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August 28, 2019
Project No. 51-039

Mr. Paul Latala
Latala Homes
1999 South Bascom Avenue
Suite 700
Campbell, CA 95008

Subject: Noise and Vibration Assessment Study for the Planned "The Lumber Yard" Multi-Family Development, Depot Street, Morgan Hill

Dear Mr. Latala:

This report presents the results of a noise and vibration assessment study for the planned "The Lumber Yard" multi-family development along Depot Street in Morgan Hill, as shown on the Site Plan, Ref. (a). The noise exposures at the site were evaluated against the standards of the City of Morgan Hill General Plan Noise Element, Ref. (b), and the State of California Code of Regulations, Title 24, Ref. (c). The projected interior levels in the commercial spaces were evaluated against the standards of the CalGreen Non-Residential Mandatory Measures, Ref. (d). The on-site ground-borne vibration levels from rail operations were evaluated against guidelines established by the Federal Transit Administration, Ref. (e). The noise and vibration data used in this study were obtained from the noise and vibration analysis for the Casa Diana development directly across the railroad tracks, Ref. (f). Vibration data from railroad vibration analyses for the Gippetti Property, Ref. (g) and the City Ventures Morgan Hill 7 site, Ref. (h) were also used to supplement the vibration data at the Casa Diana site. There are no large outdoor common recreational areas associated with this project that fall under the restrictions of the Noise Element.

The analysis of the noise data applied to the subject project indicate that the noise environment is created primarily by railroad sources on the adjacent Union Pacific Railroad/CalTrain line and traffic sources on East Dunne Avenue. The results of the analysis reveal that interior noise exposure excesses will occur in project living spaces and mitigation measures will be required. The ground-borne vibration levels are within the limiting guidelines of the FTA. Mitigation measures for vibration will not be required.

Sections I and II of this report contain a summary of our findings and recommendations, respectively. Subsequent sections contain site, traffic, railroad and project descriptions, analyses and evaluations. Appendices A, B and C, attached, contain the list of references, descriptions of the standards, definitions of the terminology, descriptions of the instrumentation used for the field survey, ventilation requirements, general building shell controls and the noise measurement data from the Casa Diana project.

I. Summary of the Findings

A. Noise and Vibration Standards, Criteria and Guidelines

City of Morgan Hill Noise Element

The noise exposures presented herein were evaluated against the standards of the City of Morgan Hill Noise Element, which utilizes the Day-Night Level (DNL) 24-hour descriptor to define acceptable noise exposures for various land uses.

Policy 7

New development projects shall be designed and constructed to meet acceptable exterior noise level standards (see *Table 9*), as follows:

- *The maximum exterior noise level of 60 dBA Ldn shall be applied in residential areas where outdoor use is a major consideration (e.g., backyards in single family housing developments and recreation areas in multi-family housing projects). Where the City determines that providing an Ldn of 60 dBA or lower cannot be achieved after the application of reasonable and feasible mitigation, an Ldn of 65 dBA may be permitted.*

- *Indoor noise levels should not exceed an Ldn of 45 dBA in new residential housing units.*

- *Noise levels in new residential development exposed to an exterior Ldn 60 dBA or greater should be limited to a maximum instantaneous noise level (e.g., trucks on busy streets, train warning whistles) in bedrooms of 50 dBA. Maximum instantaneous noise levels in all other habitable rooms should not exceed 55 dBA.*

- *The maximum outdoor noise level for new residences near the railroad shall be 70 dBA Ldn, recognizing that train noise is characterized by relatively few loud events.*

Note that common recreational exterior living areas are not shown on the plans. Therefore, evaluations of noise impacts to exterior areas are not provided in this study.

The City of Morgan Hill Planning Department has determined that applying noise controls to the private exterior spaces of the projects (balconies, patios) is not feasible due to the close proximity of the railroad and the elevation of the tracks.

Our experience with applying maximum noise limits reveals that there are problems achieving these very stringent standards. The window and glass door sound ratings usually need to be unreasonably high for a single, 1 second noise event. The reasoning behind the 50 dBA maximum limit for bedrooms is to inhibit sleep disturbance. The reasoning behind the 55 dBA maximum limit for other living spaces is to inhibit speech interference. Rather than evaluating the highest maximum sound level, which by definition, is a 1 second rms level of the peak noise event over the entire 24-hour day, the highest L_1 value could be used. The L_1 is the level of noise that is exceeded for 1% of the period, in this case each hour of the 24-hour day. Since 1% of 1 hour is 36 seconds, the hourly L_1 represents a 36 second cumulative period in the hour where the noise levels exceeded that level. For instance, an L_1 of 70 dBA means that 70 dBA was exceeded for a total of 36 seconds during the hour.

For sleep disturbance, 36 seconds of sound in excess of 50 dBA in a bedroom has a low probability (less than 15%) of awakening a person in second stage or third stage (REM) sleep.

A sound level of 55 dBA in other living spaces (kitchens, living rooms, etc.) is roughly equivalent to the level of two people having a normal conversation or of typical television or stereo sound levels.

This study evaluates the highest hourly L_1 noise level during the daytime hours of 7:00 a.m. to 10:00 p.m. calculated for the interior living spaces against the 55 dBA limit for other living spaces (other than bedrooms). This study also evaluates the highest hourly L_1 noise level during the nighttime hours of 10:00 p.m. to 7:00 a.m. calculated for the bedrooms against the 50 dBA limit for bedrooms.

State of California, Title 24

The Title 24 standards specify an interior noise exposure limit of 45 dB DNL from exterior noise sources. This standard corresponds to the City of Morgan Hill Noise Element standard.

Title 24 also establishes minimum sound insulation ratings for common partitions separating different dwelling units and dwelling units from interior common spaces. The standards specify that common walls and floor/ceiling assemblies must have a design Sound Transmission Class (STC) rating of 50 or higher. In addition, common floor/ceiling assemblies must have a design Impact Insulation Class (IIC) rating of 50 or higher. As design details for the interior partitions of the project were not available at the time of this study, an evaluation of the interior partitions has not been made.

State of California, Title 24 CalGreen

The CalGreen Non-Residential Mandatory Measures, which are part of Title 24, are applied to the retail spaces of the project. Section 5.507 “Environmental Comfort, contains two methods for determining the interior noise levels. These methods impose different interior noise level requirements. When on-site noise level data are available, the “Performance Method” is used. The standards are outlined below.

5.507.4 Acoustical control. Employ building assemblies and components with Sound Transmission Class (STC) values determined in accordance with ASTM E90 and ASTM E413 or Outdoor-Indoor Sound Transmission Class (OITC) determined in accordance with ASTM E1332, using either the prescriptive or performance method in Section 5.507.4.1 or 5.507.4.2.

5.507.4 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:

Within the 65 CNEL noise contour of an airport

Exceptions:

1. L_{dn} or CNEL for military airports shall be determined by the facility Air Installation Compatible Land Use Zone (AICUZ) plan.

2. L_{dn} 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 fixed-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 L_{eq}-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.

As noise level data for the site are available, the Performance Method of the CalGreen standards is used in this study.

Federal Transit Administration

The vibration levels shown in the findings are expressed in units of dB re: 1×10^{-6} in/sec (peak velocity). The human response to vibration can vary within wide limits, as it depends on the position and inherent motion of the person perceiving the vibration, as well as the physical and psychological makeup of the particular person.

