

8 September 2022

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Dear David

Noise and vibration assessment for proposed fast-track application – Residential development at 30-40 Sandspit Road and 2-4 Reydon Place

Box Property Investments Ltd have engaged Styles Group Acoustics and Vibration Consultants to provide acoustic expertise to accompany the fast-track resource consent application for the proposed construction of a residential development at 30-40 Sandspit Road and 2-4 Reydon Place (the **Site**).

This advice sets out our experience, a summary of our assessment and recommendations to address the relevant noise and vibration criteria of the Auckland Unitary Plan (**AUP**).

1.0 Our role and expertise

Styles Group Acoustics and Vibration Consultants have extensive experience in the preparation and review of a significant number of acoustic assessments across New Zealand involving the management of operational and construction noise and vibration effects under relevant District Plan standards.

We have prepared a significant number of applications subject to the AUP operational and construction noise and vibration standards and hold a comprehensive understanding of the typical effects from development proposals under the AUP zoning framework and development controls.

2.0 The key noise and vibration considerations for the proposal

The proposal is to demolish the existing buildings and construct 70 dwellings on the Site. The development consists of three apartment buildings, and 12 terraced houses with associated parking and access.

The key noise considerations for the proposal are to ensure that the construction noise and vibration effects of the proposal can be managed to acceptable levels at all adjacent receivers, and to ensure that the operational noise levels can comply with the maximum permitted noise levels in the Residential Zone of the AUP.

Figure 1 displays the Site and adjoining sites in the Residential – Single House Zone of the AUP. The Residential – Mixed Housing Suburban Zone is located on the western side of Sandspit Road. The adjacent sites are occupied by residential dwellings, with the exception of Cockle Bay School to the north, and Howick College to the west of the school.

We have assessed the construction noise and vibration levels and operational noise levels from the proposal to determine compliance with standards E25.6.27, E25.6.30 and E25.6.2 of the AUP at all adjacent sites.



Figure 1 The Site (outlined in yellow) and surrounding receivers

3.0 Construction noise and vibration levels

Chapter E25 provides standards to manage and control noise and vibration effects from construction activities. The construction phase will be approximately 24 months. We anticipate that the construction noise and vibration effects from this project will be typical of a medium-to-large scale residential development.

The project does not involve any high-noise or vibration activities such as rock-breaking and the proposed earthworks period will be typical for an infill residential development of this scale.

The permitted construction noise limits are 70 dB L_{Aeq} and 85 dB L_{Amax} for works undertaken between 07:30 and 18:00, Monday to Saturday. The noise limits apply when measured and assessed 1 m from the most exposed façade of any occupied dwelling.

Our noise level calculations demonstrate that the works can comply for the vast majority of the 24-month construction period. We predict the construction noise limits may be exceeded by up

to 5 dB L_{Aeq} when earthworks, piling and concrete pours are undertaken near to the boundary with 3 and 3A Trelawn Place and 6 and 6A Reydon Place.

Resource consent is required as a restricted discretionary activity to exceed the construction noise limit of 70 dB L_{Aeq} by up to 5 dB when measured and assessed at the upper-level facades of 3 and 3A Trelawn Place and 6 and 6A Reydon Place. The proposal will comply with the construction noise standards at all other receivers.

A 5 dB exceedance would be experienced as appreciably louder than a compliant situation, but not significantly louder. The exceedances will be short term and only generated during earthworks, piling and concrete pours. Noise from all other construction work will comply with the construction noise limit using practicable mitigation measures. A Construction Noise and Vibration Management Plan (CNVMP) will set out the best practicable option to ensure that noise effects are and reasonable at all times.

3.1 Construction vibration

The proposed construction works will readily comply with the AUP permitted construction vibration limits to avoid building damage set out in E25.6.30(1)(a).

The permitted vibration amenity limits in E25.6.30(1)(b) may be exceeded at 3 and 3A Trelawn Place and 6 and 6A Reydon Place if vibratory compaction is undertaken near to the boundary.

We consider that the potential effects of this infringement will be appropriately managed by providing written advice to the occupants of all neighbouring dwellings within 50 m of the site, restricting the use of vibratory rollers to daytime only and ensuring that the building damage limits are complied with at all times. We note that an infringement of E25.6.30(1)(b) is very typical for construction works where there are occupied dwellings nearby.

4.0 Operational noise

We have undertaken an assessment of the potential operational noise levels from the proposal, including noise from traffic movements, swimming pool, gym, communal lounge, collections and deliveries and mechanical plant.

A number of noise mitigation and management measures are proposed by the applicant and form part of the application. The mitigation provided by these measures has been included in our calculation of the noise emissions from the site and our assessment of the potential noise effects. We have included recommended conditions relating to operational noise in Section 5.0 of this advice.

Our assessment demonstrates that the proposal will comply at all times with the permitted noise limits prescribed in Standard E25.6.2 at all surrounding sites.

5.0 Recommendations

We recommend that the following conditions of consent are imposed and complied with:

5.1 Construction noise and vibration

- (1) All construction works on site must be designed and conducted to ensure that noise emissions do not exceed the following limits at any occupied building. Construction noise must be measured and assessed in accordance with NZS 6803:1999 Acoustics – Construction Noise.

