REPORT

Tonkin+Taylor

May Road Steam Enhancement

Construction Noise and Vibration Management Plan

Prepared for
Watercare Services Ltd
Prepared by
Tonkin & Taylor Ltd
Date
December 2024
Job Number
1015172.1701 v1.1

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Document control

Title: May Road Steam Enhancement					
Date	**Version**	**Description**	**Prepared by:**	**Reviewed by:**	**Authorised by:**
02.09.24	1.0	DRAFT CNVMP	S Yung	D Humpheson	K Baverstock
05.12.24	1.1	DRAFT CNVMP update	S Yung	D Humpheson	K Baverstock

Distribution:

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1 Introduction

Tonkin & Taylor Ltd (T+T) has been engaged by Watercare Services Ltd (Watercare) to provide a draft Construction Noise and Vibration Management Plan (CNVMP) for works associated with the proposed steam enchantment at 54 Roma Road, Mt Roskill (the Project) to support the resource consent application.

This draft CNVMP identifies the likely construction noise and vibration levels for the project and sets out the best practicable options (BPO) for noise and vibration management that will be implemented to mitigate and minimise any adverse noise and vibration effects. It also outlines community engagement with surrounding residents in relation to the noise and vibration aspects of the project in line with current Central Interceptor (CI) processes.

This draft CNVMP relies on information around the construction methodology that has been prepared by Watercare and the existing CI CNVMP that are fit for purpose. It will be finalised prior to works commencing.

The final CNVMP will be implemented throughout the construction period. It will be considered a 'living document' that should be amended and updated as appropriate and is intended to be the primary tool to manage the project's construction noise and vibration effects.

2 Roles and responsibilities

2.1 Environmental roles and responsibilities

Each person involved in the Project has equal responsibility to avoid, remedy or mitigate adverse environmental effects. There are three key groups with responsibility for environmental management of the Project:

- Watercare as the Project owner and holder of the resource consents.
- Contractor TBC undertaking the works; and
- Auckland Council to audit the works and monitor compliance with designation and resource consent conditions, the Construction Management Plan (CMP) and sub-plans.

2.2 Project contacts

The Project Manager has the overall responsibility for complying with the requirement of this CNVMP. The Site Manager is responsible for community engagement.

Table 2.1 sets out the contact details for key project personnel relevant to the implementation of this CNVMP.

Table 2.1: Contact details

Role	Name	Organisation	Phone	Email
Project & Site Manager (Contractor)	TBC	TBC	xx	xx
Compliance Advisor	Xenia Meier	Watercare Services Ltd	021 574 585	Xenia.meier@water.co.nz
Community Liaison Manager	TBC	TBC	xx	xx
Acoustic Consultant	Sharon Yung	Tonkin + Taylor Ltd	027 409 083	s.yung@tonkintaylor.co.nz
Compliance Officer	TBC	TBC	xx	xx

3 Project overview

3.1 Timeframe

Construction activities required for stream restoration and enhancement works are expected to be undertaken over a duration of up to approximately 2-months. Commencement date TBC.

3.2 Hours of operation

Noise generating activities and truck movements will typically occur during standard construction hours, which are as follows:

- Monday to Friday: 7:30 am to 6:00 pm (site mobilisation and pack down works are proposed to occur 30 mins before and after these windows consistent with existing CI activities)
- Saturdays: 8:00 am to 6:00 pm.
- Sundays or public holidays: no works

3.3 Description of works

As part of stream enhancement work at 54 Roma Road, excavation and amendment of the existing stream channel is required. Basalt is anticipated within the northern half of the site as indicated by the red shaded areas in Figure 3.1. Therefore, rock breaking is anticipated within the area where basalt is present (to a depth of approximately 1 m from the top of the existing bank).

Space within the site is constrained so the equipment will mainly be placed on the bank opposite to the nearest residential receivers, but rock breaking noise source will be predominately generated at ground level where breaker tool and rock come into contact. Where the watercourse is located on the neighbouring property boundary at the northern end, works will only take place on the southern bank of the watercourse.

Supporting works of vegetation clearance, minor earth works such as excavation and soil removal will also be required within the Site.

