



ONE TASMAN PUKEAHU PARK
RESOURCE CONSENT APPLICATION

Rp 002 20210604 | 21 December 2022

Project: One Tasman Pukeahu Park

Prepared for: One Tasman Development Limited Partnership
Level 2, Free Ambulance Building, 5 Cable Street,
Wellington Central, 6011

Client: One Tasman Development Limited Partnership

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Report No.: Rp 002 20210604

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1.0 INTRODUCTION

Marshall Day Acoustics prepared an assessment dated 15 September 2021 on the applicant's proposal to construct a new multi-building, multi-storey residential development at 1 - 23 Tasman Street, Mt Cook. That assessment proceeded on basis that the proposal involved the construction of:

- Northern Apartments: a 10-storey base-isolated building at the northern end of the site with 104 apartments;
- Southern Apartments: a 9-storey base-isolated building at the southern end of the site with 92 apartments;
- Terrace Houses: 3-storey terrace houses, five fronting Old Buckle Street and four on the corner of Old Buckle Street and Tasman Street; and
- Courtyard Terraces: eight 2-storey terrace houses situated above the central carpark.

In that 15 September 2021 report, we assessed that the project could be designed to comply with the noise provisions of the Wellington City Council District Plan to the same extent.

The applicant subsequently modified the proposal to reduce the height of the Northern and Southern Apartments to 8 and 5-storeys respectively, among other more minor amendments. No changes to our assessment were made as this did not have any impact on our assessment. Therefore, the conclusions of our 15 September 2021 report remain valid.

A glossary of acoustic terminology used in this report is included as Appendix A.

1.1 The Project

The proposal is to remove the buildings existing on the site and to construct new residential dwellings/units as included in the introduction of this report. There is also car parking included as part of the development.

The only non-residential activity proposed for the site is a café, proposed to be located on the corner of Tasman Street and Old Buckle Street.

For further details on this project, refer to the Resource Consent documentation.

1.2 The Extent of This Assessment

This report has been prepared in support of the Resource Consent Application for the proposal. It provides preliminary advice for the following aspects of the project, regulated by the requirements of the District Plan:

- External noise insulation;
- Noise from fixed plant;
- Construction noise and vibration.

At this stage, the project has not progressed sufficiently to provide a final acoustic assessment of the items mentioned above. Construction details, plant selection and construction methodology are yet to be finalised, although an indication on some of these items has been provided.

To assess the feasibility of the scheme, we have prepared a provisional assessment based on the Resource Consent Architectural drawings prepared by Athfield Architects. Additional detail on likely constructions has been provided by the Project Architect.

2.0 EXTERNAL SOUND INSULATION

2.1 District Plan Requirements

The subject site is zoned Central Area under the District Plan. The external sound insulation and ventilation requirements for this area are contained in rule 13.6.1.2 of the District Plan, as reproduced below:

13.6.1.2 Noise Insulation and Ventilation

13.6.1.2.1 Noise Insulation

Any habitable room in a building used by a noise sensitive activity within the Central Area shall be protected from noise arising from outside the building by ensuring the external sound insulation level achieves the following minimum performance standards:

[...]

- *D_{nT,w} + C_{tr} > 30 dB: All other areas Note: In the Central Area and Suburban Centre Areas the definition for Noise Sensitive Activity includes residential activities.*

Compliance with this performance standard shall be achieved by ensuring habitable rooms are designed and constructed in a manner that:

- *accords with the schedule of typical building construction set out in Appendix 6; or*
- *accords with an acoustic design certificate signed by a suitably qualified acoustic engineer stating the design as proposed will achieve compliance with the above performance standard.*

13.6.1.2.2 Ventilation

Where bedrooms with openable windows are proposed, a positive supplementary source of fresh air ducted from outside is required at the time of fit-out. For the purposes of this requirement, a bedroom is any room intended to be used for sleeping. The supplementary source of air is to achieve a minimum of 7.5 litres per second per person.'

This report focuses on the noise insulation part of this rule, i.e. rule 13.6.1.2.1.

