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CITY OF SANTA BARBARA
PLANNING DIVISION

**COMMUNITY NOISE ANALYSIS FOR
1298 COAST VILLAGE ROAD, SANTA
BARBARA,
CALIFORNIA**

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Existing noise levels were monitored at 1298 Coast Village Road, Santa Barbara, California, the site of a gas service station proposed for development with two retail commercial spaces adjacent to the street, and eight residential units above and to the rear of the commercial uses. The property is bounded by Coast Village Road to the south, Olive Mill Road to the east, a single family residence to the north, and commercial office uses to the west. This report analyzes the noise environment that will affect the proposed residential uses, and changes in the noise environment that would be caused by the project.

The existing noise levels are dominated by traffic on Coast Village Road, with some contribution from Olive Mill Road. Other noise sources making small contributions to the noise environment include traffic on US Highway 101, approximately 200 feet to the southeast and well below the elevation of the project site, and distant traffic. The current Day-Night Average Noise Level (Ldn) at locations representative of the project exterior range from 61 to 63 dBA. Future Ldn values at these locations will range from 62 to 64.2 dBA. The project will provide a series of open interior patios and a common courtyard that will be shielded from traffic noise by the structure of the building. Modeled noise results for these outdoor living areas are all well under 50 dBA. These Ldn values are well below the City of Santa Barbara standard of 60 dBA for outdoor living areas.

Interior noise levels are expected to be at or below 45 dBA, assuming standard residential construction methods in compliance with current California building standards. Three proposed residential units (Units 3, 4, and 5) that face onto Coast Village Road may have to keep windows closed in order to achieve the interior Ldn standard. A condition requiring forced air circulation for these units is recommended.

Construction noise from the project could affect adjacent residential and office uses. With the inclusion of the recommended mitigation measures, the construction noise effects of the project will not be significant.

2.1 NOISE STANDARDS

Noise Element

The City of Santa Barbara Noise Element (1979:1-8) provides a thorough background discussion of noise and its effects on human health and quality of life. For the project at 1298 Coast Village Road, the major noise issue relates to achieving acceptable exterior noise levels in outdoor living areas. Interior noise levels, and the temporary effect of construction noise on the adjacent single family house to the north of the project site are also important issues.

The compatibility standards adopted in the City Noise Element are expressed in terms of the Day-Night Average Noise Level (Ldn). Similar standards contained in the Noise Ordinance are expressed in terms of the Community Noise Equivalent Level (CNEL). Both of these noise descriptors are based on hourly average noise levels during different times of the day, and include an adjustment or penalty for noise during evening and/or nighttime hours. Results computed in both methods usually agree within a decibel or two, and the two descriptors are often used interchangeably. The Ldn is used in this report, and is defined more completely below. Noise levels used in the standards and measurements described in this report are expressed as decibels, using the "A" weighted frequency response that duplicates the sensitivity of the human ear (abbreviated dBA).

An additional term used in this report and in describing noise standards is "Equivalent Noise Level" or Leq. For a noise of varying loudness over a defined time period, the Leq is the constant value that represents the same amount of energy. Leq values are usually expressed for 1-hour periods, as in the hourly average noise levels that are used to define the Ldn described above. They may be expressed for longer or shorter time periods, however.

For residential areas, the Noise Element recommends that 60 dBA is the maximum exterior Ldn compatible with residential development (City of Santa Barbara 1979:13 and Figure 2).

Other standards referenced in the Noise Element (City of Santa Barbara 1979: Table 3) include State of California Noise Insulation Standards. These state standards require that the interior noise levels of multi-family dwelling units shall not exceed 45 dBA CNEL. State and federal exterior noise standards usually consider Ldn or CNEL values of 65 dBA or less to be normally acceptable for multi-family residential areas. These exterior noise level recommendations are generally consistent with the interior requirement for 45 dBA since normal wood frame residential construction usually provides from 12 to 18 dBA of reduction from exterior to interior areas, and 20 dBA is commonly achieved.

Noise Ordinance

The City of Santa Barbara Noise Ordinance (Chapter 9.16 of the Municipal Code) applies to activities within the City, and establishes noise level limits based on zoning or present land uses. The proposed project includes retail commercial uses on the first floor, facing Coast Village Road, and residential uses throughout the rest of the project. As such, it will not involve any substantial noise generating activities in the vicinity of the existing residential use to the north of the project site. Construction noise, however, will be noticeable on this adjacent residential lot. Section 9.16.015 of the Noise Ordinance prohibits construction work at night.

