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Environmental Noise Assessment

Arrow and Branch Winery, Use Permit Major Modification P23-00057
Planning Commission Hearing Date September 17, 2025

ARROW AND BRANCH WINERY
USE PERMIT MODIFICATION
ENVIRONMENTAL NOISE ASSESSMENT

Napa County, California

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EXECUTIVE SUMMARY

This Environmental Noise Analysis evaluates the potential for increased noise as a result of the proposed use permit modification of the Arrow and Branch Winery. The permit modification will result in increased square footage of production and accessory uses along with an increase in wine production, on-site employment, the maximum number of visitors and the number of marketing events allowed. Noise attributable to project operations with the permit modification, such as parking lot noise, truck deliveries, winery operations, and marketing events were evaluated and potential impacts to nearby residences were identified. Based on the noise standards presented in the Napa County General Plan, except for outdoor marketing events with music performances and indoor marketing events with open windows and/or doors all noise generated at the project site is expected to meet the Napa County noise thresholds at the nearest residential property lines. Recommendations to mitigate the impact of noise from marketing events at the adjacent residences are included.

INTRODUCTION

This Environmental Noise Assessment evaluates the potential for increased noise as a result of the proposed use permit modification of the Arrow and Branch Winery located at 5210 Solano Avenue in unincorporated Napa County in terms of the regulatory criteria established by the Noise Policy of the Napa County General Plan. This report includes a summary of applicable noise regulations, the results of a noise monitoring survey conducted for the project, and an assessment of noise impacts and the need for noise mitigation measures to meet the applicable County standards at adjacent noise sensitive land uses. Persons not familiar with environmental noise analysis are referred to Appendix A for additional discussion.

PROJECT DESCRIPTION

The Arrow and Branch Winery is in current operation and is requesting to modify its current use permit as follows:

1. An increase in production from 30,000 gallons per year to 45,000 gallons of wine per year,
2. An increase in on-site employment from 2 to 9 full-time and 1 to 2 part-time positions,
3. An increase in visitors from a maximum of 15 to a maximum of 40 per day, and
4. An increase in approved annual events from 6 events with 30 guests and 1 event with 125 guests to a maximum of 12 events with 30 visitors and 2 events with 125 guests.

To support the increased production the project also proposes to increase the Production facility[1] from 10,268 sq.ft. to 13,797 sq.ft. and increase the footprint of Accessory uses[2] from 379 sq.ft. to 4,308 sq.ft.

The project site is situated west of Hwy 29 and Solano Avenue and south of Darms Lane and an unnamed creek, north of the City of Napa in un-incorporated Napa County. The Winery is bordered on the north by an unnamed creek and residential uses, and by vineyards to the south, west and east. Figure 1 shows the site extents, development boundaries and vicinity.

Figure 1: Project Site and Vicinity

[1] The proposed production area increase provide for a second fermentation room and second barrel storage area.

[2] The proposed include accessory area increases provide for a Hospitality Addition which will include winery offices, mixed-use conference and tasting rooms, winery storage, a catering staging area, and visitor restrooms.

NAPA COUNTY NOISE REGULATIONS

The Arrow and Branch Winery lies north of the Napa City Limits and is contained entirely within Napa County and as a result, the following Napa County noise standards apply.

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 placing 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 pm to 7 am	45	45	50
	7 am to 10 pm	50	55	60
Multiple Residential 3 or More Units Per Building (Triplex+)	10 pm to 7 am	45	50	55
	7 am to 10 pm	50	55	60
Office and Retail	10 pm to 7 am	60		
	7 am to 10 pm	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

Section 8.16.070 of the Napa County Noise Ordinance regulates exterior noise levels within the unincorporated area of the county due to operational related noise as follows;

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].

Table 8.16.070: **EXTERIOR NOISE LIMITS**
(Levels not to be exceeded more than 30 minutes in any hour)

Receiving Land Use Category	Time Period	Noise Level (dBA) Noise Zone Classification		
		Rural	Suburban	Urban
Residential: Single and double	10 p.m. to 7 a.m.	45	45	50
	7 a.m. to 10 p.m.	50	55	60
Residential: multiple and country	10 p.m. to 7 a.m.	45	50	55
	7 a.m. to 10 p.m.	50	55	60
Commercial	10 p.m. to 7 a.m.	60		
	7 a.m. to 10 p.m.	65		
Industrial, including wineries	10 p.m. to 7 a.m.	75		
	7 a.m. to 10 p.m.	45		

Based on the exterior noise limits shown in Table 8.16.070 and the cumulative hourly noise levels described above for rural residential and commercial uses are as shown in Table 1, following:

Table 1: County Noise Ordinance Standards

	Rural Residential		Commercial	
Hourly Noise Metric	**Daytime Level**	**Nighttime Level**	**Daytime Level**	**Nighttime Level**
L_{50} (30 Min.)	50 dBA	45 dBA	65 dBA	60 dBA
L_{25} (15 Min.)	55 dBA	50 dBA	70 dBA	65 dBA
L_{08} (5 Min.)	60 dBA	55 dBA	75 dBA	70 dBA
L_{02} (1 Min.)	65 dBA	60 dBA	80 dBA	75 dBA
L_{max}	70 dBA	65 dBA	85 dBA	80 dBA

If the measured ambient noise level differs from that permissible within any of the first four noise categories (L_{50}, L_{25}, L_{08}, L_{02}), the allowable noise exposure standard shall be the ambient noise level.

Another provision is included to correct the allowable noise standard for the character of the sound as follows,

> "*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.*"

EXISTING NOISE ENVIRONMENT

To quantify the existing noise levels near the property lines of the closest noise sensitive (residential) uses, an ambient noise monitoring survey consisting of one short term and two long-term noise measurements was conducted between 12pm on Friday, August 25th and 12pm on Wednesday, August 30th, 2023. The noise measurements were made using Larson-Davis Laboratories (LDL) precision Type 1 model meters fitted with a ½-inch pre-polarized condenser microphones and windscreens. The meters were calibrated before and after installation with an LDL acoustical calibrator. During the measurement period the weather was clear with no precipitation. The noise monitoring locations are identified in Figure 2.

