Rothermel Associates
Architectural Acoustics Collaborative

24 June 2014

Mr. Greg McClure
Delawie
2265 India Street
San Diego, CA 92101-1725

Subject: VVSD New Resolve - Escondido
Exterior-to-Interior and Exterior-to-Exterior Noise Analysis

Dear Greg:

This letter report summarizes the exterior noise analysis as it impacts interior noise levels at the apartments and exterior noise levels at open space areas of the VVSD New Resolve Project in Escondido. Review and analysis was based on site noise measurements conducted on 30 May 2014, on review of the rendering drawings showing the building configuration and fenestration, on descriptions of the proposed type of construction, on the understanding that the project site lies well outside the noise contours for all nearby airports and on the understanding that the predominant noise affecting the site is due to vehicular traffic on nearby South Escondido Boulevard to the west.

1. Interior Noise Criteria

The Noise Element of the City of Escondido (Chapter 4.12) found in the General Plan dated April 2012 in accordance with the California Noise Insulation Standards (CCR Title 24, Part 2, Chapter 2-35) stipulates an interior noise level attributable to exterior sources shall not exceed 45 CNEL (Community Noise Equivalent Level) in residential rooms based on estimates of the future noise impact. Additionally, the City's Land Use Compatibility Matrix, as shown on enclosed Figure 1 recognizes that Multi-Family/Mixed Use Residential and Transient Lodging land use categories are "Conditionally Acceptable" in zones having CNEL values less than or equal to CNEL 70 and that "conventional construction with closed windows and fresh-air supply systems or air-conditioning usually suffice".

2. Measured Exterior Noise

The subject property is located on the east side of South Escondido Boulevard on the south east corner of the intersection of 15th (Idaho) Avenue to the north and S. Escondido Blvd. to the west. The site is bounded on other sides by existing residential areas.

In order to establish a baseline noise level for existing conditions, noise measurements were conducted on site using a Type 1 integrating sound level meter set for fast response on the A-weighted scale. The measurement microphone was located at the

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approximate location of the future west façade immediately adjacent to and facing S. Escondido Blvd. (the expected worst-case noise exposure) and along the west façade behind the existing market building. The A-weighted, integrated Leq* sound levels were measured for the duration of 30 minutes at each location. Measurements were conducted between 1:30pm and 3:00pm on 5-30-14. The measured A-weighted, Leq is 66 dBA CNEL near Escondido Blvd. (Location A) and 57 dBA CNEL (Location B) further back behind the market as shown on Figure 2.

** - Equivalent Sound Level. The dBA level of a steady state sound that has the same dBA weighted sound energy as that contained in the actual time-varying sound being measured over a specific time period.*

3. Interior Noise Due to Exterior Traffic

The analysis considered as 'worst-case' a second floor residence above the commercial occupancy in the clubhouse building module at the west side of the project nearest the highest expected site noise level along Escondido Boulevard – essentially adjacent to measurement Location A, Figure 2.

The sound pressure level within the second floor residence was examined and then compared to the maximum allowed interior criterion of 45 CNEL. If the 'worst-case' arrangement achieves the indoor criterion of 45 CNEL it is expected that the balance of the units and exposures will also satisfy the 45 CNEL criteria. Wall and window construction assemblies were assumed to be as follows: exterior walls comprised of stucco on plywood over 2x6 wood studs with 5/8" thick gypsum board on the inside with glass fiber insulation in the stud cavity; window assemblies with nominal 1"- thick insulated glazing with a nominal 1/2" airspace between 1/4" glass lights; exterior door assemblies of solid core wood or insulated hollow metal with small view lights and full perimeter gaskets.

While the measured result shown in Figure 2 of nominally 66 CNEL represents current conditions, and shows good agreement and corroborates the Existing Noise Contours in Figure 3 of nominally 65 CNEL it is important to note that the requirements for California Title 24 as it applies to projects of this type involve examining the expected noise impact at least ten years after construction. The estimate of future noise was based on the Future Noise Contours outlined in The City's Noise Element, Figure 4.12-2 for the year 2035. As shown on Figure 3, Existing Conditions are nominally 65CNEL immediately adjacent to Escondido Blvd. with 60CNEL throughout the balance of the site. The Future Conditions show a rise of noise levels immediately adjacent and along Escondido Blvd. to nominally 70 CNEL with the balance of the site in the 65 to 60 CNEL range.

The tabulation below shows the results of the analysis for the second floor room noted above, immediately adjacent to S. Escondido Blvd. The measured noise spectra with an overall level of 66 CNEL for existing conditions has been extrapolated up to a level of 70 CNEL in accordance with the Future Noise Contours. This source noise level was then 'pushed' through the worst-case intervening window construction facing S. Escondido Blvd. As indicated in the table, with the basic construction as noted

above, this typical, worst-case unit should have an interior CNEL of 39 with other exposures and facades less than or equal to this level.

