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July 31, 2020 TTA-07

Ms. Chandra Miehe
TAIT & Associates, Inc.
11280 Trade Center Drive
Rancho Cordova, CA 95742

Subject: 43 Middle Rincon Road 7-Eleven Project Noise and Vibration Assessment

Dear Ms. Miehe:

HELIX Environmental Planning, Inc. (HELIX) has assessed the noise and vibration impacts associated with the construction and operation of the proposed 43 Middle Rincon Road 7-Eleven Project (project). The analysis has been prepared to support environmental review under the California Environmental Quality Act (CEQA).

PROJECT LOCATION

The project site is located at the corner of Middle Rincon Road and State Route (SR-) 12 at 43 Middle Rincon Road in the City of Santa Rosa (City). The 2.2-acre site is composed of Assessor's Parcel Numbers (APN) 182-540-024 and 182-540-025. Project site access would be provided via driveways on Middle Rincon Road and SR-12 (see Figure 1, *Vicinity Map*, and Figure 2, *Aerial Map*).

PROJECT DESCRIPTION

The project site is currently developed and contains an approximately 2,400 square foot (SF) convenience store, a single-family home, an approximately 10,300 SF warehouse, and four additional small outbuildings. The project proposes to demolish all structures on the site and develop the southern 1.02 acres of the 2.2-acre site with a 4,191 SF convenience market and retail gasoline dispensing facility (gas station). Twelve gas pumps through six production dispensers would be provided and a 3,096 SF steel canopy would be constructed above the gas pumps. Additionally, three underground storage tanks for gasoline and diesel would be installed in the north portion of the project site. Approximately 14,300 SF of landscaping would be installed around the project site periphery. The remaining development area would be impervious asphalt or concrete surfaces and would include 20 vehicle parking spaces. The remaining 1.18-acre northern portion of the project site would be a separate lot reserved for future development (see Figure 3, *Site Plan*, for details).

Project Construction

Project construction is assumed to begin January 2021 and be completed by August 2021, for a total construction period of eight months. Construction activities include demolition, site preparation, grading, installation of underground utilities and fuel tanks, construction of structures, paving, and architectural coating (e.g., painting).

EXISTING NOISE SETTING

The project site is located in a suburban area in the northeastern portion of the City. Surrounding land uses include single-family residences to the west, north, and northeast; vacant lots to the northwest; and commercial/retail businesses across Middle Rincon Road to the east and across SR-12 to the south. Ambient noise in the project vicinity is dominated by traffic noise from SR-12 (an arterial street with four travel lanes and a raised median) and from City streets.

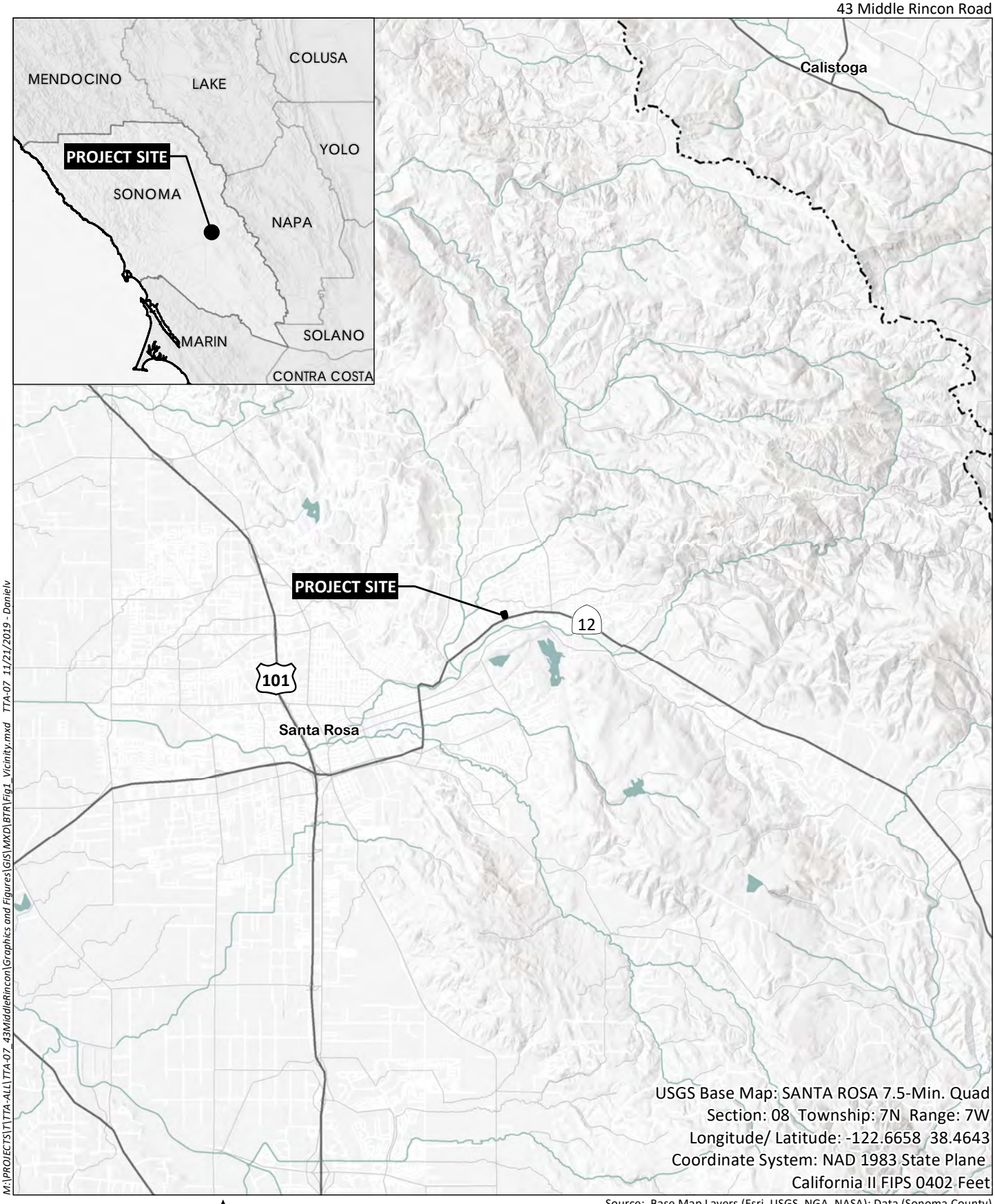
Noise-sensitive land uses (NSLUs) are land uses that may be subject to stress and/or interference from excessive noise, including residences, schools, libraries, or similar facilities where quiet is an important attribute of the environment. Noise receptors are individual locations that may be affected by noise. There are multiple single-family residences to the west, north, and northeast. The single-family residence approximately 35 feet west of the project site (this lot is zoned General Commercial) is the closest NSLU to the project site. See Figure 4, *Receptor Locations*, for other receptor locations.

Land uses in which ground-borne vibration could potentially interfere with operations or equipment, such as research, manufacturing, hospitals, and university research operations (California Department of Transportation [Caltrans] 2013) are considered "vibration-sensitive." The degree of sensitivity depends on the specific equipment that would be affected by the ground-borne vibration. In addition, excessive levels of ground-borne vibration of either a regular or an intermittent nature can result in annoyance to residential uses or schools. The closest land uses in the project area that are subject to annoyance from vibration would be the single-family residence adjacent to the project site to the west.

