Styles Group
Acoustics & Vibration Consultants

DRAFT CONSTRUCTION NOISE AND VIBRATION MANAGEMENT PLAN

THE POINT MISSION BAY

PREPARED FOR

Ngāti Whātua Ōrākei Whai Rawa Limited and Generus Living Group

DATE

21 October 2025

Construction noise and vibration management plan prepared by Styles Group for Ngāti Whātua Ōrākei Whai Rawa Limited and Generus Living Group.

REVISION HISTORY

Rev:	Date:	Comment:	Version:	Prepared by:	Reviewed by:
1	21/10/25		Final	Jamie Exeter, MASNZ, Assoc. NZPI Principal Styles Group	Jon Styles, MASNZ Director and Principal Styles Group

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Appendices

1.0 Introduction

Ngāti Whātua Ōrākei Whai Rawa Limited and Generus Living Group have engaged Styles Group to prepare a draft Construction Noise and Vibration Management Plan (**CNVMP**) for the construction of The Point Mission Bay, a proposed comprehensive retirement village development over several sites at the northern ends of Rukutai Street, Aotea Street, Kupe Street, and Te Arawa Street, Orakei (the **Site**).

The objectives of this CNVMP are to:

i. Set out the procedures to identify and adopt the best practicable options for minimising adverse construction noise and vibration effects; and

ii. Define the procedures to be followed to ensure that the proposed project construction noise and vibration standards are being met.

This CNVMP has been prepared in accordance with the proposed project conditions and with reference to Appendix E of NZS 6803:1999 *Acoustics – Construction noise* and the Association of Australasian Acoustical Consultants *Guideline for Interpreting and Applying NZS 6803-1999*.

The final CNVMP will be submitted for certification by Auckland Council before construction works begin on the Site. Updates may be required as the works progress. Any updates to the construction methodology will be tracked and the revised CNVMP submitted to the Council for certification. All works will be in accordance with the latest version of the certified CNVMP.

A glossary of the acoustical terms used in this document is provided as Appendix A.

2.0 Contacts

The contact for queries or complaints regarding the project, and the manager responsible for implementing this CNVMP is:

- Company name: TBC
- Contact person: TBC
- Contact person email address: TBC
- Contact person phone number: TBC

The consultant engaged to provide construction noise and vibration advice and undertake monitoring is:

- Company name: Styles Group Acoustics & Vibration Consultants
- Contact phone number: 09 308 9015

3.0 Project conditions

The project conditions of consent with respect to construction noise and vibration are set out in Appendix B. These conditions must be complied with.

Sections 5.0 and 6.0 of this CNVMP summarise the construction noise and vibration limits with respect to the working hours and receiving sites.

4.0 Duration of works and hours of construction

The works are anticipated to be completed over five key stages (with enabling works occurring prior to this). The indicative programme of works is set out in Table 1.

Table 1: Indicative programme of works

Stage	Indicative scope of works	Estimated completion
Enabling Works	• Site establishment • Underground services/infrastructure install	Q4 2026
Stage 1	• Construction of basement and podium level for Building 2 and 3. • Construction of Building 2 • Construction of restaurant	Q4 2027
Stage 2	• Construction of basement and podium for Building 3. • Construction of Building 3. • Demolition of Aotea Street Apartment blocks • Construction of Basement to B1 and Entry Pavilion (finished at podium level) • Construction of restaurant on podium between Buildings 3 & 4	Q3 2029
Stage 3	• Construction of Building 1	Q1 2031
Stage 4	• Construction of Building 4 and basement • Construction of remaining L2 basement • Amenity space on podium	Q3 2032
Stage 5	• Construction of Building 5	Q3 2034

Construction work involving heavy vehicles (weighing 3.5 t or more) and machinery must only be undertaken between 07:30 and 18:00 on Monday to Saturday.

Quieter activities and internal works may be undertaken outside of these hours providing they are generally inaudible at the neighbouring sites.

5.0 Project noise limits

The construction noise limits for the project are summarised in Table 2. Reference noise levels for the construction activities likely to occur on site and setback distances for achieving compliance with the project noise limits are set out in Section 10.

All construction noise must be measured and assessed in accordance with the New Zealand Standard NZS 6803:1999 *Acoustics – Construction Noise*. This means the noise limits apply at 1 m from the façade, and 1.2 to 1.5 m above the relevant floor level, of any building that is occupied during the works (the **Receivers**).

The project noise limits do not apply at unoccupied buildings or at any building on the Site. The L_{Amax} noise limits do not apply at 230 Kupe Street.