The external noise insulation performance standard applicable to this project is $D_{nT,w} + C_{tr} > 30$ to all habitable space.

2.2 Provisional Assessment

We understand from correspondence with the Project Architect that the following construction materials are being considered for the proposed buildings.

- Cladding types under consideration are mix of aluminium, ceramic, timber or masonry.
- Cladding would be over fibre cement board on nominal 140mm framing, cavity insulation, and lined with standard plasterboard (up to two layers allowed for);
- Roof would be a Rooflogic system (including a Securock layer) and a plasterboard ceiling below;
- Glazing to be double glazed aluminium framed (tbc).

Based on the proposed layout of the buildings, we expect that the external sound insulation requirement of the District Plan can be complied with, subject to appropriate glazing configurations. Final wall and ceiling linings would be determined as the design progresses.

3.0 NOISE FROM FIXED PLANT AND ACTIVITIES

The following section sets out our preliminary assessment for noise from fixed plant and from activities on site.

3.1 District Plan Requirements

The District Plan includes two separate noise limits: a noise limit from fixed plant; and a noise limit for activities (e.g. the café).

For this proposal to be a complying activity in respect of noise, noise from fixed plant is required to meet rule 13.6.1.1.1 of the District Plan and noise from Activities is required to meet rule 13.6.2.1.1. These rules are reproduced below:

13.6.1.1 Noise (fixed plant)

Note, all activities have a duty to avoid unreasonable noise under section 16 of the Resource Management Act regardless of the standards set in this Plan. The best practicable option shall be adopted to ensure that the emission of noise does not exceed a reasonable level.

13.6.1.1.1 *Noise emission levels from fixed plant shall not exceed the following at or within the boundary of any land parcel, or at the outside wall of any building on any site, other than the building or site from which the noise is emitted:*

At all times: 55 dB LAeq(15min)

10pm to 7am: 70 dB LAFmax

[...]

Note that the above shall not apply to fixed plant used solely for emergency purposes.

13.6.2.1 Noise

Note, all activities have a duty to avoid unreasonable noise under section 16 of the Resource Management Act regardless of the standards set in this Plan. At all times Council retains its power under the Act to ensure that the general duty under sections 16 and 17 to avoid unreasonable noise and avoid, remedy or mitigate any adverse effects of activities on the environment is met, and section 326 may be used to control excessive noise. The best practicable option shall be adopted to ensure that the emission of noise does not exceed a reasonable level.

13.6.2.1.1 *[Except for noise from port related activities which is covered in 13.6.2.1.4a,] noise emission levels when measured at or within the boundary of any fee simple site or at the outside wall of any building on any site, other than the site from which the noise is emitted, shall not exceed the following:*

At all times: 60 dB LAeq(15min)

At all times: 85 dB LAFmax

13.6.2.1.2 *[Except for noise from port related activities which is covered in 13.6.2.1.4a,] any activity occurring within the Central Area shall comply with the noise levels stated in Appendix 5 when measured from any land or premises outside the Central Area.*

Appendix 5 of the District Plan provides more stringent limits for the noise received in sites zoned in *Residential (Inner)* or *Residential (Outer)*. For this project, the closest site that falls under either of these zonings is 170 metres to the south. Therefore, we anticipate that compliance with the above noise rules would comfortably enable compliance with the noise limits of Appendix 5.

3.2 Fixed Plant Noise – Provisional Assessment

Specific details on fixed plant have yet to be provided. However, we expect that plant would include ventilation for the townhouses/apartments as well as a car park extract fan.

Ventilation may be provided through a central air handling unit or through small ventilation fans for each unit. The majority of the residential buildings are located sufficiently far enough from the site boundary that compliance with the noise limits of the District Plan would be readily achievable using standard noise control techniques. The exception is Block C which is close to the boundary of an

adjacent site. To avoid risk of non-compliance or a high level of noise mitigation design, plant should be located as far from the subject site boundary as is reasonably practicable.

Similarly, any car park exhaust fans should not be located on or near the boundary of the subject site to avoid excessive attenuation design.