NOISE TERMINOLOGY

All noise level or sound level values presented herein are expressed in terms of decibels (dB), with A-weighting (dBA) to approximate the hearing sensitivity of humans. Time-averaged noise levels are expressed by the symbol L_{EQ} and represent a period of one hour unless otherwise specified. The Community Noise Equivalent Level (CNEL) is a 24-hour weighted average, where noise levels during the evening hours of 7:00 p.m. to 10:00 p.m. have an added 5 dBA weighting, and sound levels during the nighttime hours of 10:00 p.m. to 7:00 a.m. have an added 10 dBA weighting. This is similar to the Day Night sound level (L_{DN}), which is a 24-hour average with an added 10 dBA weighting on the same nighttime hours but no added weighting on the evening hours.

Because decibels are logarithmic units, sound pressure level (SPL) cannot be added or subtracted through standard arithmetic. Under the decibel scale, a doubling of sound energy corresponds to a 3-dBA increase. In other words, when two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dBA higher than from one source under the same conditions. For example, if one automobile produces an SPL of 70 dBA when it passes an observer, two cars passing simultaneously would not produce 140 dBA—rather, they would combine to



Source: Base Map Layers (Esri, USGS, NGA, NASA); Data (Sonoma County)

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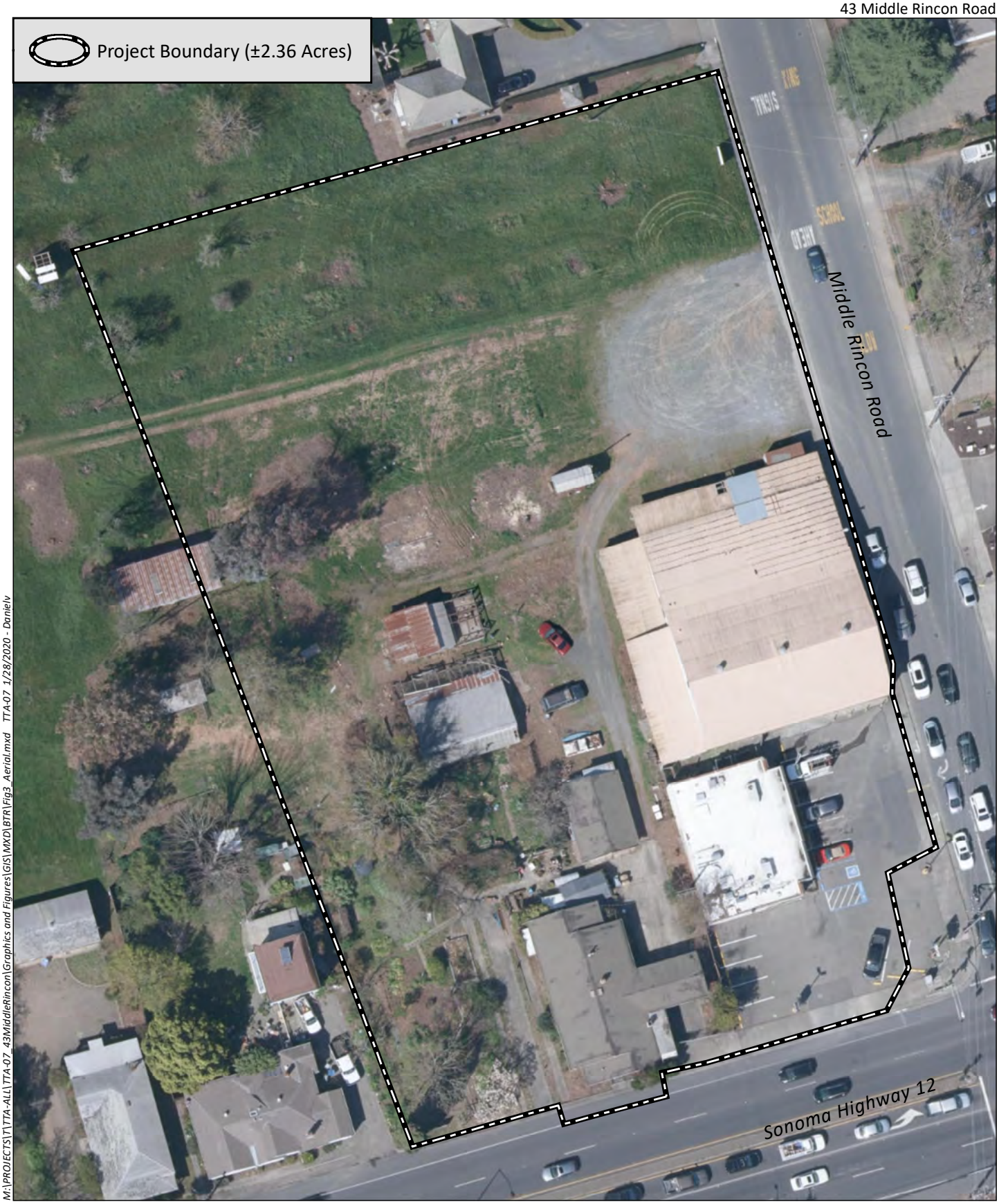
Vicinity Map

Figure 1



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Source: Base Map Layers (Esri, USDA, USGS); Data (Sonoma County)

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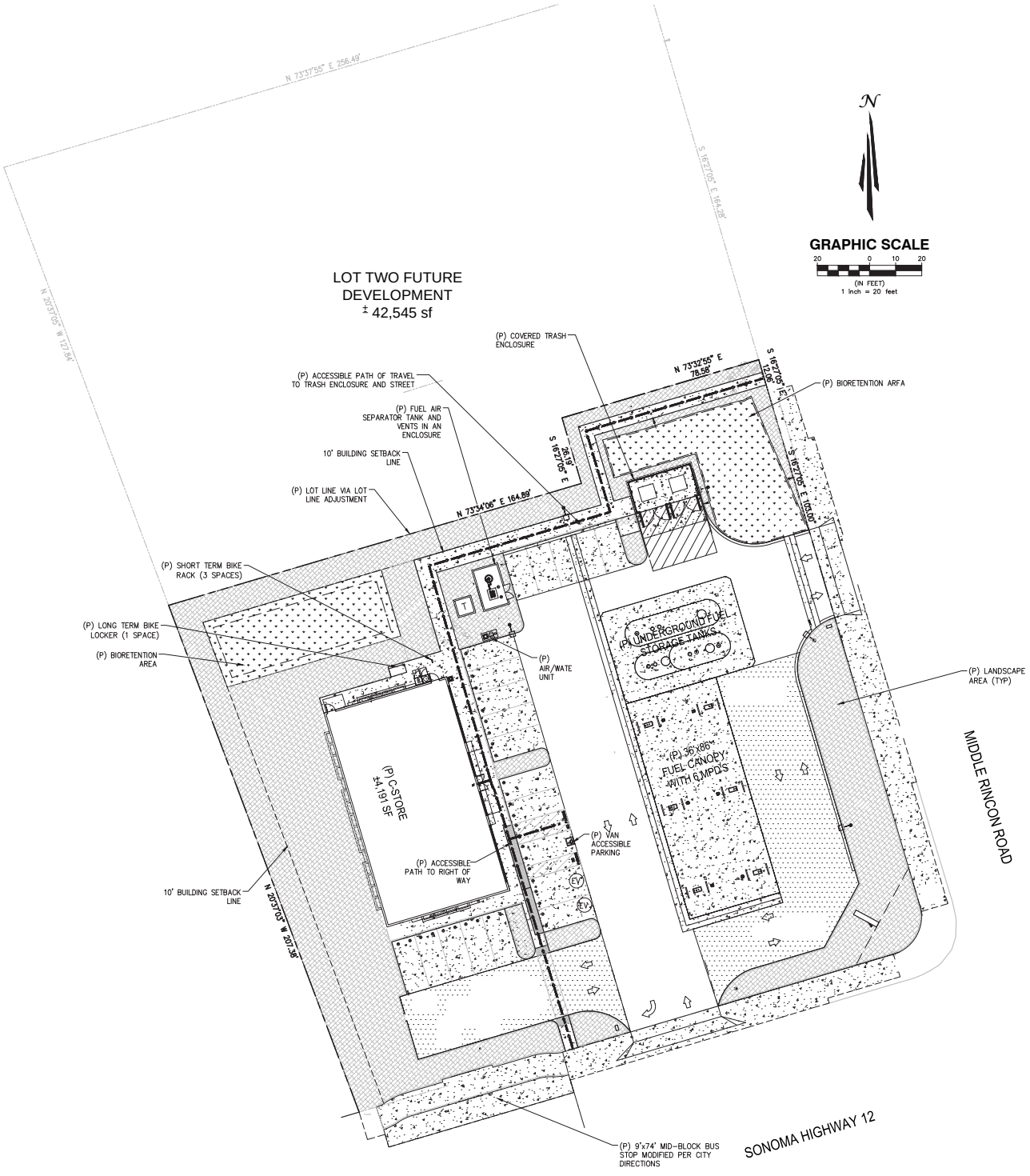
Aerial Map