The City of Morgan Hill currently does not have any standards for vibration in residential areas. Therefore, the vibration analysis presented in this report uses the criteria established by the Federal Transit Administration (FTA). For residences near rail lines that carry fewer than 30 trains per day, which is considered infrequent, the FTA recommends a limit of 80 decibels of vibration (VdB) inside the dwelling. The FTA guidelines provide adjustment methodologies to vacant site vibration levels to determine the approximate vibration levels in various floor elevations of residential structures.

The noise exposures and noise and vibration levels shown below represent the noise environment for existing and post-project site conditions.

B. Exterior Noise Exposures (dB DNL)

- The existing exterior noise exposure at the most impacted planned building setback from the UPRR/CalTrain tracks (64 ft. from the centerline) is 70 dB DNL. Under future conditions, the noise exposure is expected to remain at 70 dB DNL.

- The existing exterior noise exposure at the most impacted planned building setback from East Dunne Avenue (65 ft. from the centerline) is 63 dB DNL. Under future traffic conditions, the noise exposure is expected to increase to 66 dB DNL.

Note: As traffic on East Dunne Avenue and the railroad do not occur at the same time (vehicular traffic stops at the crossing), the noise levels from the two sources are not combined.

C. Exterior Noise Levels (dBA L_1)

- The existing highest L_1 values at the planned minimum building setback from the railroad are 85 dBA during the daytime and 80 dBA at night.

- The existing highest L_1 values at the planned minimum building setback from East Dunne Avenue are 72 dBA during the daytime and 69 dBA at night. Under future traffic conditions, the L_1 values are expected to increase to 75 dBA during the daytime and to 72 dBA at night.

D. Interior Noise Exposures (dB DNL)

- The interior noise exposure in the most impacted living spaces closest to the UPRR will be 55 dB DNL. Thus, the noise exposures will be up to 10 dB in excess of the City of Morgan Hill Noise Element and Title 24 standards.

- The interior noise exposure in the most impacted living spaces closest to East Dunne Avenue will be 48 and 51 dB DNL, under existing and future traffic conditions, respectively. Thus, the noise exposures will be up to 6 dB in excess of the City of Morgan Hill Noise Element and Title 24 standards under future conditions.

E. Interior Noise Levels (dBA L_1)

- The interior L_1 noise levels in the most impacted living spaces closest to the UPRR will be 75 dBA during the daytime and 70 dBA at night. Thus, the noise levels will be up to 20 dB in excess of the 55 dBA daytime limit and up to 25 dB in excess of the nighttime limit of the City of Morgan Hill Noise Element standards.

- The interior L_1 noise levels in the most impacted living spaces closest to East Dunne Avenue will be 62 and 65 dBA, under existing and future traffic conditions, respectively, during the daytime. The nighttime L_1 noise levels will be 59 and 62 dBA under existing and future traffic conditions, respectively. Thus, the noise levels will be up to 10 dB in excess of the City of Morgan Hill Noise Element standards during the daytime and up to 12 dB in excess of the standards at night.

The findings reveal that interior noise exposure and noise level excesses will occur and mitigation measures will be required. The recommended measures are described in Section II.

F. Exterior Noise Levels (CalGreen)

The CalGreen interior noise requirements for the non-residential areas of the project apply during the proposed hours of operation. However, as the specific commercial uses have not been determined, the hourly average noise levels ($L_{eq(h)}$) are being provided for the entire 24-hour day.

- The existing exterior hourly average noise levels at the most impacted building setback of the commercial portion of the project building facing the railroad tracks, 140 ft. from the centerline of the tracks, range from 35.5 to 67.9 dBA $L_{eq(h)}$ over the 24-hour day. Under future traffic conditions, the noise levels are estimated to remain at 35.5 to 67.9 dBA $L_{eq(h)}$.

- The existing exterior hourly average noise levels at the most impacted building setback of the commercial portion of the project building facing East Dunne Avenue, 174 ft. from the centerline of the road, range from 41.4 to 58.9 dBA $L_{eq(h)}$ over the 24-hour day. Under future traffic conditions, the noise levels are estimated to increase to 44.4 to 61.9 dBA $L_{eq(h)}$.

G. Interior Noise Levels (CalGreen)

- The interior hourly average noise levels in the most impacted commercial spaces of the project facing the railroad tracks will range from 10.5 to 42.9 dBA $L_{eq(h)}$ over the 24-hour day. Under future traffic conditions, the noise levels are estimated to remain at 10.5 to 42.9 dBA $L_{eq(h)}$. Thus, the noise levels will be within the 50 dBA $L_{eq(h)}$ limit of the CalGreen Non-Residential Mandatory Measures.

- The interior hourly average noise levels in the most impacted commercial spaces of the project facing East Dunne Avenue will range from 16.4 to 33.9 dBA $L_{eq(h)}$ over the 24-hour day. Under future traffic conditions, the noise levels are estimated to increase to 19.4 to 36.9 dBA $L_{eq(h)}$. Thus, the noise levels will be within the 50 dBA $L_{eq(h)}$ limit of the CalGreen Non-Residential Mandatory Measures.

E. <u>Railroad Vibration Levels</u>

- The railroad induced ground-borne vibration levels on the bare site at the most impacted planned building setback, 64 ft. from the centerline of the railroad tracks, range from 66 to 71 VdB for freight trains, 57 to 67 VdB for CalTrains and 59 to 64 VdB for Amtrak trains.

- Using the adjustment methodologies of the FTA, the vibration levels in the first floor living spaces will be 61-72 VdB for freight trains, 58-68 VdB for CalTrains and 60-65 VdB for Amtrak trains.

- At the second floor elevations, the vibration levels in the living spaces will be 59-70 VdB for freight trains, 56-66 VdB for CalTrains and 58-63VdB for Amtrak trains.

- At the third floor elevations, the vibration levels in the living spaces will be 57-68 VdB for freight trains, 56-66 VdB for CalTrains and 56-61 VdB for Amtrak trains.

The vibration levels will be within the 80 VdB guideline recommended by the Federal Transit Administration for infrequent operations. Mitigation measures for ground-borne vibration will not be required.

II. Recommendations

A. Interior Noise Controls

Attempting to the achieve compliance with the 50 dBA maximum instantaneous limit contained in the City of Morgan Hill Noise Element would require window sound ratings up to Sound Transmission Class (STC) 58. These types of windows are not available for residential construction. Therefore, we recommend that the City of Morgan Hill Planning Department waive the "maximum instantaneous" requirements and adopt the L_1 noise level methodology described in the study.

To comply with the 45 dB DNL standard of the City of Morgan Hill Noise Element, the 50 dBA nighttime L_1 for bedrooms and the 55 dBA daytime L_1 for other living spaces, the following noise control measures will be required. In addition, general construction measures affecting the building shell are also recommended, as described in Appendix B.

- Maintain closed at all times all windows and glass doors of living spaces of the project.
- Install windows and glass doors rated minimum Sound Transmission Class (STC) 35 at living spaces within approximately 120 ft. of the railroad tracks and with a direct or side view of the railroad.
- Install windows and glass doors rated minimum STC 31 at all other living spaces between 120 ft. and 190 ft. of the railroad tracks with a direct or side view of the railroad.
- Install windows and glass doors rated minimum STC 31 at all living spaces with a direct or side view to East Dunne Avenue and within approximately 105 ft. of the centerline.