Figure 2: Site, Noise Measurement Locations and Adjacent Residences

The first long-term sound level measurement (LT-1) was made on the Hwy 29/ Solano Avenue project property line as shown in Figure 2. The monitoring equipment was installed on a utility pole on the west side of Solano Avenue adjacent to the eastern project property line. The monitor was about 25 feet, 130 feet and 215 feet form the respective centerlines of Solano Avenue, the Wine Train rail line, Hwy 29. Noise from Hwy 29 dominated the noise environment, while occasional traffic on Solano Avenue and train passbys, contributed occasional higher noise levels emissions to the ambient noise environment at LT-1. The hourly trend in noise levels at this location, including the energy equivalent noise level (L_{eq}), maximum (L_{max}), minimum (L_{min}), and the noise levels exceeded 2, 8, 25, and 50 percent of the time (indicated as L_2, L_8, L_{25}, and L_{50}) are shown on Chart 1.

A review of Chart 1 shows that the average weekday noise levels ranged from 61 to 70 dBA L_{eq} during the day, and 48 to 69 dBA L_{eq} at night, and average weekend noise levels ranged from 60 to 70 dBA L_{eq} during the day and 48 to 67 dBA L_{eq} at night. The calculated average day/night noise level (L_{dn}) at this location was 68 dBA on weekdays and 69 dBA on the weekend. The overall L_{dn} at this location was found to be 69 dBA. The average, maximum, minimum levels measured for the daytime and nighttime periods for the entire LT-1 measurement along with the corresponding Napa County Noise Standard Limits are shown in Table 2, following.

Table 2: Comparison of LT-1 Noise Measurements Results and Napa County Standards

Type of Level		Noise Level, dBA				
		L_{50}	**L_{25}**	**L_8**	**L_2**	**L_{max}**
Daytime Levels	County Noise Standard	50	55	60	65	70
	Average Level **Measured**	**60**	**64**	**72**	**77**	**85**
	Range (Max/Min)	*57/64*	*60/70*	*62/76*	*68/79*	*57/97*
Nighttime Levels	County Noise Standard	45	50	55	60	65
	Average Level **Measured**	**52**	**57**	**61**	**66**	**80**
	Range (Max/Min)	*39/65*	*45/68*	*53/74*	*57/78*	*70/92*

The second long-term sound level measurement (LT-2) was made on the project property line near the western extent of the property and the adjacent residential properties to the northwest across the creek as shown in Figure 2. The monitoring equipment was installed on the trunk of a tree at a height of 10 feet above grade. Noise levels measured at this site were primarily produced by distant traffic and winery noise sources along with sounds produced by insects and other noise associated woodland areas and bird chirps. The hourly trend in noise levels at this location, including the energy equivalent noise level (L_{eq}), maximum (L_{max}), minimum (L_{min}), and the noise levels exceeded 2, 8, 25, and 50 percent of the are shown on Chart 2.

The average weekday noise levels at LT-2 ranged from 36 to 56 dBA L_{eq} during the day, and 30 to 52 dBA L_{eq} at night, and average weekend noise levels ranged from 37 to 55 dBA L_{eq} during the day and 30 to 51 dBA L_{eq} at night. The calculated average day/night noise level (L_{dn}) at this location was 47 dBA on weekdays and 52 dBA on the weekend. The overall L_{dn} at this location was found to be 51 dBA. The average, maximum, minimum levels for the daytime and nighttime levels for the entire LT-2 measurement period are shown in Table 3, along with the Napa County Noise Standards.

Table 3: Comparison of LT-2 noise measurements results and Napa County Standards

Type of Level		Noise Level, dBA				
		L_{50}	**L_{25}**	**L_{8}**	**L_{2}**	**L_{max}**
Daytime Levels	County Noise Standard	50	55	60	65	70
	Average Level **Measured**	**42**	**44**	**47**	**50**	**60**
	Range (Max/Min)	*32/56*	*36/57*	*36/65*	*41/60*	*49/73*
Nighttime Levels	County Noise Standard	45	50	55	60	65
	Average Level **Measured**	**40**	**41**	**43**	**45**	**52**
	Range (Max/Min)	*28/51*	*30/52*	*33/53*	*35/53*	*41/68*

Two short-term, 15-minute duration, noise measurements (ST-1 and ST-2 in Figure 2) were made on the northern property line opposite the creek form the property lines of the nearest residences to the north (Residences 3 and 4) as shown in Figure 2. The average day-night noise level (L_{dn}) at the short-term measurement locations were estimated at this site by correlating the short-term measurement data to the data gathered during the corresponding time period at the long-term sites. Noise levels measured at the short-term measurement locations were produced by distant traffic and winery noise sources along with sounds produced by insects and other noise associated woodland/ riparian areas and bird chirps. The measurement results and estimated L_{dn} levels at these locations are shown in Table 4, following.

Table 4: Summary of Short-Term Noise Measurement Data, dBA

Noise Measurement Location	**L_{50}**	**L_{25}**	**L_{08}**	**L_{02}**	**L_{max}**	**L_{dn}**
ST-1: Near Property line of Residence 3 to project site.	48	49	50	51	56	**57**
ST-2: Near Property line of Residence 4 to project site.	43	45	47	54	59	**53**
County Daytime Noise Standard	**50**	**55**	**60**	**65**	**70**	
County Nighttime Noise Standard	**45**	**50**	**55**	**60**	**65**	

Note: L_{dn} is approximated by correlation to the corresponding measurement period at the long-term sites.

PROJECT SPECIFIC NOISE LEVEL CRITERIA

Based on the results of the noise measurements, the existing levels at the property lines shared with the nearest residences north of the creek (Residences 1 through 8 as shown in Figure 2) do not exceed the Napa County Noise Limits for L_{max}, L_2, L_8, L_{25}, and L_{50} during the daytime or nighttime. The average measured levels at the residences is expected to be between 5 and 10 dBA (or more) below the County noise limits. Therefore, the standard County Daytime and Nighttime noise standards are used in this analysis.

