Noise Data

FIGURE A1 Daily Trend in Noise Levels at LT-1, Thursday, June 9, 2022

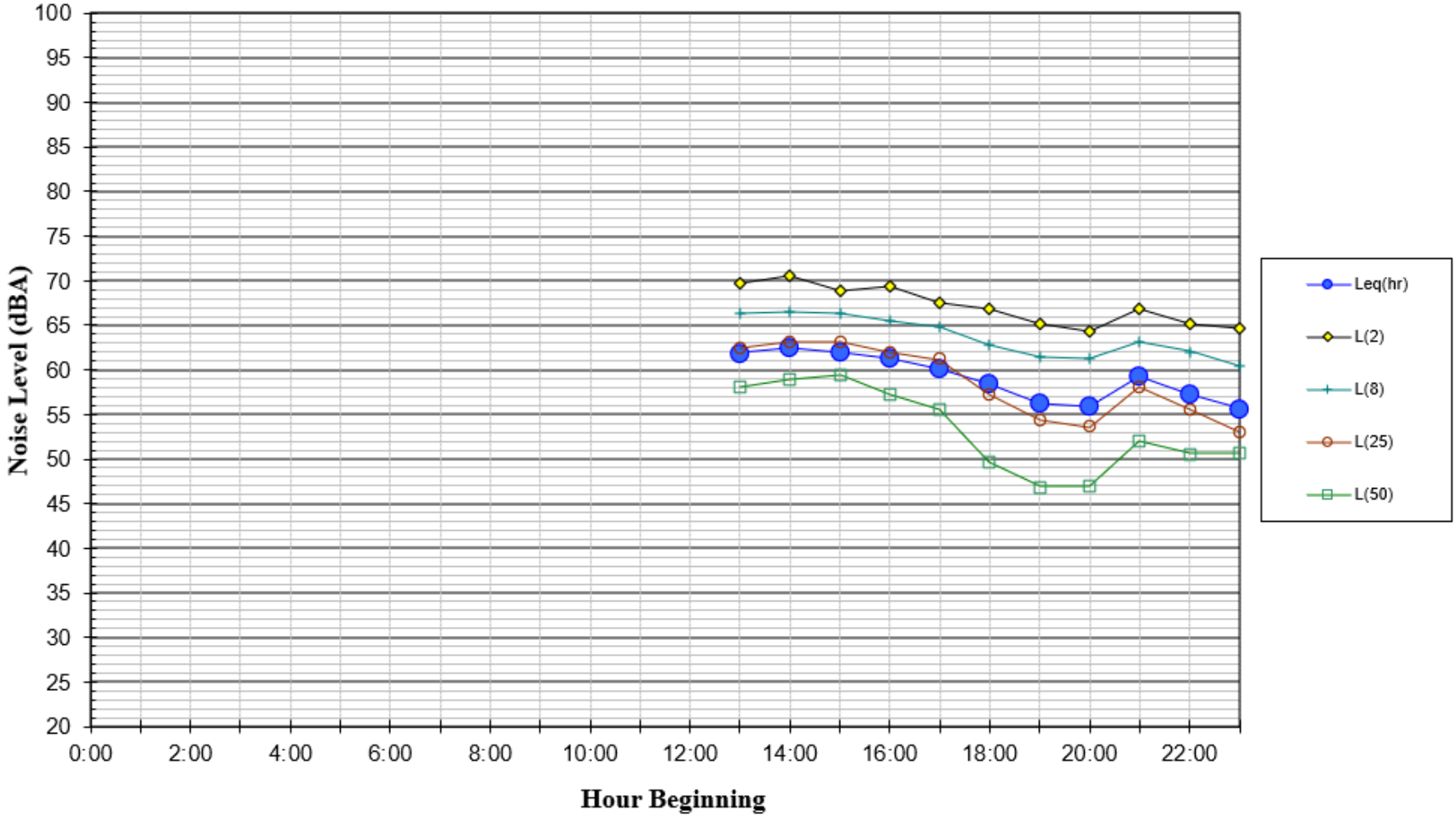


FIGURE A2 Daily Trend in Noise Levels at LT-1, Friday, June 10, 2022