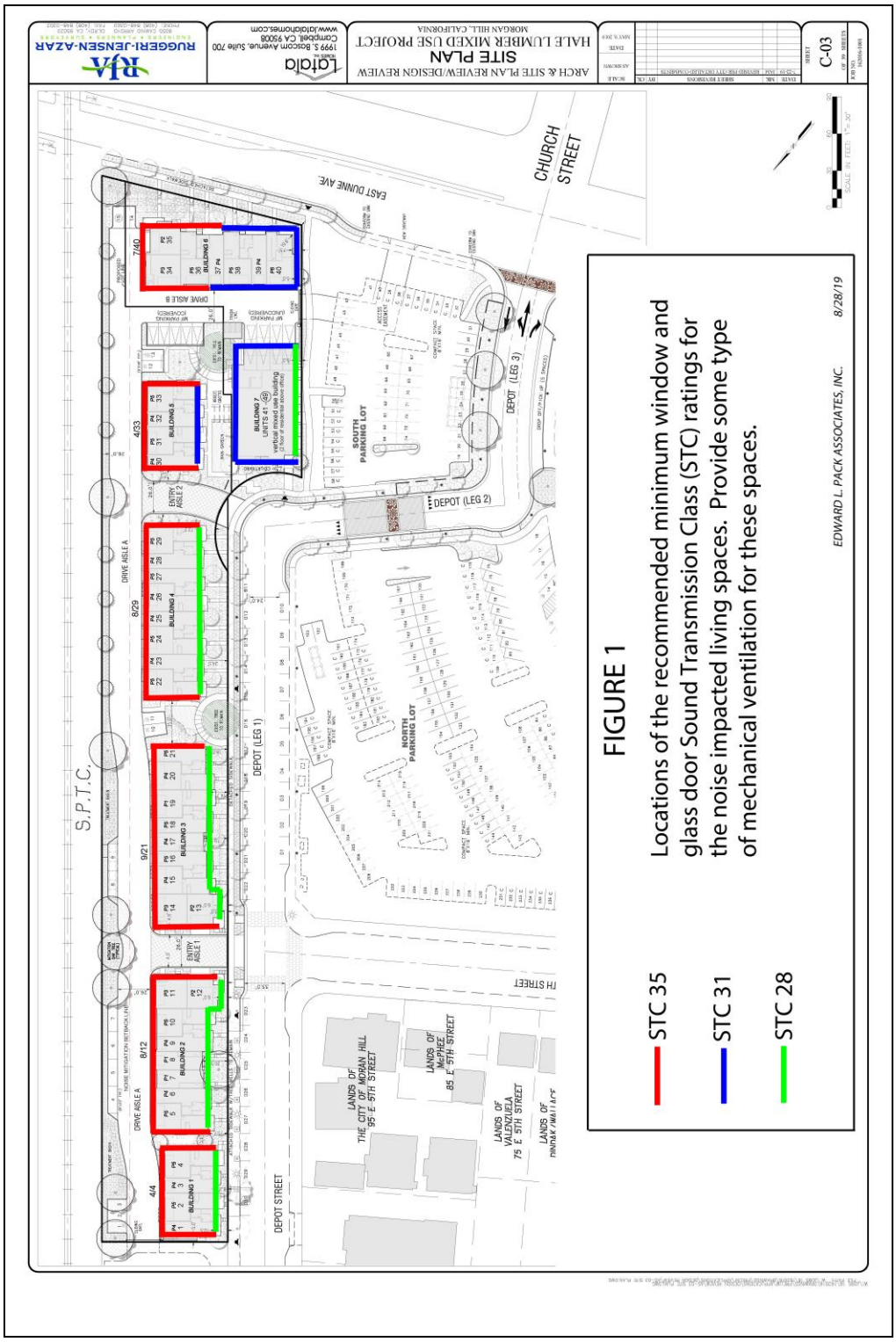
- Install windows and glass doors rated minimum STC 28 at all other living spaces of the project.

- Provide some type of mechanical ventilation for living spaces with a closed window condition.

Please see Figure 1 for the locations of the sound rated window and glass door assemblies.

When windows and doors are maintained closed for noise control, some type of mechanical ventilation to assure a habitable environment must be provided. The mechanical ventilation requirements specified by the Uniform Building Code (UBC) are described in Appendix B. The windows and glass doors specified to be maintained closed are to be operable, as the requirement does not imply a "fixed" condition. All other windows and glass doors of the project and all bathroom windows may have any type of glazing and may be kept opened as desired unless the bathroom is an integral part of a living space and not separated by a closeable door.

In addition to the required STC ratings, the windows and doors shall be installed in an acoustically-effective manner. To achieve an acoustically-effective window construction, the sliding or swinging window and door panels must form an air-tight seal to the outside environment when in the closed position and the window and door frames must be caulked to the wall opening around their entire perimeter with a non-hardening caulking compound to prevent sound infiltration. Exterior doors must seal air-tight around the full perimeter when in the closed position. Spray-in or expandable foams are not acceptable acoustical sealants.


ARCH & SITE PLAN REVIEW/DESIGN REVIEW
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BUILDING 3
BUILDING 4
BUILDING 5
BUILDING 6
BUILDING 7
UNITS 41-48
vertical mixed use building
4/4
8/12
9/21
4/33
8/29
7/40
S.P.T.C.
LANDS OF THE CITY OF MORGAN HILL 95 E. 5TH STREET
LANDS OF McPHEE 85 E. 5TH STREET
LANDS OF VALENZUELA 75 E. 5TH STREET
FIGURE 1
Locations of the recommended minimum window and glass door Sound Transmission Class (STC) ratings for the noise impacted living spaces. Provide some type of mechanical ventilation for these spaces.
STC 35
STC 31
STC 28
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8/28/19

Please be aware that many dual-pane window and glass door assemblies have inherent noise reduction problems in the traffic and railroad noise frequency spectra due to resonance that occurs within the air space between the window lites, and the noise reduction capabilities vary from manufacturer to manufacturer. Therefore, the acoustical test report of all sound rated windows should be reviewed by a qualified acoustician to ensure that the chosen windows will adequately reduce traffic and railroad noise to acceptable levels.

The implementation of the above recommended measures will reduce interior noise exposures to 45 dB DNL and to 50 dBA L_1 or lower during nighttime hours.

III. Site, Traffic, Railroad and Project Descriptions

The planned project site is located along Diana Avenue, west if Highway 101 in Morgan Hill and currently contains the Hale Lumber Company. The site is relatively flat and approximately 1 ft. to 6 ft. below the grade of East Dunne Avenue and approximately 6 ft. below the railroad track elevation. Surrounding land uses include the Casa Diana multi-family development across the railroad tracks to the east, multi-family residential across East Dunne Avenue to the south, the Morgan Hill Community and Cultural Center and single-family residential across Depot Street to the west and the Morgan Hill CalTrain station and tot lot adjacent to the north.

The on-site noise environment is controlled primarily by operations on The UPRR/CalTrain line and traffic sources on East Dunne Avenue. The Union Pacific Railroad/CalTrain line carries 6 CalTrain passenger trains (3 northbound, 3 southbound), 2 Amtrak trains (Coast Starlight; 1 northbound and 1 southbound) and 1-5 freight trains per day. Freight trains are usually unscheduled and can vary from day to day.

Current traffic volume data for East Dunne Avenue were not available at the time of this study. However, the Casa Diana analysis indicated that there would be a 3 dB increase in the East Dunne Avenue traffic noise levels for the project year of 2025.

The planned project includes the construction of 40 townhouses and 9 condominiums in seven 3-story buildings. Building 7 will contain commercial uses on the first floor and the condominiums on the second and third floor. Ingress and egress to the site will be by way of driveways off of Depot Street. The Site Plan is shown on Figure 2, below.