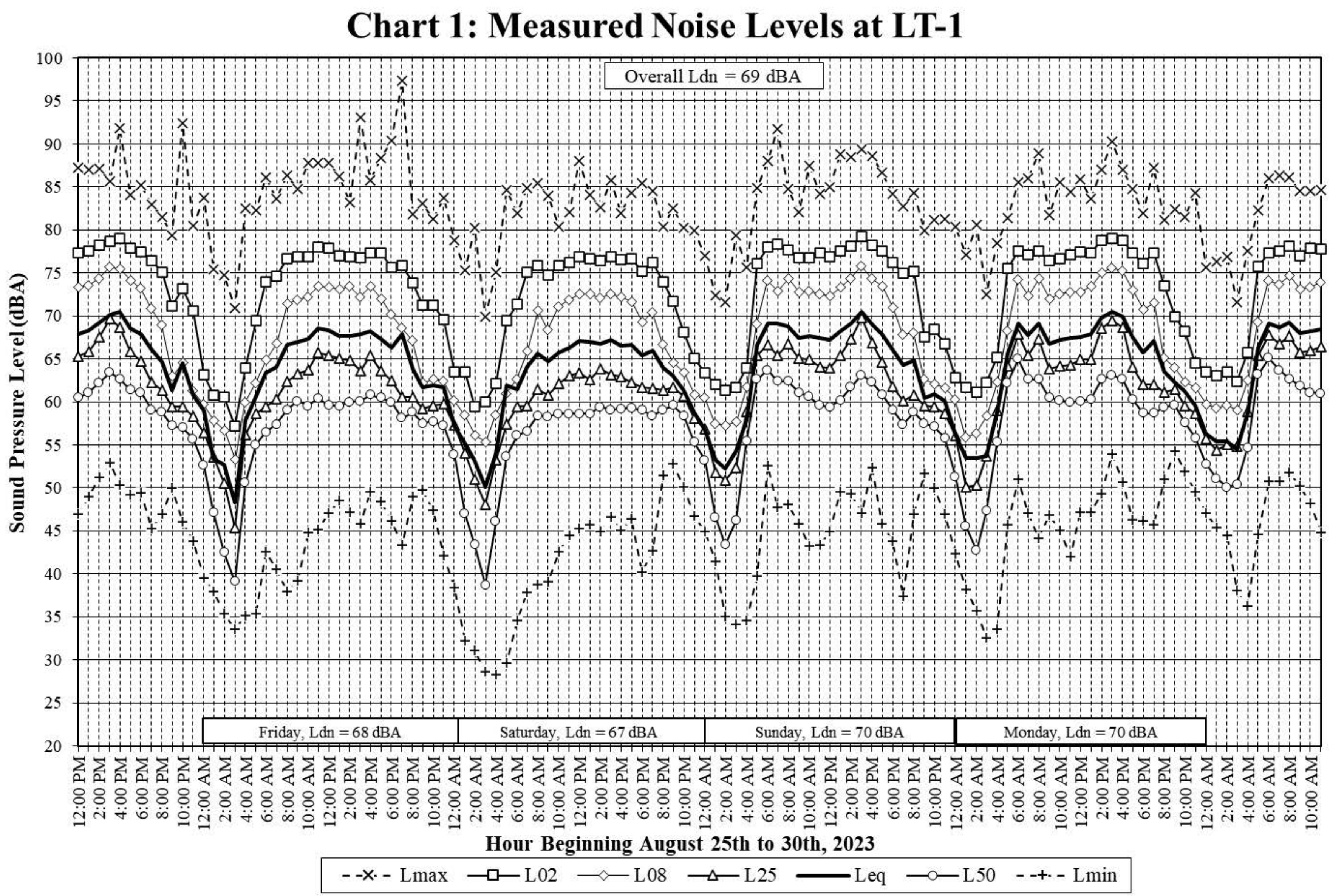
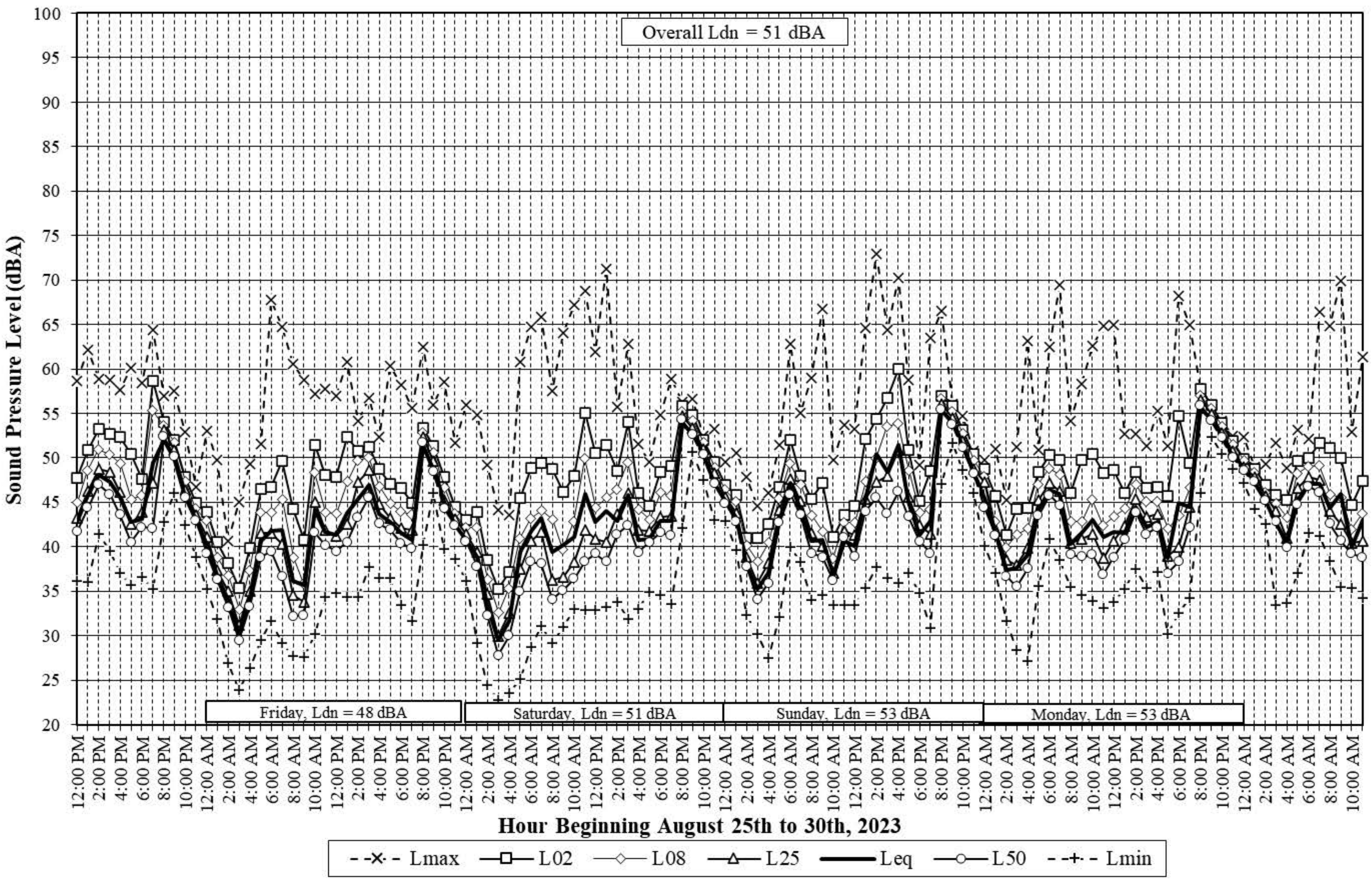