2.2 NOISE MONITORING RESULTS

The project is known by its address of 1298 Coast Village Road, and is located in the northeast quadrant of the intersection of Coast Village Road with Olive Mill Road in the Montecito community. Figure 1 shows the location of the property and the surrounding land uses. The surrounding area includes retail commercial and office uses to the west along Coast Village Road, the Montecito Inn across Coast Village Road to the south, and residential uses to the west across Olive Mill Road and to the north. US Highway 101 is located to the southeast, approximately 200 feet from the project site. Along this segment, the highway is depressed approximately 30 feet below the adjacent terrain. For this reason, local traffic, and not the highway, is the dominant noise source at the project site.

The site occupies approximately one-quarter acre and is currently occupied by a gas service station. A soil vapor extraction and flare installation is operating in the rear (north) portion of the lot, and supplementary gas for the flare is supplied through a gas meter near the northeast corner of the lot. This equipment—the vapor flare and gas meter—both generate some existing noise.

Field observations and noise measurements were conducted at the property on October 13, 2006. Measurements were made with a Larson-Davis Model 700 sound level meter using the following settings: Slow Meter Response, 3 dBA exchange rate, 6-second and 1-minute recording periods. The meter was calibrated at 94 dB and 114 dB before the measurements; and the calibration remained unchanged when checked after the measurements. During the time measurements were made, noise levels from the vapor extraction system and flare, gas meter, and a tree trimming operation nearby on Olive Mill Road, affected the northern portion of the property. Figure 1 shows the location of the monitoring point, which was chosen to represent typical noise levels along the front (south) portion of the property, and to avoid significant influence from the temporary sources noted above. Appendix A presents the results of the measurements, and shows that for the measurement period the L_{eq} at M1 was 68.5 dBA.

The dominant noise sources in the area are Coast Village Road and Olive Mill Road. US Highway 101 contributes very little noise at this location since it is depressed relative to the elevation of the adjacent land, which provides an effective noise barrier. Distant traffic noise also makes a minor contribution to noise levels at the site.

2.3 ESTIMATE OF EXISTING Ldn

Current traffic noise levels were estimated using the Traffic Noise Model (version 2.5) published by the Federal Highway Administration (Lau et al 2004). The traffic counts taken during the noise measurement period for location M1, discussed above, were first used to generate an estimate of the existing noise levels. Under the measurement circumstances at this location, the model tended to under-predict the measured noise level by about 4 dBA. This was primarily due to the effect of traffic on Olive Mill Road, which could not be counted during the measurement period and was not included in the model. The other noise sources in the area, which were described above, also contributed a small amount to this error.

The Ldn is a 24-hour equivalent noise level that accounts for the added nuisance of nighttime noise by adding 10 dBA to noise levels between 10:00 p.m. and 7:00 a.m.

Ldn is computed as follows:

$$Ldn = 10 * \log \left\{ \left(\frac{1}{24} \right) * \left[15 * 10^{Ld/10} + 9 * 10^{(Ln+10)/10} \right] \right\}$$

Where:

Ldn = Day-Night Average Noise Level

Ld = Hourly equivalent noise level for hours during the daytime, 15 hours from 7:00 a.m. to 10:00 p.m.

Ln = Hourly equivalent noise level for hours during the nighttime, 9 hours from 10:00 p.m. to 7:00 a.m.

To compute the Ldn, the existing Average Daily Traffic (ADT) volume for Coast Village Road was used, with typical assumptions to distribute the traffic between daytime and nighttime periods. Appendix B shows the traffic data and assumptions used to arrive at the hourly traffic during the daytime period and the nighttime period. This information was then used in the TNM model to estimate the daytime hourly equivalent noise level (Ld) and the nighttime hourly equivalent noise level (Ln). Only the exterior structure wall of the proposed

building was assumed as a noise barrier. There would be some additional noise reduction due to additional walls in the building, but multiple barriers were not assumed in this analysis. Receiver locations for the noise model were chosen to represent each of the outdoor patios and the central common open area, which are the designated outdoor living areas for the project. Several of the exterior facing balconies—facing towards were also chosen as receiver points, but these areas are not intended as outdoor living areas. The results at these exterior points were used to assess effects related to interior noise levels. The model input and results are included in Appendix C.

Table 1 summarizes the results from the TNM model presented in Appendix C, showing the daytime and nighttime noise levels at each receiver point, and the computed Ldn results. Both existing and future conditions are shown.