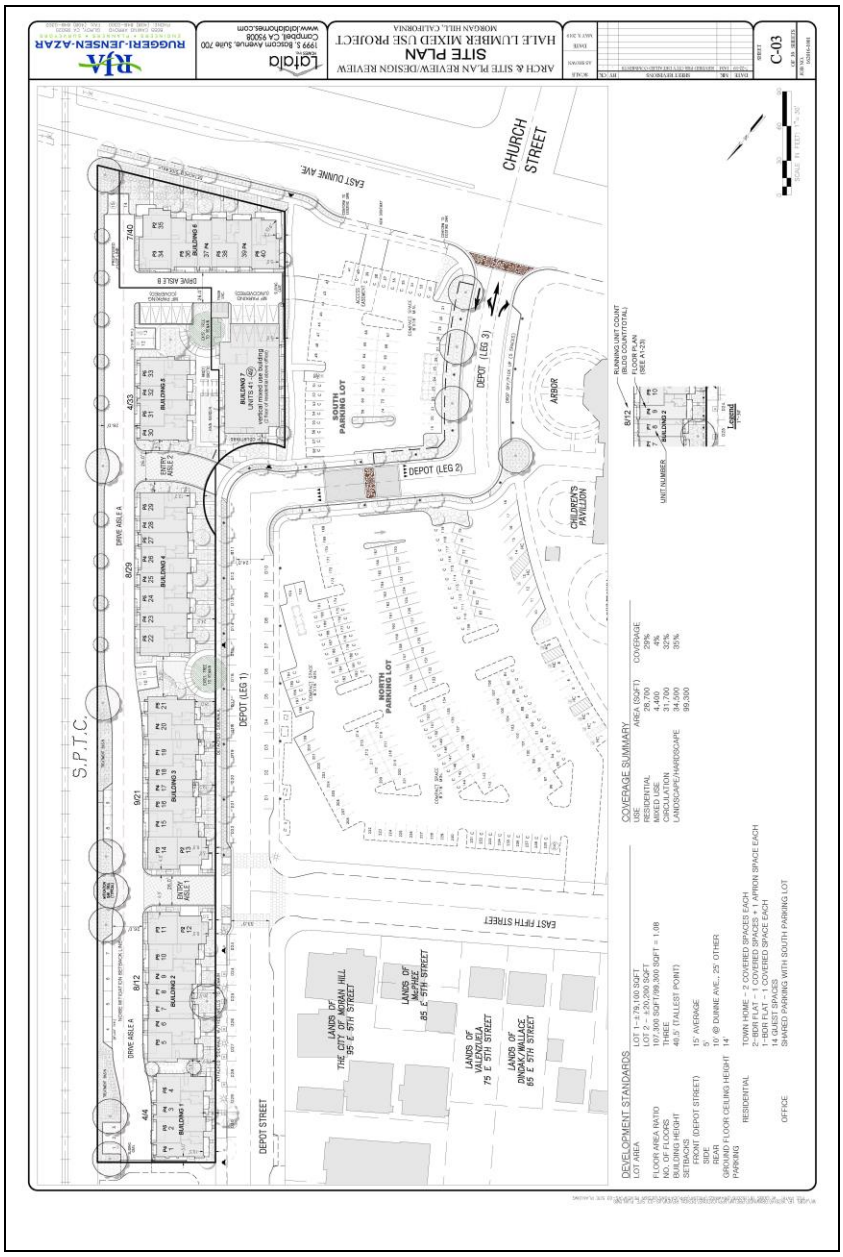

FIGURE 2 – Site Plan

III. Analysis of the Noise Levels

A. Existing Noise Levels

To determine the existing noise environment at the site, continuous recordings of the sound levels were made at two locations on the Casa Diana site. Location 1 was 28 ft. from the centerline of the UPRR tracks. This location was chosen for security of the sound measuring instrument and to facilitate the segregation of rail noise from traffic noise. Location 2 was 55 ft. from the centerline of East Dunne Avenue at the (original) driveway onto the site. The noise measurement locations are shown on Figure 3, below.

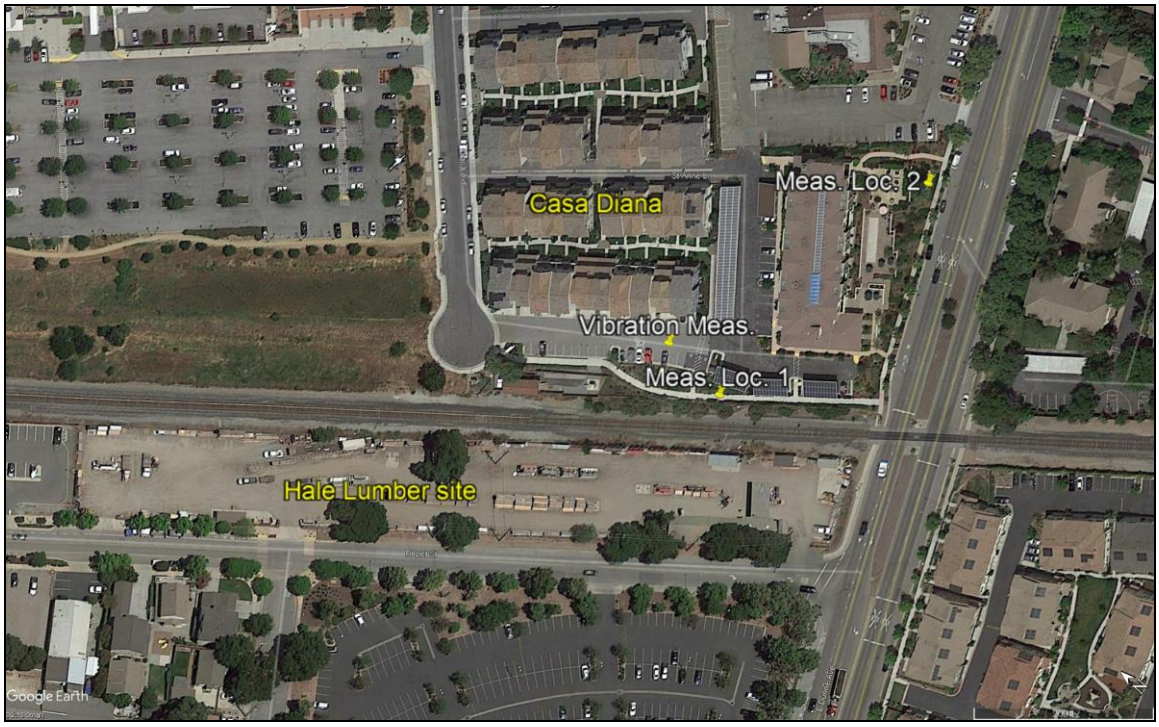

FIGURE 3 – Noise Measurement Locations

The measurements were made on September 24-25, 2007 at Locations 1 and 2 using Larson-Davis LDL 812 Precision Integrating Sound Level Meters. The meters yield, by direct readout, a series of descriptors of the sound levels versus time, as described in Appendix B.

The measured descriptors included the L_1, L_{10}, L_{50}, and L_{90}, i.e., those levels that are exceeded 1%, 10%, 50%, and 90% of the time. Also measured were the maximum and minimum levels, and the continuous equivalent-energy levels (L_{eq}), which are used to calculate the DNL.

The measurements were made for a total period of 24 hours at each location and included recordings of the noise levels during representative hours of the daytime and nighttime periods of the DNL index. The results of the measurements are shown in data tables in Appendix C.