Figure 2



Source: TAIT 2020

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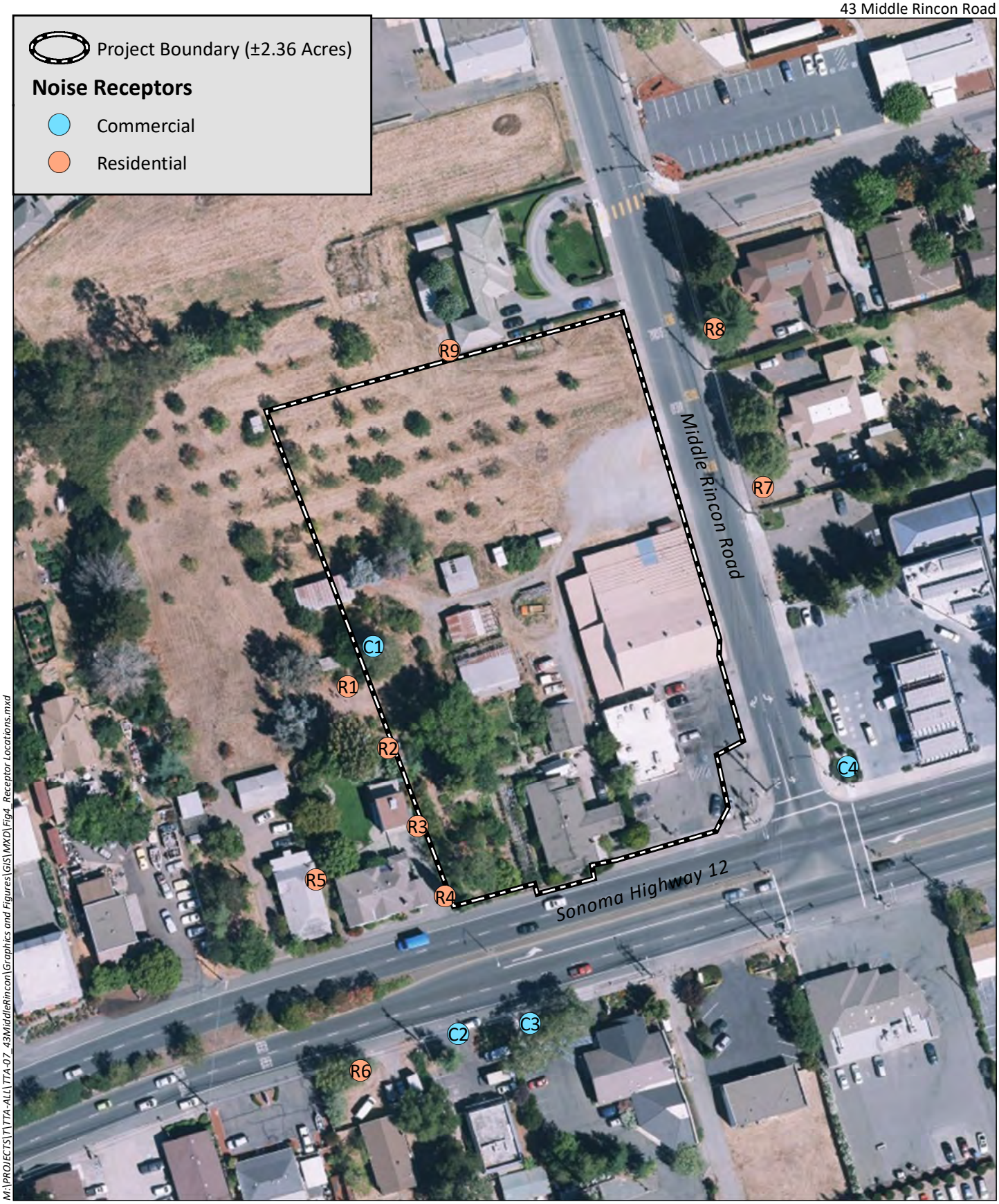
Site Plan

Figure 3



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Source: Base Map Layers (Esri, USDA, USGS); Data (Sonoma County)

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Receptor Locations

Figure 4

produce 73 dBA. Under the decibel scale, three sources of equal loudness together produce a sound level 5 dBA louder than one source.

Under controlled conditions in an acoustical laboratory, the trained, healthy human ear is able to discern 1-dBA changes in sound levels, when exposed to steady, single-frequency ("pure-tone") signals in the mid-frequency (1,000 Hz–8,000 Hz) range. In typical noisy environments, changes in noise of 1 to 2 dBA are generally not perceptible. It is widely accepted, however, that people begin to detect sound level increases of 3 dB in typical noisy environments. Further, a 5-dBA increase is generally perceived as a distinctly noticeable increase, and a 10-dBA increase is generally perceived as a doubling of loudness.

To place noise levels measured in dBA in context, typical noise levels for common outdoor and indoor noise sources are shown in Table 1, *Typical Noise Levels*.

Table 1
TYPICAL NOISE LEVELS

Common Outdoor Noise	Noise Level (dBA)	Common Indoor Noise
	110	Rock band
Jet flyover at 1000 feet		
	100	
Gas lawn mower at 3 feet		
Diesel truck at 50 feet at 50 mph	90	
		Food blender at 3 feet
Noisy urban area, daytime	80	Garbage disposal at 3 feet
Gas lawn mower at 100 feet	70	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	60	
		Large business office
Quiet urban area, daytime	50	Dishwasher in next room
Quiet urban area, nighttime	40	Theater, large conference room (background)
Quiet suburban area, nighttime		
	30	Library
Quiet rural area, nighttime		Bedroom at night, concert hall (background)
	20	
		Broadcast/recording studio
	10	
	0	

Source: Caltrans 2009

GROUNDBORNE VIBRATION LEVEL DESCRIPTORS AND TERMINOLOGY

Groundborne vibration consists of rapidly fluctuating motions or waves transmitted through the ground with an average motion of zero. Sources of groundborne vibrations include natural phenomena and anthropogenic causes (e.g., explosions, machinery, traffic, trains, construction equipment). Vibration

sources may be continuous (e.g., factory machinery) or transient (e.g., explosions). Several different methods are typically used to quantify vibration amplitude. One is the peak particle velocity (PPV); another is the root mean square (RMS) velocity. For this analysis, the PPV, defined as the maximum instantaneous positive or negative peak of the vibration wave, with units of inches per second is used to evaluate construction-generated vibration for building damage and human complaints.