3.3 Activity Noise – Provisional Assessment

Activity noise considered in this assessment includes noise from car parking activities and noise from the café.

3.3.1 Car Park Noise

We have reviewed the traffic assessment prepared by Stantec. The traffic assessment states that 36 AM and 46 PM peak hour vehicle movements are expected.

Based on the above movements, we predict that noise from car parking activities would comply with the District Plan noise limits.

3.3.2 Café Noise

The café is proposed for the corner of Tasman Street and Old Buckle Street. The closest assessment location is the former Mount Cook Police Station, located across Tasman Street. For the purposes of this assessment, we have assumed the café would have an outside seated area.

The predicted noise level from café activities, received at the closest assessment location is 50 dB $L_{eq(15mins)}$. This is comfortably compliant with the 60 dB $L_{Aeq(15 min)}$ activity noise limit of the District Plan.

3.3.3 Cumulative Activity Noise

The café and car park are separated by a minimum distance of 40 metres with several buildings in between. As a result, our predictions show that cumulative noise level of these activities would remain within the activity noise limits of the District Plan.

4.0 CONSTRUCTION ACTIVITIES

4.1 Construction Noise Criteria

Under the District Plan General Provisions, *“noise from construction, maintenance and demolition activities, including those associated with the urgent repair of utilities to maintain continuity of service, on any site or on any road shall comply with, and be measured and assessed using, the recommendations of NZS6803:1999”*.

The noise limits of NZS 6803:1999 depend on the duration of construction works. Construction projects which are of a shorter duration have a higher allowable noise limit than those of a longer duration. For this project, we expect the long term duration limits to apply. These are reproduced Table 1 and Table 2.

Table 1: Recommended upper limits for construction noise received in residential zones (from New Zealand Standard NZS 6803:1999 'Acoustics – Construction Noise' Table 2)

Time of week	Time period	Duration of work Long-term duration, L_{Aeq} (dB)	
		L_{eq}	L_{max}
Weekdays	0630-0730	55	75
	0730-1800	70	85
	1800-2000	65	80
	2000-0630	45	75
Saturdays	0630-0730	45	75
	0730-1800	70	85
	1800-2000	45	75
	2000-0630	45	75
Sundays and public holidays	0630-0730	45	75
	0730-1800	55	85
	1800-2000	45	75
	2000-0630	45	75

Table 2: Recommended upper limits for construction noise received in industrial or commercial areas (from New Zealand Standard NZS 6803:1999 'Acoustics – Construction Noise' Table 3)

Time of week	Time period	Duration of work Long-term duration, L_{Aeq} (dB)
All days	0730-1800	70
	1800-0730	75

Notes in the standards to the tables above:

7.2.5

The night time limits in Table 2 shall apply to activities carried out in industrial or commercial areas where it is necessary to prevent sleep interference, specifically where there are residential activities, hospitals, hotels, hostels, or other accommodation facilities located within commercial areas. The limits in Table 2 may also be used to protect other specific noise sensitive activities at certain hours of the day.

7.2.6

One major factor which should be considered is whether there is a relatively high background sound level (L_{90}) due to noise from sources other than construction work at the location under investigation. In such cases limits should be based on a determination of the existing level of noise in the area (a "background plus" approach).

7.2.7

Where there is no practicable method of measuring noise outside a building, the upper limits for noise measured inside the building shall be the levels stated in tables 2 and 3 minus 20 dB. This is considered to be a typical value for the sound reduction normally achieved in New Zealand buildings with doors and windows closed."

4.2 Construction Vibration Criteria – Cosmetic Building Damage

The District Plan does not address vibration resulting from construction activities. However, guidance can be found in DIN 4150-3:2016 "Vibrations in buildings – Part 3: Effects on structures". This Standard is used widely in New Zealand to assess potential for vibration causing damage to buildings and is frequently referenced in consent conditions issued by Wellington City Council.

Vibration sources are assessed as being either short-term (transient)¹ or long term. The limits, as set out in DIN 4150-3:2016, are reproduced below.