Chart 1: Measured Noise Levels at LT-1
Overall Ldn = 69 dBA
Sound Pressure Level (dBA)
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
Friday, Ldn = 68 dBA
Saturday, Ldn = 67 dBA
Sunday, Ldn = 70 dBA
Monday, Ldn = 70 dBA
12:00 PM
2:00 PM
4:00 PM
6:00 PM
8:00 PM
10:00 PM
12:00 AM
2:00 AM
4:00 AM
6:00 AM
8:00 AM
10:00 AM
Hour Beginning August 25th to 30th, 2023
Lmax
L02
L08
L25
Leq
L50
Lmin

Chart 2: Measured Noise Levels at LT-2



NOISE ASSESSMENT

Estimating the expected noise produced by, and impacts from, the proposed modification of the Arrow and Branch Winery use permit at adjacent noise sensitive uses requires three elements; the first is an assessment of what increases in noise producing operations are likely to occur, the second is typical noise source levels for those operations, and the third is to determine the temporal nature of the operations.

I. Identification of Noise Producing operations/uses

There are a number of operations associated with wine production and events at the facility that will produce noise. These include:

1. Project Traffic,
2. Winery operations and seasonal production activities,
3. Maintenance and forklift operations, and
4. Marketing Event noise.

II. Typical Noise Source Levels

To estimate the noise levels associated with project operations, some attention must be given to the temporal nature of the noise produced. Below each of the major winery related noise producing operations outlined above are discussed:

Project Traffic would produce the following type and range of traffic noise levels:

- Automobile and light vehicle traffic accessing the tasting room would occur during the daytime hours and noise produced is expected to include the sounds of vehicles traveling on the access road maneuvering in parking areas, engine starts, door slams. Automobile and other light vehicle traveling at 25 to 35 mph typically produce sound levels of between 59 to 65 dBA at 50 feet. Parking lot activities such as engine starts, door slams and low speed vehicle movements typically produce maximum sounds levels ranging from 53 dBA to 63 dBA at 50 feet.
- Truck traffic on the project site will continue to access the winery off of Solano Avenue via the project access road. Noise levels generated by truck traffic are dependent on the size and speed of trucks, typical noise levels generated by heavy duty (semi-tractor trailer type) trucks would be expected to range from 70 to 75 dBA when traveling at constant speeds to 75 to 80 dBA when stopping/starting and maneuvering at a distance of 50 feet. Typical maximum noise levels generated by medium (box type and delivery) trucks would be expected to range from 60 to 65 dBA when traveling at constant speeds to 65 to 70 dBA when stopping/starting and maneuvering at a distance of 50 feet.

Winery and seasonal production operations typically produce the following type and range of noise levels[3]:

- Refrigeration equipment, as a maximum condition, is assumed operate under constant conditions day and night. Though the model, type and capacities of the existing or any additional cooling compressors are not known, field measurements of such equipment shows that sound from such equipment can produce levels of between 50 dBA to 65 dBA at 50 feet, with average (L_{eq}) noise levels of 60 dBA at 50 feet.
- Air compressors, used for various processes in the facility, typically cycle on and off based on the need for compressed air. Though the model, type and capacities of existing or any additional cooling compressors for the facility are not specified, from field measurements of cooling

[3] The Use permit modification requests an increase in production from 30,000 gallons per year (~12,500 cases) to 45,000 gallons (~18,750 cases) of wine per year.

compressors at other wineries, we expect this equipment to produce average (L_{eq}) sound levels of 62 dBA at 50 feet.

- Bottling would be constant on an hourly basis although it is likely to occur for only a few weeks each year. Based on sound level measurements of mobile (truck based) and fixed bottling lines at other wineries, we would expect bottling operations to produce average (L_{eq}) sound levels of between 65 and 70 dBA at 50 feet.
- Crush activities typically occur for about two weeks each year. The majority of the noise sources associated with the crush include the operation of hoppers, presses, destemmers, separators, crushers, air compressors, forklifts, conveyors, etc. Average noise levels resulting from the crush are typically constant on an hourly basis. Individual pieces of crush-specific equipment such as the separators and destemmers are relatively quiet with sound levels of around 50 dBA L_{eq} at about 50 feet, however the composite crush activities at a small sized winery, such as the proposed 45,000 Gallon (~16,750 case) capacity facility, typically generate noise levels of about 62 dBA L_{eq}, at a distance of 50 feet from the center of operations. During the crush, discrete maximum noise events, such as the setting of empty bins, may reach 70 to 80 dBA L_{max} at 50 feet from the center of operations.

Maintenance and forklift operations typically produce intermittent noise depending on the exact nature of the operation. These would likely occur at a much less than a daily rate although operations may span several hours once initiated. Backup alarms (or beepers), which are repetitive and irritating by design, also produce noise during these activities, and as with forklift operations themselves are expected to be intermittent by nature. Based on experience with other winery operations, we estimate that noise levels from these operations may reach levels of between 66 and 67 dBA at 50 feet.

Marketing Event Noise

The Use permit modification requests an increase in approved events from 6 events with 30 guests and 1 event with 125 guests to a maximum of 12 events with 30 visitors and 2 events with 125 guests. The project description states that no amplified outdoor music will occur at the project outdoor spaces. However, considering the proposed event sizes, outdoor or indoor events may have background music, outdoor events may include non-amplified (acoustic) music performance and indoor events may have amplified music performances. Table 5 lists typical average noise levels at distances of 50 feet from the source generated by the types of events which may occur at the project.

Table 5: Typical Noise Source Levels for Events (A-Weighted L_{eq} Levels)

Event or Activity	Typical Noise Level @ 50 ft.
Amplified Music Performances	72 dBA[1]
Amplified Speech	70 dBA
Non-amplified (acoustic) Music Performances	67 dBA[1]
30 Guests in Raised Conversation with Background Music	56 dBA
125 Guests in Raised Conversation with Background Music	62 dBA

[1] Based on the results of measurements conducted at wineries and other event venues, I&R has found that Music performances are louder than multiple (100 person) guests with background music. In general, we have found that when music is only used as a background for dinner, tasting, and similar events it is played at a lower level to encourage conversation. Conversely, where Music performances are a focal point of an event, they typically produce higher sound levels than simple background music.