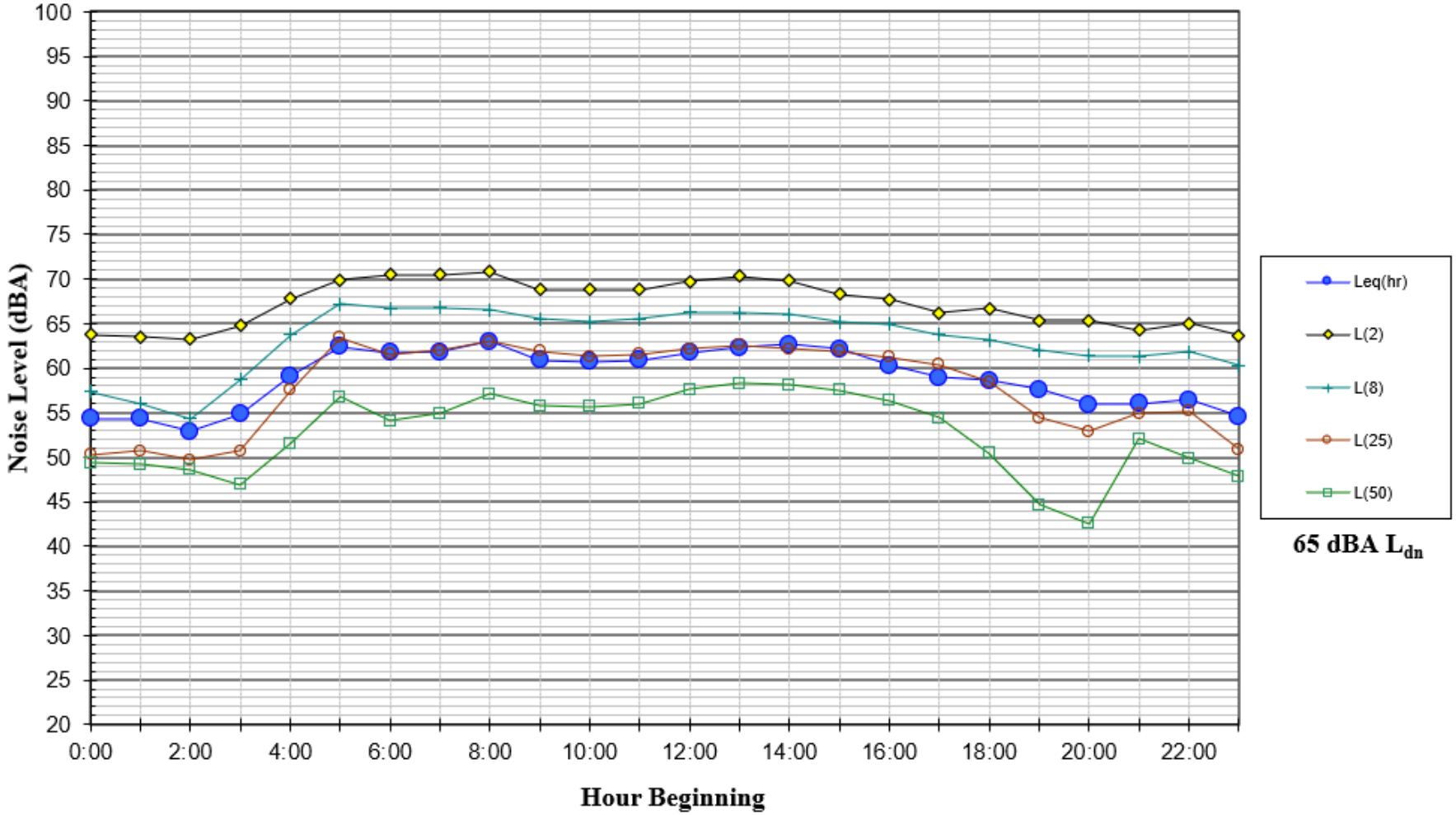


FIGURE A3 Daily Trend in Noise Levels at LT-1, Saturday, June 11, 2022

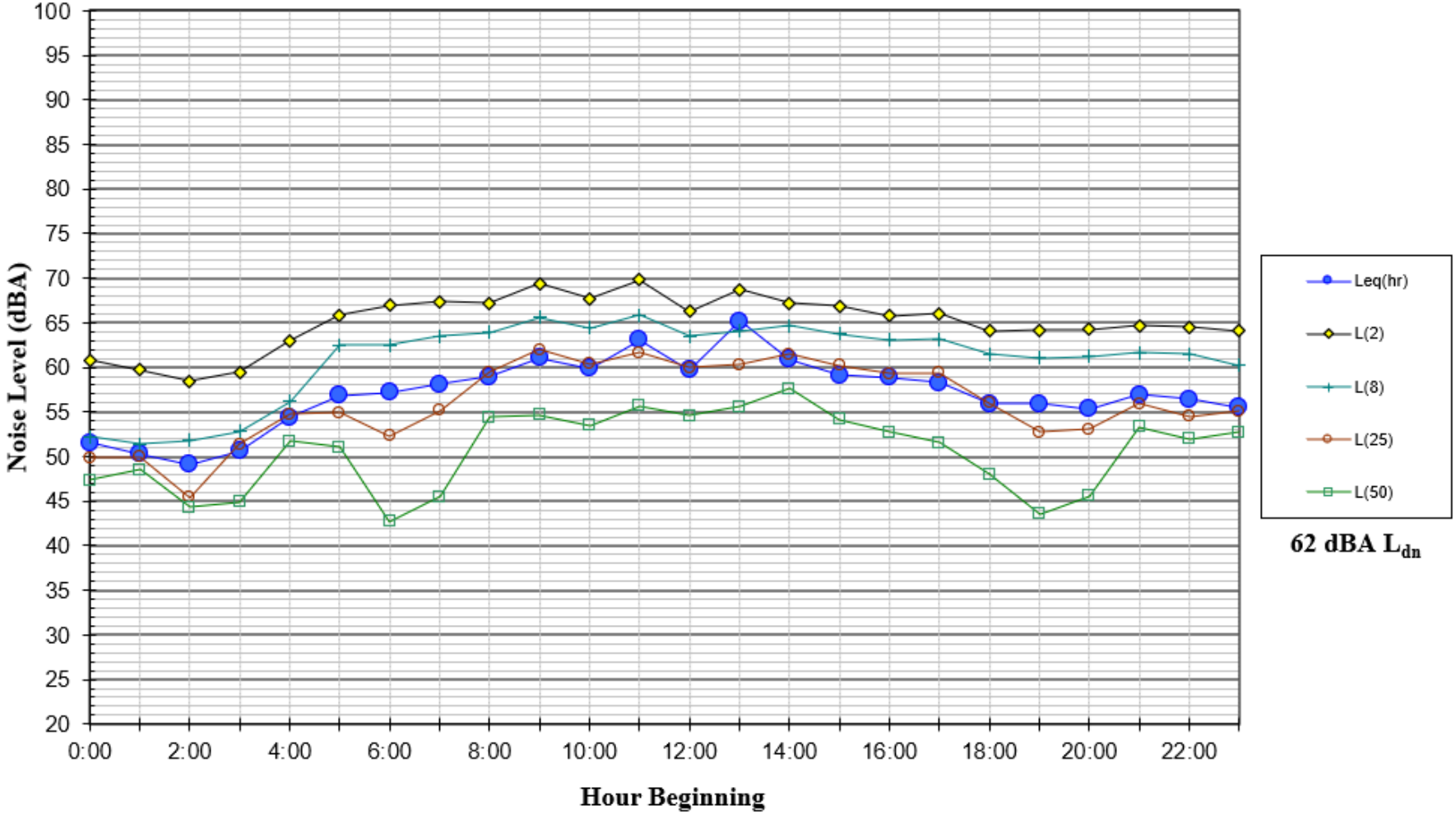