Table 3: Guideline values for evaluating effects of short-term vibration (DIN 4150-3 2016: Table 1)

Structure Type	Peak Particle Velocity Vibration Level (mm/s)	
	Topmost floor, horizontal direction	Floor slabs, vertical direction
Line 1. Commercial or Industrial buildings	40	20
Line 2. Residential buildings	15	20
Line 3. Historic or Sensitive Structures	8	20

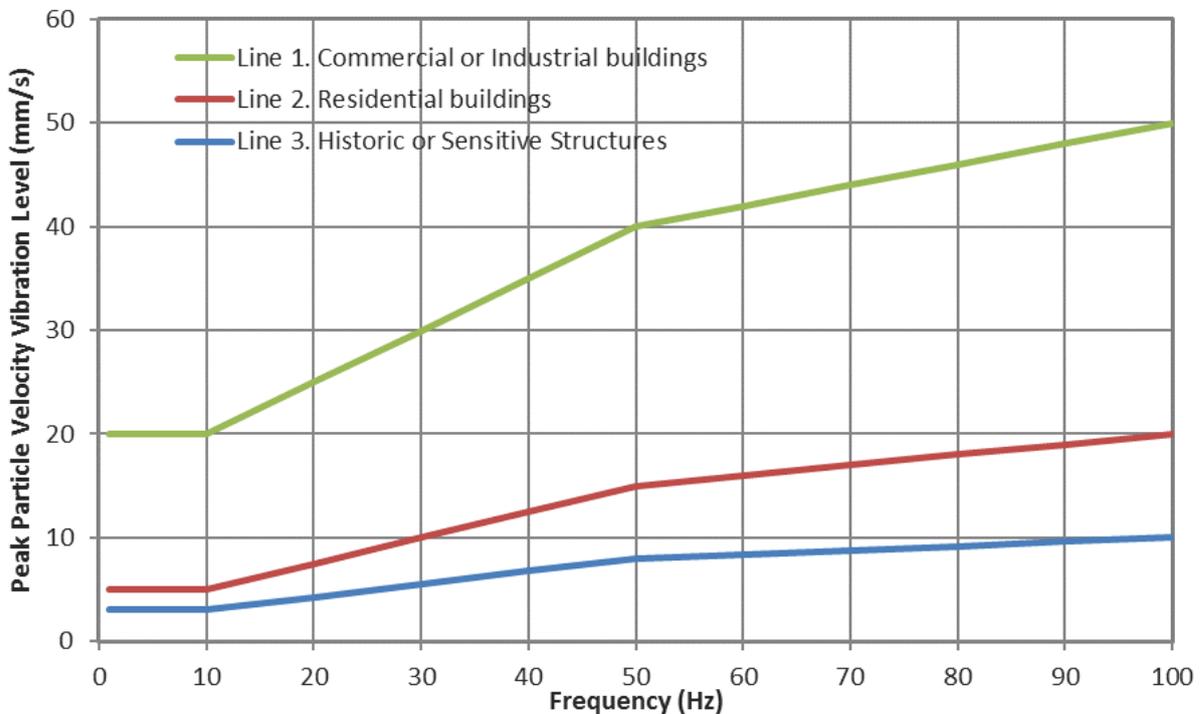


Figure 1: Short-term (transient)¹ vibration at building foundations (DIN 4150-3 2016: Figure 1)

Table 4: Guideline values for evaluating effects of long-term vibration (DIN 4150-3 2016: Table 4)

Structure Type	Peak Particle Velocity Vibration Level (mm/s)	
	Topmost floor, horizontal direction	Floor slabs, vertical direction
Line 1. Commercial or Industrial buildings	10	10
Line 2. Residential buildings	5	10
Line 3. Historic or Sensitive Structures	2.5	10

¹ Short-term (transient) vibration is “vibration which does not occur often enough to cause structural fatigue and which does not produce resonance in the structure being evaluated”

The criteria relate to the avoidance of cosmetic damage of a building, such as cracking in paint or plasterwork. Building cosmetic damage effects are deemed 'minor damage' in the Standard and can generally be easily repaired. The thresholds of cosmetic damage to a building are much lower than those that would result in structural damage. The Standard states: "*Experience has shown that if these values are complied with, damage that reduces the serviceability of the building will not occur.*"

Note that the above criteria are the limits to avoid structural damage to buildings. People will be able to 'feel' vibration at lower levels than these criteria. During consultation, this needs to be conveyed to concerned residents and building occupants. This will be addressed in the Construction Noise and Vibration Management Plan (CNVMP).

