APPENDIX H

Noise Assessment

Stantec

Memo

To:	Karen Massey, Burbank Housing Development Corporation	From:	Elena Nuno, Project Manager
File:	Dry Creek Commons Development Project	Date:	June 2, 2022

Reference: Noise Assessment Update

Stantec Consulting Services prepared a Noise Assessment for the Dry Creek Commons Development Project (project or proposed Project) on February 1, 2022. Additional information has been received regarding the location of the nearest noise sensitive receptor and the project size acreage.

Noise-Sensitive Receptor

In the February 1st assessment, Stantec evaluated construction noise impacts at the nearest noise-sensitive receptor, which was identified as the Hotel Trio Healdsburg and Hotel Vinea across Dry Creek Road to the south. The hotels are approximately 127 feet from the south border of the Project site. It was recently determined that there is an existing apartment residence at the Plank Coffee Shop at the southwest corner of Grove Street and Dry Creek Road approximately 63 feet west of the Project boundary.

The assessment included a worst-case construction analysis for the Project where it was assumed that all noise-generating equipment were operating at the same time and at the same distance from the closest noise-sensitive receptor. Construction noise impacts were determined to fall in the "Unacceptable" range; however, the increase in noise would be temporary in nature and limited to the restrictions and requirements set by the City of Healdsburg's General Plan Policy S-25 and Municipal Code which states the following:

- *"S-25: Where construction occurs that would result in a potentially significant impact on noise-sensitive uses, require use of noise-reducing measures that may include the following:*

    a. *Equip internal combustion engine-driven equipment with intake and exhaust mufflers that are in good condition and are appropriate for the equipment.*

    b. *Locate stationary noise-generating equipment as far as possible from sensitive receptors in the vicinity.*

    c. *Utilize "quiet" air compressors and other stationary noise sources where technology exists.*

    d. *Erect temporary noise control blanket barriers in a manner to shield noise sensitive uses.*

    e. *Control noise levels from workers' amplified music so that sounds are not audible sensitive receptors in the vicinity.*

    f. *Designate a "disturbance coordinator" responsible for responding to complaints about project construction noise and taking reasonable measures to correct the problem. Conspicuously post a telephone number for the disturbance coordinator at the construction site and include it in any notice sent to neighbors regarding the construction schedule"*

Furthermore, Paragraph 9.32.080.A in the Healdsburg Municipal Code states the following:

Reference: **Noise Assessment Update**

> *"Noise sources associated with or vibration created by construction, repair, remodeling, or grading of any real property or during authorized seismic surveys are permitted, provided such activities do not take place between the nighttime hours of 6:00 p.m. and 7:30 a.m. daily, or at any time on Sunday or a legal holiday, and provided the noise level created by such activities and any vibration created does not endanger the public health, welfare, and safety."*

With implementation of the City of Healdsburg's General Plan Policy S-25 and Municipal Code temporary noise impacts would be reduced to a less than significant level.

Reducing the distance to the nearest noise-sensitive receptor would result in an increase in noise levels (see Table 1 below) and would remain in the "Unacceptable" range; however, compliance with the City's General Plan Policy S-25 and Municipal Code would reduce the temporary noise impacts to a less than significant level. The temporary construction noise impact finding would remain the same; the impact remains less than significant.

Table 1: Calculated Noise Level from Each Construction Stage

Construction Phase	Distance to Closest Noise Sensitive Receptor, ft (Prior analysis)	Calculated Lmax, dB(A) (Prior analysis)	Calculated Leq, dB(A) (Prior analysis)
Demolition	63 (127)	89.6 (83.5)	84.0 (77.9)
Site Preparation	63 (127)	87.0 (80.9)	83.0 (76.9)
Grading	63 (127)	88.1 (82.0)	84.1 (78.0)
Building Construction	63 (127)	88.0 (81.9)	83.8 (77.7)
Paving	63 (127)	86.0 (79.9)	81.5 (75.4)
Architectural Coating	63 (127)	75.7 (69.6)	71.7 (65.6)

The noise-sensitive receptor being located closer to the Project site would not result in a change in long-term operational noise impacts from the Project. Operational noise from fixed mechanical equipment will incorporate measures, such as shielding, barriers, and/or attenuators, to reduce noise levels that may affect nearby properties to the limits set forth in the Healdsburg Municipal Code. Compliance with the Municipal Code would result in less than significant impacts to the nearest noise-sensitive receptor, including the on-site residences.

Project Size

The City of Healdsburg noted that the project acreage evaluated in the noise assessment was 3.53 acres; however, this did not include the 0.17 acres for the project's frontage improvements. The total project acreage is 3.70 acres. The means and methods of construction would not change as a result of this revision to the project acreage, as such the temporary noise impacts would remain the same as previously disclosed with the clarification described above with respect to the nearest noise-sensitive receptor being located closer to the Project site.

Reference: **Noise Assessment Update**

The slight change in Project acreage would not affect the operational characteristics of the Project, as such the long-term noise impacts of the Project would remain less than significant.

Conclusion

The additional clarifications on the nearest noise-sensitive receptor and Project acreage would not result in a change in the previous noise impact findings. The impacts remain less than significant.

Stantec Consulting Services Inc.

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Noise Assessment

Dry Creek Commons Development Project

February 1, 2022

Prepared for:
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Appendix A: Noise Calculations

Acronyms and Abbreviations

CalGreen	California Green Building Standards Code
Caltrans	California Department of Transportation
CBC	California Building Code
CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
dB	Decibels
dB(A)	Decibels A-Weighted
EPA	United Stated Environmental Protection Agency
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
Hz	Hertz (Frequency)
Ldn / DNL	Day-Night Noise Level
Leq	Equivalent Noise Level
Lmax	Maximum Noise Level
Lmin	Minimum Noise Level
OITC	Outside-Inside Transmission Class
PPV	Peak Particle Velocity
RCNM	Roadway Construction Noise Model
STC	Sound Transmission Class

1.0 PROJECT DESCRIPTION

The Dry Creek Commons project is proposed as a 58-unit affordable family rental housing project on a 3.53-acre City-owned property located at 155 Dry Creek Road, Healdsburg. The project consists of two (2), four story apartment buildings totaling approximately 61,579 gross square feet connected by an above ground pedestrian bridge. The buildings include a mix of one-, two-, and three-bedroom units.

The units will range in size from approximately 499 to 946 square feet. The affordable housing will be designed to meet the needs of families and will include approximately 5,000 square feet for amenities including multi-purpose activity common/teen rooms, laundry room, bike room, and reception area, as well as space for Property Management, Resident Services, and Reach for Home (RFH) staff to provide vital on-site resident services aimed at helping households retain housing, improving their health outcomes, and maximizing their ability to live and work in Healdsburg.

All the units, except one manager's unit, will be offered to extremely low, very low- and low-income households earning between 30-60% area median income. To further meet the City's housing needs, Reach for Home (RFH) will have priority to approximately 5 of these units, to help address the City's very low-income supportive housing needs.

2.0 ENVIRONMENTAL SETTING

2.1 NOISE FUNDAMENTALS AND TERMINOLOGY

Noise is generally defined as unwanted sound that annoys or disturbs people and potentially causes an adverse psychological or physiological effect on human health. Because noise is an environmental pollutant that can interfere with human activities, evaluation of noise is necessary when considering the environmental impacts of a proposed project.

Sound is mechanical energy (vibration) transmitted by pressure waves over a medium such as air or water. Sound is characterized by various parameters that include the rate of oscillation of sound waves (frequency), the speed of propagation, and the pressure level or energy content (amplitude). In particular, the sound pressure level (SPL) is the most common descriptor used to characterize the loudness of an existing sound level.

Although the decibel (dB) scale, a logarithmic scale, is used to quantify sound intensity, it does not accurately describe how sound intensity is perceived by human hearing. The perceived loudness of sound is dependent upon many factors, including sound pressure level and frequency content. The human ear is not equally sensitive to all frequencies in the entire spectrum, so noise measurements are weighted more heavily for frequencies to which humans are sensitive in a process called A-weighting, written as dB(A) and referred to as A-weighted decibels. There is a strong correlation between A-weighted sound levels and community response to noise. For this reason, the A-weighted sound level has become the standard tool of environmental noise assessment. Table 1 summarizes typical A-weighted sound levels for different common noise sources.