FIGURE A4 Daily Trend in Noise Levels at LT-1, Sunday, June 12, 2022

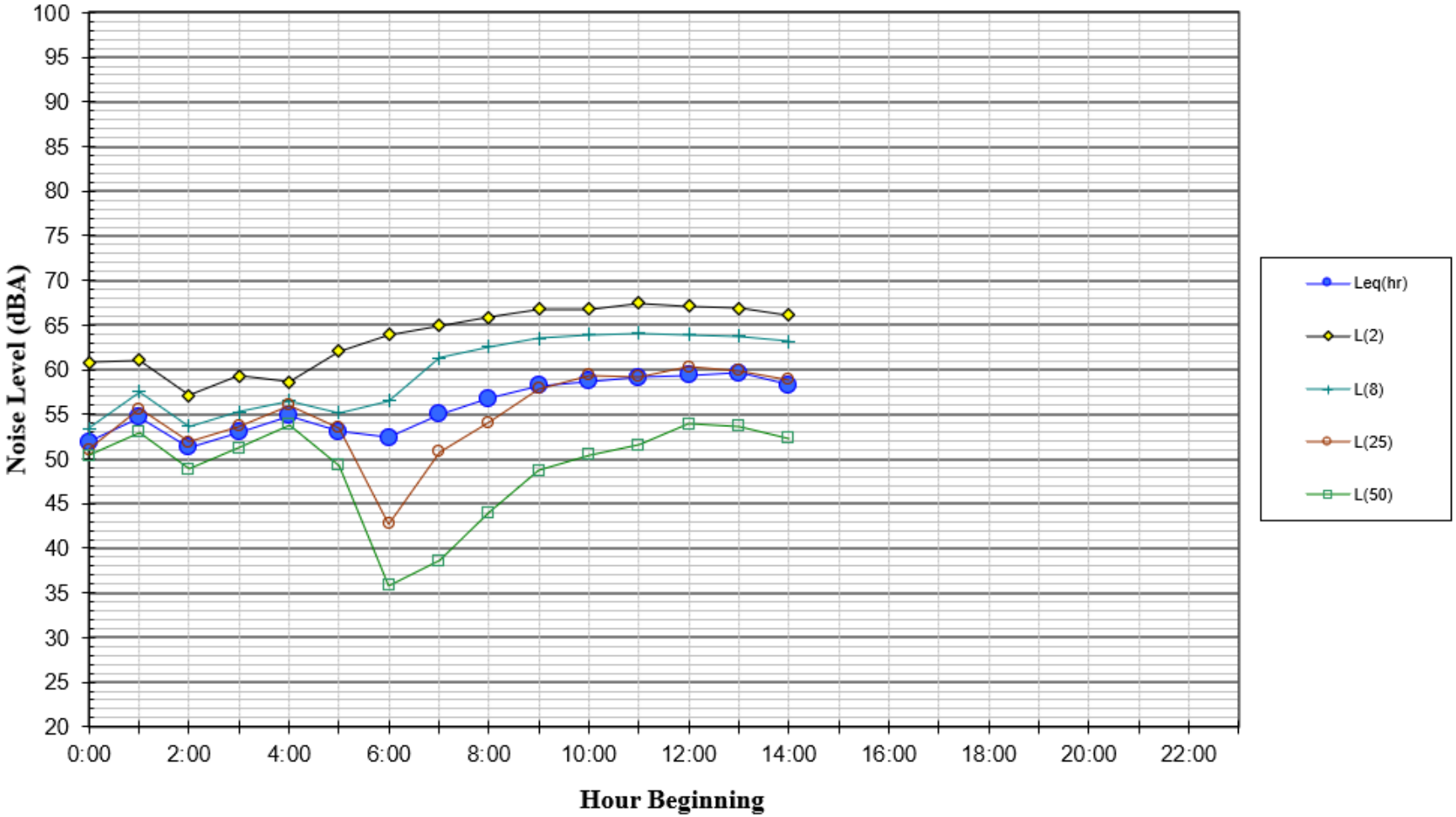


FIGURE A5 Daily Trend in Noise Levels at LT-2, Thursday, June 9, 2022