REGULATORY FRAMEWORK

City of Santa Rosa General Plan

The City General Plan Noise and Safety Element (City 2009) contains adopted goals and policies, and land use compatibility standards pertaining to noise. The applicable General Plan Noise and Safety Element policies are listed below:

NS-B-3 Prevent new stationary and transportation noise sources from creating a nuisance in existing developed areas. Use a comprehensive program of noise prevention through planning and mitigation, and consider noise impacts as a crucial factor in project approval.

The Land Use Compatibility Standards specify normally acceptable levels for community noise in various land use areas.

NS-B-4 Require new projects in the following categories to submit an acoustical study, prepared by a qualified acoustical consultant:

- All new projects that could generate noise whose impacts on other existing uses would be greater than those normally acceptable (as specified in the Land Use Compatibility Standards).

NS-B-6 Do not permit existing uses to generate new noises exceeding normally acceptable levels unless:

- Those noises are mitigated to acceptable levels; or
- The activities are specifically exempted by the City Council on the basis of community health, safety, and welfare.

NS-B-14 Discourage new projects that have potential to create ambient noise levels more than 5 dBA L_{DN} above existing background, within 250 feet of sensitive receptors.

The City General Plan Noise and Safety Element contains the following normally acceptable community noise standards applicable to the project site and surrounding land uses:

- Residential - Low Density Single Family, Duplex, Mobile Homes: less than 50 L_{DN} or CNEL.
- Office Buildings, Business Commercial and Professional: Less than 70 L_{DN} or CNEL.

City of Santa Rosa Municipal Code

The City Municipal Code Chapter 17-16, *Noise*, contains the following ordinances pertaining to the project (City 2019):

17-16.030 Ambient base noise level criteria - The following criteria will be used as a base (ambient noise level) from which noise levels can be compared:

- Residential Zones R1 and R2: 10:00 p.m. to 7:00 a.m. 45 dBA; 7:00 p.m. to 10:00 p.m. 50 dBA; and 7:00 a.m. to 7:00 p.m. 55 dBA.
- Office and Commercial Zones: 10:00 p.m. to 7:00 a.m. 55 dBA; and 7:00 a.m. to 10:00 p.m. 60 dBA.

17-16.120 Machinery and equipment - It is unlawful for any person to operate any machinery, equipment, pump, fan, air-conditioning apparatus or similar mechanical device in any manner so as to create any noise which would cause the noise level at the property line of any property to exceed the ambient base noise level by more than five decibels.

NOISE MODELING SOFTWARE

Project construction noise was analyzed using the Roadway Construction Noise Model Version 1.1 (RCNM; USDOT 2004), which utilizes measured and estimated of sound levels from standard construction equipment.

Modeling of the exterior noise environment for this report was accomplished using the noise modeling software Computer Aided Noise Abatement (CadnaA) version 2019. CadnaA is a model-based computer program developed by DataKustik for predicting noise impacts in a wide variety of conditions. CadnaA assists in the calculation, presentation, assessment, and mitigation of noise exposure. It allows for the input of project related information, such as noise source data, barriers, structures, and topography to create a detailed digital environmental noise model to predict outdoor noise impacts.

Modeling of the exterior transportation noise environment for this report was accomplished using the Traffic Noise Model (TNM) version 2.5. The TNM was released in February 2004 by the U.S. Department of Transportation (USDOT) and calculates the daytime average hourly L_{EQ} from three-dimensional model inputs and traffic data (USDOT 2004). The one-hour L_{EQ} noise level is calculated utilizing peak-hour traffic; when peak-hour traffic data is limited, peak-hour traffic volumes can be estimated based on the assumption that 10 percent of the average daily traffic would occur during a peak hour. The model-calculated one-hour L_{EQ} noise output is the equivalent to the L_{DN} (Caltrans 2013).

SIGNIFICANCE CRITERIA

Based on Appendix G of the CEQA Guidelines, implementation of the project would result in a significant adverse impact if it would exceed the following thresholds based on the City General Plan and noise ordinance:

a) Generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the City General Plan or noise ordinance.

Impacts from noise generated on the project site would be significant if operation of the project produces noise levels at the property line of land uses in the project vicinity exceeding the City noise ordinance base levels by five or more dBA, as described in Chapter 17-16.030 of the noise ordinance.

Impacts from transportation-related noise would be significant if project-related traffic results in noise levels that exceed the acceptable community noise standards specified by the Noise and Safety Element, discussed in Regulatory Framework above. If existing conditions are already above those standards, a significant increase would occur if the project results in a perceptible change of 3 dBA or more over existing conditions.

Impacts from construction noise would be significant if they result in a strongly perceptible increase in ambient noise levels in the project vicinity.

b) Generate excessive ground-borne vibration or ground-borne noise levels.

A level of 0.2 PPV inches per second is commonly used as a threshold for risk of architectural damage to non-engineered timber and masonry buildings. At a level of 0.1 PPV inches per second continuous vibrations would be strongly perceptible and it is the level at which there is a risk of architectural damage to historical buildings and other vibration-sensitive structures. (FTA 2018).

c) For a project located within the vicinity of a private airstrip or an airport land use plan, or where such a plan has not been adopted, within two miles of a public use airport or private airstrip, expose people residing or working in the project area to excessive noise.

Excessive noise exposure is defined as noise levels that exceed the standards in the City's General Plan land use noise compatibility standards, described above.

PROJECT ANALYSIS

a) Generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the City General Plan or noise ordinance.

Construction

Construction of the project would generate noise from the use of heavy construction equipment. The equipment to be used for project construction had not been determined at the time of this analysis. Based on the construction modeling from the air quality emissions analysis for the project, the most intense use of heavy construction equipment would be during demolition, site preparation, and grading/excavation phases, which are anticipated to last a total of approximately six weeks (HELIX 2020). Construction equipment could be used sporadically throughout the project site but would be concentrated primarily in areas requiring substantial improvements (such as excavation for the underground fuel tanks and the building foundations). During these operations it is anticipated that a dozer, excavator and backhoe could all be operating simultaneously within 30 feet of a residential property line. Using the RCNM, the combined total noise of all equipment at the residential property line would be 85.5 dBA L_{EQ}.

The City does not have standards for acceptable temporary construction noise levels. Project construction activities have the potential to result in a strongly perceptible temporary noise increase

over ambient noise levels in the project vicinity. Therefore, temporary construction noise impacts are considered potentially significant. Implementation of mitigation measure **NOI-1** would limit project construction to the hours between 7:00 am to 7:00 pm Monday through Friday, between 8:00 am to 6:00 pm on Saturdays, and no construction on Sundays and all City recognized public holidays and require construction noise best management practices (BMPs). With implementation of mitigation measure **NOI-1**, the project's temporary noise construction noise impact would be reduced to a less-than-significant level.