3.1 EXTERIOR LIVING AREA NOISE LEVELS

As presented in Table 1, both the existing and the future Ldn values at all of the designated outdoor living areas within the project will be far below the 60 dBA standard used in the City of Santa Barbara. The highest anticipated Ldn value would be about 41 dBA, near the center of the common courtyard area and in the patio of Unit 2. The relatively high barrier provided by the structure of the building, and very favorable geometry for this barrier, explain the exceptionally low projected Ldn values. In reality, however, the Ldn values are likely to be somewhat higher than the results in Table 1, due to some noise contribution from Olive Mill Road and other sources not included in the model, and due to interior reflections in the patio and courtyard areas of the project. Allowing for these effects would add approximately 7 dBA to the results. Even a 10 dBA increase would result in future Ldn values--still well below the 60 dBA criteria, and not a significant noise impact. Outward facing balconies adjacent to Coast Village Road and Olive Mill Road will have noise levels above 60 dBA Ldn, but each residential unit will be provided with other quiet outdoor areas, so the noise levels at these outward facing balconies is not considered a significant impact.

The project will also remove an existing noise source (the vapor extraction equipment, and local traffic and activity at the service station) and will provide a structural barrier that will ultimately reduce noise levels at the adjacent residence to the north. This is a beneficial effect of the project from a noise viewpoint, and need not be addressed further.

3.2 INTERIOR NOISE LEVELS

Future noise levels along the outer walls of the proposed residential units will range up to about 64 dBA Ldn. These higher exterior noise levels would occur along the southerly building exposure, and would affect proposed Units 3, 4, and 5. The remaining units are located in a manner that the structure of the building itself will tend to shield most of the traffic noise from them. The effects of future traffic on adjacent roadways on interior noise levels at Units 3,4, and 5 is considered a potential impact that can be mitigated through measures that are routinely incorporated in modern residential building construction. These are discussed in Section 4.2 below.

3.3 ON-SITE CONSTRUCTION NOISE

Noise levels from heavy equipment used for earth moving during construction typically range from 80-90 dBA at distances of 50 feet. Existing land uses in the neighborhood include a single family residence immediately north of the project site, and other nearby residences to the northeast across Olive Mill Road. Office and commercial uses are located to the west of the project site and the Montecito Inn is located to the south. The proximity of these uses to the project site could lead to significant construction noise impacts, particularly

at the residence to the north. These noise impacts can be mitigated so that they are less than significant. This topic is discussed further in section 4.2.

4.1 EXTERIOR NOISE LEVELS

No mitigation is necessary regarding noise levels in the patios and open courtyard that are provided as outdoor living areas in the project.

4.2 INTERIOR NOISE LEVELS

In order to ensure that interior Ldn values do not exceed 45 dBA, the structure of the building will have to provide an exterior-to-interior noise reduction of 19 dBA, for the affected units. This degree of noise reduction is commonly achieved in standard residential construction using materials and methods that comply with current California energy conservation standards. These typically include the use of standard 2.x.6 wall studs, stucco or wood exterior coating, R-10 or R-13 wall insulation, and minimum of ½" interior gypsum wall board. There should be no ventilation or plumbing penetrations through outward facing walls. Exterior doors and windows for all units should be well sealed and should have a sound transmission class rating of 25 to 30 dBA to provide the required interior noise levels.

For the units exposed to exterior noise levels above 60 dBA (Units 3, 4, and 5), it is likely that windows would have to remain closed in order to achieve the required noise reduction. For these units, forced air circulation should be provided. The following condition should be applied to Units 3, 4, and 5:

Building plans for Units 3, 4 and 5 shall incorporate forced air circulation. The mechanical ventilation and cooling system shall supply a minimum of two air changes per hour to each habitable room including 20% (one-fifth) fresh make-up air obtained directly from the outdoors. The fresh air inlet duct shall be of sound attenuating construction and shall consist of a minimum of ten feet of straight or curved duct or six feet plus one sharp bend.

This condition could be removed or revised if a more detailed acoustical engineering report demonstrates alternate noise insulation measures that can achieve the same result—provision of an interior Ldn that does not exceed 45 dBA.