Table 2: Project construction noise limits

Construction activity	Assessment location	Upper noise limits
Concrete breaking	86 Aotea St	73 dB L_{Aeq} and 88 dB L_{Amax}
	104, 119, 119B Rukutai St	70 dB L_{Aeq} and 90 dB L_{Amax}
	97-99 Aotea St	70 dB L_{Aeq} and 90 dB L_{Amax}
	All other sites	70 dB L_{Aeq} and 85 dB L_{Amax}
Drilling during foundation work	59 Te Arawa St	74 dB L_{Aeq} and 89 dB L_{Amax}
	119 Rukutai St	77 dB L_{Aeq} and 92 dB L_{Amax}
	119B Rukutai St	75 dB L_{Aeq} and 90 dB L_{Amax}
	97-99 Aotea St	74 dB L_{Aeq} and 89 dB L_{Amax}
	All other sites	70 dB L_{Aeq} and 85 dB L_{Amax}
Bored piling for temporary shoring	59 Te Arawa St	76 dB L_{Aeq} and 91 dB L_{Amax}
	104 Rukutai St	76 dB L_{Aeq} and 91 dB L_{Amax}
	119 Rukutai St	79 dB L_{Aeq} and 94 dB L_{Amax}
	119B Rukutai St	79 dB L_{Aeq} and 94 dB L_{Amax}
	86 Aotea St	77 dB L_{Aeq} and 92 dB L_{Amax}
	97-99 Aotea St	76 dB L_{Aeq} and 91 dB L_{Amax}
	All other sites	70 dB L_{Aeq} and 85 dB L_{Amax}
Sheet piling for temporary shoring	48 Te Arawa St	74 dB L_{Aeq} and 89 dB L_{Amax}
	2/48 Te Arawa St	71 dB L_{Aeq} and 86 dB L_{Amax}
	59 Te Arawa St	74 dB L_{Aeq} and 89 dB L_{Amax}
	104 Rukutai St	75 dB L_{Aeq} and 90 dB L_{Amax}
	119 Rukutai St	75 dB L_{Aeq} and 90 dB L_{Amax}
	119B Rukutai St	74 dB L_{Aeq} and 89 dB L_{Amax}
	97-99 Aotea St	73 dB L_{Aeq} and 88 dB L_{Amax}
	All other sites	70 dB L_{Aeq} and 85 dB L_{Amax}

Construction activity	Assessment location	Upper noise limits
Excavator works	59 Te Arawa St	76 dB L_{Aeq} and 91 dB L_{Amax}
	104 Rukutai St	74 dB L_{Aeq} and 89 dB L_{Amax}
	119 Rukutai St	78 dB L_{Aeq} and 93 dB L_{Amax}
	119B Rukutai St	76 dB L_{Aeq} and 91 dB L_{Amax}
	86 Aotea St	78 dB L_{Aeq} and 93 dB L_{Amax}
	97-99 Aotea St	78 dB L_{Aeq} and 93 dB L_{Amax}
	All other sites	70 dB L_{Aeq} and 85 dB L_{Amax}
Drilling for retaining walls	59 Te Arawa St	75 dB L_{Aeq} and 90 dB L_{Amax}
	104 Rukutai St	72 dB L_{Aeq} and 87 dB L_{Amax}
	119 Rukutai St	73 dB L_{Aeq} and 88 dB L_{Amax}
	119B Rukutai St	74 dB L_{Aeq} and 89 dB L_{Amax}
	All other sites	70 dB L_{Aeq} and 85 dB L_{Amax}
Vibratory compaction	59 Te Arawa St	72 dB L_{Aeq} and 87 dB L_{Amax}
	119B Rukutai St	75 dB L_{Aeq} and 90 dB L_{Amax}
	97-99 Aotea St	71 dB L_{Aeq} and 86 dB L_{Amax}
	All other sites	70 dB L_{Aeq} and 85 dB L_{Amax}
All other works	All sites	70 dB L_{Aeq} and 85 dB L_{Amax}

6.0 Project vibration limits

This section summarises the construction vibration limits for the project.

All construction vibration must be measured and assessed in accordance with DIN 4150–3:1999 *Structural Vibration – Part 3 Effects of vibration on structures* (**DIN 4150–3:1999**).

6.1 Vibration amenity limits (within occupied buildings)

The project limit for avoiding disruption inside occupied buildings is 2 mm/s PPV within any occupied building not on the subject site.

A limit of 5 mm/s PPV may be adopted during vibratory compaction if all the following steps are carried out:

1. Assess whether it is practicable to comply with 2 mm/s PPV by adopting mitigation measures (see Section 12.0), or using smaller plant, static rollers, plate compactors, or other methodologies when within 20 m of any occupied dwelling. Practicability will depend on factors such as availability of plant, cost, whether adopting the mitigation will make a noticeable difference, and whether compaction specification can be achieved within a reasonable timeframe.

2. The following information must be provided to the occupants of any building where vibration will exceed 2 mm/s PPV no less than three days before the vibratory compaction works begin:
    i. The dates and approximate times for the highest levels of vibration.
    ii. A phone number and contact person for any questions or to advise of any sensitive times for construction vibration during the day.
3. A record of the advice provided to the building occupants must be retained and provided to Auckland Council on request.