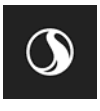


Table 1: Typical A-Weighted Sound Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	-110-	Rock band
Jet flyover at 1,000 Feet		
	-100-	
Gas lawnmower at 3 Feet		
	-90-	
Diesel truck at 50 Feet at 50 MPH		Food blender at 3 Feet
Noisy urban area, daytime	-80-	Garbage Disposal at 3 Feet
Gas lawnmower, 100 Feet		
Commercial area	-70-	Vacuum Cleaner at 10 Feet
Heavy traffic at 300 Feet		Normal Speech at 3 Feet
	-60-	
Quiet urban daytime		Large business office
	-50-	Dishwasher in next room
Quiet urban nighttime		
Quiet suburban nighttime	-40-	Theater, large conference room (Background)
	-30-	
Quiet rural nighttime		Library
	-20-	Bedroom at night, concert hall (Background)
	-10-	
		Broadcast/recording studio
	-0-	

Source: Caltrans, Technical Noise Supplement Traffic Noise Analysis Protocol, September 2013 (https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tens-sep2013-a11y.pdf)

Different types of measurements are used to characterize the time-varying nature of sound. These measurements include the equivalent sound level (Leq), the minimum and maximum sound levels (Lmin and Lmax), percentile-exceeded sound levels (such as L10, L20), the day-night sound level (Ldn), and the community noise equivalent level (CNEL). Ldn and CNEL values often differ by less than 1 dB. As a matter of practice, Ldn and CNEL values are considered to be equivalent and are treated as such in this assessment. Table 2 defines sound measurements and other terminology used in this report.

Table 2: Definition of Sound Measurements

Sound Measurements	Definition
Decibel (dB)	A unitless measure of sound on a logarithmic scale, which indicates the squared ratio of sound pressure amplitude to a reference sound pressure amplitude. The reference pressure is 20 micro-pascals.
A-Weighted Decibel (dB(A))	An overall frequency-weighted sound level in decibels that approximates the frequency response of the human ear.
Maximum Sound Level (Lmax)	The maximum sound level measured during the measurement period.
Minimum Sound Level (Lmin)	The minimum sound level measured during the measurement period.

Sound Measurements	Definition
Equivalent Sound Level (Leq)	The equivalent steady state sound level that in a stated period of time would contain the same acoustical energy.
Percentile-Exceeded Sound Level (Lxx)	The sound level exceeded xx % of a specific time period. L10 is the sound level exceeded 10% of the time. L90 is the sound level exceeded 90% of the time. L90 is often considered to be representative of the background noise level in a given area.
Day-Night Level (Ldn)	The energy average of the A-weighted sound levels occurring during a 24-hour period, with 10 dB added to the A-weighted sound levels occurring during the period from 10:00 p.m. to 7:00 a.m.
Community Noise Equivalent Level (CNEL)	The energy average of the A-weighted sound levels occurring during a 24-hour period with 5 dB added to the A-weighted sound levels occurring during the period from 7:00 p.m. to 10:00 p.m. and 10 dB added to the A-weighted sound levels occurring during the period from 10:00 p.m. to 7:00 a.m.
Peak Particle Velocity (Peak Velocity or PPV)	A measurement of ground vibration defined as the maximum speed (measured in inches per second) at which a particle in the ground is moving relative to its inactive state. PPV is usually expressed in inches/second.
Frequency: Hertz (Hz)	The number of complete pressure fluctuations per second above and below atmospheric pressure.

Source: Federal Highway Administration Construction Noise Handbook, 2006[1]

With respect to how humans perceive and react to changes in noise levels, a 1 dB(A) increase is imperceptible, a 3 dB(A) increase is barely perceptible, a 5 dB(A) increase is clearly noticeable, and a 10 dB(A) increase is subjectively perceived as approximately twice as loud[2]. These subjective reactions to changes in noise levels were developed on the basis of test subjects' reactions to changes in the levels of steady-state pure tones or broadband noise and to changes in levels of a given noise source. These statistical indicators are thought to be most applicable to noise levels in the range of 50 to 70 dB(A), as this is the usual range of voice and interior noise levels. A number of agencies and municipalities have developed or adopted noise level standards, consistent with these and other similar studies to help prevent annoyance and to protect against the degradation of the existing noise environment.

For a point source such as a stationary compressor or construction equipment, sound attenuates based on geometry at a rate of 6 dB per doubling of distance. For a line source such as free-flowing traffic on a freeway, sound attenuates at a rate of 3 dB per doubling of distance. Atmospheric conditions including wind, temperature gradients, and humidity can change how sound propagates over distance and can affect the level of sound received at a given location. The degree to which the ground surface absorbs acoustical energy also affects sound propagation. Sound that travels over an acoustically absorptive surface, such as grass, attenuates at a slightly greater rate than sound that travels over a hard surface, such as pavement. The increased attenuation is typically in the range of 1–2 dB per doubling of distance.

[1] https://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/handbook02.cfm, Last Accessed January 21, 2022.
[2] Egan, David M. Architectural Acoustics. J. Ross Pub., Pub 2007

Barriers, such as buildings and topography that block the line of sight between a source and receiver, also increase the attenuation of sound over distance.

2.2 DECIBEL ADDITION

Because decibels are logarithmic units, sound pressure levels cannot be added or subtracted through ordinary arithmetic. On the dB scale, a doubling of sound energy corresponds to a 3 dB increase. In other words, when two identical sources are each producing sound of the same loudness, their combined sound level at a given distance would be 3 dB higher than one source under the same conditions. For example, if one source produces a sound pressure level of 70 dB(A), two identical sources would combine to produce 73 dB(A). The cumulative sound level of any number of sources can be determined using decibel addition.

2.3 VIBRATION STANDARDS

Vibration is like noise such that noise involves a source, a transmission path, and a receiver. While related to noise, vibration differs in that noise is generally considered to be pressure waves transmitted through air, whereas vibration usually consists of the excitation of a structure or surface. As with noise, vibration consists of an amplitude and frequency. A person's perception to vibration depends on their individual sensitivity to vibration, as well as the amplitude and frequency of the source and the response of the system that is vibrating.

Vibration can be measured in terms of acceleration, velocity, or displacement. A common practice is to monitor vibration in terms of peak particle velocity in inches per second (in/sec PPV). Standards pertaining to perception as well as damage to structures have been developed for vibration levels defined in terms of in/sec PPV.

Human and structural response to different vibration levels is influenced by a number of factors, including ground type, distance between source and receptor, duration, and the number of perceived vibration events. Table 3 notes the general threshold at which human annoyance could occur is 0.1 PPV for continuous/frequent sources. Table 4 indicates the threshold for damage to typical residential and commercial structures ranges from 0.3 to 0.5 PPV for continuous/frequent sources.

Table 3: Guideline Vibration Annoyance Potential Criteria

Human Response	Maximum PPV (in/sec)	
	Transient Sources	Continuous/Frequent Sources
Barely perceptible	0.035	0.012
Distinctly perceptible	0.24	0.035
Strongly perceptible	0.90	0.10
Severe	2.0	0.40

Notes: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seal equipment, vibratory pile drivers, and vibratory compaction equipment.
Source: California Department of Transportation, Transportation and Construction Vibration Guidance Manual, April 2020[3]

Table 4: Guideline Vibration Damage Potential Criteria

Structure and Condition	Maximum PPV (in/sec)	
	Transient Sources	Continuous/Frequent Sources
Extremely fragile historic buildings, ruins, ancient monuments	0.12	0.08
Fragile buildings	0.30	0.12
Historic and some old buildings	0.50	0.20
Older residential structure	0.70	0.30
New residential structures	1.2	0.50
Modern industrial/commercial buildings	2.0	0.50

Notes: Transient sources again create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seal equipment, vibratory pile drivers, and vibratory compaction equipment.
Source: California Department of Transportation, Transportation and Construction Vibration Guidance Manual, April 2020

Operation of heavy construction equipment, particularly pile driving, and other impact devices, such as pavement breakers, create seismic waves that radiate along the surface of the ground and downward into the earth. These surface waves can be felt as ground vibration. Vibration from the operation of this equipment can result in effects ranging from annoyance of people to damage of structures. Varying geology and distance will result in different vibration levels containing different frequencies and displacements. In all cases, vibration amplitudes will decrease with increasing distance. Perceptible groundborne vibration is generally limited to areas within a few hundred feet of construction activities.

[3] https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tcvgm-apr2020-a11y.pdf, Last Accessed January 2022.

Table 7-4 “Vibration Source Levels for Construction Equipment” in the 2018 Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual (FTA Report No. 0123 September 2018) lists vibration source levels for the construction equipment most likely to generate high levels of ground vibration. The equipment listed in the FTA table includes impact and sonic pile drivers, clam shovel drops, hydromills, vibratory rollers, hoe rams, large and small bulldozers, caisson drilling, loaded trucks, and jackhammers. Table 5 below summarizes typical reference vibration levels generated by select construction equipment proposed for this Project.