4.3 Compliance with Construction Noise and Vibration Criteria

At this stage, a construction methodology has not been developed sufficiently to carry out a noise assessment and specifics of any exceedances cannot be reliably determined.

Due to the close proximity of some of the surrounding sites, it is highly unlikely that the construction noise limits would be complied with at all times. This is not unusual for construction sites in Wellington.

The buildings at 4 Sussex Street and 22 Sussex Street would be most at risk in terms of construction noise exceedances.

Until further details on the construction methodology have been determined, we are unable to comment on whether or not the vibration limits can be complied with. In our experience, impact piling (if used) is likely to cause the highest level of vibration. However, some other activities on a construction site, such as the use of vibratory rollers, can also cause vibration.

To address the above, we propose a CNVMP be provided to the CMO for approval, at least 10 days prior to construction commencing on site.

APPENDIX A GLOSSARY OF TERMINOLOGY

Noise	A sound that is unwanted by, or distracting to, the receiver.
dB	<u>Decibel</u> The unit of sound level. Expressed as a logarithmic ratio of sound pressure P relative to a reference pressure of $P_r=20 \mu\text{Pa}$ i.e. $\text{dB} = 20 \times \log(P/P_r)$
dBA	The unit of sound level which has its frequency characteristics modified by a filter (A-weighted) so as to more closely approximate the frequency bias of the human ear.
A-weighting	The process by which noise levels are corrected to account for the non-linear frequency response of the human ear.
$L_{\text{Aeq}}(t)$	The equivalent continuous (time-averaged) A-weighted sound level. This is commonly referred to as the average noise level. The suffix "t" represents the time period to which the noise level relates, e.g. (8 h) would represent a period of 8 hours, (15 min) would represent a period of 15 minutes and (2200-0700) would represent a measurement time between 10 pm and 7 am.
L_{Amax}	The A-weighted maximum noise level. The highest noise level which occurs during the measurement period.
Sound Insulation	When sound hits a surface, some of the sound energy travels through the material. 'Sound insulation' refers to ability of a material to stop sound travelling through it.
$D_{nT,w}$	<u>Weighted Standardised Level Difference</u> A single number rating of the sound level difference between two rooms. $D_{nT,w}$ is typically used to measure the on-site sound insulation performance of a building element such as a wall, floor or ceiling
C_{tr}	A sound insulation adjustment, commonly used with R_w and $D_{nT,w}$. C_{tr} adjusts for low frequency noise, like noise from trucks and subwoofers. C_{tr} values typically range from about -4 to about -12. This term is used to provide information about the acoustic performance at different frequencies, as part of a single number rating system.
Vibration	When an object vibrates, it moves rapidly up and down or from side to side. The magnitude of the sensation when feeling a vibrating object is related to the vibration velocity. Vibration can occur in any direction. When vibration velocities are described, it can be either the total vibration velocity, which includes all directions, or it can be separated into the vertical direction (up and down vibration), the horizontal transverse direction (side to side) and the horizontal longitudinal direction (front to back).
PPV	<u>Peak Particle Velocity</u> For Peak Particle Velocity (PPV) is the measure of the vibration aptitude, zero to maximum. Used for building structural damage assessment.
NZS 6801:2008	New Zealand Standard NZS 6801:2008 "Acoustics – Measurement of environmental sound"
NZS 6802:2008	New Zealand Standard NZS 6802:2008 "Acoustics – Environmental Noise"
NZS 6803:1999	New Zealand Standard NZS 6803: 1999 "Acoustics - Construction Noise"