Considering our review of the project plans and experience with other wineries, events may occur inside the Existing Winery Building, the Hospitality Addition, or the previously approved covered terrace as identified in Figure 3.

III. Propagation of sound

The final step in estimating the project noise levels is assessing the propagation of sound to the sensitive receptors. To do this, it is necessary to assume some rate of sound attenuation between the operations and receiver locations. The most dominant physical effect is due to the spreading out of sound waves with distance. Depending on ground absorption conditions noise from traffic noise sources can be considered to attenuate at 3 to 4.5 dB per doubling of distance from the source while noise from fixed project source can be considered to attenuate at a rate of 6 to 7.5 dB per doubling of distance from the source. Considering the vineyard and other vegetative over much of the site, distance attenuation rates of 4.5 dB per distance doubling for traffic noise sources and 7.5 dB per distance doubling for fixed noise sources are used in this analysis. Other effects can modify these fall-off rates such as partial shielding from buildings or topography, atmospheric attenuation of sound, and meteorological effects. These effects almost always reduce the noise in addition to that due to sound divergence. As most of these effects will vary with time due to changing environmental conditions, it is most conservative to assume only attenuation due to divergence for outdoor activities, minimum terrain or building shielding factors (6 dBA) where intervening terrain or structures break the line of sight from source to receiver, and structural attenuation rates of 12 dBA for indoor event/operations with open windows and doors, or 20 dBA with closed windows and doors.

The closest noise sensitive uses to the Winery are the residences to the north of the site across the creek identified as Residences 2, 3, 4 and 6 in Figure 2.

IMPACT ASSESSMENT

As stated in the project description, to support the increased production the project proposes to increase the size of the Production facility from 10,268 sq.ft. to 13,797 sq.ft. with the addition of secondary fermentation and barrel storage areas and to increase the footprint of Accessory uses from 379 sq.ft. to 4,308 sq.ft. with the addition a Hospitality area with will include a great room, winery offices, mixed-use conference and tasting rooms, winery storage, a catering staging area, and visitor restrooms, and an exterior cover terrace. Figure 3 shows the orientation of the new and previously approved building areas in relation to the immediate winery development area.

Impact 1: Increased Vehicular Noise on Winery Access Road.

Automobile parking and traffic

Autos and passenger vehicles would continue to use the existing driveway from Solano Avenue and the parking areas south of the winery building. A review of the project site plan and information from Google Earth indicates that:

- The property line of Residence 1 is approximately 375 feet from the closest winery visitor parking area and 390 feet from the site driveway,
- The property line of Residence 2 is partially shielded by the winery buildings at approximately 300 feet from the closest winery visitor parking area and 320 feet from the site driveway,
- The property line of Residence 3 is shielded by the winery buildings at approximately 230 feet from the closest winery visitor parking area and 260 feet from the site driveway,
- The property line of Residence 4 is shielded by the winery buildings at approximately 220 feet from the closest winery visitor parking area and 270 feet from the site driveway, and
- The property line of Residence 6 is shielded by the winery buildings at approximately 260 feet from the closest winery visitor parking area and 280 feet from the site driveway.

Given the expected visitor and employee use information provided with the Use Permit Application, these activities are expected to occur for more than 5 but less than 15 minutes out of

an hour on a typical day and fall in the L_{08} daytime category of 60 dBA (see Table 1). However, during events, on busy weekends, or during harvest season such activities may occur more frequently and occur for more than 15 but less than 30 minutes out of an hour and fall in the Napa County L_{25} daytime category of 55 dBA. Considering these activity durations and the distances, Table 6, following, summarizes the assessment of automobile noise on the driveway and in the parking lots at the closest residences.