Table 5: Reference Vibration Source Levels for Construction Equipment

Equipment	PPVref at 25 Feet
Vibratory roller	0.210
Large bulldozer	0.089
Loaded trucks	0.076
Small bulldozer	0.003

Source: Federal Transit Administration Transit Noise and Vibration Impact Assessment Manual, September 2018[4]

Vibration amplitude attenuates over distance and is a complex function of how energy is imparted into the ground and the soil conditions through which the vibration is traveling. The following equation can be used to estimate the vibration level at a given distance for typical soil conditions (Federal Transit Administration 2018). “PPVref” is the reference PPV from Table 5 and “Distance” is the distance between the source and the receptor:

PPV = PPVref x (25/Distance)^1.5

3.0 REGULATORY SETTING

Federal, state, and local agencies regulate different aspects of environmental noise. Generally, the federal government sets standards for transportation-related noise sources closely linked to interstate commerce, including aircraft, locomotives, and trucks. No federal noise standards are directly applicable to this project since this project does not involve modifications to interstate roadways.

The state government sets standards for transportation noise sources such as automobiles, light trucks, and motorcycles. Noise sources associated with industrial, commercial, and construction activities are generally subject to local control through noise ordinances and general plan policies. Local general plans identify general principles intended to guide and influence development plans.

[4] https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf, Last Accessed January 21, 2022.

3.1 STATE REGULATIONS

3.1.1 California Building Code (CBC)

Part 2, Title 24 of the California Code of Regulations California Noise Insulation Standards establishes minimum noise insulation standards to protect persons within new hotels, motels, dormitories, long-term care facilities, apartment houses, and dwellings other than single-family residences. Under Section 1207.11 “Exterior Sound Transmission Control”, interior noise levels attributable to exterior noise sources cannot exceed 45 dB(A) Ldn in any habitable room. Where such residences are located in an environment where exterior noise is 60 dB(A) Ldn or greater, an acoustical analysis is required to ensure interior levels do not exceed the 45 dB(A) Ldn interior standard. If the interior allowable noise levels are met by requiring that windows be kept closed, the design for the building must also specify a ventilation or air conditioning system to provide a habitable interior environment.

3.1.2 California Green Building Standards (CalGreen)

The California Green Building Standards Code (CalGreen) establishes interior noise insulation standards for non-residential occupied buildings. The CalGreen code also applies to occupied non-residential spaces within a multifamily residential building, such as community rooms, offices, etc. CalGreen Section 5.507 “Environmental Comfort”, states the following:

5.507.4.1 Exterior noise transmission. Wall and roof-ceiling assemblies exposed to the noise source making up the building or addition envelope or altered envelope shall meet a composite STC rating of at least 50 or a composite OITC rating of no less than 40, with exterior windows of a minimum STC of 40 or OITC of 30 in the following locations:

1. *Within the 65 CNEL noise contour of an airport*

Exceptions:

1. *Ldn or CNEL for military airports shall be determined by the facility Air Installation Compatible Land Use Zone (AICUZ) plan.*
2. *Ldn or CNEL for other airports and heliports for which a land use plan that has not been developed shall be determined by the local general plan noise element.*
3. *Within the 65 CNEL or Ldn noise contour of a freeway or expressway, railroad, industrial source or fxed-guideway notice source as determined by the Noise Element of the General Plan.*

5.507.4.1.1 Noise exposure where noise contours are not readily available. Buildings exposed to a noise level of 65 dB Leq-1-hr during any hour of operation shall have building, addition or alteration exterior wall and roof-ceiling assemblies exposed to the noise source meeting a composite STC rating of at least 45 (or OITC 35), with exterior windows of a minimum STC of 40 (or OITC 30).

5.507.4.2 Performance method. For buildings located as defined in Section 5.507.4.1 or 5.507.4.1.1, wall and roof-ceiling assemblies exposed to the noise source making up the building or addition envelope or altered envelope shall be constructed to provide an interior noise environment attributable to exterior

sources that does not exceed an hourly equivalent noise level (Leq -1Hr) of 50 dBA in occupied areas during any hours of operations

5.507.4.2.1 Site features. Exterior features such as sound walls or earth berms may be utilized as appropriate to the building, addition, or alteration project to mitigate sound migration to the interior.

5.507.4.2.2 Documentation of compliance. An acoustical analysis documenting complying interior sound levels shall be prepared by personnel approved by the architect or engineer of record.

5.507.4.3 Interior sound transmission. Wall and floor-ceiling assemblies separating tenant spaces and tenant spaces and public places shall have an STC of at least 40.

3.1.3 California Environmental Quality Act

The California Environmental Quality Act (CEQA) Guidelines, Appendix G, indicates a significant noise impact may occur if a project exposes persons to noise or vibration levels in excess of the local general plan or noise ordinance standards, or cause a substantial permanent or temporary increase in ambient noise levels.

3.1.4 National Environmental Policy Act

The National Environmental Policy Act (NEPA) establishes a national policy on the environment and created the Council on Environmental Quality (CEQ). The purpose of NEPA is to minimize or eliminate damage to the environment caused by actions funded or taken by the federal government. NEPA provides broad authority and responsibility for evaluating and mitigating adverse environmental effects including those resulting from highway traffic noise.

3.2 LOCAL REGULATIONS

3.2.1 Healdsburg 2030 General Plan[5]

Chapter 8 “Safety”, Figure 10 in the Healdsburg 2030 General Plan Policy Document identifies land use compatibility noise standards for noise-sensitive land uses affected by transportation and non-transportation noise sources. As shown in Figure 1 below, the ranges for noise-sensitive multifamily residential land uses that are impacted by transportation noise sources are as follows:

Multifamily Residential

- “Normally Acceptable” – <65 dB(A) Ldn
- “Conditionally Acceptable” – 60-70 dB(A) Ldn
- “Normally Unacceptable” – 70-75 dB(A) Ldn
- “Clearly Unacceptable” – Higher than 75 dB(A) Ldn

[5] https://www.ci.healdsburg.ca.us/354/General-Plan, last accessed January 21, 2022.

Sites with ambient noise at "conditionally acceptable" levels should be undertaken only after a detailed analysis of the noise reduction requirements is made and after needed noise insulation features are included in the design. Conventional construction, with closed windows and fresh-air supply systems or air conditioning will normally suffice. New construction with exterior noise levels in the "Normally Unacceptable" range are discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design. Outdoor areas must also be shielded.

Figure 1: City of Healdsburg Land Use Compatibility Standards

Land Use Category	Community Noise Exposure (dBA L_{dn})			
	Normally Acceptable[1]	Conditionally Acceptable[2]	Normally Unacceptable[3]	Clearly Unacceptable[4]
Residential – Single-family, duplex, mobile home	≤60[5]	55–70	70–75	75+
Residential – Multi-family	≤65[6]	60–70	70–75	75+
Residential - Interior	≤45			
Transient lodging - Motel, hotel	<65	60–70	70–80	80+
School, library, church, hospital, nursing home	<70	60–70	70–80	80+
Auditorium		<70	65+	
Sports arena, outdoor spectator sports		<75	70+	
Playground, neighborhood park	<70		67.5–75	72.5+
Golf course, cemetery	<75		70–80	80+
Commercial – retail, office, service	<70	67.5–77.5	75+	
Industrial, utility, agriculture	<75	70–80	75+	

Notes: dBA = A-weighted decibels; L_{dn} = day-night average noise level

[1] Specified land use is satisfactory based on the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

[2] New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and after needed noise insulation features are included in the design. Conventional construction, but with closed windows and fresh-air supply systems or air conditioning, will normally suffice.

[3] New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design. Outdoor areas must be shielded.

[4] New construction or development should generally not be undertaken.

[5] Outdoor private use areas

[6] Outdoor active use areas, excluding balconies

The Healdsburg 2030 General Plan also lists several policies relating to noise including the following:

- *S-G-1: New development shall not be approved unless it is generally consistent with the Land Use Compatibility for Community Noise Environments guidelines contained in General Plan Figure 10 and it is demonstrated that the new development will not violate the City's ordinance regulating excessive noise.*
- *S-G-2: The City will require the inclusion of design techniques in new construction that minimize noise impacts, including building location and orientation, building design features, and placement of noise-tolerant components (i.e., parking, utility areas, and maintenance facilities) between*

noise sources and the sensitive receptor areas where necessary to meet the Land Use Compatibility for Community Noise Environments guidelines contained in General Plan Figure 10.