These limits do not apply at any building that is not occupied while the work is taking place (e.g. when the residents are at work and school).

6.2 Vibration limits for avoiding building damage

The project construction vibration limits for avoiding cosmetic building damage (e.g. cracked plaster) are the guideline values of DIN 4150–3:1999.

The DIN 4150–3:1999 Standard recommends limits according to the design, occupancy, and sensitivity of the subject building. The classifications are:

- Line 1: Buildings used for commercial purposes, industrial buildings, and buildings of similar design
- Line 2: Dwellings and buildings of similar design and/or occupancy
- Line 3: Structures that, because of their particular sensitivity to vibration, cannot be classified under lines 1 and 2 and are of great intrinsic value (e.g., listed buildings under preservation order).

Line 3 typically applies to any receiving structure that is considered by a suitably qualified person to be particularly sensitive to vibration and/or of great intrinsic value e.g. a heritage building. No Line 3 structures have been identified in the area. The Line 2 limits (for dwellings) are therefore applicable at the neighbouring buildings.

The guideline values provided in DIN 4150–3:1999 also depend on whether the vibration is ‘short-term’ or ‘long-term’. Short-term vibration is defined by the Standard as vibration which does not occur often enough to cause structural fatigue, and which does not produce resonance. Long-term vibration is all other types of vibration. In our experience in measuring vibration in low-rise structures shows that construction vibration typically meets the short-term criteria.

The DIN 4150–3:1999 frequency-dependent values for short-term vibration are illustrated in Figure 1. These apply at the building foundations. Construction vibration limits within dwellings (Line 2) are typically between 5 mm/s and 15 mm/s PPV. The project vibration and structural experts should be contacted if confirmation of the limits is required.

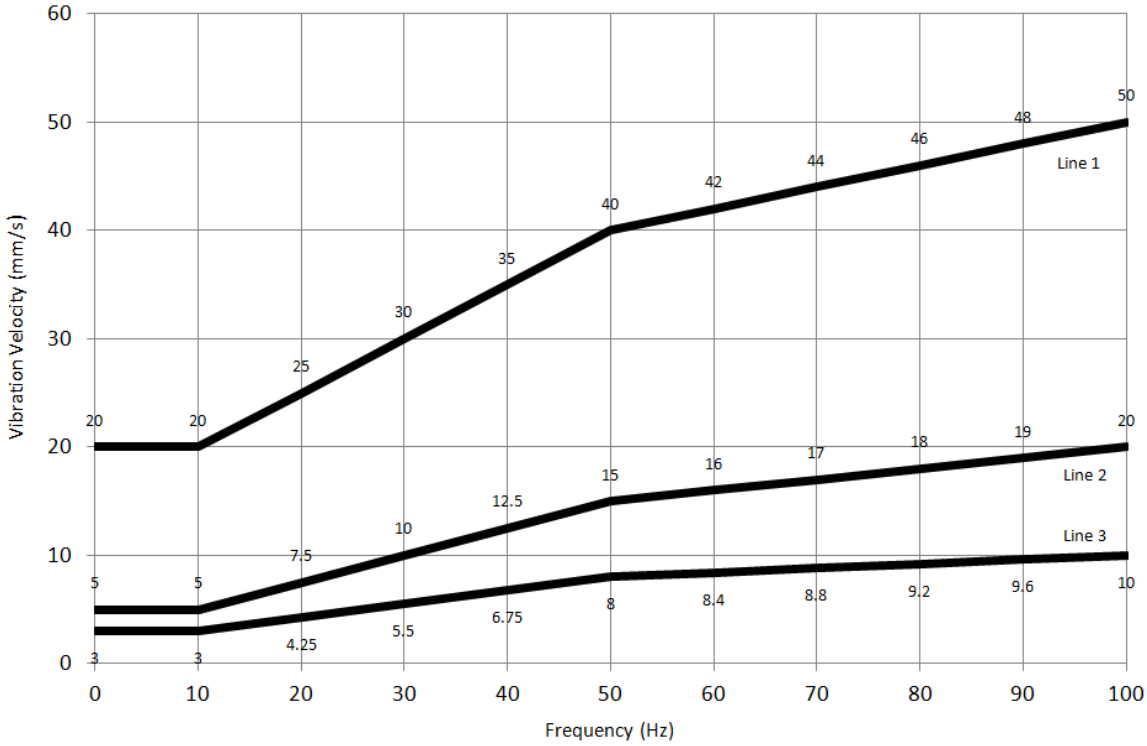


Figure 1: DIN 4150–3:1999 guideline values for short-term vibration

7.0 The neighbouring sites

The nearest neighbours to the Site where construction noise and vibration will be received are set out in Table 3. All properties within 50 m of the Site are identified in Appendix C.