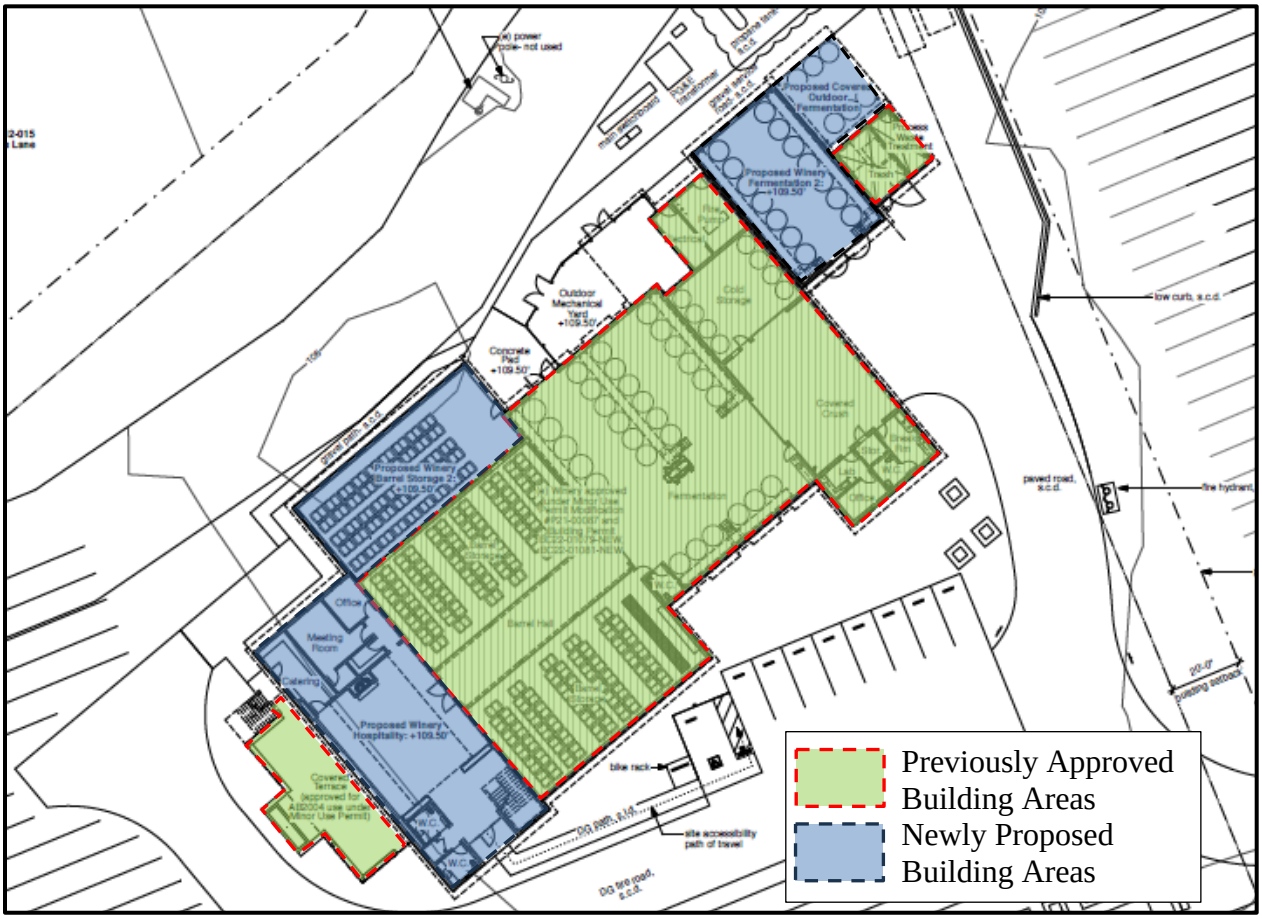


Figure 3: Newly Proposed and Previously Approved Winery Building Areas

Table 6: Driveway and Parking Lot Automobile Noise Levels

	Noise Levels, dBA				
	Res. 1	**Res. 2**	**Res. 3**	**Res. 4**	**Res. 6**
Daytime L_{08} Noise Limit	60	60	60	60	60
Noise levels due to Autos on Winery Access Roads and in parking lot at Adj. Residences	**43**	**42**	**41**	**41**	**40**
Driveway Noise Exceeds Daytime L_{08} Limit?	*No*	*No*	*No*	*No*	*No*
Daytime L_{25} Noise Limit	65	65	65	65	65
Noise levels due to Autos in parking areas at Adj. Residences	**41**	**41**	**40**	**41**	**39**
Parking Noise Exceeds Daytime L_{25} Limit?	*No*	*No*	*No*	*No*	*No*

Based on this finding, noise associated with auto traffic at the winery would comply with Napa County noise standards at all adjacent residences.

Truck Traffic

Trucks entering the Winery site currently enter the site off of Solano Avenue and travel on the access road on the site. A review of the project site plan and information from Google Earth indicates that trucks traveling on this drive path drive would come as close as approximately 330, 260, 230, 250, and 320 feet from the property lines of adjacent Residences 1, 2, 3, 4 and 6 as identified in Figure 2. Based on these distances, the maximum noise levels generated by medium and heavy-duty trucks traveling at constant speeds on the winery driveways would, respectively, be 45 & 55 dBA at Residence 1, 44 & 54 dBA at Residence 2, 42 & 52 dBA at Residences 3 and 4, and 39 & 49 dBA at Residence 6.

Further review of the project site plan and information from Google Earth indicates that trucks maneuvering in the winery shipping/receiving area would be as close as approximately 300, 225, 175, 200, and 280 feet from the property lines of adjacent Residences 1, 2, 3, 4 and 6 as identified in Figure 2. Based on these distances, the maximum noise levels generated by medium and heavy-duty trucks maneuvering in the winery shipping/receiving area would, respectively, be 48 & 58 dBA at Residence 1, 51 & 61 dBA at Residence 2, 50 & 60 dBA at Residence 3, 49 & 59 dBA at Residence 4, and 45 & 55 dBA at Residence 6.

Given the expected truck trip information provided, we expect that the winery will have one truck trip per day during non-harvest season, with an expected increase in truck trips to 4 truck trips per day during harvest season. Based on this usage, maximum noise levels due to on-site Truck traffic is expected to occur for more than 1 but less than 5 minutes out of an hour during the highest use (harvest season) periods and fall in the Napa County L_{02} daytime category of 65 dBA. Considering this activity duration and sound levels, Table 7 summarizes the assessment of truck traffic noise at the closest residences.

Table 7: On-site Truck Noise Levels

		Noise Levels dBA				
		Res. 1	**Res. 2**	**Res. 3**	**Res. 4**	**Res. 6**
	Daytime L_{02} Noise Limit	65	65	65	65	65
Medium Trucks	**On site access drives**	**45**	**44**	**42**	**42**	**39**
	In shipping/receiving area	**48**	**51**	**50**	**49**	**45**
Heavy Trucks	**On site access drives**	**55**	**54**	**52**	**52**	**49**
	In shipping/receiving area	**58**	**61**	**60**	**59**	**55**
Truck Noise Exceeds Daytime L_{02} Limit?		*No*	*No*	*No*	*No*	*No*

Based on this finding, noise associated with truck use at the winery would comply with the Napa County noise standards at all adjacent residences.

Mitigation 1: None required.

Impact 2: Mechanical Equipment Noise

The winery operations currently, and will continue to, use noise-generating mechanical equipment such as air-cooled condensing units, pumps, and compressors as well as less significant sources of noise, such as air-conditioning systems and exhaust fans. The project drawings show the location of the enclosed project mechanical yard on the northern side to the winery building (see Figure 3). Considering that most or all of the outdoor mechanical equipment to be in this yard and using distance information obtained via Goggle Earth, this equipment may be as close as approximately 310, 230, 110, 130, and 200 feet from the property lines of adjacent Residences 1, 2, 3, 4 and 6 as identified in Figure 2. Thus, under the worst-case condition with the equipment located outside in

the enclosed project mechanical , constant L_{50} noise levels from mechanical equipment could produce respective L_{50} levels of 39,42, 50, 49, and 44 dBA at adjacent Residences 1, 2, 3, 4, and 6 as identified in Figure 2. Table 8, below, presents and summarizes the assessment of this worst-case mechanical equipment noise versus the Napa County L_{50} daytime criterion of 50 dBA at the property lines of the closest noise sensitive uses.

Table 8: Mechanical Equipment Noise Levels

	Noise Levels dBA				
	Res. 1	**Res. 2**	**Res. 3**	**Res. 4**	**Res. 6**
Daytime L_{50} Noise Limit	50	50	50	50	50
Mechanical Noise Levels at Residence	**39**	**42**	**50**	**49**	**44**
Mechanical Noise Exceeds L_{50} Limit?	*No*	*No*	*No*	*No*	*No*

Considering the findings shown in Table 9, noise levels associated with worst-case winery mechanical equipment would not exceed the project specific noise standards at the closest noise sensitive uses.

Mitigation 2: None required.