As shown in the tables, the L_{eq}'s at 28 ft. from the centerline of the UPRR tracks ranged from 55.2 to 79.1 dBA during the daytime and from 64.7 to 73.7 at night.

The L_{eq}'s at measurement Location 2, 55 ft. from the centerline of East Dunne Avenue, ranged from 59.4 to 66.4 dBA during the daytime and from 48.9 to 59.2 dBA at night.

Railroad and traffic noise dissipates at the rate of 3 to 6 dB for each doubling of the distance from the source to the receiver. Therefore, other locations on the site at greater distances from the railroad or roadway will have lower noise levels. Additional noise shielding will be provided by interposed buildings of the project.

Railroad and vehicular noise contain wide spectra of frequency components (from 63 to 10,000 Hz), which are associated with engine, tire, drive-train, exhaust, wheel-rail interaction and other sources. The frequency components of the primary noise contributors are centered in the 125, 250 to 500 Hz octave bands and were in determining the noise control measures recommended in this study.

B. Future Noise Levels

Future operational information on the UPRR line is not available at this time. For the purposes of this study, we are assuming that future operations will be similar to present levels. Should CalTrain increase operations by 30%, this would yield one additional train each way. This increase in CalTrain volume will not increase the overall noise levels generated by freight, Amtrak and CalTrain operations by more than 0.5 decibels.

Future traffic volume data for East Dunne Avenue is predicted to increase from the 2009 volume of 17,324 ADT to 31,900 ADT for year 2025, Ref. (i). This increase in traffic volume yields a 3 dB increase in the traffic noise levels.

C. Vibration Analysis

To determine the levels of railroad induced ground vibration, vibration level measurements were made at a location 70 ft. from the centerline of the tracks, as shown on Figure 3. The measurements were made on September 25, 2007. The measurements were made with a PCB Piezotronics 393A03 accelerometer and a Larson Davis 2900 Dual Channel Real Time analyzer. The analyzer measured real time 1/3-octave band vibration levels, in dB re: 1×10^{-6} in./sec. for the three orthogonal directions over the frequency range of 0.8 to 10 kHz in Channel 2. The vibration levels from 8 Hz to 80 Hz were used to assess the impact of ground borne vibration on homes of the project. The measured vibration levels are shown below.

In addition, more recent ground vibration measurements were made for the Gippetti Property and the City Ventures Morgan Hill 6 sites, both of which are along Monterey Road. Table I on the following page provides the measured vibration levels over 1/3-octave bands from 8 Hz to 80 Hz, the vibration levels calculated for the subject project nearest and most impacted building setback and the calculated vibration levels in each floor elevation of the most impacted building(s).

TABLE I
ON-SITE GROUND-BORNE VIBRATION LEVELS, VdB

Train type	Direction	Dist, ft.	Freq. (Hz) 8	10	12.5	16	20	25	31.5	40	50	63	80	TOTAL	Setback Dist, ft.	Setback VdB	Residential Interior 1st Floor	2nd Floor	3rd Floor
Casa Diana																			
Freight	SB	70	26.7	30.7	45.3	50.9	57.2	63.9	59.1	60	60.4	62	63.1	**70**	64	**71**	**72**	**70**	**68**
			467.7	1174.9	33884.4	123026.9	524807.5	2454708.9	812830.5	1000000.0	1096478.2	1584893.2	2041737.9	9674010.2					
CalTrain	NB	70	23.1	28.2	38.4	44.6	51.2	56.7	57.1	57.5	58.1	59.2	60.4	**66**	64	**67**	**68**	**66**	**64**
			204.2	660.7	6918.3	28840.3	131825.7	467735.1	512861.4	562341.3	645654.2	831763.8	1096478.2	4285283.2					
Freight	SB	70	40.8	41.1	36.8	43.3	41	54.5	60.4	60.2	65.9	54.6	61.2	**69**	64	**70**	**71**	**69**	**67**
			12022.6	12882.5	4786.3	21379.6	12589.3	281838.3	1096478.2	1047128.5	3890451.4	288403.2	1318256.7	7986216.7					
Morgan Hill 7																			
CalTrain	SB	40	19	32.6	41.9	46.6	52.4	48.7	52.7	56.9	51.6	52	48.5	**61**	64	**57**	**58**	**56**	**54**
			79.4	40.2	15488.2	45708.8	173780.1	74131.0	186208.7	489778.8	144544.0	158489.3	70794.6	1359043.1					
Amtrak	NB	40	26.9	31.5	38.4	38.1	44.8	52.8	51.6	56.8	57.7	55.4	54.3	**63**	64	**59**	**60**	**58**	**56**
			488.7	1412.5	6918.3	6456.5	30199.5	190546.1	144544.0	478630.1	588843.7	346736.9	269153.5	2063929.7					
Freight	NB	40	34	38.4	40.9	38.8	44.4	52.4	50.9	54.4	56.6	54	60	**64**	64	**60**	**61**	**59**	**57**
			2511.9	6918.3	12302.7	7585.8	27542.3	173780.1	123026.9	275422.9	457088.2	251188.6	1000000.0	2337367.6					
Freight	NB	40	37.8	38.6	39.6	42.5	45.2	51.4	51.8	56.5	62.4	66.5	65.3	**70**	64	**66**	**67**	**65**	**63**
			6025.6	7244.4	9120.1	17782.8	33113.1	138038.4	151356.1	446683.6	1737800.8	4466835.9	3388441.6	10402442.4					
Gippetti Prop.																			
CalTrain	SB	33	15.9	19.6	29.3	36.4	46.6	54.1	57.6	59.8	59.1	56.4	53.8	**65**	64	**59**	**60**	**58**	**56**
			38.9	91.2	851.1	4365.2	45708.8	257039.6	575439.9	954992.6	812830.5	436515.8	239883.3	3327757.0					
CalTrain	SB	33	15.9	18.1	28.1	36.5	47.4	53.3	57.3	59.2	59.3	54.6	52.3	**65**	64	**59**	**60**	**58**	**56**
			38.9	64.6	645.7	4466.8	54954.1	213796.2	537031.8	831763.8	851138.0	288403.2	169824.4	2952127.4					
Amtrak	NB	33	17.6	28.4	38.6	41.3	50.0	59.1	58.8	62.5	64.3	64.9	59.1	**70**	64	**64**	**65**	**63**	**61**
			57.5	691.8	7244.4	13489.6	100000.0	812830.5	758577.6	1778279.4	2691534.8	3090295.4	812830.5	10065831.6					
CalTrain	NB	33	29.6	34.7	44.9	51.1	57.7	63.2	63.6	64	64.6	65.7	66.9	**73**	64	**67**	**68**	**66**	**64**
			912.0	2951.2	30903.0	128825.0	588843.7	2089296.1	2290867.7	2511886.4	2884031.5	3715352.3	4897788.2	19141657.0					
Freight	SB	33	34	35.5	54.4	51.2	57.8	63.5	59.9	66.1	66.3	65.1	65.9	**73**	64	**67**	**68**	**66**	**64**
			2511.9	3548.1	275422.9	131825.7	602559.6	2238721.1	977237.2	4073802.8	4265795.2	3235936.6	3890451.4	19697812.5					
Freight	SB	33	45.5	52.4	55.7	55.5	54.6	60.9	59.5	69.9	70.3	66.5	59.2	**75**	64	**69**	**70**	**68**	**66**
			35481.3	173780.1	371535.2	354813.4	288403.2	1230268.8	891250.9	9772372.2	10715193.1	4466835.9	831763.8	29131697.9					
Freight	SB	33	44.3	48.8	44.5	51	48.7	62.2	68.1	67.9	73.6	62.3	68.9	**77**	64	**71**	**72**	**70**	**68**
			26915.3	75857.8	28183.8	125892.5	74131.0	1659586.9	6456542.3	6165950.0	22908676.5	1698243.7	7762471.2	46982451.1					

As shown in Table I, the expected vibration levels calculated for the various residential floor elevations, using calculation methods of the FTA, will be within the 80 VdB criterion of the FTA for infrequent (fewer than 30 trains per day) events. Ground-borne vibration mitigation measures will not be required.