- *S-G-5: The City will work to minimize noise impacts related to passenger or freight rail service*
- *S-16: Require a noise study, including field noise measurements, for any proposed project that would place a potentially intrusive noise source near an existing noise-sensitive use or place a noise-sensitive land use near an existing or potentially-intrusive noise source such as a freeway, arterial street or railroad, using the projected future noise contours in Figure 11 as a guide.*
- *S-20: Where necessary, require the provision of sound-proofing and other similar noise-attenuating measures in residential development when proximate to noise sources.*
- *S-21: Require that prospective purchasers and tenants of residential units proximate to non-residential uses are advised of potential noise and other elements typically associated with such uses.*
- *S-23: Use the Federal Transit Administration vibration impact criteria to evaluate the land use compatibility of sensitive uses proposed along the railroad using the best available information (without active railroad operations) or site-specific analyses (with active railroad operations). Developers of sensitive uses shall demonstrate that potential impacts of existing or potential vibration have been minimized to the maximum feasible extent.*
- *S-25: Where construction occurs that would result in a potentially significant impact on noise-sensitive uses, require use of noise-reducing measures that may include the following:*

    a. *Equip internal combustion engine-driven equipment with intake and exhaust mufflers that are in good condition and are appropriate for the equipment.*

    b. *Locate stationary noise-generating equipment as far as possible from sensitive receptors in the vicinity.*

    c. *Utilize "quiet" air compressors and other stationary noise sources where technology exists.*

    d. *Erect temporary noise control blanket barriers in a manner to shield noise sensitive uses.*

    e. *Control noise levels from workers' amplified music so that sounds are not audible sensitive receptors in the vicinity.*

    f. *Designate a "disturbance coordinator" responsible for responding to complaints about project construction noise and taking reasonable measures to correct the problem. Conspicuously post a telephone number for the disturbance coordinator at the construction site and include it in any notice sent to neighbors regarding the construction schedule*

3.2.3 Healdsburg Municipal Code[6]

Chapter 9.32 "Noise", Paragraph 9.32.080 "Standards for maximum sound levels and determining violations" in the Healdsburg Municipal Code sets criteria for noise received by properties based on their land use as follows:

Receptor Land Use	Daytime Exterior Sound Level dBA L_{10}	Nighttime Exterior Sound Level dBA L_{10}
Residential-zoned properties not located adjacent to industrial-zoned properties and office-zoned properties:	60	55
Residential-zoned properties located adjacent to industrial-zoned properties:	65	55
Commercial-zoned properties:	65	60
Industrial-zoned properties:	75	70

B. Daytime shall be considered 7:00 a.m. to 8:00 p.m., and nighttime shall be considered to be 8:00 p.m. to 7:00 a.m.

C. Where a land use activity is carried out over two of the above receptor land uses, the least restrictive sound level standard shall apply.

D. Properties that are zoned residential master plan (RMP) or planned development (PD) shall be subject to the sound level standards under this section based upon the corresponding general plan land use designation of residential, office, commercial, or industrial.

E. Mobile equipment used for ongoing land use activities shall be equipped with radar-activated backup alarms to the extent allowed under applicable state and federal regulations.

F. The following criteria, at a minimum, shall be applied in addition to the quantitative sound level measurements and standards during an enforcement procedure as set forth in HMC 9.32.100, to assist in a determination of the nature and severity of a potential violation:

1. *The intensity of the noise;*
2. *Whether the origin of the noise is natural or unnatural;*
3. *The level and intensity of the background noise;*
4. *The proximity of the noise source to receptors;*
5. *The time of the day or night the noise occurs;*
6. *The duration of the noise;*

[6] https://www.codepublishing.com/CA/Healdsburg/, last accessed January 21, 2022.

7. *Whether the noise is recurrent, intermittent, or constant;*

8. *Whether the noise is produced by a commercial or noncommercial activity; and*

9. *Whether the noise is produced by equipment normally required for maintenance of residential properties or for authorized construction projects. (Ord. 1011 § 8, 2003.)*

Paragraph 9.32.080 addresses noise generated from construction and temporary activities:

A. *Noise sources associated with or vibration created by construction, repair, remodeling, or grading of any real property or during authorized seismic surveys are permitted, provided such activities do not take place between the nighttime hours of 6:00 p.m. and 7:30 a.m. daily, or at any time on Sunday or a legal holiday, and provided the noise level created by such activities and any vibration created does not endanger the public health, welfare, and safety.*

B. *Residential gardening activities conducted by the owner/occupants and outside contractors is permitted between the hours of 7:30 a.m. and 9:00 p.m., to include power mowers, pressure washers, and other power apparatus.*

C. *Nothing in this section shall be construed to prohibit construction activities that do not exceed the ambient noise level by more than 10 dBA, such as painting or interior work. (Ord. 1011 § 7, 2003.)*

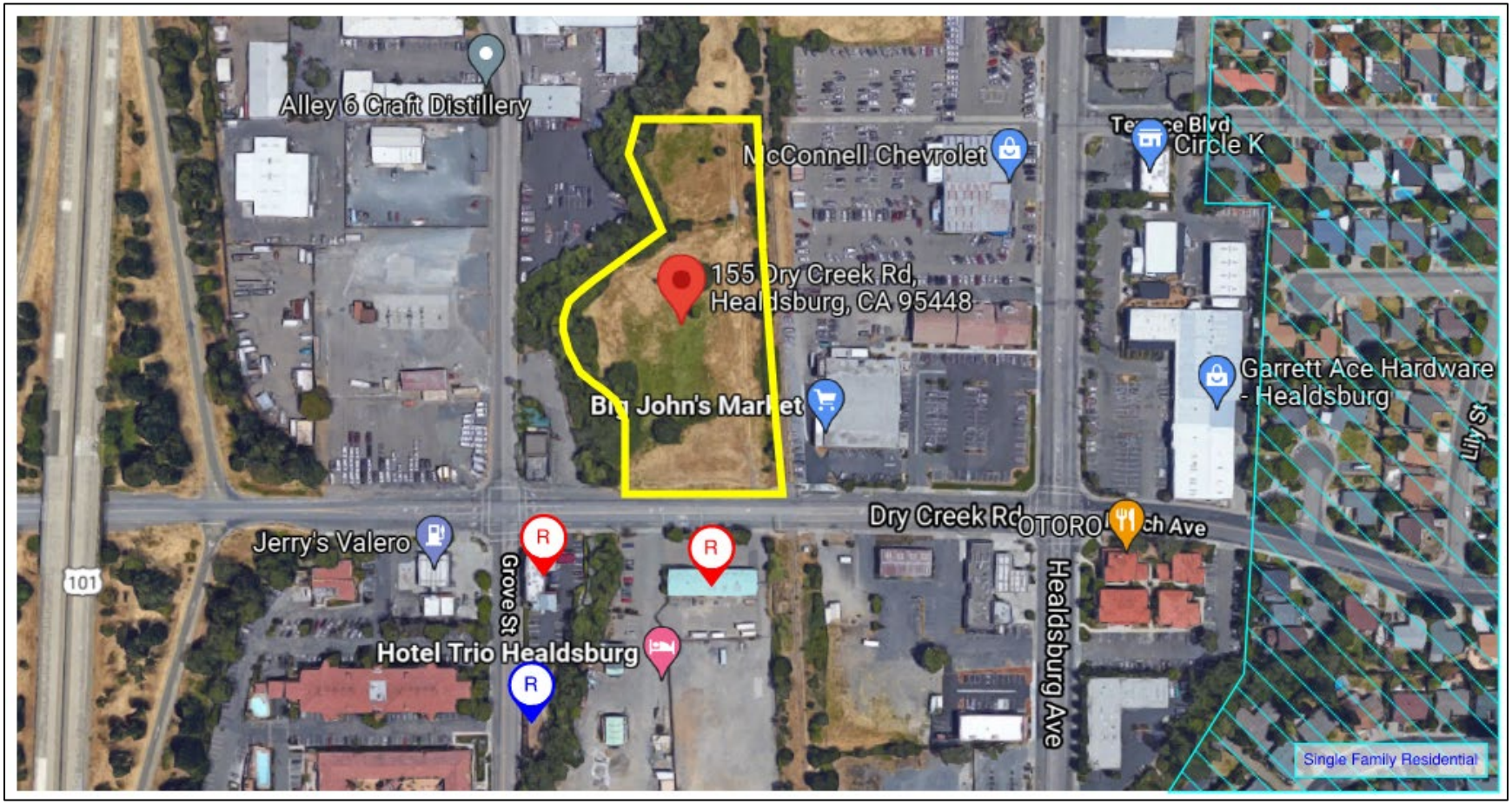
4.0 EXISTING NOISE ENVIRONMENT

4.1 SENSITIVE RECEPTORS

Some land uses are more tolerant of noise than others. For example, schools, hospitals, churches, and residences are considered to be more sensitive to noise intrusion than are commercial or industrial activities. Ambient noise levels can also affect the perceived desirability or livability of a development.