Recommended Mitigation

NOI-1 Prior to issuance of any project Grading Permit or Building Permit, the City shall confirm that the construction specifications stipulate that the following construction noise measures and best management practices shall be implemented for all project construction activity:

- Restrict noise-generating activities at the construction site to the hours between 7:00 a.m. to 7:00 p.m., Monday through Friday, and between 8:00 a.m. to 6:00 p.m. on Saturdays, Sundays and City recognized public holidays;
- Post a publicly visible sign at the primary project construction entrance listing the permitted construction days and hours, complaint procedures and who to notify in the event of a problem. The sign shall also include a listing of telephone numbers to be used during regular construction hours and off-hours to contact both the City and the construction contractor regarding noise complaints;
- All construction equipment shall have appropriate sound muffling devices, which are properly maintained and used at all times such equipment is in operation;
- Construction staging areas shall be located the maximum distance possible from the nearest residences to the project site; and
- Portable equipment (e.g., air compressors; welders, generators) shall be located the maximum distance possible from the nearest residences to the project site and shall electrically powered (from the grid) whenever possible.

Operational Noise Assumptions

The proposed operational noise sources for the project include heating, ventilation, and air conditioning (HVAC) systems, refrigeration condensers for the convenience store; and an air compressor. The following assumptions were used in modeling the project's operational noise.

Heating, Ventilation, and Air Conditioning Units

Specific HVAC planning information for the project, including unit types and locations, was not available at the time of the analysis. Standard HVAC planning assumes approximately one ton of HVAC for every 350 SF of habitable space (American Society of Heating, Refrigeration, and Air Conditioning Engineers [ASHRAE] 2012). Based on the 4,191 SF building size, one 10-ton unit would be required for the Project. This analysis assumes a 10-ton Carrier Centurion Model 50 PG03-12 with a sound rating of 80 dBA sound power. This unit produces noise levels of 45 dBA L_{EQ} at 50 feet, which would be reduced by at least

5 dBA by standard parapet walls installed on a building's roofline. The manufacturer's data sheets are included in Attachment A to this report.

Commercial Refrigeration

Specific information for the convenience store's planned refrigeration condensers was not available at the time of the analysis. This analysis assumes the use of two Hussman Proto-Air 3280 units. The units would use 0.5-horsepower (HP), 1150 revolutions per minute (RPM) motors and variable speed drives (fan speed controllers). The fan was assumed to operate at 1150 RPM for daytime operations and 850 RPM for nighttime operations. The modeled noise levels from the refrigeration unit fans is shown in Table 2, *Typical Refrigeration Condenser Unit Fan Noise.* The manufacturer's data sheets are included in Attachment A to this report.

Table 2
TYPICAL REFRIGERATION CONDENSER UNIT FAN NOISE

Noise Levels in Decibels[1] (dBA) Measured at Octave Frequencies in Hertz (Hz)								Overall Noise Level (dBA)
Fan Type	**63 Hz**	**125 Hz**	**250 Hz**	**500 Hz**	**1 KHz**	**2 KHz**	**4 KHz**	
Single Fan 1,150 RPM	90.6	93.6	89.6	86.6	84.6	79.6	75.6	86.3
Single Fan 850 RPM	80.6	83.6	79.6	76.6	74.6	69.6	65.5	79.3

[1] Sound Power Levels (S_{WL})
RPM = revolutions per minute

Air Compressor

Gasoline stations are required by California law to provide air compressors and water for vehicles. The air is typically provided by a small compressor near the gas pumps. These small air pump units may produce noise ranging from a 65 dBA to 85 dBA measured at 5 feet from the unit. Air compressors are assumed to be used once per hour, with a two-minute cycle time. This analysis conservatively assumes the air compressor generates 85 dBA at 5 feet.

Delivery Truck Noise

Long-term operation of the project would require regular deliveries of fuel and retail items for the convenience store. Fuel deliveries are anticipated to occur no more than once per day and involve a heavy truck entering the side, unloading the fuel to the storage tanks, and departing the site. Deliveries to the convenience store would require up to four medium trucks per day and an occasional heavy truck. Truck deliveries could result in the occasional use of backup alarms for periods of approximately 30 seconds. Because the noise events related to truck deliveries would be infrequent and of short duration, it is not anticipated that these events would substantially increase the project's hourly average on-site noise generation (L_{EQ}). Therefore, these noise events are not included in the project's operational noise modeling and analysis.

Operational Noise Analysis

Stationary Source Noise

Potential noise sources on the project site, including a roof-top mounted HVAC system, two roof-top mounted refrigeration condensers, and one air compressor located near the parking areas, were analyzed using the CadnaA software. Modeling assumed one hour of continuous operation of all equipment except for the compressor which was modeled as operating for two minutes per hour. Modeled noise levels were analyzed at receivers placed at the property line of nearby land uses at a height of five feet above the ground (see Figure 4, *Receptor Locations)*. The modeled 1-hour (L_{EQ}) noise level at the adjacent property lines is compared with the City standards in Table 3, *Operational Equipment Daytime Noise*, and Table 4, *Operational Equipment Nighttime Noise*.

Table 3
OPERATIONAL EQUIPMENT DAYTIME NOISE

Receptor	Existing Use	Lot Zone	Noise Level (dBA)		
			Modeled Daytime Noise	Daytime Standard	Exceed Standards?
R1	SF Residence	Commercial (CG)	48.3	65	No
R2	SF Residence	Commercial (CG)	47.7	65	No
R3	SF Residence	Commercial (CG)	47.1	65	No
R4	SF Residence	Commercial (CG)	44.7	65	No
R5	SF Residence	Residential (R1)	46.3	60	No
R6	SF Residence	Residential (R1)	43.2	60	No
R7	SF Residence	Commercial (CG)	43.3	65	No
R8	SF Residence	Residential (R1)	41.6	60	No
R9	SF Residence	Residential (PD)	42.9	60	No
C1	Vacant	Commercial (CG)	47.3	65	No
C2	Commercial	Commercial (CN)	42.9	65	No
C3	Commercial	Commercial (CG)	43.3	65	No
C4	Commercial	Commercial (CG)	43.0	65	No

Source: CadnaA version 2019; City Noise Ordinance Sections 17-16.030 and 17-16.120

Table 4
OPERATIONAL EQUIPMENT NIGHTTIME NOISE

Receptor	Existing Use	Lot Zone	Noise Level (dBA)		
			Modeled Nighttime Noise	Nighttime Standard	Exceed Standards?
R1	SF Residence	Commercial (CG)	47.8	60	No
R2	SF Residence	Commercial (CG)	47.0	60	No
R3	SF Residence	Commercial (CG)	46.4	60	No
R4	SF Residence	Commercial (CG)	43.6	60	No
R5	SF Residence	Residential (R1)	45.7	50	No
R6	SF Residence	Residential (R1)	42.5	50	No
R7	SF Residence	Commercial (CG)	42.7	60	No
R8	SF Residence	Residential (R1)	41.0	50	No
R9	SF Residence	Residential (PD)	42.3	50	No
C1	Vacant	Commercial (CG)	46.7	60	No
C2	Commercial	Commercial (CN)	42.1	60	No
C3	Commercial	Commercial (CG)	42.5	60	No
C4	Commercial	Commercial (CG)	42.4	60	No

Source: CadnaA version 2019; City Noise Ordinance Sections 17-16.030 and 17-16.120

As shown in Table 3 and Table 4, the project's operational equipment noise would not exceed the City daytime or nighttime standards. Therefore, impacts from the project operation on-site stationary noise would be less than significant.