Table 3: Nearest neighbouring sites

Address	Building type and use
215 Kupe St	Car park
222 Kupe St	Early childhood education centre
230 Kupe St	Ngāti Whātua Ōrākei offices
48 Te Arawa St	Multiple-level residential dwelling
2/48 Te Arawa St	Multiple-level residential dwelling
59 Te Arawa St	Multiple-level residential dwelling
104 Rukutai St	Multiple-level residential dwelling
113 Rukutai St	Single level and multiple-level residential dwellings

Address	Building type and use
115-117 Rukutai St	Single-level residential dwellings
119 Rukutai St	Multiple-level residential dwelling
119B Rukutai St	Multiple-level residential dwelling
86 Aotea St	Multiple-level residential dwelling
97-99 Aotea St	Multiple-level residential dwellings
39 Atkin Av	Multiple-level residential dwelling

8.0 Community liaison

The occupants of all buildings within 50 m of works must be provided the following information by letter drop at least 10 working days before works begin:

i. A brief overview of the works.

ii. The expected start date and duration of the works.

iii. The days and hours of the week when works may be undertaken.

iv. The approximate timing and duration of the highest noise and vibration activities.

v. The noise and vibration mitigation that will be in place.

vi. The availability of noise and vibration monitoring to address any concerns.

vii. Contact details for the receipt of any noise or vibration complaints or concerns.

9.0 Complaints about noise and vibration

Any complaints received will be directed to the manager identified in Section 2.0. A register will be kept and maintained on site to record the details of any complaints, including:

i. The time and date of the noise and/or vibration causing the complaint.

ii. The nature of the noise and/or vibration and what it was caused by (if known).

iii. The name and contact number of the complainant (if given).

iv. The action taken in response to the complaint.

v. Any corrective action measures taken in accordance with Section 14.0.

The complaints register must be made available to Auckland Council on request.

10.0 Reference noise levels and setback distances for compliance

Table 4 sets out minimum setback distances for construction activities on site that will require additional mitigation when they take place near to occupied buildings.

These are the shortest distances permitted between the construction activity and the most exposed ground-level facade of the nearest occupied building before further screening or other mitigation is required (see Section 11.0).

The mitigated compliance distances are based on 2.4 m high construction noise barriers effectively screening the ground level of an occupied building from the noise generating activity and reducing the noise level by 10 dB.

The mitigated setback distances are not relevant to the upper levels of an occupied building that is not screened by an acoustic barrier. The setback distance will depend on the nature of the activity and the heights of the noise source and receiver. In these cases, adopt localised screening (Section 11.2) or further noise mitigation (Section 11.1), or both. Alternatively, contact the project construction noise consultant (Section 2.0) to confirm setback distances or appropriate mitigation.

The setback distances are not relevant where the construction activity has a noise limit higher than 70 dB L_{Aeq} (see Section 5.0).

Table 4: Noise sources and calculated separation distances

Construction activity	Reference unmitigated noise level at 10 m $L_{Aeq(15\ min)}$	Unmitigated setback distance for compliance	Mitigated setback distance for compliance
Vibrating hammer on 20-t excavator driving sheet piles for temporary shoring	88 dB	106 m	34 m
Concrete breaking of existing slabs and palisade wall with hydraulic breaker on 20-t excavator	82 dB	54 m	17 m
Bored piling with a 20-t excavator	79 dB	38 m	12 m
Demolition of a building with a 20-t excavator	78 dB	34 m	11 m

Construction activity	Reference unmitigated noise level at 10 m $L_{Aeq(15\ min)}$	Unmitigated setback distance for compliance	Mitigated setback distance for compliance
Concrete breaking of existing slabs and palisade wall with hydraulic breaker on 20-t excavator with acoustic shroud on breaker attachment	77 dB	30 m	10 m
D6, D7, or D10 bulldozer	76 dB*	27 m	9 m
Compaction with a 15-t padfoot vibratory compaction roller	76 dB*	27 m	9 m
Drilling with a 12-t excavator for retaining walls	75 dB	24 m	8 m
Drilling at the building foundations with a CFA fixed mast drill rig 60-t	75 dB	24 m	8 m
Loader (skid steer 120HP)	75 dB	24 m	8 m
Tower crane under load	75 dB	24 m	8 m
Compaction with plate compactor	74 dB	22 m	7 m
Compaction with 10-t twin drum vibratory roller	73 dB*	19 m	6 m
Cut and fill, clearing, and loading trucks with a 30-t excavator	72 dB	17 m	6 m
Drilling with a 6-t excavator	72 dB	17 m	6 m
50-t mobile crane under load	70 dB	14 m	5 m
Cut and fill, clearing, and loading trucks with a 20-t excavator	69 dB	12 m	4 m
Compaction with 5-t to 7-t vibratory compaction roller	69 dB*	12 m	4 m
Concrete pump and truck discharging	69 dB	12 m	4 m

