11 November 2021

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Subject: 831 Water Street
Preliminary Environmental Noise Study
Salter Project 21-0508

Dear Sam:

We have conducted a preliminary environmental noise study for the project. The purpose of the study is to determine the noise environment at the site, compare the measured data with applicable standards, and propose mitigation measures as necessary. This report summarizes the results.

PROJECT CRITERIA

State Noise Standards

Building Code Title 24 (Dwelling Units)

The 2019 California Building Code requires that the indoor noise level in residential units of multi-family projects not exceed DNL[1] 45 dB.

1 DNL (Day-Night Average Sound Level) – A descriptor for a 24-hour A-weighted average noise level. DNL accounts for the increased acoustical sensitivity of people to noise during the nighttime hours. DNL penalizes sound levels by 10 dB during the hours from 10 PM to 7 AM. For practical purposes, the DNL and CNEL are usually interchangeable. DNL is sometimes written as Ldn.

CALGreen Code (Retail and Amenities)

This Code addresses acoustical issues for non-residential spaces in Section 5.507.4. If a building is exposed to an exterior $L_{eq}(h)$[2] of 65 dB during any hour of operation, the building envelope must reduce the interior noise environment to $L_{eq}(h)$[2] of 50 dBA in occupied areas.

We assumed that the hours of operation for the retail and amenity spaces would be 8 AM to 9 PM and used the loudest $L_{eq}(h)$ during our measurement period[3] as the basis of design.

City Noise Standard

The Santa Cruz General Plan interior noise standard are consistent with the State requirement for multi-family housing. Additionally, for new multi-family residential developments, the following policy applies:

Policy HZ3.2.2

Establish DNL noise level targets of 65 dBA for outdoor activity areas in new multi-family residential developments.

NOISE ENVIRONMENT

The site is in Santa Cruz, northwest the intersection of Water Street and North Branciforte Avenue. The noise environment at the site is predominantly controlled by traffic on these roads with a bus stop along Water Street and an existing car wash on site.

To quantify the existing noise environment, we conducted two long-term noise measurements between 28 October and 1 November 2021. The monitors were at a height of 12 feet above grade. **Figure 1** shows the measurement locations and measured noise levels.

A traffic analysis has not yet been provided for this project. We have added 1 dB to our measured noise levels to account for future traffic increases[4].

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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 The maximum $L_{eq}(h)$ measured during the weekend was used due to site operation noise during weekdays (e.g., carwash, laundromat, shipments).

4 The California Department of Transportation (DOT) assumes a traffic volume increase of three-percent per year, which corresponds to a 1 dB increase in DNL over a ten-year period.

RECOMMENDATIONS

Interior Noise

Using the Entitlement Set Drawings dated 9 September 2021, we calculated the STC[5] ratings needed to meet the criteria. Our calculations assume that the flooring is hard surfaced in living rooms/studios and carpeted in bedrooms. To meet the indoor DNL 45 dB criterion, it will be necessary for the windows and exterior doors to have STC ratings as shown in Figures 2 to 4.

To meet the CALGreen interior noise criterion, the STC ratings for the building will need to be as shown on Figure 2.

The recommended STC ratings are for full window assemblies (glass and frame) rather than just the glass itself. Tested sound-rated assemblies should be used. For reference, typical construction-grade assemblies achieve an STC rating of 28. Where STC ratings above 32 are required, at least one pane will need to be laminated.

Where windows need to be closed to achieve an indoor DNL of 45 dB, an alternative method of supplying fresh air (e.g., mechanical ventilation) should be considered. This applies to all locations where an STC rating is shown. This issue should be discussed with the project mechanical engineer.

Exterior Noise

We calculated expected noise levels at the ground floor open space and at the roof decks. These spaces will be exposed to noise levels no greater than DNL 65 dB, which is within the City's goal. Therefore, no mitigation is needed.

* * *

[5] STC (Sound Transmission Class) – A single-number rating defined in ASTM E90 that quantifies the airborne sound insulating performance of a partition under laboratory conditions. Increasing STC ratings correspond to improved airborne sound insulation.

This concludes our preliminary environmental noise study for the 831 Water Street project. Please feel free to call if you have any questions.