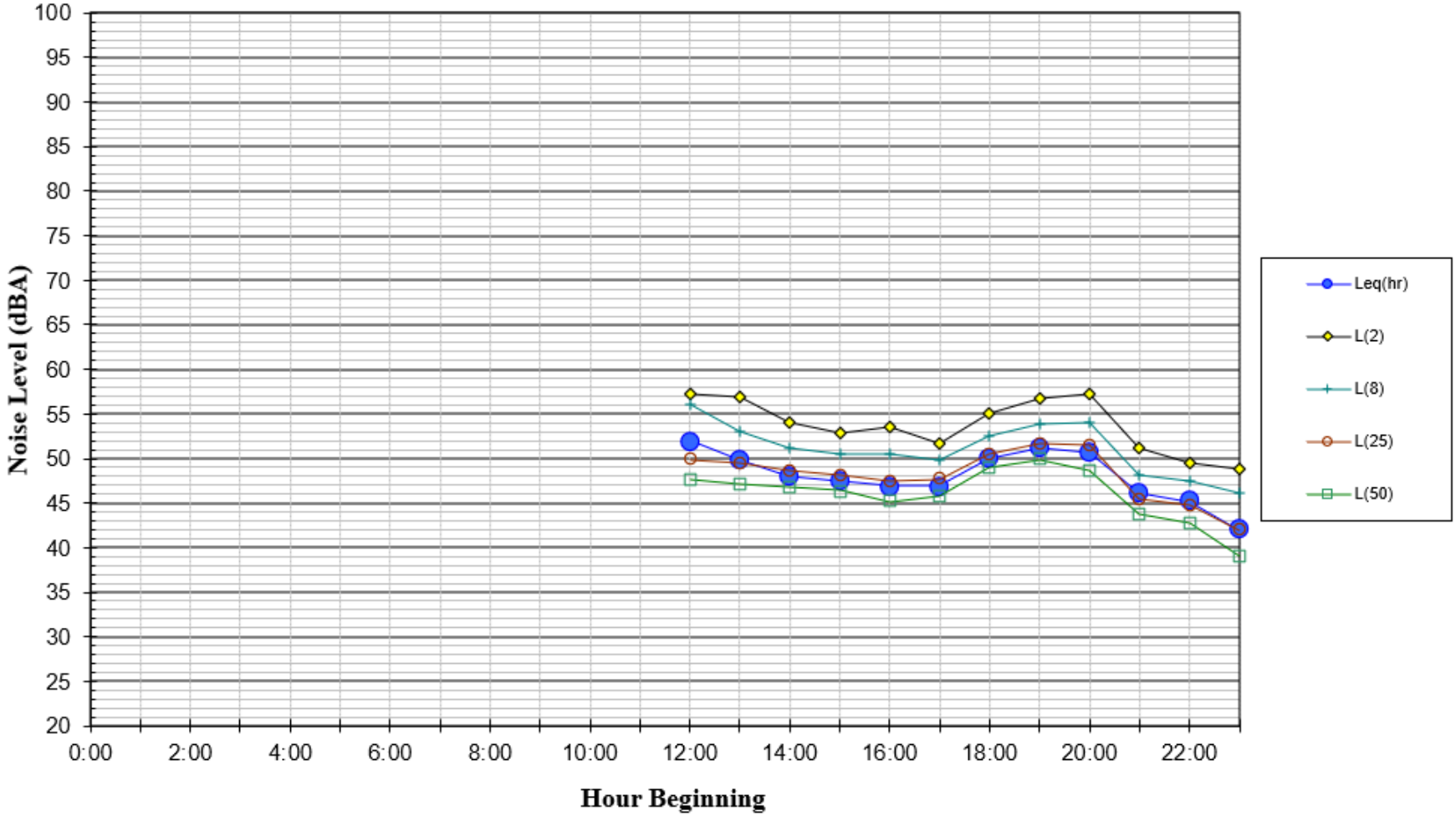


FIGURE A6 Daily Trend in Noise Levels at LT-2, Friday, June 10, 2022

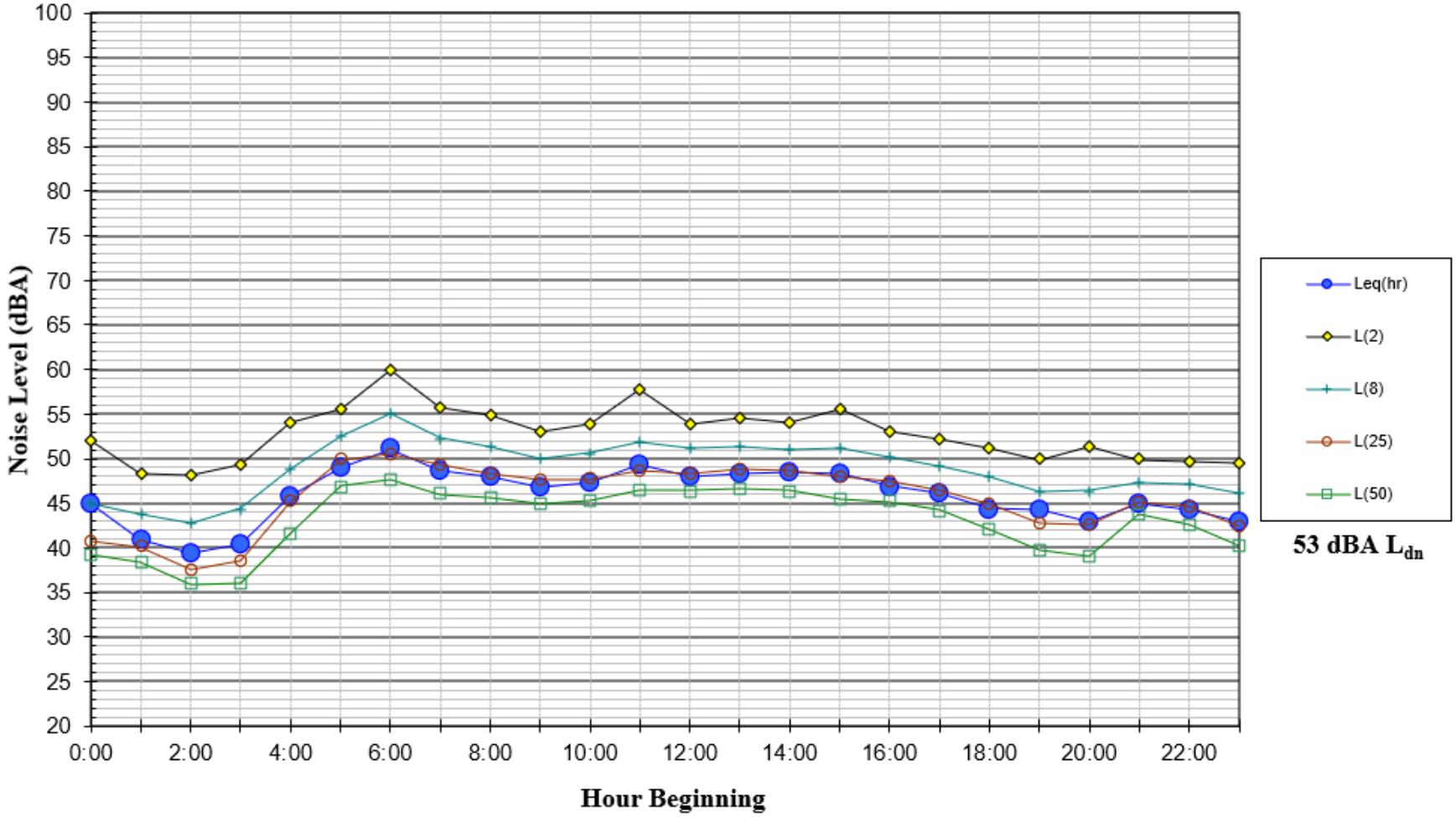