Impact 3: Crush Related Noise

Under the modified use permit annual crush related activities would continue to take place in the covered crush pad of the winery building. Crush activities occurring in these areas will receive some noise shielding from building structures. Based on a review of project plans and distance information obtained via Goggle Earth, crush activities may be as close as approximately 320, 240, 180, 200, and 270 feet from the property lines of adjacent Residences 1, 2, 3, 4 and 6 as identified in Figure 2. As discussed previously, noise from crush activities are largely made up of relatively constant noise, with occasional discrete maximum noise events, such as the setting of empty bins. Noise from crush activities would therefore fall in the Napa County noise criteria of 50 dBA L_{50} and 70 dBA L_{max}. Table 9, below, presents and summarizes the assessment of crush noise against these L_{50} and L_{max} noise criteria noise standard and maximum noise events, such as the setting of empty bins.

Table 9: Crush Noise Levels

	Noise Levels dBA				
	Res. 1	**Res. 2**	**Res. 3**	**Res. 4**	**Res. 6**
Daytime L_{50} Noise Limit	50	50	50	50	50
L_{50} Crush Noise Levels at Residence	**30**	**33**	**36**	**35**	**32**
Crush Noise Exceeds Daytime L_{50} Limit?	*No*	*No*	*No*	*No*	*No*
Daytime L_{max} Noise Limit	70	70	70	*70*	*70*
L_{max} Crush Noise Levels at Residence	**48**	**51**	**54**	**53**	**50**
Crush Noise Exceeds Daytime L_{max} Limit?	*No*	*No*	*No*	*No*	*No*

Considering the findings shown in Table 10, noise levels associated with annual crush activities would not exceed the project specific noise standards at the property lines of the closest noise sensitive uses.

Mitigation 3: None required.

Impact 4: Bottling Noise

The project description and drawings do not indicate whether bottling occurs within buildings or in the crush area or shipping/receiving area between the Winery and Production Buildings. However, in keeping with the practice of many similar sized wineries this report assumes that, under worst case conditions, bottling will be done with a mobile bottling truck in the closest areas to the adjacent residences of the covered crush pad. Based on this consideration, and distance information obtained via Goggle Earth, bottling noise is therefore analyzed at respective distances of approximately 320, 240, 175, 200, and 265 feet from the property lines of adjacent Residences 1, 2, 3, 4 and 6 as identified in Figure 2. . As discussed previously, noise from bottling is relatively constant noise and would therefore fall in the Napa County Noise Criteria of 50 dBA L_{50} at the adjacent residential uses. Table 10, below, presents and summarizes the assessment of indoor bottling noise against the L_{50} project specific noise criterion.

Table 10: Bottling Noise Levels

	Noise Levels, dBA				
	Res. 1	**Res. 2**	**Res. 3**	**Res. 4**	**Res. 6**
Daytime L_{50} Noise Limit	50	50	50	50	50
Bottling Noise Levels at Residence	**38**	**41**	**44**	**43**	**40**
Bottling Noise Exceeds L_{50} Limit?	*No*	*No*	*No*	*No*	*No*

Considering the findings shown in Table 10, noise levels associated with bottling activities would not exceed the project specific noise standards at the closest noise sensitive uses.

Mitigation 4: None required.

Impact 5: Maintenance and Forklift Operations

Forklift and maintenance operations are expected to take place in the covered crush/receiving areas and within the winery and production/barrel buildings. Such activities within buildings would receive significant noise shielding from the building and are not analyzed here. Outdoor forklift and maintenance operations are considered a worst-case condition and are analyzed. Such outdoor operations could therefore occur as close as approximately, 300, 225, 175, 200, and 280 feet from the property lines of Residences 1, 2, 3, 4 and 6. Based on experience with other winery operations, during high activity periods these activities would be expected to occur for more than 15 but less than 30 minutes out of an hour and fall in the Project Specific Noise Criteria of 55 dBA L_{25} at the adjacent residential uses. However, considering that forklift backup alarms are repetitive and irritating by design, this activity noise has been penalized by 5 dBA and is judged against a more stringent noise criteria of 50 dBA at the adjacent residential uses. Table 11, following, presents and summarizes the assessment of forklift and maintenance activity against this 5-dBA reduced L_{25} Napa County noise criterion.

Table 11: Forklift and Maintenance Activity Noise Levels

	Noise Levels, dBA				
	Res. 1	**Res. 2**	**Res. 3**	**Res. 4**	**Res. 6**
Daytime L_{25} Noise Limit	50	50	50	50	50
Forklift and Maintenance Noise Levels at Residence	**45**	**48**	**47**	**46**	**42**
Forklift and Maintenance Exceeds modified L_{25} Limit?	*No*	*No*	*No*	*No*	*No*

Considering the findings shown in Table 11, noise levels associated with Forklift and Maintenance Activity activities would not exceed the project specific noise standards at the closest noise sensitive uses.

Mitigation 5: None required.

Impact 6: Marketing Event Noise at adjacent residential uses

The Use permit modification requests 6 events per year with 30 visitors, 2 events per year with 125 visitors. Marketing events would conclude by 10 pm. The project description states that no amplified outdoor music will occur at the project outdoor spaces. However, considering the proposed event sizes, outdoor or indoor events may have background music, outdoor events may include non-amplified (acoustic) music performance and indoor events may have amplified music performances. Events may occur inside the Existing Winery Building, the Hospitality Addition, or the previously approved covered terrace as identified in Figure 3. Indoor events would receive noise shielding from building structure estimated at 12 dBA with open windows and doors and 20 dBA with closed windows and/or doors.

Based on a review of the project site plan and distance information obtained via Goggle Earth;

- Outdoor events held in the covered patio area could be close as approximately 460, 380, 200, 175 and 190 feet from the near property lines of Residences 1, 2, 3, 4 and 6,
- Events held within the Hospitality or Winery Buildings could be close as approximately 340, 280, 160, 160 and 175 feet from the near property lines of Residences 1, 2, 3, 4 and 6,

When underway, events typically produce noise from periods of 30 minutes or more per hour, and thus event noise is judged against the L_{50} standard. Additionally, a 5-dBA penalty is applied to event noise, because event noise includes typically contains music or speech. Noise from events concluding by 10 pm is therefore judged against the Napa County Event Noise Criteria of 45 dBA L_{50} (see Table 5).