Construction activity	Reference unmitigated noise level at 10 m $L_{Aeq(15\ min)}$	Unmitigated setback distance for compliance	Mitigated setback distance for compliance
Cut and fill, clearing, and loading trucks with a 10-t / 12-t excavator	67 dB	10 m	3 m
Compaction with 5-t to 7-t single drum static compaction roller	67 dB*	10 m	3 m
Compaction with 3-t vibratory compaction roller	67 dB*	10 m	3 m
Large generator	66 dB	9 m	3 m
Compaction with 3-t single drum static compaction roller	65 dB*	8 m	3 m
Use of handheld power tools	65 dB	8 m	3 m
Submersible electric pump for dewatering	55 dB – 65 dB	8 m	3 m
Tractor grader	62 dB*	6 m	2 m
Idling delivery truck, dump truck, moxy	62 dB	6 m	2 m

* Reference noise level is for a moving noise source.

11.0 Noise mitigation measures

The contractor will take all practicable steps to reduce the noise associated with the works by implementing the general noise mitigation measures listed below:

11.1 General noise mitigation measures

- The quietest plant, machinery, and methods available will be used wherever practicable. This includes using plant that is no larger than necessary to complete the works.
- All construction equipment will be maintained throughout the project to ensure it is not generating unnecessary noise. For example, all tracked plant will be greased to reduce squeaking.

- When machinery or plant is not required to be running, it should be switched off and not left idling.
- Noisy plant and stationary equipment will be positioned on the site as far from the residential boundaries as practicable.
- Plant on site will use broadband reverse alarms in place of traditional pure tone 'beepers' where practicable.
- The tail gates of trucks will be closed with care and not slammed or allowed to fall closed.
- Material will not be dropped from height into empty trucks. Softer materials will be loaded into trucks first, where possible.
- Tools and equipment will not be dropped on hard ground. Materials will not be dragged along the ground.
- Vehicle horns will not be used unless in the case of an emergency.
- Any radios or music played on site will be used quietly so they are inaudible at the nearest dwellings.
- Communication over distance will be by radio or phone. Shouting will be avoided.
- Equipment generating excess or unnecessary noise will be stopped (where safe) and reported to the Site Manager.
- Staff meetings held by the Site Supervisor will include discussions about any noise and vibration issues, and any complaints received.
- All workers on site will be familiar with the provisions of this CNVMP and made aware of the potential impacts of noise on neighbours.

11.2 Acoustic barriers

- Temporary construction noise barriers will be installed on the site boundaries (excluding the northern boundary adjoining the reserve and vehicle crossings) before works begin. The locations where acoustic barriers are required are shown in Appendix C.
- All acoustic barriers must be at least 2.4 meters high and constructed from solid timber with a surface mass of at least 7 kg/m^2 (e.g. 12 mm plywood) or proprietary construction noise barriers (e.g. Hushtec Performance Noise Barrier[1], SFI Echo Barrier[2]).

[1] https://www.hushtecsolutions.com/nz/performance-noise-barrier

[2] https://supplyforce.co.nz/construction-noise-barrier/echo-barrier

- Localised acoustic barriers will be used where any construction plant must be operated within the unmitigated compliance distances (Table 4).
- Localised acoustic barriers around noisy activities will be constructed from plywood sheets or proprietary construction noise barriers (e.g. Pyrotek Wavebar Noise Curtains[3]) fixed to scaffolding or temporary metal fencing. The barrier must block line-of-sight from the noisiest part of the machinery to the receiver (including windows at upper-level facades). The length of the barrier must be at least five times greater than its height, or it must be bent around the noise source.
- Localised acoustic barriers will be positioned as close to the noise source as practicable to improve their effectiveness.

11.3 Activity specific noise mitigation

The following activity specific noise mitigation measures will be adopted to ensure the project noise limits identified in Table 2 are complied with.

11.3.1 Hydraulic breaking

An acoustic shroud[4] must be used for all hydraulic concrete breaking within 55 m of any occupied dwelling and a localised barrier used (as specified in Section 11.2) when within 30 m of any occupied dwelling.

11.3.2 Dewatering

Submersible electric pumps used for dewatering on the Site must be positioned and screened to ensure that noise levels during night-time hours do not exceed 40 dB L_{Aeq} at 1 m from the façade of any neighbouring dwelling.

11.3.3 Sheet piling

Sheet piling will only be used for temporary shoring along the northern boundaries of Stages 2 and 4. Other methods will be used for all other temporary shoring.

11.3.4 Bored piling

Casing will not be driven during bored piling works.

[3] https://www.pyroteknc.com/assets/documents/WAVEBAR-NC-304-4IG.pdf

[4] A reduction of at least 5 dB can be achieved by using an acoustic shroud such as the Hushtec Rock Breaker Shroud (https://www.hushtecsolutions.com/nz/rock-breaker-shroud/)

12.0 Vibration mitigation measures

Vibratory compaction and the operation of heavy plant on site have the potential to generate perceptible vibration in the nearest dwellings when used near to the boundary.