As shown in Figure 2, the Project site (within the yellow polygon) is surrounded by a mix of land uses, including commercial buildings to the west across Grove Street, to the northwest, and to the east across the railroad tracks. The closest noise-sensitive receptors (red pins in Figure 2) are Hotel Trio Healdsburg and Hotel Vinea across Dry Creek Road to the south. The hotels are approximately 127’ from the south border of the Project site. The closest multifamily residential building is the Citrine Apartments building at 1260 Grove Street, south of the hotel. The north edge of the apartment building is about 330’ south of the Project site (shown as a blue pin in Figure 2). The closest single-family residential neighborhood to the Project site is about 788’ to the east across Healdsburg Avenue (shown in the aqua hatched area in Figure 2).

Figure 2: Project Site and Neighboring Sensitive Receptors Locations



4.2 EXISTING AMBIENT NOISE LEVELS

The existing, or ambient, noise environment in a project area is characterized by the area's general level of development. Areas which are not urbanized are relatively quiet, while areas which are more urbanized are noisier as a result of roadway traffic, industrial activities, and other human activities.

The City of Healdsburg is exposed to several sources of noise, including traffic on major highways, such as US-101, noise from traffic on busy arterial roads, such as Dry Creek Road and Healdsburg Avenue, and noise from railways. The loudest source of noise at the Project site is traffic noise from the surrounding local roadways. Other sources of noise at the project site include activity from the commercial and hotel uses and nature-based noises.

A noise survey was conducted between Wednesday, January 12 and Thursday, January 13, 2022 to establish the existing baseline condition for the Project. The survey involved securing a calibrated Norsonic N140 sound level meter to a tree near the southeast corner of the project site (shown as the "Long Term LT-1" pin in Figure 3). The microphone was extended approximately 10' above the street.

The unattended meter collected data continuously between Wednesday and Thursday for a minimum of 24-hours. The highest one-hour Leq sound pressure level measured at this location during anticipated business hours (8:00 AM to 6:00 PM) was 67.6 dB(A). The resulting 24-hour day-night noise level measured at the long-term location was 66.3 dB(A) Ldn. Average 15-minute sound pressure levels measured at the 24-hour measurement location are shown in Figure 4.

Three additional spot measurements were taken during the same time period to extrapolate the 24-hour noise level to different locations to gain an understanding of sound across the full project site. The spot measurements were taken using a fully calibrated SoftdB Piccolo II sound level meter. The microphone was about 5'-6" above ground for all spot measurements. The locations of the measurements are shown in Figure 3 in the pins labeled "ST-1", "ST-2", and "ST-3". The results of the measurements are listed below in Table 6.

Table 6: Measured Short-Term Noise Levels

Measurement Location	Measured Leq, dB(A)	Estimated Ldn, dB(A)
ST-1: SW Corner of Future Building Footprint	64.6	66.0
ST-2: SE Corner of Future Building Footprint	56.3	58.5
ST-3: NE Corner of Future Building Footprint	54.8	55.2

Figure 3: Ambient Noise Measurement Locations

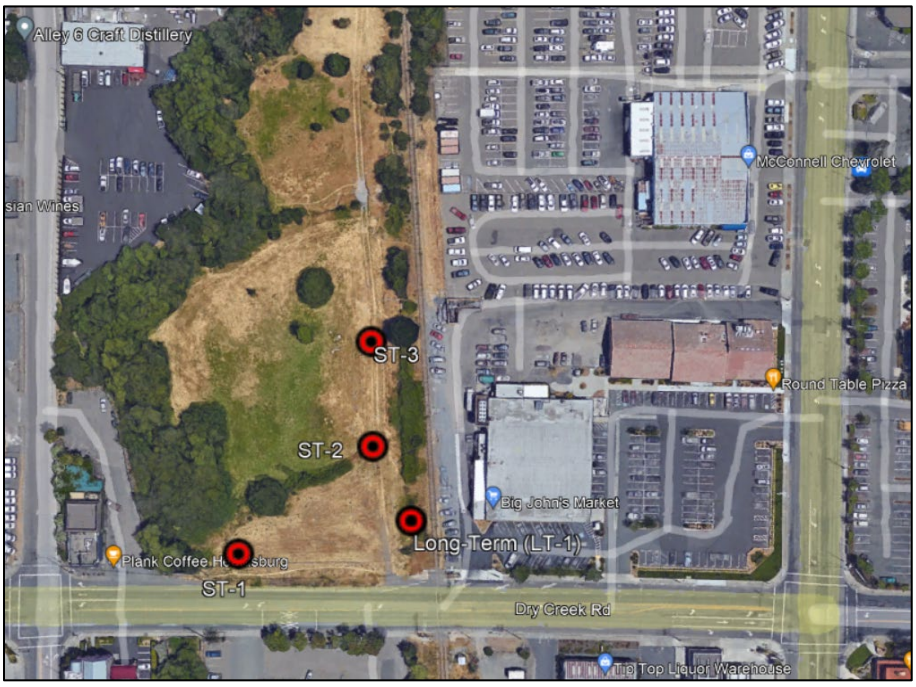
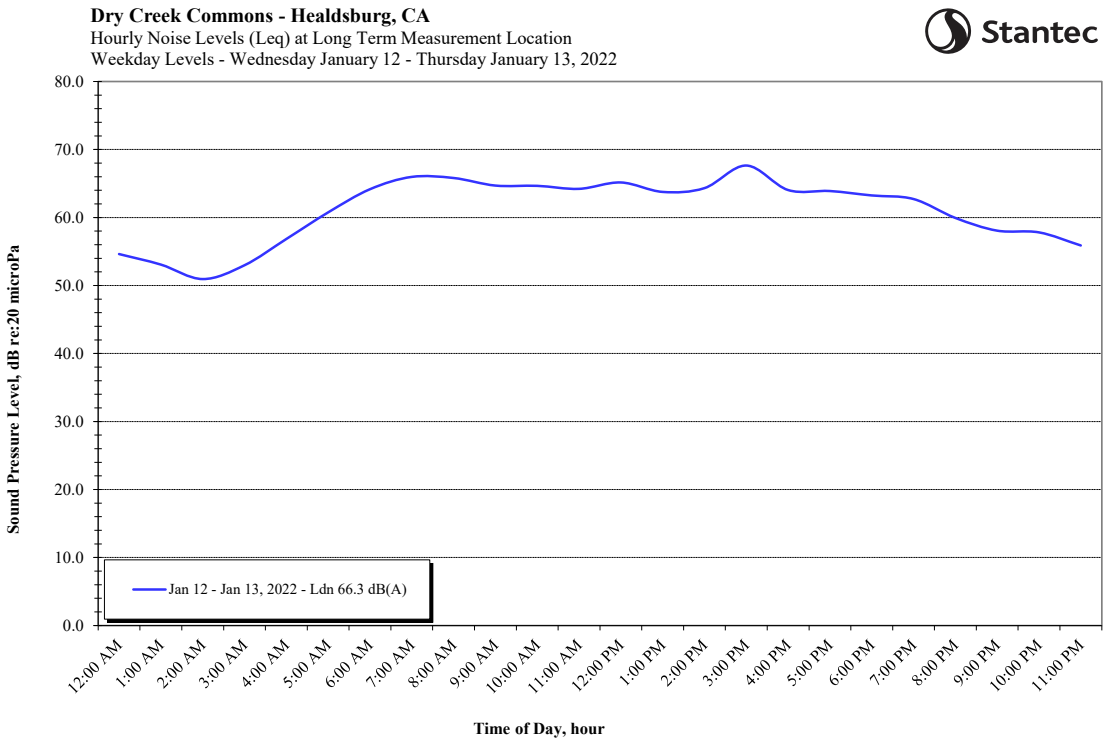


Figure 4: 15-Minute Noise Levels at the 24-Hour Measurement Location



According to the current Project site plan, the residential building footprint will be approximately 96' from the future Sonoma-Marin Area Rail Transit (S.M.A.R.T) line (Figure 5). The rail line in Healdsburg is currently not active but is planned to be completed when funding becomes available[7].