Transportation Noise

According to the project trip generation analysis, the project would result in a net increase of 749 daily trips, 60 AM peak hour trips, and 41 PM peak hour trips on streets in the project vicinity. (W-Trans 2020). Traffic count data from the City for the streets adjacent to the project site indicates that Middle Rincon Road from SR-12 to Spears Road carries an AM peak hour volume of 847. The 2017 Traffic count data from Caltrans indicates that SR-12 from Brush Creek Road to Calistoga Road carries a peak hour traffic of 8,600. The distribution of project trips on the surrounding streets was not analyzed in the project traffic study. Therefore, project trips were assumed to be distributed similarly to existing traffic volumes: 91 percent on SR-12 and 9 percent on Middle Rincon Road. All traffic was assumed to be traveling at the posted speed limit in the project vicinity: 35 miles per hour (mph) for Middle Rincon Road and 45 mph for SR-12. Traffic was assumed to be comprised of a typical mix for California roads: 96 percent cars and light trucks; 3 percent medium trucks; and 1 percent heavy trucks.

Noise levels at the closest residential properties located along the project-affected road segments were estimated using TNM 2.5 The predicted traffic noise level for the project-affected road segments are shown in Table 5, *Operational Traffic Noise*.

Table 5
OPERATIONAL TRAFFIC NOISE

Roadway Segment	Distance to Nearest NSLU (feet)[1]	NSLU Type	dBA L_{DN} at Nearest NSLU[2]		
			Existing	Existing + Project	Change in L_{DN}
Middle Rincon Road					
SR-12 to Speers Road	30	SF	66.7	66.8	+0.1
SR-12					
Brush Creek Road to Calistoga Road	35	SF	79.2	79.2	+0.0

Source: TNM 2.5
I-580 = Interstate 580; MF = SF = Single-Family Residential.
1 Distance measured from roadway centerline.

As shown in Table 5, existing traffic noise levels along Middle Rincon Road and SR-12 in the project vicinity already exceed the City General Plan acceptable community noise standard of 50 dBA L_{DN} for low density residential land uses. With the project traffic included, the maximum increase in noise levels along any roadway segment would be 0.1 dBA L_{DN}. This imperceptible increase in ambient noise levels would not exceed the 3 dBA L_{DN} standard for a significant increase. Therefore, project operational traffic noise would not result in the generation of a substantial permanent increase in ambient noise levels in the vicinity of the project.

Impact Summary

The project would not result in the generation of a substantial temporary permanent increase in ambient noise levels in the vicinity of the project and the impact would be less than significant with mitigation incorporated.

b) Generate excessive ground-borne vibration or ground-borne noise levels.

Construction activities known to generate excessive ground-borne vibration, such as pile driving, would not be conducted by the project. A possible source of vibration during general project construction activities would be a vibratory roller, which may be used within 60 feet of the nearest off-site residential building, west of the project site. A large vibratory roller would create approximately 0.210 inch per second PPV at a distance of 25 feet (FTA 2018). A 0.210 inch per second PPV vibration level would equal 0.08 inch per second PPV at a distance of 60 feet[1]. This would be lower than what is considered a "strongly perceptible" impact for humans of 0.1 inches per second PPV, and the structural damage impact to non-engineered timber and masonry buildings of 0.2 inch per second PPV. Therefore, although vibrations from a vibratory roller may be perceptible to nearby human receptors, temporary impacts associated with the roller (and other potential equipment) would be less than significant.

The proposed project does not include equipment that would generate substantial vibration. Therefore, operational vibration impacts would be less than significant.

1 Equipment PPV = Reference PPV * $(25/D)^n$ (in/sec), where Reference PPV is PPV at 25 feet, D is distance from equipment to the receiver in feet, and n = 1.1 (the value related to the attenuation rate through the ground); formula from FTA 2018.

c) For a project located within the vicinity of a private airstrip or an airport land use plan, or where such a plan has not been adopted, within two miles of a public use airport or private airstrip, expose people residing or working in the project area to excessive noise.

The closest airport or private airstrip to the project site is Charles M. Schulz–Sonoma County Airport, located approximate eight miles northwest. At this distance, airport operations would not create substantial noise at the project site, and impacts associated with airports would be less than significant.

CONCLUSION

With implementation of mitigation measure **NOI-1** to limit the hours of construction activity, temporary construction noise impacts would be less than significant. Long term operation of the project would not result in machinery and equipment noise in exceedance of the City standards, measured at nearby commercial and residential property lines. Project-related traffic would not result in a perceptible increase ambient noise level along streets in the project area. Ground-borne vibrations generated by the project during short-term construction activities and during long-term operation would be less than significant. The project would not expose persons working in the project area to excessive noise from airports.

Sincerely,

Martin Rolph
Noise Specialist

Joanne M. Dramko, AICP
Principal Noise Specialist

Attachments:

Attachment A: Equipment Specifications

REFERENCES

American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE). 2012. ASHRAE Handbook.

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Attachment A

Equipment Specifications

50PG03–28
Ultra High Efficiency Single Package Electric Cooling with Optional Electric Heat Commercial Rooftop Units with PURON® (R–410A) Refrigerant, Optional EnergyX™ (Energy Recovery Ventilator)

Carrier®
Turn to the Experts.℠

Product Data

CENTURION

EnergyX model shown

DEALER DESIGN AWARDS
theNEWS | GOLD

BUILDINGS magazine
Editors' Choice
TOP 100 PRODUCTS
2005

Puron
the environmentally sound refrigerant

Operation Air Quantity Limits

50PG03-16 Units

UNIT 50PG	COOLING (cfm)		HEATING (cfm) ELECTRIC HEAT	
	Min	Max	Min	Max
03	600	1000	600	1000
04	900	1500	900	1500
05	1200	2000	1200	2000
06	1500	2500	1500	2500
07	1800	3000	1800	3000
08	2250	3750	2250	3750
09	2550	4250	2550	4250
12	3000	5000	3000	5000
14	3750	6250	3750	6250
16	4500	7500	4500	7500

50PG20-28 Units

50PG	COOLING		ELECTRIC HEAT	ELECTRIC HEAT (Vertical)	ELECTRIC HEAT (Horizontal)
	Minimum Cfm	Maximum Cfm		Minimum Cfm	Minimum Cfm
20	5000	9,000	High Heat (75 kW)	4,500	5,400
			Medium Heat (50 kW)	3,750	4,800
			Low Heat (25 kW)	3,750	3,750
24	5500	10,000	High Heat (75 kW)	4,500	5,400
			Medium Heat (50 kW)	3,750	4,800
			Low Heat (25 kW)	3,750	3,750
28	6500	12,000	High Heat (75 kW)	4,500	5,400
			Medium Heat (50 kW)	3,750	4,800
			Low Heat (25 kW)	3,750	3,750

Outdoor Sound Power (Total Unit)

UNIT 50PG	A-WEIGHTED* (dB)	OCTAVE BAND LEVELS dB							
		63	125	250	500	1000	2000	4000	8000
03	75.0	82.6	79.9	75.7	73.3	70.0	64.3	58.4	50.5
04	73.2	79.8	77.2	74.1	70.1	68.0	63.6	58.4	51.9
05	71.9	79.7	79.6	72.6	69.6	66.0	61.4	56.4	48.5
06	78.5	82.2	82.6	79.5	75.7	73.9	68.6	64.0	56.3
07	78.5	87.5	83.0	78.5	76.3	73.8	68.4	63.8	56.5
08	80.0	91.7	83.6	81.0	77.9	75.0	69.9	66.0	59.3
09	79.9	89.1	82.7	80.0	77.7	75.0	70.2	66.3	57.8
12	80.0	90.4	83.1	80.9	77.8	75.2	70.0	66.1	57.6
14	83.3	86.4	85.9	85.3	81.8	78.2	72.2	67.9	59.9
16	84.0	90.3	85.2	83.5	81.1	79.0	73.7	70.5	65.4
20	81.7	90.2	84.8	80.7	79.0	77.6	71.4	66.7	60.7
24	84.9	90.0	86.3	83.6	82.9	80.3	74.9	71.4	66.5
28	84.9	90.0	86.3	83.6	82.9	80.3	74.9	71.4	66.5

LEGEND

db – Decibel

*Sound Rating ARI or Tone Adjusted, A–Weighted Sound Power Level in dB. For sizes 03–12, the sound rating is in accordance with ARI Standard 270–1995. For sizes 14–28, the sound rating is in accordance with ARI 370–2001.