FIGURE A7 Daily Trend in Noise Levels at LT-2, Saturday, June 11, 2022

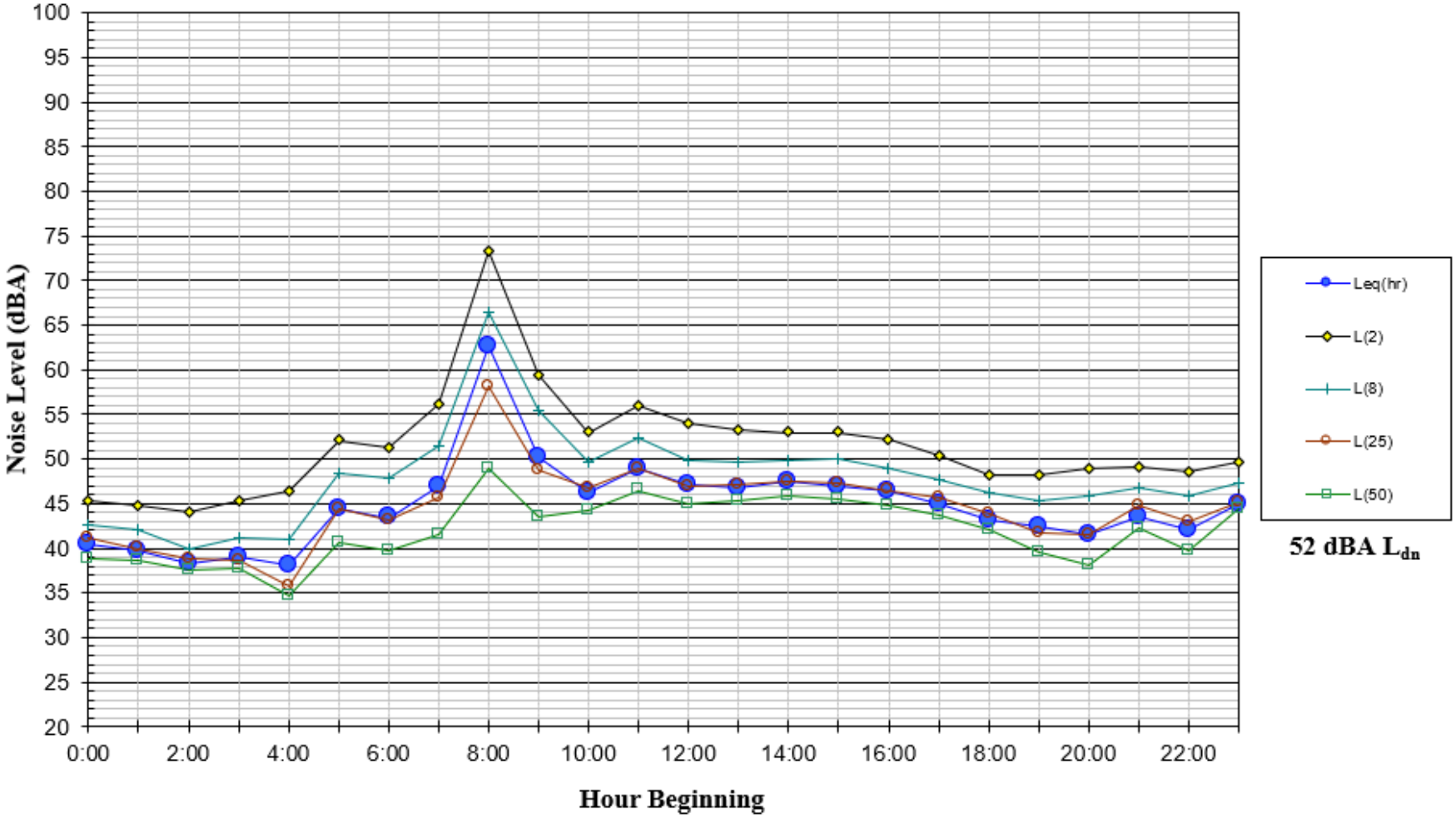


FIGURE A8 Daily Trend in Noise Levels at LT-3, Thursday, June 9, 2022