Figure 5: Approximate Distance between Dry Creek Commons Buildings and S.M.A.R.T Rail Line

Therefore, to help assess the impact the future train line may have on the Dry Creek Commons project, measurements of noise generated from the S.M.A.R.T trains were conducted at the Santa Rosa North Station. Measurements of noise generated from the 1:24 PM southbound train were taken on January 13, 2021. Measurements were conducted in one-second intervals of the entire train pass by with a fully calibrated SoftdB Piccolo II sound level meter. The microphone was located 270' from the closest gate siren, about 60' from the northbound track, and approximately 90' from the southbound track. The measurement distance of 90' between the microphone and the southbound track correlates to the distance between the Dry Creek Commons buildings and the closest rail tracks. The loudest one-second noise level recorded from one train pass-by was 69.6 dB(A). The average noise level generated by the 2 minute, 28 second train pass by was 60.1 dB(A).

Using the S.M.A.R.T train weekday schedule currently posted on the website[8] and assuming every train pass by generates a worst-case noise level of 69.6 dB(A), the overall day-night noise level estimated to be received by the Project buildings including train activity is 68.8 dB(A) Ldn.

Therefore, based on the short-term and long-term ambient noise measurements and including future S.M.A.R.T train activity, a 24-hour noise level of **68.8 dB(A) Ldn** was assumed for the apartment

[7] https://www.sonomamarintrain.org/stations, Last accessed January 21, 2022.
[8] https://www.sonomamarintrain.org/schedules-fares, Last accessed January 21, 2022.

buildings and a one-hour maximum noise level of **69.6 dB(A) Leq** was assumed for the occupied non-residential spaces within the buildings.

5.0 METHODOLOGY FOR ANALYSIS

Results from the short-term and 24-hour site measurements were used to provide baseline noise conditions within the project site vicinity. For the purpose of this analysis, potential sensitive receptors were determined by reviewing current aerial photography and by walking the site.

Impacts from future project-related traffic were estimated using predicted peak hour volumes from the traffic report, prepared by W-Trans.

Noise from the Project's mechanical systems would operate regularly and are therefore required to comply with the requirements listed in Chapter 9.32 "Noise", Paragraph 9.32.080 in the Healdsburg Municipal Code.

The FHWA Roadway Construction Noise Model (RCNM) was used to estimate the impact from short-term construction activities. The RCNM is used as the FHWA's national standard for predicting noise generated from construction activities. The RCNM analysis includes the calculation of noise levels at a defined distance for a variety of construction equipment. The spreadsheet inputs include acoustical use factors and distance to receptors and calculates the expected Lmax values and Leq values at a selected receptor.

5.1 EPA GUIDELINES

The EPA has established guidelines (Environmental Protection Agency Region 10 Environmental Impact Statement Guidelines, April 1973[9]) for assessing the impact of an increase in noise levels. These guidelines have been used as industry standard for several years to determine the potential impact of noise increases on communities. Most people will tolerate a small increase in background noise (up to about 5 dB(A)) without complaint, especially if the increase is gradual over a period of years (such as from gradually increasing traffic volumes). Increases greater than 5 dB(A) may cause complaints and interference with sleep. Increases above 10 dB(A) (heard as a doubling of judged loudness) are likely to cause complaints and should be considered a serious increase. Table 7 defines each of the traditional impact descriptions, their quantitative range, and the qualitative human response to changes in noise levels.

9 https://nepis.epa.gov/Exe/ZyNET.exe/2000RZBX.TXT?ZyActionD=ZyDocument&Client=EPA&Index=Prior+to+1976&Docs=&Query=&Time=&EndTime=&SearchMethod=1&TocRestrict=n&Toc=&TocEntry=&QField=&QFieldYear=&QFieldMonth=&QFieldDay=&IntQFieldOp=0&ExtQFieldOp=0&XmlQuery=&File=D%3A%5Czyfiles%5CIndex%20Data%5C70thru75%5CTxt%5C00000002%5C2000RZBX.txt&User=ANONYMOUS&Password=anonymous&SortMethod=h%7C-&MaximumDocuments=1&FuzzyDegree=0&ImageQuality=r75g8/r75g8/x150y150g16/i425&Display=hpfr&DefSeekPage=x&SearchBack=ZyActionL&Back=ZyActionS&BackDesc=Results%20page&MaximumPages=1&ZyEntry=1&SeekPage=x&ZyPURL, Last Accessed January 21, 2022.

Table 7: EPA Impact Guidelines

Increase over Existing or Baseline Sound Levels	Impact Per EPA Region Guidelines	Qualitative Human Perception of Difference in Sound Levels
0 dB to 5 dB	Minimum Impact	Imperceivable or Slight Difference
6 dB to 10 dB	Significant Impact	Significant Noticeable Difference – Complaints Possible
Over 10 dB	Serious Impact	Loudness Changes by a Factor of Two or Greater. Clearly Audible Difference – Complaints Likely

6.0 ENVIRONMENTAL ANALYSIS

6.1 EXTERIOR TRAFFIC NOISE

Traffic noise depends primarily on vehicle speed (tire noise increases with speed), proportion of medium and large truck traffic (trucks generate engine, exhaust, and wind noise in addition to tire noise), and number of speed control devices, such as traffic lights and stop signs (accelerating and decelerating vehicles and trucks can generate more noise).

Changes in traffic volumes can also have an impact on overall traffic noise levels. For example, it takes 25 percent more traffic volume to produce an increase of only 1 dB(A) in the ambient noise level. For roads already heavy with traffic volume, an increase in traffic numbers could even reduce noise because the heavier volumes could slow down the average speed of the vehicles. A doubling of traffic volume results in a 3 dB(A) increase in noise levels.

To describe future noise levels due to traffic added from the Project, AM and PM peak hour existing traffic volumes (with and without the Project) listed in the traffic study provided by W-Trans were used to determine the percentage increase of traffic on the roads adjacent to the Project site and nearby sensitive receptors.

Table 8 shows the peak hour volumes associated with traffic on the local roadway network under the existing and existing plus Project traffic conditions. The last columns in the table show the overall percentage change and the estimated difference in peak hour noise level in dB(A).

Table 8: Traffic Peak Hour Volumes and Estimated Noise Increase

Roadway Intersection	Existing Peak Hour Traffic Volumes	Existing Peak Hour Traffic Volumes with Project	Percentage Change	Estimated dB(A) Change
US 101 South and Dry Creek Road	1,094 (1,290)	1,098 (1,296)	0.37% (0.47%)	0.015 (0.019)
US 101 North and Dry Creek Road	1,669 (1,763)	1,676 (1,778)	0.42% (0.85%)	0.017 (0.034)
Grove Street and Dry Creek Road	1,728 (1,977)	1,737 (1,995)	0.52% (0.91%)	0.021 (0.036)

Roadway Intersection	Existing Peak Hour Traffic Volumes	Existing Peak Hour Traffic Volumes with Project	Percentage Change	Estimated dB(A) Change
Healdsburg Avenue and Dry Creek Road – March Avenue	1,705 (1,949)	1,707 (1,953)	0.12% (0.21%)	0.005 (0.008)

Notes:

1. Numbers in parenthesis are PM peak hour traffic volumes; numbers not in parenthesis are AM peak hour traffic volumes.

The Project is expected to minimally increase traffic counts along Dry Creek Road and the surrounding roadways. There will essentially be no change in traffic noise (below 1 dB(A)) expected along these streets. Therefore, the Project should not cause increased traffic noise levels over the baseline conditions at the neighboring sensitive receptors, and this would be a less than significant impact relative to this topic.

6.2 INTERIOR TRAFFIC NOISE LEVEL IMPACTS

6.2.1 Interior Traffic Noise Level Impacts – Residential Units

The California Building Code states the interior noise levels attributable to exterior sources shall not exceed 45 dB(A) Ldn in any habitable room within multifamily residential units. The needed sound isolation requirements of a building's exterior façade will be dependent on the following conditions:

- The dimension of the rooms with exterior windows;
- The finishes within the rooms;
- The ratio of clear glass to solid wall in the exterior wall assembly; and
- The exterior solid wall construction.

Modern construction with punch windows typically provides a 25 dB(A) exterior-to-interior noise level reduction with the windows closed. Therefore, generally speaking, sensitive receptors exposed to an exterior noise level of 70 dB(A) Ldn or less will typically comply with the code-required interior noise level standard. Modern construction utilizing window walls, curtainwalls, or a high ratio of exterior clear glass will provide less reduction with the windows closed. Buildings using a high amount of glass will typically comply with the code-required interior noise level standard if exposed to exterior noise levels of 67 dB(A) Ldn or less.