The following measures must be observed when working within 50 m of any occupied dwelling, to ensure that vibration complies with the project conditions and does not cause unreasonable disturbance:

- Static rollers will be used instead of vibratory rollers where practicable.
- Vibratory compaction for construction of the accessways along the southern boundaries will be undertaken using a roller no larger than 10-t. Vibratory compaction will be undertaken making passes parallel to the site boundary. The operator will avoid changing direction or stopping outside occupied dwellings wherever possible.
- Sheet piling will only be used for temporary shoring along the northern boundaries of Stages 2 and 4. Other methods will be used for all other temporary shoring.
- Casing will not be driven during bored piling works.
- Excavators and heavy vehicles will be driven slowly (fast movement across an uneven site can generate high vibration levels).
- The lightest plant practicable and available will be used for the works.
- Wheeled plant will be selected over tracked plant where practicable.
- Excavator operators will avoid banging buckets on the ground.
- Equipment generating excessive or unnecessary vibration will be stopped (where safe) and reported to the Site Manager.
- Workers will be informed of the need to minimise perceptible vibration at the nearest dwellings, and the mitigation measures available to achieve this.

13.0 Noise and vibration monitoring and reporting

This section sets out requirements for construction noise and vibration monitoring during the project.

Noise and vibration measurements must be undertaken to ensure the project limits are being complied with. This includes:

- Noise monitoring to confirm compliance when any activity is first undertaken within the relevant mitigated setback distances specified in Table 4.
- Testing the effectiveness of mitigation measures.

- Periodic noise monitoring to confirm compliance.
- Responding to requests for construction noise and vibration monitoring from Auckland Council.
- Responding to construction noise or vibration complaints from neighbours.

Construction noise and vibration Measurements must be undertaken by a suitably qualified and experienced person (e.g., MASNZ) or a person trained by the project construction noise and vibration consultant.

All construction noise measurements must be undertaken using a sound level meter conforming to at least IEC651 Type 2 criteria, and in accordance with NZS 6803:1999 *Acoustics - Construction Noise*. A noise monitoring form is attached as Appendix D.

All construction vibration measurements must be undertaken in accordance with DIN 4150-3:1999 *Structural Vibration – Part 3 Effects of Vibration on Structures*.

The results of any site and plant specific noise and vibration monitoring will be used to update this CNVMP to ensure that setback distances and mitigation measures for compliance are relevant to the project.

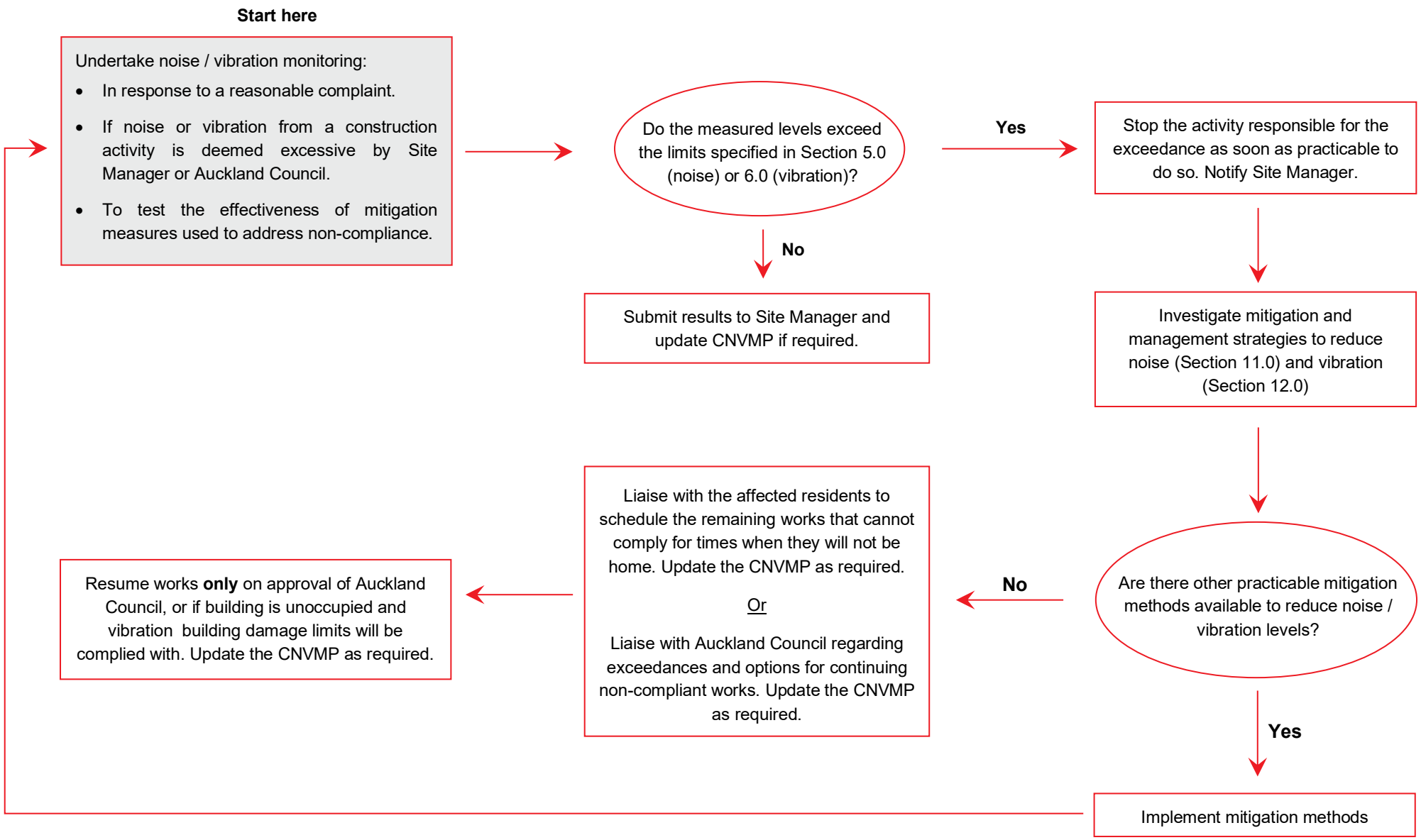
The results of all noise and vibration monitoring will be retained for the duration of the project and made available to Auckland Council on request.