Construction activity	Assessment position	Noise limit
Earthworks, piling and concrete pours	Upper-level façade of 3 and 3A Trelawn Place and 6 and 6A Reydon Place	75 dB L _{Aeq} & 90 dB L _{Amax}
All other works	All locations	70 dB L _{Aeq} & 85 dB L _{Amax}

- (2) At least 10 days before earthworks start, the consent holder must prepare and submit a Construction Noise and Vibration Management Plan (CNVMP) to the satisfaction of Auckland Council. The objective of the CNVMP is to identify, require and enable the adoption of the best practicable option to minimise adverse construction noise and vibration effects and minimise any infringements of Chapter E25 of the Auckland Unitary Plan.

The CNVMP must be prepared with reference to Annex E of NZS 6803:1999 *Acoustics – Construction Noise* and must address the following matters as a minimum:

- Details for providing written advice of the works to the receivers within 50 m of the site
- The construction noise and vibration limits for the project
- The limitations on working days and hours
- Requirements and specifications for acoustically effective barriers on the site boundaries and additional screening
- Minimum separation distances for compliance (mitigated and unmitigated)
- A procedure for responding to any noise and vibration complaints
- A procedure for any noise and vibration monitoring during the works and applying any corrective action that may be required
- Details of practicable noise and vibration mitigation measures to be applied during the various stages of the construction period
- Procedures for ensuring that all contractors and operators on site are aware of the requirement to minimise noise and vibration effects on the neighbouring sites.
- The consent holder must advise the occupants of all neighbouring sites within 50 m of the site boundary of the works. The advice will be provided in writing at least 5 days before earthworks start on site and will include:
- An overview of the construction works including the duration of the project and working hours on site
- The expected duration of any high noise and vibration works near the boundary

- (m) Specific details on the vibration generating works that may infringe the AUP permitted construction vibration limits
- (n) Specific details on the noise generating works that may infringe the AUP permitted construction noise limits
- (o) The mitigation to be implemented, such as acoustic screening
- (p) A contact and phone number for any concerns regarding noise and vibration and the availability of monitoring where concerns about noise or vibration are raised.
- (q) All noisy construction work must take place between the hours of 07:30 and 18:00, Monday to Saturday. No noisy works may be undertaken on Sundays or public holidays. Minimum setback distances and screening required for compliance must be observed at all times.
- (r) Before piling works commence on site, acoustic screening will be erected along the north-eastern site boundary or localised around the piling rig to screen receivers to the north east. The barrier will be no less than 2.0 m in height and constructed with no gaps along the length or at the base. The screening must be in place and made effective until all piling works on the site have finished. The surface mass of any timber acoustic barrier will be no less than 10 kg/m² e.g. 18 mm plywood. Alternatively, proprietary construction noise barriers may be used. A suitably qualified acoustics specialist (e.g. MASNZ) must review the specifications of any proprietary construction noise barrier to determine its suitability before it is used on site.
- (s) All construction works on the site must be designed and conducted to ensure that the construction vibration does not exceed the guideline vibration values set out in the German Standard DIN 4150-3:1999 *Structural vibration – Effects of vibration on structures* when measured from any surrounding building in accordance with the Standard. This condition allows an exceedance of the AUP permitted construction vibration amenity Standard E25.6.30.1(b).

5.2 Operational noise

In addition to the standard condition requiring compliance with the application documents as lodged (including this report) and the noise limits set by the Auckland Unitary Plan, we recommend the following conditions of consent are also imposed:

- (1) An acoustically effective fence shall be installed along the common boundaries with 6a and 6b Reydon Place, and 3a and 3b Trelawn Place. The fences must be at least 2m in height with a mass of at least 10kg/m² and be constructed with no air gaps along the length or at the base. The fence must be maintained to be acoustically effective for as long as this consent is given effect to.
- (2) There will be no amplified music played in the gym or in the communal lounge outside the hours of Monday to Saturday 7.00am - 10.00pm and Sunday 9.00am – 6.00pm.
- (3) Vehicles driving along the access route shall be limited to a speed limit no greater than 10km/h.

6.0 Conclusion

Styles Group have assessed the construction and operational noise effects of the proposal. Our assessment demonstrates that the permitted construction noise and vibration limits will be infringed intermittently during earthworks, piling and potentially concrete pours near to the site boundaries if the residents are home during the works. The permitted construction vibration amenity limit will be exceeded but the permitted construction vibration limits to avoid building damage will be complied with at all times.

Resource consent will be required for the infringements of standards E25.6.27 and E25.6.30(1)(b) of the AUP to enable the works. E25.2 and E25.3 of the AUP seek to enable construction works that cannot practicably comply with the noise and vibration standards while controlling duration, frequency and timing to manage adverse effects. Mitigation measures and written advice to the neighbouring sites are proposed to manage the potential effects of these infringements. The CNVMP will set out the best practicable option to ensure that noise effects are consistent with the relevant objectives and policies and are reasonable under section 16 of the Resource Management Act 1991.

The operational noise levels from the proposal will comply with the noise levels permitted in the Residential Zone.

Please contact me if you require any further information.

Yours sincerely,



Daniel Winter, MASNZ

Styles Group