The building elevations shown in the current Project drawing set shows the residential units are expected to use punch windows and not a high ratio of window wall. Noise levels experienced at the Project site including future train activity (at 68.8 dB(A) Ldn) are expected to be below the 70 dB(A) Ldn threshold for buildings with punch windows. Standard construction with a window system achieving a minimum Outside-Inside Transmission Class (OITC) rating of OITC 22 should be sufficient to achieve the California Building Code interior noise requirement for residential units. Therefore, noise from exterior traffic within the residential units should be less than significant.

6.2.2 Interior Traffic Noise Level Impacts – Occupied Non-Guestroom Spaces

CalGreen states if an occupied non-guestroom space (i.e. lobby, community room, offices) is exposed to a noise level of 65 dB(A) Leq 1-hour during any hour of operation, the exterior façade design shall incorporate features to reduce noise inside the spaces to a maximum of 50 dB(A) Leq 1-hour. Given the Project site may be exposed to hourly noise levels up to 69.6 dB(A) Leq the building would be subject to the CalGreen requirements.

Assuming a worst-case condition of the non-residential occupied spaces being finished with a hard-surfaced floor, hard ceiling, and punch windows, windows with a minimum rating of OITC 18 would be required to help achieve the code-dictated maximum 50 dB(A) 1-hour Leq noise level. A typical 1" thick insulating glass unit constructed of ¼" glass – ½" airspace – ¼" glass has an expected rating of OITC 26. Therefore, standard construction should be acceptable for the non-residential areas to achieve the CalGreen code requirement and traffic noise levels would have a less than significant impact.

6.3 PROJECT FIXED-SOURCE AND OPERATIONAL NOISE

6.3.1 Fixed-Source Noise

Typical multifamily residential construction will often involve new rooftop mechanical equipment, such as condensing units and exhaust fans. This equipment will generate noise that will radiate to the neighboring properties. The noise from this equipment will be required to comply with Chapter 9.32 "Noise", Paragraph 9.32.080 in the Healdsburg Municipal Code. Thus, the on-site equipment would be designed incorporating measures such as shielding and/or appropriate attenuators to reduce noise levels that may affect nearby properties. In addition, nighttime noise limits would be applicable to any equipment required to operate between the hours of 8:00 P.M. and 7:00 A.M.

When the actual on-site equipment is selected, the equipment would be designed to incorporate measures as needed, such as shielding, barriers, and/or attenuators, to reduce noise levels that may affect nearby properties. Therefore, the impact of fixed-source noise to the neighboring properties would be less than significant.

6.3.2 Trash Room

The Dry Creek Commons project will have a fully enclosed trash room situated on the northeast corner of the project buildings facing the railroad. The trash room will not face any noise-sensitive receptors and will be well-shielded from the hotels across Dry Creek Road. Activity from garbage truck traffic and trash pickup would remain similar as currently experienced with the commercial uses already around the site and noise from trash pickup would have a less than significant impact.

6.4 SHORT TERM CONSTRUCTION NOISE

Two types of short-term noise impacts could occur during construction. The first type of noise is from construction crew vehicular commutes. Construction crew commutes would incrementally increase noise levels on access roads leading to the project site.

The construction of the project would involve an estimated peak of 29 construction worker vehicles and 6 vendor vehicles per day (35 vehicles total) traveling to and from the site. Assuming a worst-case of all worker and vendor vehicles entering or exiting the site at the same time, this would add 35 vehicles to the peak hour traffic volume on Dry Creek Road. Adding 35 vehicles to the existing traffic on Dry Creek Road represents a 3.2% increase in traffic volumes, which equates to a 0.128 dB(A) increase in noise, which is a less than significant impact.

The second type of noise generated during construction is from the construction activity itself. Construction activities would include demolition, site preparation, grading, building construction, paving, and architectural coating. Each construction stage has its own mix of equipment, and consequently, its own noise characteristics. The various construction operations would change the character of the noise generated at the project site and therefore, the noise level as construction progresses. The loudest stages of construction include the demolition and grading stages, as the noisiest construction equipment is typically earthmoving and grading equipment.

The construction of the Dry Creek Commons project would be conducted in six stages and each stage will use different construction equipment. The main types of noise-producing equipment for each construction stage are shown in Table 9.

Table 9:Construction Stage Equipment

Construction Stage	Construction Equipment	
Demolition	• Concrete Saw • Tractor • Backhoe	• Rubber-Tired Dozer • Front-End Loader
Site Preparation	• Grader • Tractor	• Scraper
Grading	• Grader • Tractor • Haul Trucks (5)	• Rubber-Tired Dozer • Front-End Loader
Building Construction	• Crane • Generator • Welders (3)	• Forklifts (2) • Tractor
Paving	• Paver • Paving Equipment • Tractor	• Cement and Mortar Mixer • Rollers (2)
Architectural Coating	• Air Compressor	

Table 10 lists the types of construction equipment and the maximum and average operational noise level as measured at 127 feet from the operating equipment. The 127-foot distance represents the approximate distance between the Project and the closest noise-sensitive receptor at the Hotel Trio Healdsburg building.

Table 10: Summary of Federal Highway Administration Roadway Construction Noise Model

Construction Equipment Source at the Project Site	Distance to Nearest Sensitive Receptor, feet	Sound Level at Receptor		
		Lmax, dB(A)	Acoustical Use Factor (%)	Leq, dB(A)
Backhoe	127	69.5	40	65.5
Concrete Saw	127	81.5	20	74.5
Crane, Tower Crane	127	72.5	16	64.5
Concrete Mixer Truck	127	70.7	40	66.7
Compressor (air)	127	69.6	40	65.6
Dozer	127	73.6	40	69.6
Forklift (Gradall)	127	75.3	40	71.3
Front End Loader	127	71.0	40	67.0
Generator	127	72.5	50	69.5
Grader	127	76.9	40	72.9
Haul Truck	127	68.4	40	64.4
Paver / Paving Equipment	127	69.1	50	66.1
Roller	127	71.9	20	64.9
Scraper	127	75.5	40	71.5
Tractor	127	75.9	40	71.9
Welder	127	65.9	40	61.9

Notes:
1. Source: Stantec 2022, Federal Highway Administration RCNM v1.1 2008

A worst-case condition for construction activity would assume all noise-generating equipment were operating at the same time and at the same distance from the closest noise-sensitive receptor. Using this assumption, the RCNM program calculated the following combined Leq and Lmax noise levels from each stage of construction as shown in Table 11:

Table 11: Calculated Noise Level from Each Construction Stage

Construction Phase	Distance to Closest Noise Sensitive Receptor, ft	Calculated Lmax, dB(A)	Calculated Leq, dB(A)
Demolition	127	83.5	77.9
Site Preparation	127	80.9	76.9

Construction Phase	Distance to Closest Noise Sensitive Receptor, ft	Calculated Lmax, dB(A)	Calculated Leq, dB(A)
Grading	127	82.0	78.0
Building Construction	127	81.9	77.7
Paving	127	79.9	75.4
Architectural Coating	127	69.6	65.6

Although noise levels from construction could fall into the "Unacceptable" range as defined in Figure 1, increases in noise levels from construction activities would be temporary and construction activities would be limited to the restrictions set by Policy S-25 in the Healdsburg 2030 General Plan and Paragraph 9.32.080.A in the Healdsburg Municipal Code. To recap, Policy S-25 in the Healdsburg 2030 General Plan states the following:

- *S-25: Where construction occurs that would result in a potentially significant impact on noise-sensitive uses, require use of noise-reducing measures that may include the following:*

    a. *Equip internal combustion engine-driven equipment with intake and exhaust mufflers that are in good condition and are appropriate for the equipment.*

    b. *Locate stationary noise-generating equipment as far as possible from sensitive receptors in the vicinity.*

    c. *Utilize "quiet" air compressors and other stationary noise sources where technology exists.*

    d. *Erect temporary noise control blanket barriers in a manner to shield noise sensitive uses.*

    e. *Control noise levels from workers' amplified music so that sounds are not audible sensitive receptors in the vicinity.*

    f. *Designate a "disturbance coordinator" responsible for responding to complaints about project construction noise and taking reasonable measures to correct the problem. Conspicuously post a telephone number for the disturbance coordinator at the construction site and include it in any notice sent to neighbors regarding the construction schedule*

Paragraph 9.32.080.A in the Healdsburg Municipal Code states the following:

A. *Noise sources associated with or vibration created by construction, repair, remodeling, or grading of any real property or during authorized seismic surveys are permitted, provided such activities do not take place between the nighttime hours of 6:00 p.m. and 7:30 a.m. daily, or at any time on Sunday or a legal holiday, and provided the noise level created by such activities and any vibration created does not endanger the public health, welfare, and safety.*

In addition to the restrictions listed in the City of Healdsburg documents, the Federal Transit Administration offers the following construction noise reduction measures listed in Section 7 "Noise and

Vibration During Construction" in the Transit Noise and Vibration Impact Assessment Manual document (FTA Report No. 0123 September 2018):

Design Considerations and Project Layout:

- *Construct noise barriers, such as temporary walls or piles of excavated material, between noisy activities and noise-sensitive receivers.*
- *Re-route truck traffic away from residential streets, if possible. Select streets with fewest homes, if no alternatives are available.*
- *Site equipment on the construction lot as far away from noise-sensitive sites as possible.*
- *Construct walled enclosures around especially noisy activities, or clusters of noisy equipment. For example, shields can be used around pavement breakers, loaded vinyl curtains can be draped under elevated structures.*

Sequence of Operations:

- *Combine noisy operations to occur in the same time period. The total noise level produced will not be significantly greater than the level produced if the operations were performed separately.*
- *Avoid nighttime activities. Sensitivity to noise increases during the nighttime hours in residential neighborhoods.*

Alternative Construction Methods:

- *Use specially quieted equipment, such as quieted and enclosed air compressors, mufflers, on all engines.*
- *Select quieter demolition methods, where possible.*

In conclusion, construction noise would be short-term, temporary, and intermittent. Furthermore, construction activity would comply with all of the City's construction hours and noise standards contained in both the Municipal Code and the General Plan and as a result impacts would be less than significant with the City's construction noise measures incorporated.

6.5 GROUNDBORNE VIBRATION

During construction of the proposed Project, equipment such as trucks, bulldozers, and rollers may be used as close as 127 feet from the nearest sensitive receptor at the Hotel Trio Healdsburg. Equipment used during Project construction could generate vibration levels between 0.0003 PPV and 0.0183 PPV at 127 feet, as shown below in Table 12. All estimated vibration levels should be below the FTA vibration threshold at which human annoyance could occur and below the threshold for potential building damage as defined in Table 4. Therefore, impacts from construction vibration would be less than significant.

Table 12: Estimated Vibration Levels for Construction Equipment

Type of Equipment	Peak Particle Velocity at 127 Feet	Threshold at which Human Annoyance Could Occur	Potential for Proposed Project to Exceed Threshold
Large Bulldozer	0.0078	0.10	No
Loaded Trucks	0.0066	0.10	No
Small Bulldozer	0.0003	0.10	No
Vibratory Roller	0.0183	0.10	No

Source: Federal Transit Administration Transit Noise and Vibration Impact Assessment Manual, September 2018

7.0 CONCLUSION

The Dry Creek Commons Project would follow all requirements of the Healdsburg 2030 General Plan and the Healdsburg Municipal Code. The noise generated from the operation of the Project, with appropriate mitigation, would not significantly alter the existing acoustic environment in the area. Furthermore, onsite receptors would not be exposed to noise in excess of adopted standards.

Based on the FHWA RCNM, the Project may generate high levels of construction noise which are temporary and would not result in long-term noise increases. While the noise levels presented are a "worst-case" scenario and may at times be audible over traffic-related noise levels surrounding the area, these high levels are not expected to be continuous. Moreover, the highest noise and vibration levels will be reduced by the application of the City's required measures to control construction noise and vibration at the Project site. Noise and vibration control techniques would be implemented to ensure noise generated from temporary construction activities would reduce noise levels at nearby sensitive receptors to the limits set forth in the Healdsburg Municipal Code.

Operational noise from fixed mechanical equipment will incorporate measures as needed, such as shielding, barriers, and/or attenuators, to reduce noise levels that may affect nearby properties to the limits set forth in the Healdsburg Municipal Code.

Following all requirements of the Healdsburg 2030 General Plan and the Healdsburg Municipal Code, the Dry Creek Commons Project would therefore have a less than significant impact.

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Appendix A NOISE CALCULATIONS

Report date: 1/21/2022
Case Description: 01 - Dry Creek Commons - Demolition

		Baselines (dBA)		---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night
Hotel Trio Healdsburg	Commercial	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	127	0
Tractor	No	40	84		127	0
Front End Loader	No	40		79.1	127	0
Backhoe	No	40		77.6	127	0
Concrete Saw	No	20		89.6	127	0

Results

	Calculated (dBA)	
Equipment	Lmax	Leq
Dozer	73.6	69.6
Tractor	75.9	71.9
Front End Loader	71	67
Backhoe	69.5	65.5
Concrete Saw	81.5	74.5
Total	**83.5**	**77.9**

Report date: 1/21/2022
Case Description: 02 - Dry Creek Commons - Site Preparation

		Baselines (dBA)		---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night
Hotel Trio Healdsburg	Commercial	65	60	55

			Equipment			
	Impact		Spec Lmax	Actual Lmax	Receptor Distance	Estimated Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Scraper	No	40		83.6	127	0
Tractor	No	40	84		127	0
Grader	No	40	85		127	0

Results

	Calculated (dBA)	
Equipment	Lmax	Leq
Scraper	75.5	71.5
Tractor	75.9	71.9
Grader	76.9	72.9
Total	**80.9**	**76.9**

Report date: 1/21/2022
Case Description: 03 - Dry Creek Commons - Grading

		Baselines (dBA)		---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night
Hotel Trio Healdsburg	Commercial	65	60	55

			Equipment			
	Impact		Spec Lmax	Actual Lmax	Receptor Distance	Estimated Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Grader	No	40	85		127	0
Dozer	No	40		81.7	127	0
Tractor	No	40	84		127	0
Front End Loader	No	40		79.1	127	0
Haul Truck	No	40		76.5	127	0
Haul Truck	No	40		76.5	127	0
Haul Truck	No	40		76.5	127	0
Haul Truck	No	40		76.5	127	0
Haul Truck	No	40		76.5	127	0

Results

	Calculated (dBA)	
Equipment	Lmax	Leq
Grader	76.9	72.9
Dozer	73.6	69.6
Tractor	75.9	71.9
Front End Loader	71	67
Haul Truck	68.4	64.4
Haul Truck	68.4	64.4
Haul Truck	68.4	64.4
Haul Truck	68.4	64.4
Haul Truck	68.4	64.4
Total	**82**	**78**

Report date: 1/21/2022
Case Description: 04 - Dry Creek Commons - Building Construction

		Baselines (dBA)			---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night	
Hotel Trio Healdsburg	Commercial	65	60	55	

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	127	0
Gradall	No	40		83.4	127	0
Gradall	No	40		83.4	127	0
Generator	No	50		80.6	127	0
Tractor	No	40	84		127	0
Welder / Torch	No	40		74	127	0
Welder / Torch	No	40		74	127	0
Welder / Torch	No	40		74	127	0

Results

	Calculated (dBA)	
Equipment	Lmax	Leq
Crane	72.5	64.5
Gradall	75.3	71.3
Gradall	75.3	71.3
Generator	72.5	69.5
Tractor	75.9	71.9
Welder / Torch	65.9	61.9
Welder / Torch	65.9	61.9
Welder / Torch	65.9	61.9
Total	**81.9**	**77.7**

Report date: 1/21/2022
Case Description: 05 - Dry Creek Commons - Paving

		Baselines (dBA)		---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night
Hotel Trio Healdsburg	Commercial	65	60	55

			Equipment			
	Impact		Spec Lmax	Actual Lmax	Receptor Distance	Estimated Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Concrete Mixer Truck	No	40		78.8	127	0
Paver	No	50		77.2	127	0
Paver	No	50		77.2	127	0
Roller	No	20		80	127	0
Roller	No	20		80	127	0
Tractor	No	40	84		127	0

Results

	Calculated (dBA)	
Equipment	Lmax	Leq
Concrete Mixer Truck	70.7	66.7
Paver	69.1	66.1
Paver	69.1	66.1
Roller	71.9	64.9
Roller	71.9	64.9
Tractor	75.9	71.9
Total	**79.9**	**75.4**

Report date: 1/21/2022
Case Description: 06 - Dry Creek Commons - Architectural Coating

		Baselines (dBA)		---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night
Hotel Trio Healdsburg	Commercial	65	60	55

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Compressor (air)	No	40		77.7	127	0

Results

	Calculated (dBA)	
Equipment	Lmax	Leq
Compressor (air)	69.6	65.6
Total	**69.6**	**65.6**