IV. Evaluation of the Noise Exposures

A. Exterior Noise Exposures

To determine the noise exposures at the site, the DNL's for the survey locations on the Casa Diana site were calculated by decibel averaging of the L_{eq}'s as they apply to the daily time periods of the DNL index. The DNL is a 24-hour noise descriptor that uses the measured L_{eq} values to calculate a 24-hour time-weighted average noise exposure. The formula used to calculate the DNL is described in Appendix B. Adjustments were applied to the measured noise levels to account for the various setback distances from the measurement locations to the building setbacks using methods established by the Highway Research Board, Ref. (j).

The results of the calculations reveal that the noise exposure at the measurement location 28 ft. from the centerline of the UPRR tracks is 76 dB DNL. At the planned minimum building setback of the subject project (64 ft. from the centerline) the noise exposure reduces to 70 dB DNL. Under future conditions, the noise exposure is expected to remain at 70 dB DNL

At the measurement location of 55 ft. from the centerline of East Dunne Avenue, the noise exposure was calculated to be 64 dB DNL. Under future traffic conditions, the noise exposure is expected to increase to 67 dB DNL. At the planned minimum setback of the subject, 65 ft. from the centerline of the road, the noise exposure was calculated to be 63 dB DNL. Under future conditions, the noise exposure is expected to increase to 66 dB DNL.

B. Exterior L_1 Noise Levels

The L_1 values are provided by direct readout of the sound level meters used at the site. At measurement Location 1, 28 ft. from the centerline of the UPRR tracks, the highest L_1's were measured to be 91 dBA during the daytime hours and 86 dBA at night.

At measurement Location 2, 55 ft. from the centerline of East Dunne Avenue, the highest L1's were 73 dBA during the daytime and 70 dBA at night.

At the subject project buildings, the L_1 values at the most impacted planned building setback from the UPRR tracks were calculated to be 85 dBA during the daytime and 80 dBA at night.

The L_1 values at the most impacted planned building setback of the subject project from East Dunne Avenue were calculated to be 72 dBA during the daytime and 69 dBA at night. Under future traffic conditions, the noise levels are expected to increase to 75 dBA during the daytime and to 72 dBA at night.

C. Exterior Hourly Average Noise Levels (CalGreen)

The exterior hourly L_{eq}'s were determined by direct read out from the sound level meters. The noise levels were adjusted to represent the project site conditions and building setbacks. Although the CalGreen standards state to apply the noise limits during the proposed hours of operation, the types of operations are unknown. Therefore, the hourly average noise levels are provided by the 24-hour day. The L_{eq}'s calculated for the building setbacks (windows) at the commercial spaces are shown in Table II, below.

TABLE II

Exterior Hourly Average Noise Levels (dBA Leq(h))

Comm. 1st floor	Facing Railroad	Facing E. Dunne
Dist. (ft.) =	140	174
7:00 AM	67.9	58.6
8:00 AM	50.9	58.8
9:00 AM	45.7	56.9
10:00 AM	46.9	56.6
11:00 AM	67.5	61.9
12:00 PM	47.8	56.8
1:00 PM	44.3	56.9
2:00 PM	44.0	57.2
3:00 PM	62.5	58.8
4:00 PM	47.5	57.9
5:00 PM	55.6	58.1
6:00 PM	52.7	57.2
7:00 PM	63.1	58.0
8:00 PM	54.6	57.0
9:00 PM	61.5	54.9
10:00 PM	37.5	50.4
11:00 PM	62.1	51.6
12:00 AM	35.5	47.6
1:00 AM	62.5	53.6
2:00 AM	60.2	49.8
3:00 AM	37.3	44.4
4:00 AM	39.6	45.7
5:00 AM	43.7	50.7
6:00 AM	53.9	54.7

D. Interior Noise Exposures

To determine the interior noise exposures for evaluations against the City of Morgan Hill Noise Element and Title 24 standards, a 15 dB reduction was applied to the exterior noise exposures at the building setback locations to represent the attenuation provided by a typical building shell under an *annual-average* condition. The annual-average condition assumes that residential dwellings have windows of standard dual-pane thermal insulating glass that are kept open 50% of the time for natural ventilation.

The interior noise exposures in the most noise impacted living spaces of the project closest to the UPRR tracks, will be 55 dB DNL under existing and future operational conditions. Thus, the noise exposures will be up to 10 dB in excess of the City of Morgan Hill Noise Element and Title 24 standards.

The interior noise exposures in the most impacted living spaces of the subject project closest to the East Dunne Avenue will be 48 and 51 dB DNL under existing and future traffic conditions, respectively. The noise exposures will be up to 6 dB in excess of the City of Morgan Hill Noise Element and Title 24 standards.

As shown by the above evaluations, the interior noise exposures will be up to 10 dB in excess of the City of Morgan Hill Noise Element and Title 24 standards. Noise mitigation measures for the project will be required. The recommended measures are described in Section II of this report.

D. Interior L_1 Noise Levels

To determine the interior L_1 noise levels for evaluations against the short-term noise limits of the City of Morgan Hill Noise Element standards, a 10 dB reduction was applied to the exterior noise levels at the building setbacks to represent the attenuation provided by a typical building shell under *open window* conditions.

The interior noise levels in the project living spaces closest to the UPRR will be up to 75 dBA L_1 during the daytime and up to 70 dBA L_1 at night. The noise levels will be up to 20 dB in excess of the 55 dBA daytime limit for living spaces and up to 25 dB in excess of the 50 dBA nighttime limit for bedrooms.

As shown above, the short-term noise levels will exceed the limits of the standards. Noise mitigation measures will be required. The recommended measures are described in Section II of this report.

F. CalGreen Interior Noise Levels

The interior noise levels in the project non-residential spaces were determined by applying a 25 dB reduction to the exterior noise levels at the planned building setback to represent the attenuation provided by the commercial building shell under a closed window condition. The calculated interior hourly average noise levels in the commercial spaces of the project under future conditions are shown in Table III, below. The interior noise levels were calculated to be 10.5 to 42.9 dBA $L_{eq(h)}$ in spaces facing the railroad and 19.4 to 36.9 dBA $L_{eq(h)}$ in spaces facing East Dunne Avenue. Thus, the noise levels will be in compliance with the 50 dBA $L_{eq(h)}$ limit of Section 5.507.4.2 of the CalGreen Code – Performance Method.