	Octave Band Center Frequency in Hertz						
	63	125	250	500	1K	2K	4k
1. Meas. Noise (66dBA + 4dB = 70 CNEL)	70	68	66	66	67	63	55
2. Worst-Case NR**	-15	-22	-25	-32	-35	-36	-42
3. Level inside Unit = 39 CNEL	55	46	41	34	32	27	13

** - Measured Leq adjusted for future level of 70CNEL per Escondido Future Noise Contours*
*** - Worst Case Noise Reduction based on published values of Transmission Loss for Windows*

4. Interior Noise Due to Aircraft

The project site lies well outside the noise contours for airports in the region. No noise reduction measures due to aircraft noise are required for the project.

5. Exterior Noise at Open Space/Play Areas

As noted above, with the exception of the location immediately adjacent to S. Escondido Blvd., the Future Noise Contours for the remainder of the site fall in the 60-65 CNEL range. This means that the worst-case noise level outside at open space/play areas, with no barrier effect or abatement is expected to be no more than 65 CNEL. Although this level of 65 CNEL itself meets the City's Land Use Compatibility requirements of "Normally Acceptable – Specified Land Use is Satisfactory" for Playgrounds and Parks, as shown on the plan in Figure 2, the play areas are actually located behind existing commercial buildings, behind the new mixed use building on S. Escondido Blvd. and behind a 6' high perimeter site wall. These structures effectively act as barriers to further reduce noise at open space areas, reducing the noise to levels below 65CNEL. No special or additional mitigation measures should be necessary for outside areas.

6. Recommendations

The basic construction assemblies described above will provide adequate sound isolation to achieve the required interior noise levels of 45 CNEL. While special acoustical treatments and acoustically rated assemblies are not required, in order to ensure that the basic construction will provide maximum sound isolation to achieve the expected interior noise level, the importance of construction quality should be emphasized. The following recommendations are intended to optimize the sound isolation provided by the basic construction assemblies. Failure to seal gaps, joints, and flanking paths can degrade the effectiveness of an otherwise adequate design.

a. Although special acoustical windows, such as those with extra-wide airspaces and laminated glass are not required, the building standard insulated windows should have a minimum Sound Transmission Class (STC) rating of at least STC-32. This rating can generally be found on quality, well sealed window assemblies with 1" insulated glass.

b. Limit window area to no more than 40% of exterior wall area for each discrete room.

c. Exterior door assemblies should be solid-core wood or insulated metal doors at least 1-3/4" thick, sealed with tight-fitting weather-stripping around the full perimeter. Glass view-lights in doors should be sealed in an airtight, non-hardening sealant or in soft elastomer gasket or glazing tape.

d. All window and door frame shim spaces should be packed with glass fiber insulation and caulked with resilient sealant.

e. Penetrations and joints of exterior walls should be packed with glass fiber insulation and sealed with acoustical sealant. Where electrical outlet boxes occur on exterior walls, wrap the back of each electrical box with sheet caulking.

f. Where attic vents occur that create a flanking sound path that may circumvent the roof isolation, provide a noise attenuating sheet metal elbow on the attic side. Elbow should be lined with 1" thick duct liner.

g. Although windows will be operable, the required interior noise levels will only be achieved with windows and doors closed, obviously. Typically an open window or door provides about 12 dB of reduction from exterior to interior. This results in an interior level of 58 CNEL (70-12=58). In order to provide adequate natural ventilation with windows and doors closed, sound-attenuating fresh air intake vents should be provided to allow fresh air ventilation with all windows and doors closed. Fresh air vents equal to Thermaster Ultra-Air Fresh 80-dB or 100-dB or IAC Quiet Vent models C, H or W should be provided.

h. Where exterior wall cladding is comprised of wood or metal panels, such panels should be installed over contiguous plywood, dens-shield or gypsum board sheathing of at least 2 psf surface weight.

7. Conclusion

With the constructions and details noted in this report, current and future interior noise levels should not exceed 39 CNEL in habitable rooms at VVSD New Resolve – Escondido. This meets the City and State Criteria of 45 CNEL indoors for habitable rooms. With the location and orientation of the buildings themselves as shown on the current site plan, current and future exterior noise levels should not exceed 65 CNEL at open space/play areas. This meets the City's Land Use Compatibility Guidelines as Normally Acceptable.

