

11 November 2021

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**Subject: 831 Water Street
Preliminary Property Line Noise Analysis
Salter Project 21-0508**

Dear Sam:

This letter provides a preliminary review of the project's mechanical equipment noise levels to adjacent property lines. We have used the Entitlement Set drawings dated 9 September 2021 and mechanical information received from you via email on 3 November 2021.

SUMMARY

Our preliminary analysis indicates that the project's noise-generating equipment will meet the City property line standards without the need for any atypical mitigation. We recommend that a more refined analysis be conducted once the specific equipment has been selected and the MEP systems have been designed in greater detail.

SANTA CRUZ NOISE ORDINANCE

Noise from the project mechanical equipment is subject to the regulations of the City of Santa Cruz Municipal Code. Section 24.14.260 states the following:

*Noise Limits, Residential Property. No person shall produce, suffer or allow to be produced by any machine, animal or device, or any combination of the same, on residential property, a noise level **more than five dBA¹ above the local ambient**. The local ambient shall establish the maximum noise limit. More stringent noise limits may be established for specific uses through the conditions of a use permit.*

¹ A-Weighted Sound Level – The A-weighted sound pressure level, expressed in decibels (dB). Sometimes the unit of sound level is written as dB(A). A weighting is a standard weighting that accounts for the sensitivity of human hearing to the range of audible frequencies. People perceive a 10 dB increase in sound level to be twice as loud.



This section stipulates a 5 dB penalty for noise containing a “piercing pure tone” or “humming”. These descriptors do not necessarily apply to MEP equipment, but might. Therefore, we are conservatively applying the 5 dB penalty – meaning that equipment noise should not exceed the local ambient at the property lines.

DETERMINATION OF AMBIENT AND PROJECT CRITERIA

To determine the ambient noise levels, we conducted two long-term noise measurements along the nearest adjacent residential property lines (north and west) from 28 October to 1 November 2021. **Figure 1** shows the measurement locations and measured ambient noise levels. The noise monitors were located on a fence post (north) at an approximate height of 10 feet above grade and street light pole (west) at an approximate height of 12 feet above grade.

Table 1 summarizes the ambient noise levels we measured. We have used the quietest $L_{eq}(h)$ ² as the ambient.

Table 1: Measured Ambient Noise Levels [$L_{eq}(h)$]

Property Line	Ambient Noise Level (dBA)	Measurement Date	Measurement Hour
North	46	31 October 2021	4 am
West	42	30 October 2021	3 am

Since we are conservatively imposing the 5 dB penalty, noise levels reported in Table 1 are the property line criteria for equipment noise.

PROPOSED MECHANICAL EQUIPMENT

We received the following example mechanical equipment noise levels to use in our analysis:

- Garage exhaust fans – 87 dBA (sound power level)
- VRF Condensers – 63 dBA (sound pressure level³)

² $L_{eq}(h)$ – The equivalent steady-state A-weighted sound level that, in an hour, would contain the same acoustic energy as the time-varying sound level during that hour. This metric is typically used to describe the “average” noise level over the course of an hour

³ We have assumed this to be at an approximate distance of 1 meter (3.3 feet), which, in our experience, is in line with equipment noise data for other similar mechanical

We understand the equipment will be housed in three rooftop mechanical rooms (two on Building B and one on Building A). We have assumed the following:

- Mechanical rooms will be louvered at the roof
- Garage exhaust ducts will terminate the tops of the rooms
- There will be two garage exhaust fans: one at the westernmost and easternmost mechanical rooms (at the approximate locations of the trash chutes)
- There will be 15 VRF (5 per room)

CALCULATED NOISE LEVELS

Our preliminary calculations indicate that noise levels from the mechanical equipment to the property lines to be as shown in **Table 2**. Our analysis includes shielding provided by the rooftop mechanical room walls and roof decks.

Table 2: Calculated Equipment Noise Levels

Property Line	Equipment Noise Level (dBA)	Criterion (dBA)
North	42	46
West	39	42

As indicated in **Table 2**, noise levels from the project mechanical equipment are calculated to be below the project criteria.

We understand the equipment selection and mechanical layout are preliminary. When the design has progressed, and selection is complete we can provide an updated report.

* * *

This concludes our preliminary property line noise analysis for the 831 Water Street residences project. Please call with any questions.

Best,

SALTER



Matthew Hsiung
Consultant



Eric Mori, PE
Senior Vice President

Enclosure

filepath





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831 WATER STREET MEASUREMENT LOCATIONS AND MEASURED NOISE LEVELS

FIGURE 1

Salter #
 21-0508

MDH/EBM
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