Any non-compliance with the noise limits identified through monitoring will be addressed by following the corrective action measures in Section 14.0 of this CNVMP.

14.0 Corrective action measures

The corrective action measures illustrated in Figure 2 will be followed if non-compliance with the project noise or vibration limits is identified through monitoring.

Figure 2: Process for corrective action measures



15.0 Amendments to CNVMP

This CNVMP may be updated throughout the construction period (if necessary) to adapt to changing work methodologies or a changing receiving environment.

Any material updates to the certified CNVMP will be clearly marked using underlining for additional text and strikethrough for any deletions. The amended CNVMP will be provided to Auckland Council for certification before being actioned.

All activities will be undertaken in accordance with the latest version of the certified CNVMP.

16.0 General requirements

A copy of this CNVMP will be kept at the work site for the duration of the project.

All personnel will be informed about the need to minimise construction noise and vibration and about the effects of excessive noise on the neighbouring sites. As part of their training, special attention will be given to:

i. The mitigation measures required to comply with the project noise limits and conditions of consent.

ii. Appropriate use and maintenance of tools and plant with respect to noise and vibration emissions.

iii. Procedures for receiving, reporting, and investigating noise and vibration complaints.

iv. Procedures for applying corrective action measures.

Appendix A Glossary of terms

Noise	Noise is unwanted, harmful, or inharmonious (discordant) sound which serves little or no purpose for the exposed persons. Sound is wave motion within matter, be it gaseous, liquid, or solid. Noise usually includes vibration as well as sound. The Resource Management Act 1991 defines noise as 'includes vibration'.
dB (decibel)	The basic measurement unit of sound. The decibel is a logarithmic scale that allows a wide range of values to be compressed into a more comprehensible range, typically 0 dB to 120 dB. Noise levels in decibels cannot be added arithmetically since they are logarithmic numbers. If one machine is generating a noise level of 50 dB, and another similar machine is placed beside it, the level will increase to 53 dB and not 100 dB.
A-weighting	A frequency filter applied to the full audio range (20 Hz to 20 kHz) to approximate the response of the human ear at lower sound pressure levels.
$L_{Aeq(t)}$ (dB)	The A-weighted sound level in decibels equalled or exceeded for 95% of the of the measurement interval. It is the component of the residual sound that subjectively is perceived as continuously present. Used in New Zealand as the descriptor for background noise in the 1991 and 1999 versions of NZS 6801 and NZS 6802.
L_{AFmax} (dB)	The maximum A-weighted sound pressure level recorded during the measurement period using a fast time-weighting response.
NZS 6803:1999	N.Z. Standard NZS 6803:1999 *Acoustics – Construction noise*.
DIN 4150–3:1999	German Standard DIN 4150–3:1999 *Structural Vibration – Part 3: Effects of vibration on structures*. Typically adopted for the assessment of structure borne vibration in New Zealand.
PPV	Peak particle velocity, measured in mm/s. The standard metric for the measurement of ground borne vibration in New Zealand. The instantaneous maximum velocity reached by a vibrating element as it oscillates about its rest position.