Sincerely yours,
Rothermel and Associates, LLC

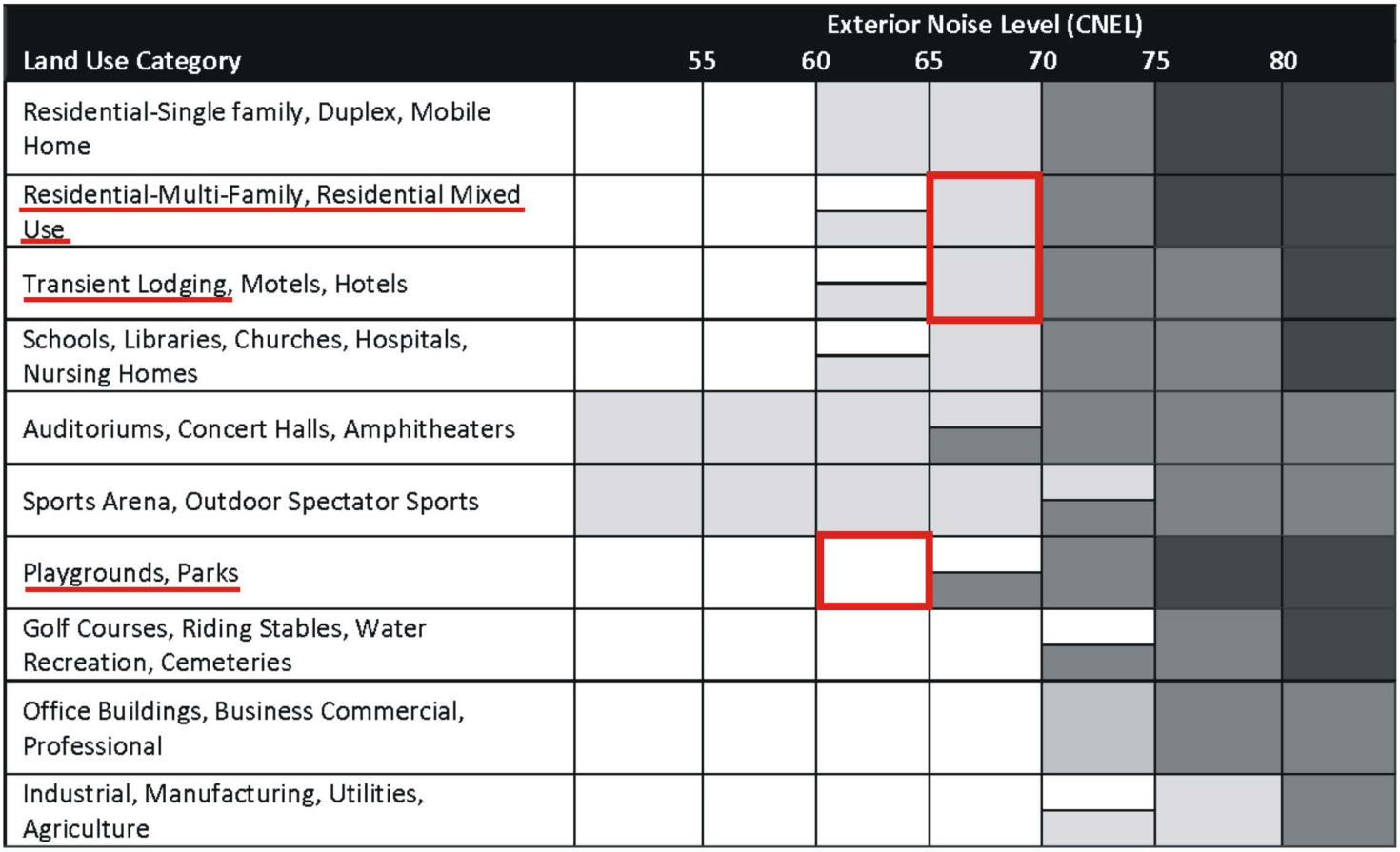
Mark E. Rothermel

Mark E. Rothermel, Principal
MER:bh
Enclosures: Figure 1 – Noise Compatibility Guidelines
Figure 2 - Site Noise Measurements
Figure 3 – Existing and Future CNEL Noise Contours

VVSD New Resolve - Exterior-to-Interior Noise Study

Noise Compatibility Guidelines Excerpted from
Chapter 4.12 - Noise, Escondido General Plan, Downtown Specific Plan
and Climate Action Plan EIR dated 23 April 2012

Table 4.12-7 Proposed Noise Compatibility Guidelines



NORMALLY ACCEPTABLE - Specified land use is satisfactory, based upon the assumption that buildings involved are of normal conventional construction, without any special noise insulation requirements.

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

NORMALLY UNACCEPTABLE - New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made with noise insulation features included in the design.

CLEARLY UNACCEPTABLE - New construction or development should generally not be undertaken.