4.2 CONSTRUCTION NOISE

Even though construction noise is a common and expected occurrence, the close proximity of residential units, as well as office and commercial uses warrant measures to help minimize the potential for noise impacts from grading and construction noise within the project site. Typical conditions imposed by the City for such projects include (City of Santa Barbara, 2004):

- Noise generating construction activity should be prohibited Saturdays, Sundays, and holidays and between the hours of 5 p.m. to 8 a.m. Holidays are defined as those days which are observed by the City of Santa Barbara as official holidays by City employees.
- All construction equipment, including trucks, should be professionally maintained and fitted with standard manufacturers' muffler and silencing devices.
- Staging and equipment areas shall be sited to minimize noise effects to residential and other noise-sensitive land uses. Temporary noise barriers shall be provided around the construction site as necessary to avoid extended disturbance to neighbors from construction noise.
- Within 10 days of commencement of construction, the applicant shall provide notice of construction schedule to surrounding neighborhood and post information on the site in a location visible to the public, including hours of operation and telephone contact number.

These measures will not eliminate construction noise, but will minimize the potential for significant impacts.

4.3 CONCLUSION

The design of the project, which provides each residential unit with a patio for outdoor living that is well-shielded from traffic and other noise sources, serves to avoid outdoor noise impacts. In addition, the structure of the project will also reduce noise levels at the adjacent residence to the north.

Roadway traffic could potentially result in interior noise levels that would exceed the 45 dBA Ldn interior standard, particularly at Units 3, 4, and 5 that are adjacent to Coast Village Road. Typical construction methods should provide adequate exterior-to-interior noise reduction to avoid this impact, however. A specific mitigation measure is recommended, which will require forced air ventilation for the three units mentioned, allowing residents to keep windows closed if desired.

Construction noise could result in a significant noise impact; however, with the inclusion of the mitigation measures described above, significant construction noise impacts can be mitigated.

- City of Santa Barbara. January, 2004. Standard Short-term Construction-Related Mitigation. Planning Division, City of Santa Barbara, Santa Barbara, CA.
- City of Santa Barbara. June 30, 2000. City of Santa Barbara Municipal Code, Title 9: Public Peace and Safety, Chapter 9.16, Noise. Santa Barbara City Government, Santa Barbara, CA.
- City of Santa Barbara. 1979. Noise Element, City of Santa Barbara General Plan. City of Santa Barbara Community Development Department, Santa Barbara CA.
- Lau, Michael C., Cynthia S.Y. lee, Judith L. Rochat, Eric R. Boeker, Gregg G. Pleming, Kevin L. Cummins, and Joseph Ruggiero. 2004. FHWA Traffic Noise Model Version 2.5. U.S. Department of Transportation, Federal Highway Administration, Washington, D.C.

Table 1 Noise Model Results

TNM Seq.	Receiver	Current Conditions	LD	LN	Ldn
1	R1	Unit #1 Patio	36.0	30.6	38.3
3	R2	Unit #2 Patio	37.4	32.0	39.7
4	R3	Unit #3 Patio	35.5	30.0	37.8
5	R3B	Unit #3 Deck	58.9	53.5	61.2
6	R4	Unit #4 Patio	36.8	31.4	39.1
7	R4B	Unit #4 Balcony	60.4	54.9	62.7
8	R5	Unit #5 Patio	36.8	31.3	39.1
9	R5B	Unit #5 Balcony	60.8	55.4	63.1
10	R6	Unit #6 Patio	36.6	31.2	38.9
11	R7	Unit #7 Patio	37.3	31.9	39.6
12	R8	Unit #8 Patio	32.9	27.4	35.2
13	R9	Center of Public Open Space	37.4	32.0	39.7
14	M1	Monitoring Point on sidewalk	64.0	58.5	66.3