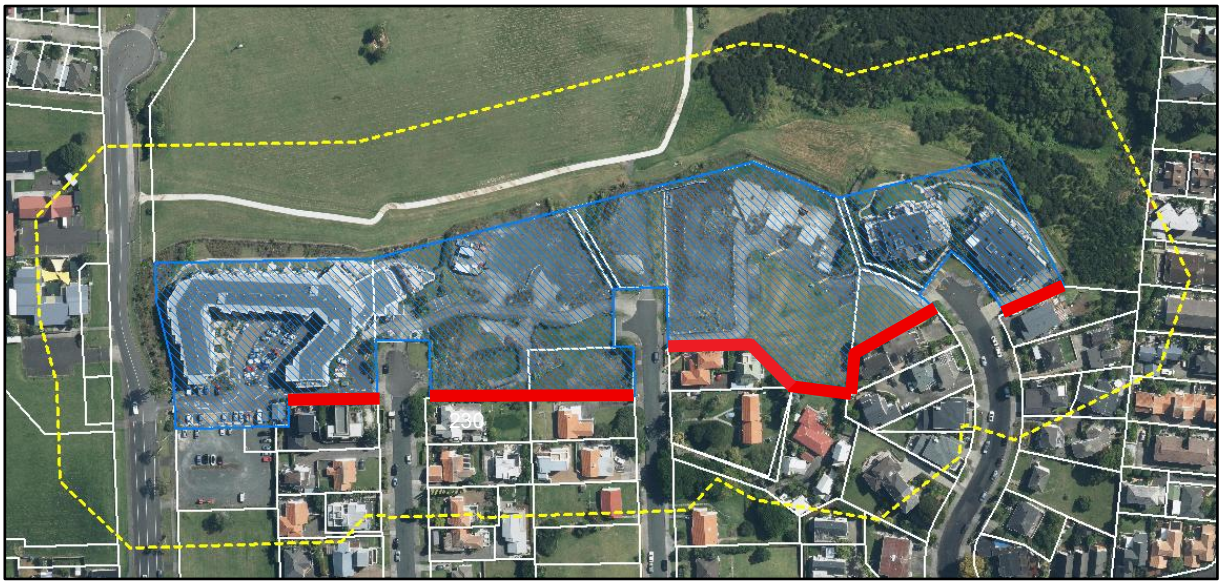
Appendix B Consent conditions

The following consent conditions must be complied with:

TBC

Appendix C The construction site

The aerial plan below shows the construction site (blue), the neighbouring buildings within 50 m (dashed yellow line), and the locations of the temporary construction noise barriers (solid red lines).



Before construction begins on the Site:

1. The temporary construction noise barriers shown above must be installed before construction works begin on the Site to ensure the project noise limits are complied with (see Section 11.2).
2. The occupiers of all neighbouring properties within 50 m of the Site (identified in the table below) must be provided with the written advice detailed in Section 8.0.

Street	Sites to be advised before construction works begin
Kupe Street	222, 230
Te Arawa Street	44, 44A, 46, 46A, 48, 2/48, 53, 53A, 55, 55A, 57, 59
Rukutai Street	100, 102, 102A,104, 107, 109, 1/113, 2/113, 3/113, 4/113, 5/113, 115, 117, 119, 119B
Aotea Street	86, 88, 88A, 88B, 90, 90A, 92, 92A, 97, 1/99, 2/99, 3/99, 4/99, 101A, 101B, 103, 105, 2/107
Atkin Avenue	37, 37A, 39, 1/39, 41, 1/41, 43, 2/43, 45, 45B

Appendix D Noise monitoring form

Name: Date:

Notes for noise monitoring

All sections of this form must be completed when undertaking construction noise measurements for the project. Please provide a sketch of the area, sound sources and measurement position on the rear of this form.

Measurements are to be undertaken at 1 m from the façade of the receiving building most exposed to the sound under investigation, and 1.2 m to 1.5 m above the relevant floor level. No adjustment to the measured level is to be made for reflected sound from the façade. Valid measurements cannot be undertaken in persistent rain or in wind speeds greater than 5 m/s.

Adjustments to the measured level may be required to correct for distance and façade reflections if measurements must be undertaken at a proxy location.

Sound source and instrumentation

Location of works	
Description of construction activity being monitored	
Measurement instrumentation (type and serial number)	
Date of most recent laboratory calibration	
Field calibration check (time and adjustment)	

Meteorological conditions

Cloud cover (octas)	
Rain	
Wind speed and direction	

Methodology

Location/orientation of microphone	
Height of microphone above ground and distance to facade of receiving building	
Distance between microphone and sound source	
Ground conditions between sound source and microphone	
Any barriers or objects between sound source and microphone	
Distance to any reflective surfaces other than receiving facade	
Extraneous noise sources	

Measurement results

Sample start time	Duration of sample	L_{Aeq} (dB)	L_{AFmax} (dB)	Sound source controlling the measured levels	Adjustments required for distance, facade correction or barriers

Do the measurements show full compliance with the project noise limits?

Yes: *The measurement results shall be used to update the site-specific noise levels and construction separation distances within the CNVMP.*

No: *The CNVMP shall be referred to for the appropriate corrective action measures and further noise mitigation options*