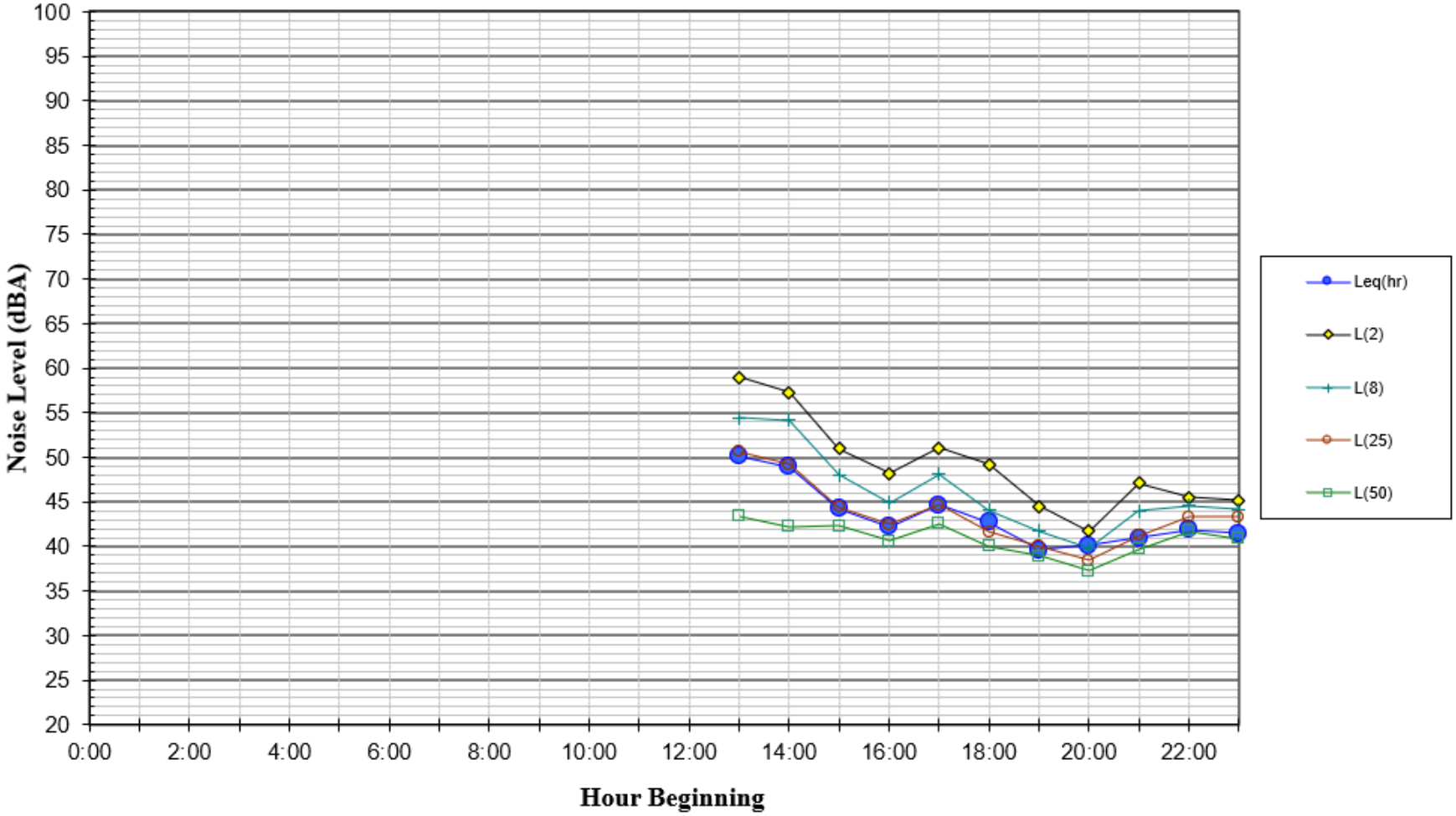


FIGURE A9 Daily Trend in Noise Levels at LT-3, Friday, June 10, 2022

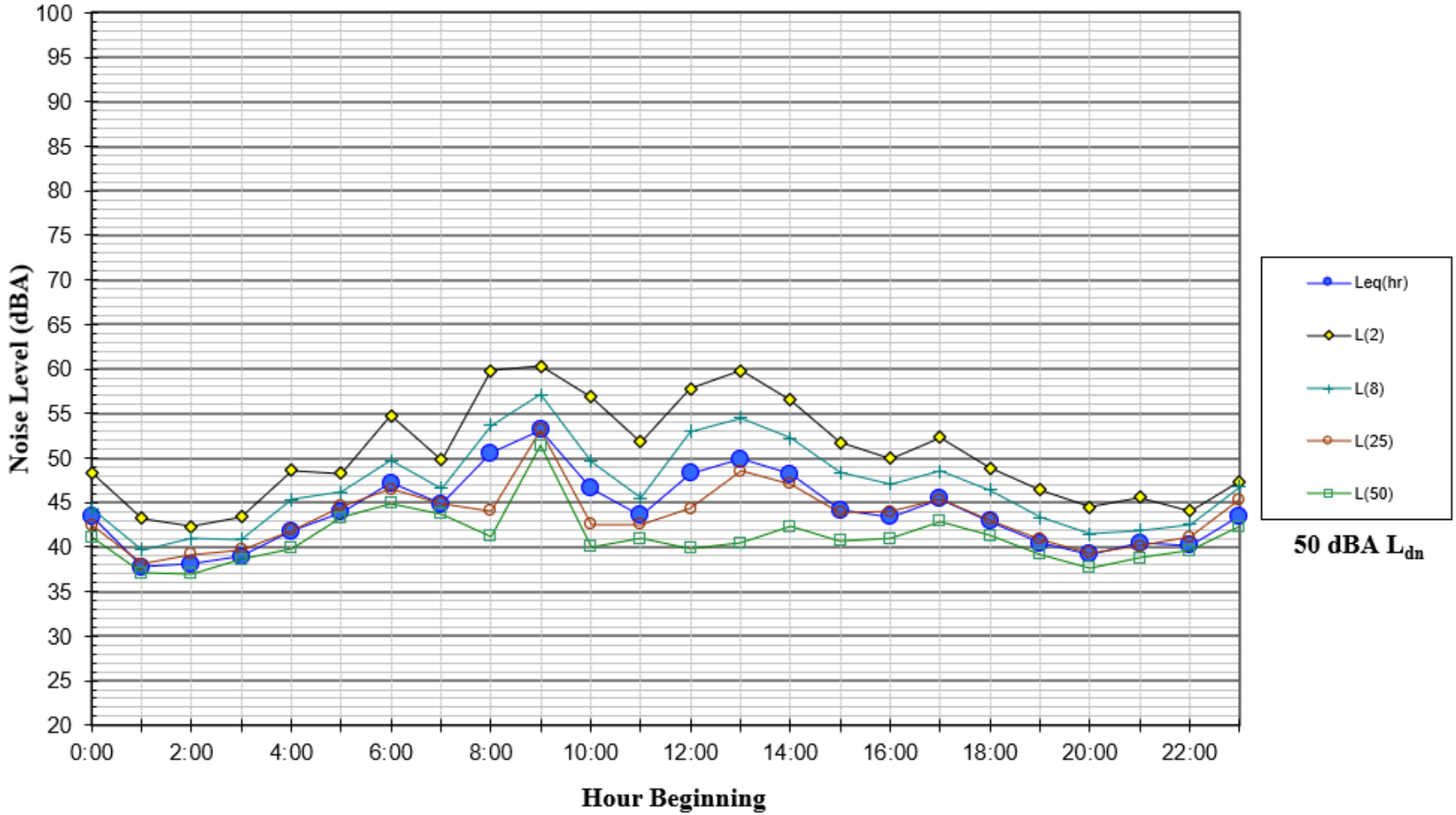