Outdoor Sound Power (Total Unit)
with High CFM EnergyX

UNIT 50PG w/ERV	A–WEIGHTED* (dB)	OCTAVE BAND LEVELS dB							
		63	125	250	500	1000	2000	4000	8000
03	83.0	82.8	81.4	79.7	78.1	77.9	76.5	72.5	70.1
04	82.7	80.2	79.6	79.1	77.3	77.6	76.5	72.5	70.1
05	82.6	80.1	81.1	78.8	77.2	77.4	76.4	72.4	70.0
06	83.8	82.4	83.4	81.6	79.1	78.8	76.9	72.9	70.2
07	83.8	87.6	83.8	81.1	79.3	78.8	76.9	72.9	70.2
08	87.3	92.0	86.8	84.5	82.4	81.8	80.5	78.0	74.2
09	87.2	89.6	86.4	84.1	82.4	81.8	80.5	78.1	74.2
12	87.3	90.8	86.5	84.5	82.4	81.8	80.5	78.0	74.2
14	88.2	87.2	88.0	87.0	84.2	82.7	80.8	78.2	74.3
16	91.4	93.2	92.8	88.2	86.3	85.5	84.4	83.4	78.4
20	91.2	93.1	92.7	87.4	85.8	85.2	84.2	83.3	78.3
24	91.7	93.0	93.0	88.2	86.9	85.8	84.5	83.5	78.5
28	91.7	93.0	93.0	88.2	86.9	85.8	84.5	83.5	78.5

LEGEND
dB – Decibel
***** Sound Rating ARI or tone Adjusted, A–Weighted Sound Power Level in dB. For sizes 03–12, the sound rating is in accordance with ARI Standard 270–1995. For sizes 14–28, the sound rating is in accordance with ARI 370–2001.

PHYSICAL DATA

50PG03-07

BASE UNIT 50PG		03	04	05	06	07
NOMINAL CAPACITY (Tons)		2	3	4	5	6
OPERATING WEIGHT (lb)						
Unit*		704	704	775	829	874
Economizer						
Vertical		40	40	40	40	40
Horizontal		50	50	50	50	50
Humidi-MiZer™ Adaptive Dehumidification System		22	22	31	27	26
Roof Curb						
14-in.		122	122	122	122	122
24-in.		184	184	184	184	184
COMPRESSOR		Fully Hermetic Scroll				
Quantity		1	1	1	1	1
Oil Type		Copeland 3MA				
Number of Refrigerant Circuits		1	1	1	1	1
Oil (oz)		38	42	42	66	56
REFRIGERANT TYPE		R-410A (Puron® Refrigerant)				
Expansion Device		TXV	TXV	TXV	TXV	TXV
Operating Charge (lb) — Standard Unit		7.3	9.0	15.7	16.6	19.0
Operating Charge (lb) — Unit with Humidi-MiZer System		11.75	13.50	25.00	22.00	22.70
CONDENSER COIL		Enhanced Copper Tubes, Aluminum Lanced Fins				
Condenser A (Outer)						
Rows...Fins/in.		1…17	1…17	2…17	2…17	2…17
Face Area (sq ft)		12.6	12.6	12.6	12.6	12.6
Condenser B (Inner)						
Rows...Fins/in.		—	1…17	2…17	2…17	2…17
Face Area (sq ft)		—	12.6	12.6	12.6	12.6
HUMIDI–MIZER COIL		Enhanced Copper Tubes, Aluminum Lanced Fins				
Rows...Fins/in.		1...17	1...17	1...17	1...17	1...17
Face Area (sq ft)		6.4	6.4	9.3	9.3	9.3
CONDENSER FAN		Propeller				
Quantity…Diameter (in.)		1…24	1…24	1…24	1…24	1…24
Nominal Cfm (Total, all fans)		3500	3500	3500	4500	4500
Motor Hp		1/8	1/8	1/8	1/4	1/4
Nominal Rpm — High Speed		825	825	825	1100	1100
Nominal Rpm — Low Speed		300	300	300	300	300
EVAPORATOR COIL		Enhanced Copper Tubes, Aluminum Double-Wavy Fins, Face Split				
Rows…Fins/in.		2…15	2…15	2…15	3…15	4…15
Face Area (sq ft)		9.3	9.3	9.3	9.3	9.3
EVAPORATOR FAN		Centrifugal Type, Belt Drive				
Quantity…Size (in.)	Low	1...12 x 9	1...12 x 9	1...12 x 9	1...12 x 9	1...12 x 9
	High	1...12 x 9	1...12 x 9	1...12 x 9	1...12 x 9	1...12 x 9
Type Drive	Low	Belt	Belt	Belt	Belt	Belt
	High	Belt	Belt	Belt	Belt	Belt
Nominal Cfm		800	1200	1600	2000	2400
Maximum Continuous Bhp	Low	0.85	0.85	0.85	0.85/2.40†	2.40
	High	0.85	0.85	1.60/2.40†	1.60/2.40†	3.10
Motor Nominal Rpm		1620	1620	1620	1725	1725
Motor Frame Size	Low	48Y	48Y	48Y	56Y	56Y
	High	48Y	48Y	56Y	56Y	56Y
Fan Rpm Range	Low	482-736	482-736	596-910	690-978	796-1128
	High	656-1001	796-1128	828-1173	929-1261	1150-1438
Motor Bearing Type		Ball	Ball	Ball	Ball	Ball
Maximum Fan Rpm		2000	2000	2000	2000	2000
Motor Pulley Pitch Diameter Range (in.)	Low	1.9-2.9	1.9-2.9	1.9-2.9	2.4-3.4	2.4-3.4
	High	1.9-2.9	2.4-3.4	2.4-3.4	2.8-3.8	4.0-5.0
Fan Pulley Pitch Diameter (in.)	Low	6.8	6.8	5.5	6.0	5.2
	High	5.0	5.2	5.0	5.2	6.0
Nominal Motor Shaft Diameter (in.)	Low	1/2	1/2	1/2	5/8	5/8
	High	1/2	1/2	5/8	5/8	7/8
Belt…Pitch Length (in.)	Low	49.3	49.3	49.3	49.3	49.3
	High	49.3	49.3	49.3	49.3	52.3
Belt…Type	Low	AX	AX	AX	AX	AX
	High	AX	AX	AX	AX	AX
Pulley Center Line Distance Min. (in.)	Low	16.2	16.2	16.2	16.2	16.2
	High	16.2	16.2	16.2	16.2	16.2
Pulley Center Line Distance Max. (in.)	Low	20.2	20.2	20.2	20.2	20.2
	High	20.2	20.2	20.2	20.2	20.2
Speed Change per Full Turn of Movable Pulley Flange (rpm)	Low	48	48	59	58	66
	High	65	62	69	66	58
Movable Pulley Maximum Full Turns from Closed Position	Low	5	5	5	5	5
	High	5	5	5	5	5
Factory Pulley Setting (rpm)	Low	482	482	596	690	796
	High	656	796	828	929	1150
Fan Shaft Diameter at Pulley (in.)		3/4	3/4	3/4	3/4	3/4
HIGH-PRESSURE SWITCH (psig)						
Cutout		660 ± 10	660 ± 10	660 ± 10	660 ± 10	660 ± 10
Reset (Auto.)		505 ± 20	505 ± 20	505 ± 20	505 ± 20	505 ± 20
RETURN-AIR FILTERS		Throwaway				
Quantity…Size (in.)		4…16 x 20 x 2	4…16 x 20 x 2	4…16 x 20 x 2	4…16 x 20 x 2	4…16 x 20 x 2

LEGEND

TXV – Thermostatic Expansion Valve

*Aluminum evaporator coil/aluminum condenser coil.