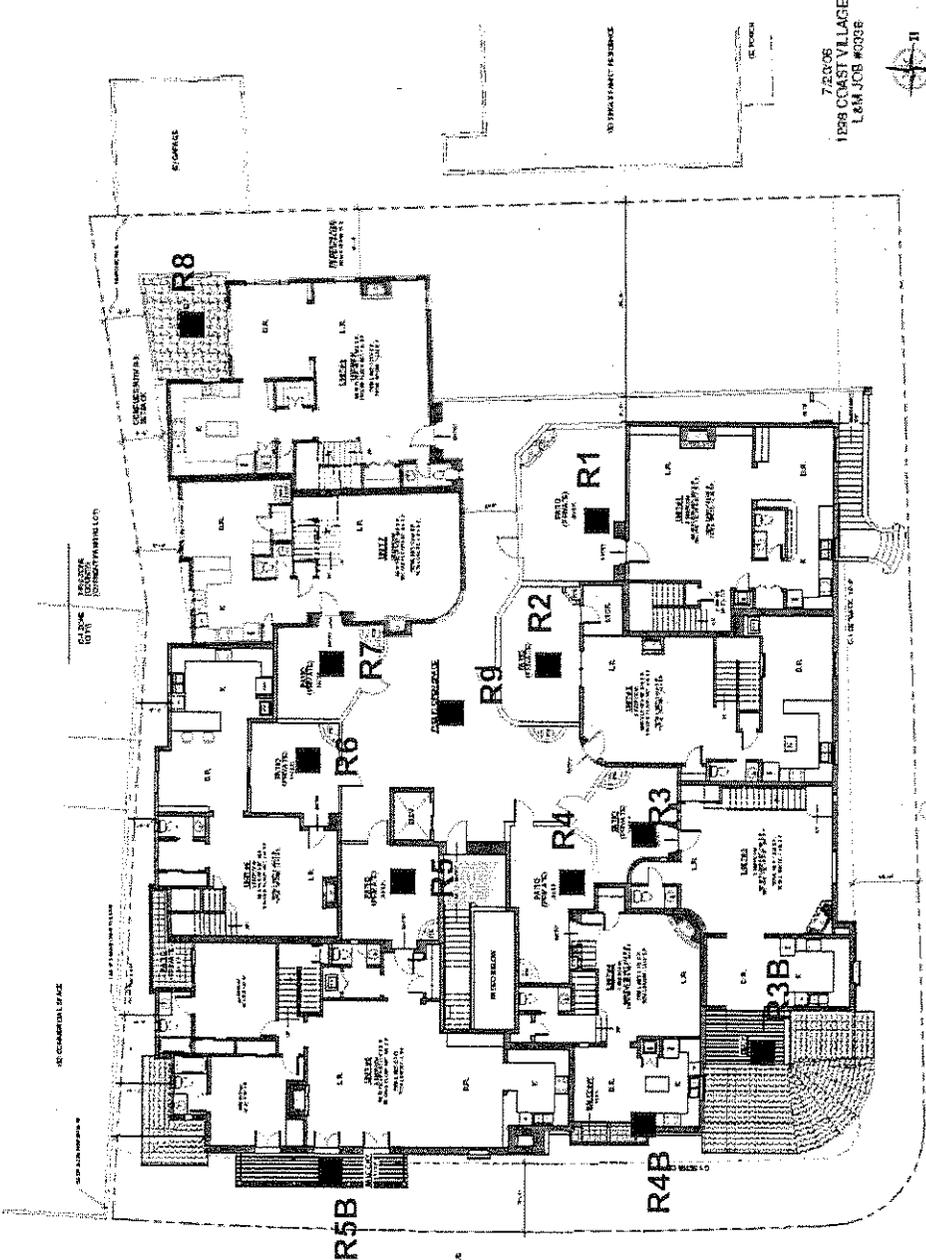
TNM Seq.	Receiver	Future (2017) Conditions	LD	LN	Ldn
1	R1	Unit #1 Patio	37.1	31.7	39.4
3	R2	Unit #2 Patio	38.5	33.1	40.8
4	R3	Unit #3 Patio	36.6	31.1	38.9
5	R3B	Unit #3 Deck	60.0	54.6	62.3
6	R4	Unit #4 Patio	37.9	32.5	40.2
7	R4B	Unit #4 Balcony	61.5	56.0	63.8
8	R5	Unit #5 Patio	37.9	32.4	40.2
9	R5B	Unit #5 Balcony	61.9	56.5	64.2
10	R6	Unit #6 Patio	37.7	32.3	40.0
11	R7	Unit #7 Patio	38.4	33.0	40.7
12	R8	Unit #8 Patio	34.0	28.5	36.3
13	R9	Center of Public Open Space	38.5	33.0	40.8
14	M1	Monitoring Point on sidewalk	65.1	59.6	67.4

LD = Daytime hourly equivalent noise level

LN = Nighttime hourly equivalent noise level

Ldn = Day-Night Average Noise Level

Bold locations and results are for outdoor living areas.



7/23/05
 1298 COAST VILLAGE
 L&M JOB #0036



M1

R1

1298 COAST VILLAGE
 L&M JOB #0036

Figure 2: Site Plan and Receiver Locations

1298 Coast Village Road
Santa Barbara, CA