FIGURE A10 Daily Trend in Noise Levels at LT-3, Saturday, June 11, 2022

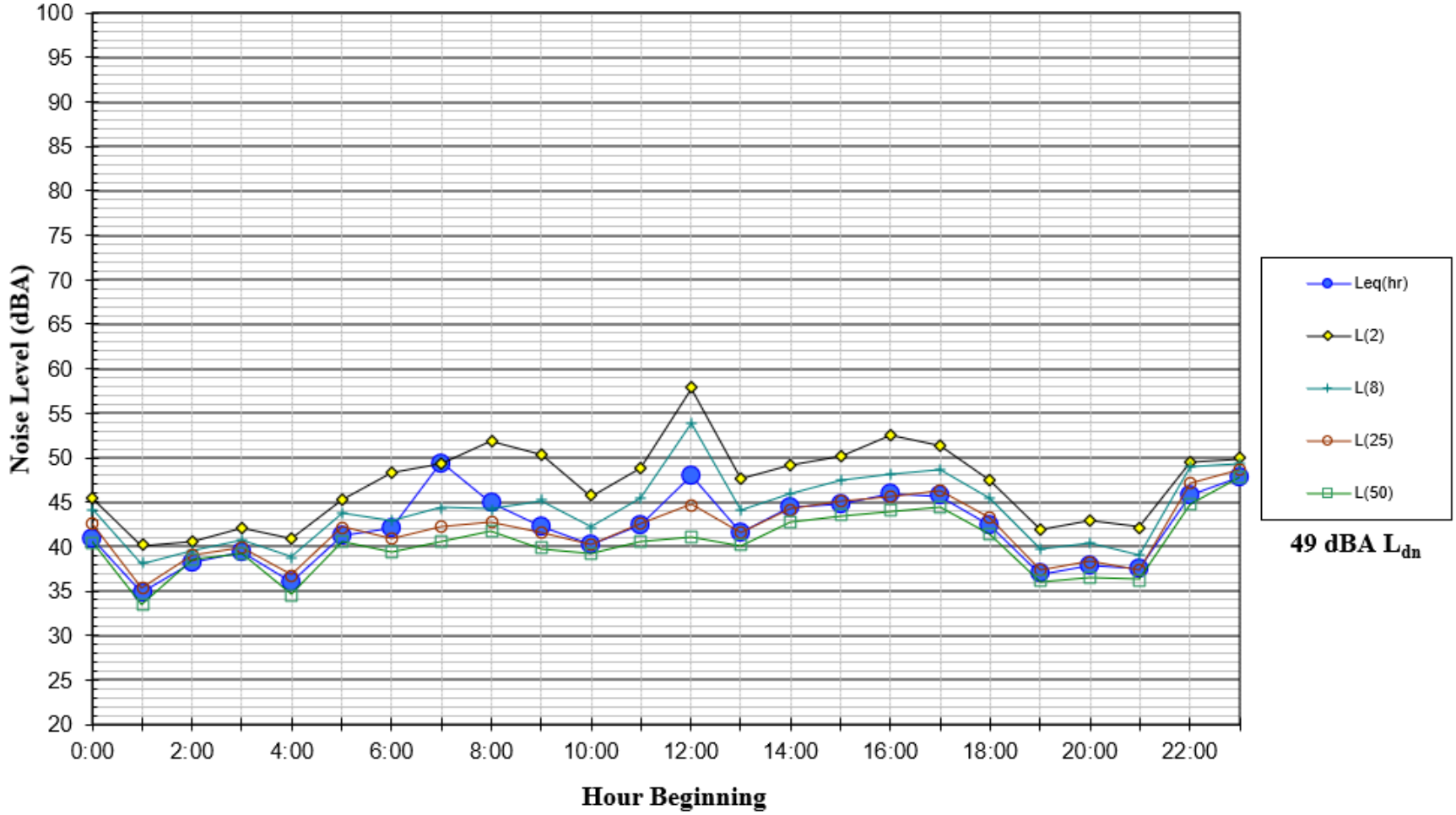


FIGURE A11 Daily Trend in Noise Levels at LT-3, Sunday, June 12, 2022