TABLE III		
CALGREEN NON-RESIDENTIAL MANDATORY MEASURES		
COMMERCIAL SPACE INTERIOR NOISE LEVELS, dBA Leq(h)		
	Facing Railroad	Facing E. Dunne
7:00 AM	42.9	33.6
8:00 AM	25.9	33.8
9:00 AM	20.7	31.9
10:00 AM	21.9	31.6
11:00 AM	42.5	36.9
12:00 PM	22.8	31.8
1:00 PM	19.3	31.9
2:00 PM	19.0	32.2
3:00 PM	37.5	33.8
4:00 PM	22.5	32.9
5:00 PM	30.6	33.1
6:00 PM	27.7	32.2
7:00 PM	38.1	33.0
8:00 PM	29.6	32.0
9:00 PM	36.5	29.9
10:00 PM	12.5	25.4
11:00 PM	37.1	26.6
12:00 AM	10.5	22.6
1:00 AM	37.5	28.6
2:00 AM	35.2	24.8
3:00 AM	12.3	19.4
4:00 AM	14.6	20.7
5:00 AM	18.7	25.7
6:00 AM	28.9	29.7

G. Ground-Borne Vibration

To determine the levels of vibration in the project structures, the FTA methodologies uses factors for coupling loss or the way the structures are tied to the ground, how the floors resonate and the small amounts of vibrational energy that are lost as it travels through the building.

- Light wood-framed structures have a 5 VdB downward adjustment for coupling loss. A 6 VdB increase is added for wall and floor resonances and a 2 VdB reduction per floor elevation is subtracted. The results of the vibration calculations are shown in Table I on page 19. The vibration levels in dwelling units will be within the 80 VdB criterion established by the FTA for infrequent rail operations.

The vibration levels will be within the limits established by the Federal Transit Administration. Thus, vibration mitigation measures will not be required.

The above report presents an initial noise and vibration assessment study for the planned "The Lumber Yard" multi-family development along Depot Street in Morgan Hill. The study findings for present conditions are based on field measurements and other data and are correct to the best of our knowledge. Future noise exposures were based on information provided by the City of Morgan Hill and estimates made by Edward L. Pack Associates, Inc. Significant deviations in the future traffic volumes, changes in motor vehicle or railroad technology, speed limits, noise regulations or other future changes beyond our control may produce long-range noise results different from our estimates.

If you need any additional information or would like an elaboration on this report, please call me.

Sincerely,

EDWARD L. PACK ASSOC., INC.

Jeffrey K. Pack
President

Attachment: Appendices A and B

APPENDIX A

References:

(a) Site Plan, Hale Lumber Mixed-Use, by Ruggeri, Jensen, Azar, July 22, 2019

(b) City of Morgan Hill General Plan, Health and Safety Element, "Noise", July 2001, Updated Through February 2010

(c) California Code of Regulations, Title 24, Part 2, Volume 1, Section 1207 "Sound Transmission", Subsection 1207.4 (Allowable Interior Noise Levels), Revised 2016

(d) California Code of Regulations, Title 24, Chapter 5, Section 5.507 "Environmental Comfort", Subsection 5.507.4.2 (Exterior Noise Transmission, Performance Method), Revised 2013

(e) Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, FTA Report No. 0123, by John A Volpe National Transportation Systems Center, September 2018

(f) "Noise Vibration Assessment Study for the Planned 'Casa Diana' Single-Family Development, Diana Avenue, Morgan Hill", Edward L. Pack Associates, Inc., Project No. 39-057, October 5, 2007

(g) Noise and Vibration Measurement Data at the Gippetti Property, Monterey Road, for UCP Development Company, August 15, 2013

(h) "Preliminary Noise and Vibration Assessment Study for the Planned Multi-Family Development, 'Morgan Hill 7', Monterey Road, Morgan Hill", by Edward L. Pack Associates, Inc., Project No. 50-019, June 6, 2018

(i) Information on Existing and Future Traffic Volumes Provided by Mr. Scott Creer, City of Morgan Hill Transportation Department, by Telephone with Edward L. Pack Associates, Inc., October 10, 2007

(j) Highway Research Board, "Highway Noise – A Design Guide for Highway Engineers", Report 117, 1971

APPENDIX B

Noise Standards, Terminology and Instrumentation

1. Noise Standards

A. City of Morgan Hill Noise Element Standards

The Public Health and Safety (Noise) Element of the City of Morgan Hill General Plan, adopted July, 2001 and updated through February 2010, contains land use compatibility standards for various land uses.

The maximum exterior noise level of 60 dBA L_{dn} shall be applied in residential areas where outdoor use is a major consideration (e.g., backyards in single family housing developments and recreation areas in multi-family housing projects). Where the City determines that providing an L_{dn} of 60 dBA or lower cannot be achieved after the application of reasonable and feasible mitigation, an L_{dn} of 65 dBA maybe permitted.

• Indoor noise levels should not exceed an L_{dn} of 45 dBA in new residential housing units.

• Noise levels in new residential development exposed to an exterior $L_{dn\ of}$ 60 dBA or greater should be limited to a maximum instantaneous noise level(e.g., trucks on busy streets, train warning whistles) in bedrooms of 50dBA. Maximum instantaneous noise levels in all other habitable rooms should not exceed 55 dBA.

The maximum outdoor noise level for new residences near the railroad shall be 70 dBA L_{dn}, recognizing that train noise is characterized by relatively few loud events.

The Noise Element references the Land Use Compatibility chart from the State of California Guidelines for the Preparation of a Noise Element. The "Normally Acceptable" standards for the land use categories are as follows:

Residential (Single-Family)	60 dB DL
Residential (Multi-Family, Hotels, Motels)	65 dB DNL
Schools, Libraries, Churches, Hospitals	70 dB DNL
Auditoriums, Concert Halls, Amphitheaters	70 dB DNL (conditionally acceptable)
Sports Arenas, Outdoor Spectator Sports	75 dB DNL (conditionally acceptable)
Playgrounds, Neighborhood Parks	70 dB DNL
Golf Courses, Riding Stables, Water Recreation	75 dB DNL
Office Buildings, Business Commercial and Professional	70 dB DNL
<u>Interior Noise Exposure Limits:</u>	
Residential	45 dB DNL
Offices	45 dBA L_{eq}

B. Title 24 Noise Standards

2016 California Building Code, Part 2, Volume 1
SECTION 1207 – SOUND TRANSMISSION

1207.1 Scope. This section shall apply to common interior walls, partitions and floor/ceiling assemblies between adjacent dwelling units and sleeping units or between dwelling units and sleeping units and adjacent public areas such as halls, corridors, stairways or service areas.

1207.2 Air-borne sound. Walls, partitions and floor/ceiling assemblies separating dwelling units and sleeping units from each other or from public or service areas shall have a sound transmission class of not less than 50, or not less than 45 if field tested, for air-borne noise when tested in accordance to ASTM E-9-. Penetrations or openings in construction assemblies for piping; electrical devices; recessed cabinets bathtubs; soffits; or heating, ventilating or exhaust ducts shall be sealed lined, insulated or otherwise treated to maintain the required ratings. The requirement shall not apply to entrance doors; however, such doors shall be tight fitting to the frame and sill.

1207.3 Structure-borne sound. Floor/ceiling assemblies between dwelling units and sleeping units or between a dwelling unit or sleeping unit and a public or service area with the structure shall have an impact insulation class rating of not less than 50, or not less than 45 if field tested, when tested in accordance with ASTM E-492.