† Single phase/three phase

HUSSMANN®

Proto-Aire Outdoor Protocol

Environmental Benefits Compared to Traditional Rack Systems.

- Better energy efficiency reduces use of fossil fuels, reduces air pollution.
- Significantly smaller refrigerant charge reduces use of HFCs.
- Significantly lower refrigerant leak rate.

PROTO-AIRE

Outdoor Small Footprint Protocol Solution.

Proto-Aire is a compact footprint outdoor Protocol unit with an integrated air-cooled condenser and weatherproof skins. Units can be installed outside next to the store or on the roof. This allows for more flexibility with Protocol store designs and reduces space requirements for equipment inside the store.

Sustainable Solutions.

Protocol is the most widely used refrigeration system directly addressing today's environmental concerns. We are using the phrase "Sustainable Solutions" to underscore Protocol's important role in helping address environmental issues.

Hussmann is committed to developing advanced technologies that reduce the use of HFCs and improve energy efficiency. Protocol is just one of many alternatives we offer to promote sustainable solutions.

Several condenser sizes.

Proto-Aire is sized based on the compressor load and the heat of rejection requirements for the compressors. The largest condenser can support up to 450 MBH at a 20˚F TD.

Features and options.

- Weatherproof outdoor enclosure.
- Factory installed suction filters and liquid driers.
- Optional factory-installed gas defrost valves and winter control.
- Optional Polyfin and Electrofin coil coating.
- Optional oversized receiver with heat tape and insulation.
- Optional hail guards and rain doors.

All standard Protocol options.

Since the Proto-Aire builds upon the Protocol frame, all standard Protocol mechanical and electrical options are available with Proto-Aire.

Proto-Aire environmental advantages.

- Significant reduction in refrigerant charge.
- Significant reduction in greenhouse gas emissions.
- Better energy efficiency in virtually all applications.
- Less copper refrigerant piping.
- Fewer braze joints for fewer leaks.

Other advantages.

- Easy to install.
- No machine room needed.
- Lower installation costs.
- Decreases or eliminates the need for EPRs.
- Compact footprint.

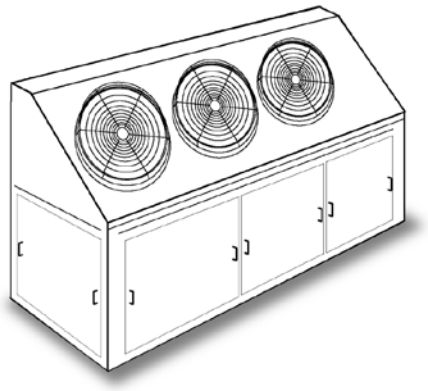
Proto-Aire dimensions.

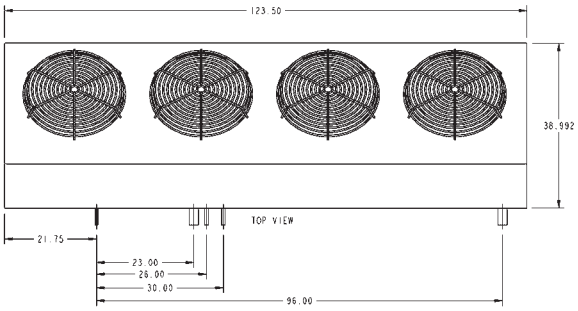
	L	H	D	Weight
Nomenclature	(in)	(in)	(in)	(lb)
3 and 4 Fan	128	56.5	42	2800
6 Fan (Super)	185	56.5	42	3700

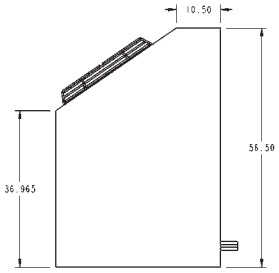
NOTE: We reserve the right to change or revise specifications and product design in connection with any feature of our products. Such changes do not entitle the buyer to corresponding changes, improvements, additions, or replacements for equipment previously sold or shipped.

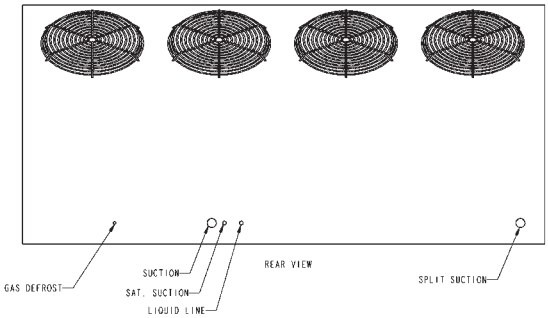
For additional resources, contact your representative or visit www.hussmann.com.

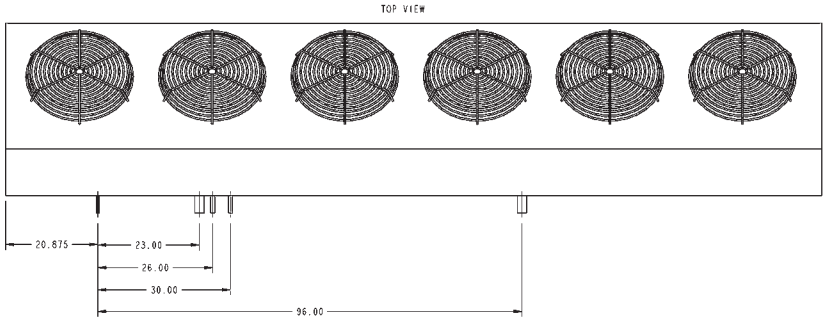
LISTED

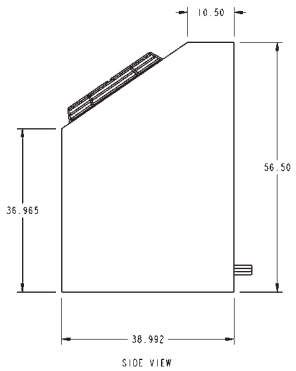


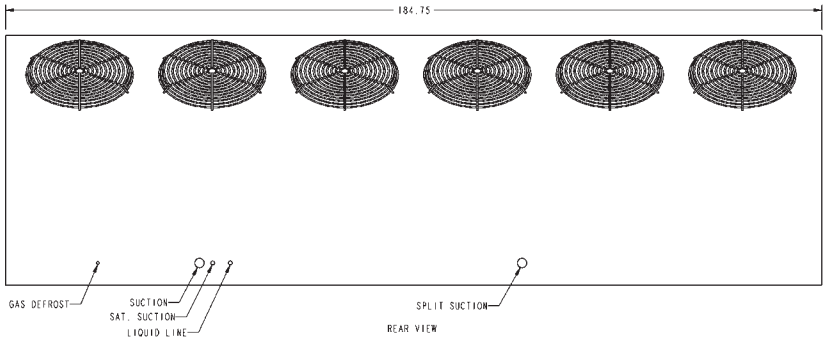












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