The following tables present and summarize the assessment of marketing event noise versus project specific criterion for outside events at the Winery Patio area (the closest outdoor event area to all adjacent residences) (Table 12a), indoor events in the Winery Building with open windows and doors (Table 12b), and indoor events in the Winery Building with closed windows and doors (Table 12c).

Table 12a: Winery Covered Patio Event Noise Levels

	Noise Levels, dBA				
	Res. 1	**Res. 2**	**Res. 3**	**Res. 4**	**Res. 6**
Daytime L_{50} Event Noise Limit	45	45	45	45	45
Non-amplified Music Performance	**40**	**42**	**49**	**50**	**50**
30 Guests with Background Music	**29**	**31**	**38**	**39**	**39**
125 Guests with Background Music	**35**	**37**	**44**	**45**	**45**
Noise level Exceeds L_{50} Limit?	*No (all)*	*No (all)*	*Yes, music performances, No (all others)*	*Yes, music performances, No (all others)*	*Yes, music performances, No (all others)*

Table 12b: Winery Building Indoor Event Noise Levels (open window and doors)

	Noise Levels, dBA				
	Res. 1	**Res. 2**	**Res. 3**	**Res. 4**	**Res. 6**
Daytime L_{50} Event Noise Limit	45	45	45	45	45
Amplified Music Performance	**39**	**41**	**47**	**47**	**46**
Amplified Speech	**37**	**39**	**45**	**45**	**44**
Non-amplified Music Performance	**34**	**36**	**42**	**42**	**41**
30 Guests with Background Music	**23**	**25**	**31**	**31**	**30**
125 Guests with Background Music	**29**	**31**	**37**	**37**	**36**
Noise level Exceeds L_{50} Limit?	*No (all)*	*No (all)*	*Yes, amp. music performances, No (all others)*	*Yes, amp. music performances, No (all others)*	*Yes, amp. music performances, No (all others)*

Table 12c: Winery Building Indoor Event Noise Levels (closed window and doors)

	Noise Levels, dBA				
	Res. 1	**Res. 2**	**Res. 3**	**Res. 4**	**Res. 6**
Daytime L_{50} Event Noise Limit	45	45	45	45	45
Amplified Music Performance	**31**	**33**	**39**	**39**	**38**
Amplified Speech	**29**	**31**	**37**	**37**	**36**
Non-amplified Music Performance	**26**	**28**	**34**	**34**	**33**
30 Guests with Background Music	**15**	**17**	**23**	**23**	**22**
125 Guests with Background Music	**21**	**23**	**29**	**29**	**28**
Noise level Exceeds L_{50} Limit?	*No (all)*	*No (all)*	*No (all)*	*No (all)*	*No (all)*

Considering the findings shown in Table 12a and 12b, outdoor events which do not include music performances and all indoor events with closed windows and doors, marketing events will meet the Napa County Noise Criteria at the closest noise sensitive uses with the use of the following mitigation measures.

Mitigation 6:

- **a.** Outdoor events should not include music performances.
- **b.** The windows and doors of the winery building should be maintained closed during any indoor event which involves amplified speech or music.

APPENDIX A:
FUNDAMENTAL CONCEPTS OF ENVIRONMENTAL ACOUSTICS

Noise may be defined as unwanted sound. Noise is usually objectionable because it is disturbing or annoying. The objectionable nature of sound may be caused by either 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 that are used to describe noise in a particular location. A decibel (dB) is a unit of measurement that 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. For lesser increases of sound from the same or similar sources, a 6 dB change is perceived to be a "noticeable" change and a 3 dB change to be just perceptible. Technical terms are defined in Table 1. There are several methods of characterizing sound. The most common in California is the A-weighted sound level or 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 2.

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 Day/Night Average Sound Level, Ldn, is a measure of the cumulative noise exposure in a community, with a 10 dB penalty added to nighttime (10:00 pm - 7:00 am) noise levels. 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.

TERM	DEFINITIONS
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, which is 20 micropascals (20 micronewtons per square meter).
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure.
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. All sound levels in this report are A-weighted, unless reported otherwise.
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.
Equivalent Noise Level, L_{eq}	The average A-weighted noise level during the measurement period.
Day/Night Noise Level, L_{dn}	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 in the night between 10:00 pm and 7:00 am.
L_{max}, L_{min}	The maximum and minimum A-weighted noise level during the measurement period.
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.

Definitions Of Acoustical Terms **Table 1**

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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 noise 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.

At a Given Distance From Noise Source	A-Weighted Sound Level in Decibels	Noise Environments	Subjective Impression
	140		
Civil Defense Siren (100')	130		
Jet Takeoff (200')	120		Pain Threshold
	110	Rock Music Concert	
Diesel Pile Driver (100')	100		Very Loud
	90	Boiler Room	
Freight Cars (50')		Printing Press Plant	
Pneumatic Drill (50')	80		
Freeway (100')		In Kitchen With Garbage	
Vacuum Cleaner (10')	70	Disposal Running	Moderately Loud
	60	Data Processing Center	
Light Traffic (100')	50	Department Store	
Large Transformer (200')			
	40	Private Business Office	Quiet
Soft Whisper (5')	30	Quiet Bedroom	
	20	Recording Studio	
	10		Threshold of Hearing
	0		

Typical Sound Levels in the Environment & Industry **Table 2**

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Typical structural attenuation is 12-17 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 57-62 dBA L_{dn} with open windows and 65-70 dBA L_{dn} if the windows are closed. Levels of 55-60 dBA are common along collector streets and secondary arterials, while 65-70 dBA is a typical value for a primary/major arterial. Levels of 75-80 dBA are normal noise levels at the first row of development

outside a freeway right-of-way. In order to achieve an acceptable interior noise environment, bedrooms facing secondary roadways need to be able to have their windows closed, those facing major roadways and freeways typically need windows with special glass.

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 Ldn 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 55 dBA Ldn. At an Ldn of about 60 dBA, approximately 2 percent of the population is highly annoyed. When the Ldn increases to 70 dBA, the percentage of the population highly annoyed increases to about 12 percent of the population. There is, therefore, an increase of about 1 percent per dBA between an Ldn of 60-70 dBA. Between an Ldn of 70-80 dBA, each decibel increase increases by about 2 percent the percentage of the population highly annoyed. People appear to respond more adversely to aircraft noise. When the Ldn is 60 dBA, approximately 10 percent of the population is believed to be highly annoyed. Each decibel increase to 70 dBA adds about 2 percentage points to the number of people highly annoyed. Above 70 dBA, each decibel increase results in about a 3 percent increase in the percentage of the population highly annoyed.