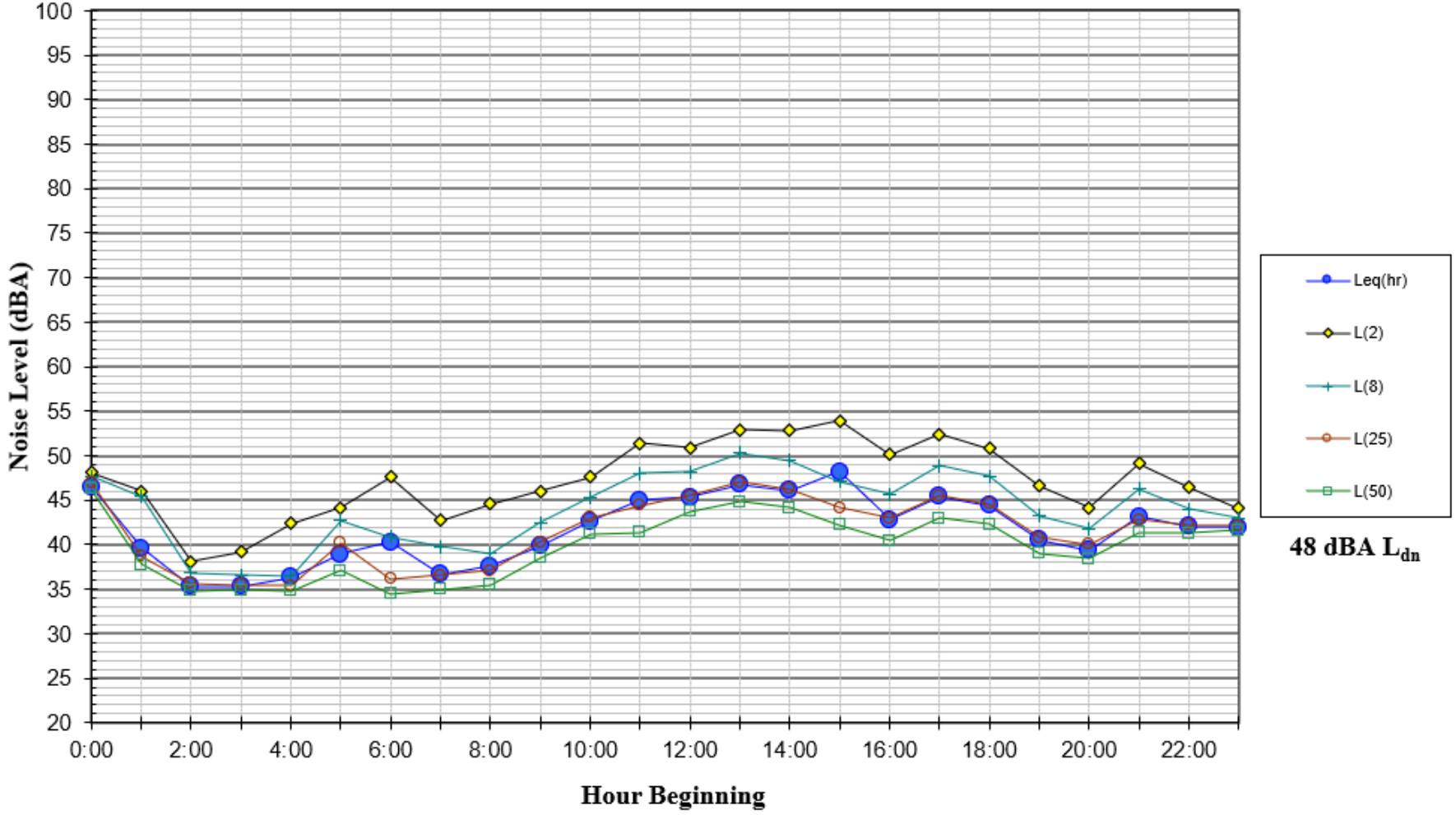
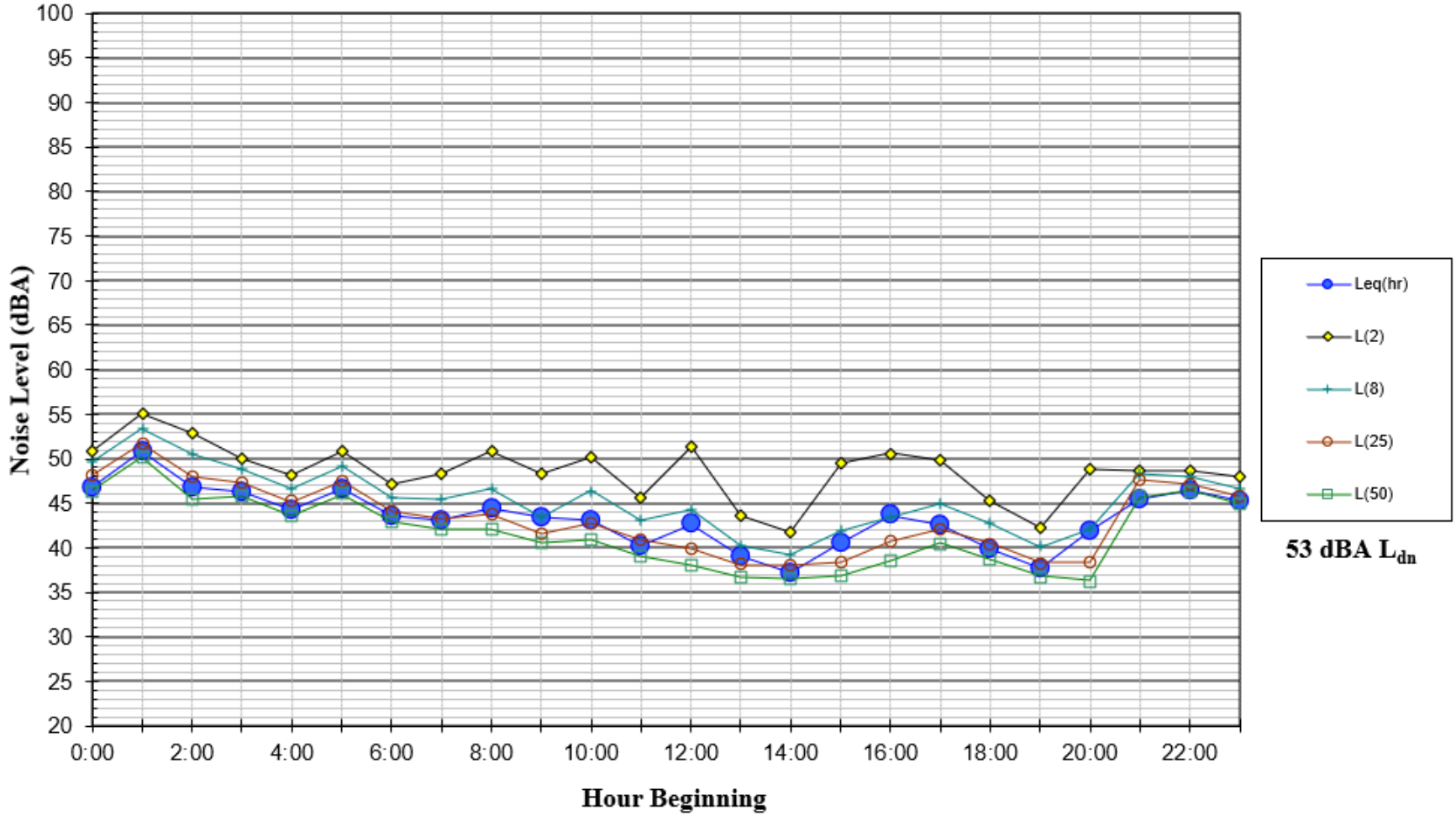



FIGURE A12 Daily Trend in Noise Levels at LT-3, Monday, June 13, 2022