Source: City 2011

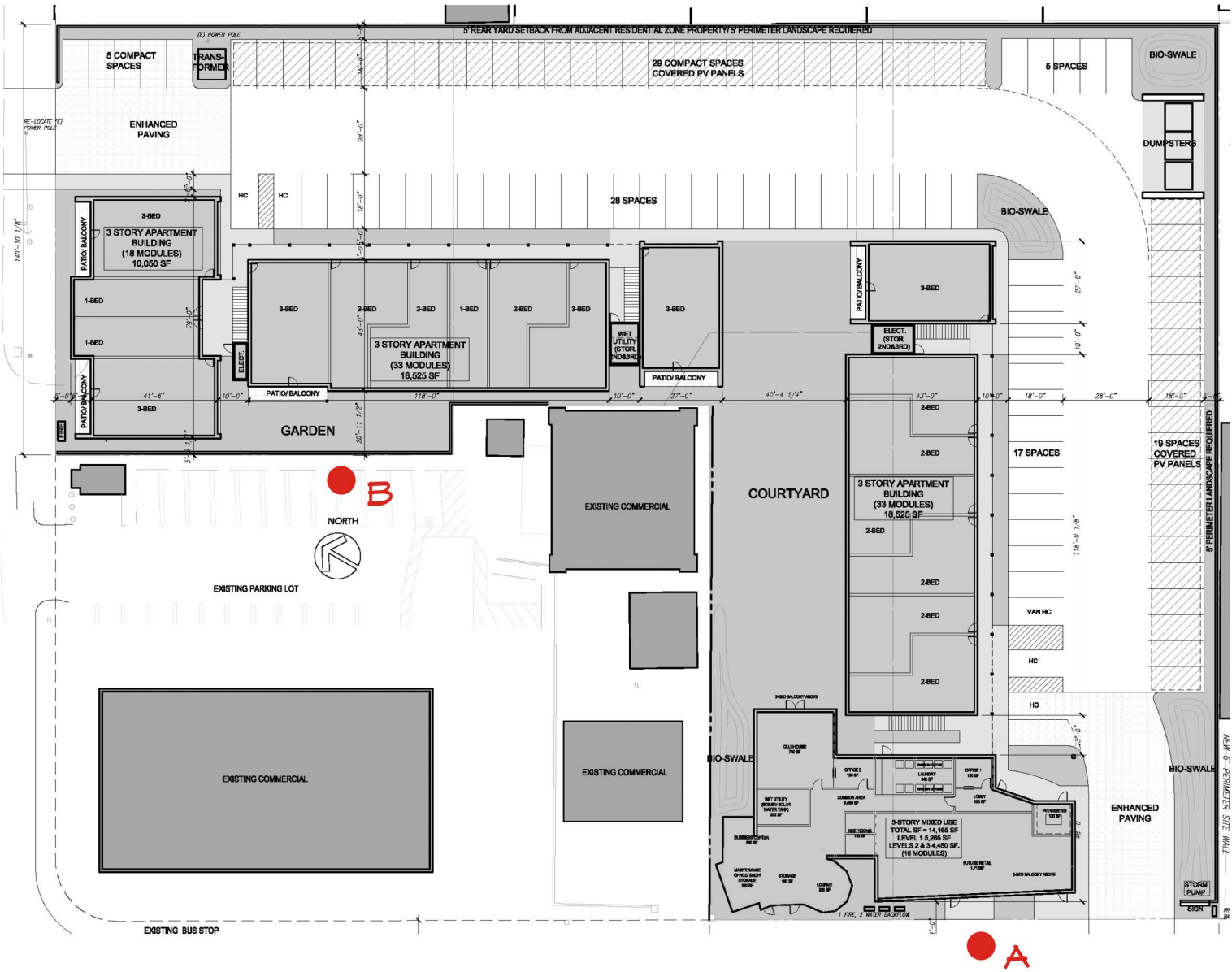
FIGURE 2

6-24-14

VVSD New Resolve - Exterior-to-Interior Noise Study

Noise Measurement Locations

Measurements Conducted on 5-30-14



● A - 30 Minute Leq = 66 dBA, CNEL

● B - 30 Minute Leq = 57 dBA, CNEL

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VVSD New Resolve - Exterior-to-Interior Noise Study

Existing & Future Noise Contours Excerpted from Chapter 4.12 - Noise, Escondido General Plan, Downtown Specific Planand Climate Action Plan EIR dated 23 April 2012

Map Reference

General Plan Boundary
City Limits
Highway
Major Roads
Lakes
Noise Contours*
70 dBA CNEL
65 dBA CNEL
60 dBA CNEL
Existing Circulation Element Roadways
Planned Future Roads

EXISTING NOISE CONTOURS
FIGURE 4.12-1

Nominally 65CNEL along S. Escondido Blvd. 60CNEL at balance of site.

General Plan Boundary
City Limits
Highway
Major Roads
Lakes
Noise Contours*
70 dBA CNEL
65 dBA CNEL
60 dBA CNEL
Existing Circulation Element Roadways
Planned Future Roads

FUTURE (2035) NOISE CONTOURS
FIGURE 4.12-2

Nominally 70CNEL along S. Escondido Blvd. 60 to 65 CNEL at balance of site.