Best,

SALTER

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Consultant

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Salter

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San Jose

Los Angeles

Honolulu

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831 WATER STREET
MEASUREMENT LOCATIONS AND MEASURED NOISE LEVELS

FIGURE 1

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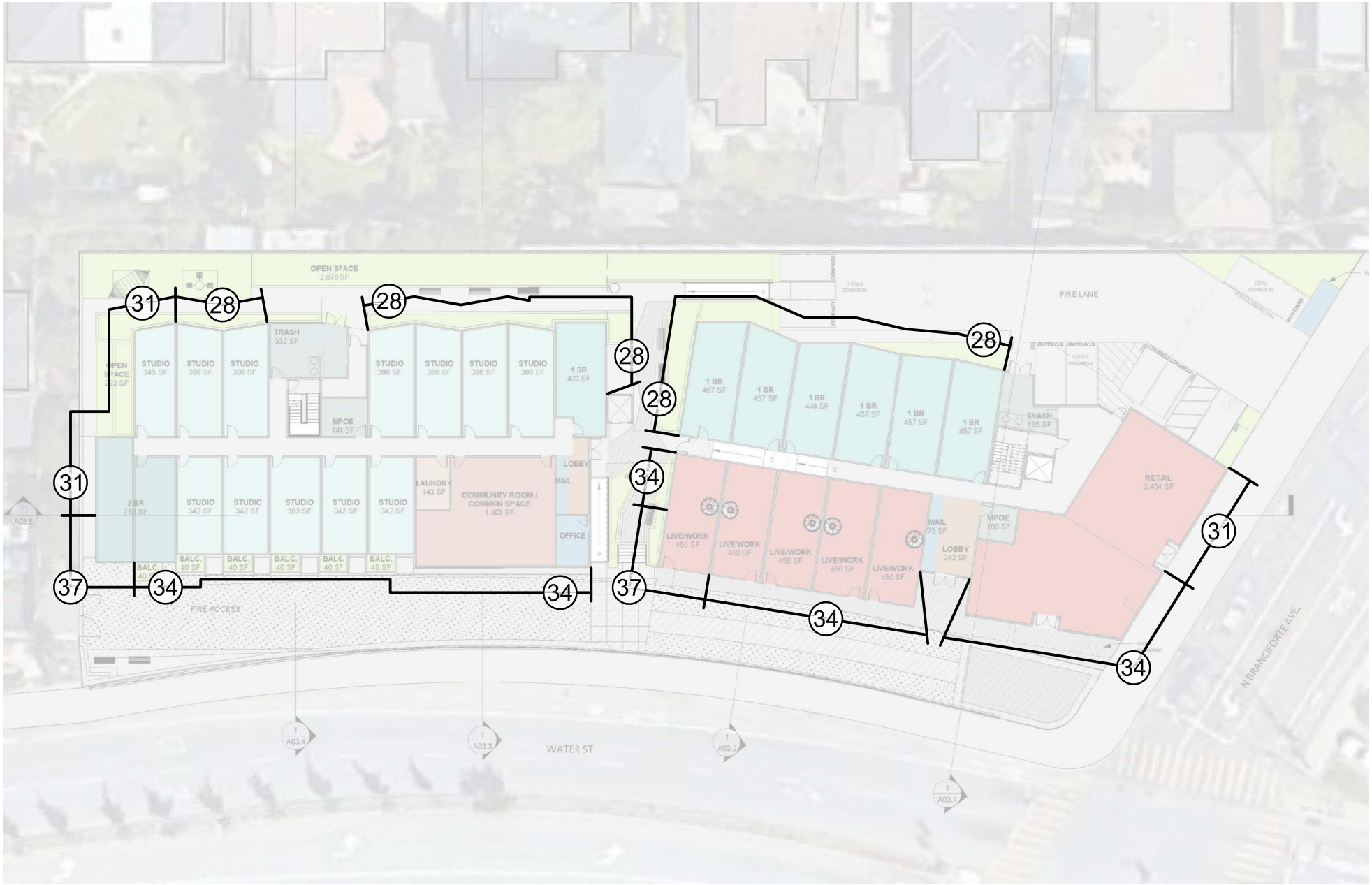

NOTE: STC RATINGS ARE FOR THE COMPLETE ASSEMBLY (E.G., GLASS, FRAME, AND OPERABLE SECTIONS) BASED ON TEST REPORTS FROM AN NVLAP-ACCREDITED LAB

831 WATER STREET
MINIMUM CODE–REQUIRED STC RATINGS FOR WINDOWS AND EXTERIOR DOORS (FLOOR 1)

FIGURE 2

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831 WATER STREET
MINIMUM CODE–REQUIRED STC RATINGS FOR WINDOWS AND EXTERIOR DOORS (FLOORS 2 TO 4)

FIGURE 3

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NOTE: STC RATINGS ARE FOR THE COMPLETE ASSEMBLY (E.G., GLASS, FRAME, AND OPERABLE SECTIONS) BASED ON TEST REPORTS FROM AN NVLAP-ACCREDITED LAB

831 WATER STREET
MINIMUM CODE–REQUIRED STC RATINGS FOR WINDOWS AND EXTERIOR DOORS (FLOOR 5)

FIGURE 4

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