Exception: *Impact sound insulation is not required for floor/ceiling assemblies over non-habitable rooms or spaces not designed to be occupied, such as garages, mechanical rooms or storage areas.*

1207.4 Allowable interior noise levels. *Interior noise levels attributable to exterior sources shall not exceed 45 dB in any habitable room. The noise metric shall be either the day-night average sound level (Ldn) or the community noise equivalent level (CNEL), consistent with the noise element of the local general plan.*

1207.5 Acoustical control. [BSC-CG] *See California Green Building Standards code, Chapter 5, Division 5.5 for additional sound transmission requirements.*

2. Terminology

A. Statistical Noise Levels

Due to the fluctuating character of urban traffic noise, statistical procedures are needed to provide an adequate description of the environment. A series of statistical descriptors have been developed which represent the noise levels exceeded a given percentage of the time. These descriptors are obtained by direct readout of the Sound Level Meters. Some of the statistical levels used to describe community noise are defined as follows:

L_1 - A noise level exceeded for 1% of the time.

L_{10} - A noise level exceeded for 10% of the time, considered to be an "intrusive" level.

L_{50} - The noise level exceeded 50% of the time representing the "mean" sound level.

L_{90} - The noise level exceeded 90 % of the time, designated as a "background" noise level.

L_{eq} - The continuous equivalent-energy level is that level of a steady-state noise having the same sound energy as a given time-varying noise. The L_{eq} represents the decibel level of the time-averaged value of sound energy or sound pressure squared and is used to calculate the DNL and CNEL.

B. Day-Night Level (DNL)

Noise levels utilized in the standards are described in terms of the Day-Night Level (DNL). The DNL rating is determined by the cumulative noise exposures occurring over a 24-hour day in terms of A-Weighted sound energy. The 24-hour day is divided into two subperiods for the DNL index, i.e., the daytime period from 7:00 a.m. to 10:00 p.m., and the nighttime period from 10:00 p.m. to 7:00 a.m. A 10 dBA weighting factor is applied (added) to the noise levels occurring during the nighttime period to account for the greater sensitivity of people to noise during these hours. The DNL is calculated from the measured L_{eq} in accordance with the following mathematical formula:

$$DNL = \left[[(10\log_{10}(10^{\Sigma Leq(7\text{-}10)})) \times 15] + [((10\log_{10}(10^{\Sigma Leq(10\text{-}7))})+10) \times 9]\right]/24$$

C. A-Weighted Sound Level

The decibel measure of the sound level utilizing the "A" weighted network of a sound level meter is referred to as "dBA". The "A" weighting is the accepted standard weighting system used when noise is measured and recorded for the purpose of determining total noise levels and conducting statistical analyses of the environment so that the output correlates well with the response of the human ear.

3. Instrumentation

The on-site field measurement data were acquired by the use of one or more of the sound analyzer listed below. The instrumentation provides a direct readout of the L exceedance statistical levels including the equivalent-energy level (L_{eq}). Input to the meters was provided by microphones extended to a height of 5 ft. above the ground. The "A" weighting network and the "Fast" response setting of the meters were used in conformance with the applicable standards. The Larson-Davis meters were factory modified to conform to the Type 1 performance standards of ANSI S1.4. All instrumentation was acoustically calibrated before and after field tests to assure accuracy.

Bruel & Kjaer 2231 Precision Integrating Sound Level Meter
Larson Davis LDL 812 Precision Integrating Sound Level Meter
Larson Davis 2900 Real Time Analyzer
Larson Davis 831 Precision Integrating Sound Level Meter

4. Mechanical Ventilation Requirements

California Mechanical Code Chapter 4- Ventilation Air

402.3 Mechanical Ventilation

Where natural ventilation is not permitted by this section or the building code, mechanical ventilation systems shall be designed, constructed, and installed to provide a method of supply air and exhaust air. Mechanical ventilation systems shall include controls, manual or automatic, that enable the fan system to operate wherever the spaces served are occupied. The system shall be designed to maintain minimum outdoor airflow as required by Section 403.0 under any load conditions.

5. Building Shell Controls

The following additional precautionary measures are required to assure the greatest potential for exterior-to-interior noise attenuation by the recommended mitigation measures. These measures apply at those units where closed windows are required.

- Unshielded entry doors having a direct or side orientation toward the primary noise source must be 1-5/8" or 1-3/4" thick, insulated metal or solid-core wood construction with effective weather seals around the full perimeter. Mail slots should not be used in these doors or in the wall of a living space, as a significant noise leakage can occur through them.

- If any penetrations in the building shell are required for vents, piping, conduit, etc., sound leakage around these penetrations can be controlled by sealing all cracks and clearance spaces with a non-hardening caulking compound.

- Ventilation openings shall not compromise the acoustical integrity of the building shell

APPENDIX C

Noise Level Data and Calculation Tables from the Casa Diana Project

DNL CALCULATIONS

CLIENT: EAH, SOUTH VALLEY DEVELOPERS
FILE: 40-048
PROJECT: CASA DIANA
DATE: 9/24-25/2007
SOURCE: UPRR, E. DUNNE AVE., MECH. EQUIP., PUMP STATION

LOCATION 1	UPRR, Amtrak, CalTrain			
Dist. To Source	28 ft.			
TIME	Leq	10^Leq/10		
7:00 AM	79.1	81283051.6		
8:00 AM	62.1	1621810.1		
9:00 AM	56.9	489778.8		
10:00 AM	58.1	645654.2		
11:00 AM	78.7	74131024.1		
12:00 PM	59.0	794328.2		
1:00 PM	55.5	354813.4		
2:00 PM	55.2	331131.1		
3:00 PM	73.7	23442288.2		
4:00 PM	58.7	741310.2		
5:00 AM	66.8	4786300.9		
6:00 AM	63.9	2454708.9		
7:00 PM	74.3	26915348.0		
8:00 PM	65.8	3801894.0		
9:00 PM	72.7	18620871.4	SUM=	240414313
10:00 PM	48.7	74131.0	Ld=	72.0
11:00 PM	73.3	21379620.9		
12:00 AM	46.7	46773.5		
1:00 AM	73.7	23442288.2		
2:00 AM	71.4	13803842.6		
3:00 AM	48.5	70794.6		
4:00 AM	50.8	120226.4		
5:00 AM	54.9	309029.5		
6:00 AM	65.1	3235936.6	SUM=	62482643
			Ld=	68.4
	Daytime Level=	83.8		
	Nighttime Level=	87.9		
	DNL=	**76**		
	24-Hour Leq=	71.0		

LOCATION 2	East Dunne Ave.			
Dist. To Source	55 ft.			
TIME	Leq	10^Leq/10		
7:00 AM	63.1	2041737.9		
8:00 AM	63.3	2137962.1		
9:00 AM	61.4	1380384.3		
10:00 AM	61.1	1288249.6		
11:00 AM	66.4	4365158.3		
12:00 PM	61.3	1348962.9		
1:00 PM	61.4	1380384.3		
2:00 PM	61.7	1479108.4		
3:00 PM	63.3	2137962.1		
4:00 PM	62.4	1737800.8		
5:00 AM	62.6	1819700.9		
6:00 AM	61.7	1479108.4		
7:00 PM	62.5	1778279.4		
8:00 PM	61.5	1412537.5		
9:00 PM	59.4	870963.6	SUM=	26658300
10:00 PM	54.9	309029.5	Ld=	62.5
11:00 PM	56.1	407380.3		
12:00 AM	52.1	162181.0		
1:00 AM	58.1	645654.2		
2:00 AM	54.3	269153.5		
3:00 AM	48.9	77624.7		
4:00 AM	50.2	104712.9		
5:00 AM	55.2	331131.1		
6:00 AM	59.2	831763.8	SUM=	3138631
			Ld=	55.4
	Daytime Level=	74.3		
	Nighttime Level=	74.9		
	DNL=	**64**		
	24-Hour Leq=	60.9		