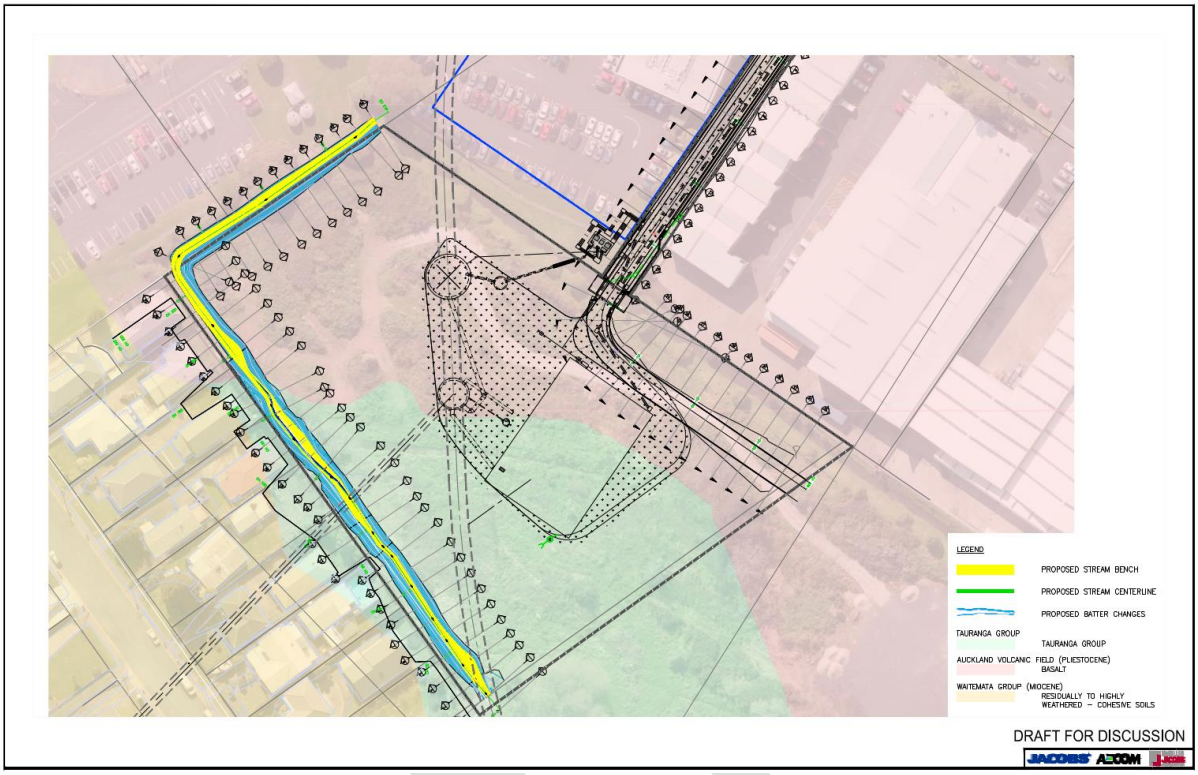


Figure 3.1: Plan of approximate basalt location.

4 Performance standards

4.1 Consent conditions

Resource consent BUNxxxxx provides the following consent condition(s) in relation to construction noise:

XXX TBC upon receipt of consent XXX

4.2 Project thresholds

A summary of the AUP noise and vibration standards for the core proposed hours of construction (Monday to Friday 7:30 am to 6 pm with potential weekends works) is provided in Table 4.1.

Table 4.1: Project criteria for construction noise and vibration

Day of week	Time of work	Noise dB		Vibration mm/s PPV		
		L_{Aeq}	L_{Amax}	Amenity	Effects on residential structures	Effects on commercial structures
Monday to Saturday	7.30 am to 6 pm	70	85	2	5*	20

* Guideline value increases with high frequency (5 mm/s PPV for residential properties 1-10 Hz), see DIN 4150-3:2016

5 Construction equipment

5.1 Noise sources

Table 5.1 provides indicative construction noise levels for proposed activities 1 m from building façade without noise barriers. These tables will be used by the Project/Construction Manager (or nominated person) prior to construction to inform what equipment will require mitigation and/or management and when specific engagement is required with affected properties. At the request of the Project Manager, it shall be kept up to date by the Acoustic Consultant when new information becomes apparent through noise monitoring or other means.

Table 5.1: Equipment list – Source data and indicative construction noise levels at different distances (without mitigation)

Equipment	Sound power level dB LWA	Noise level dB LAeq					Distance to achieve 70 dB LAeq (m)
		5 m	10 m	20 m	30 m	40 m	
Excavator (5 t)	92	76	70	64	60	57	10
Excavator (14 t)	96	77	71	65	61	58	11
Excavator (20 t)	102	86	80	74	70	67	30
Excavator (30 t)	110	91	85	79	75	72	48
Excavator with rock breaker attachment (5 t)	107	88	82	76	72	69	36
Excavator with Rock breaker attachment (14 t)	112	93	87	81	77	74	53
Excavator with Rock breaker attachment (30 t)*	120	101	95	89	85	82	117
Dump truck (15 t)	105	89	83	77	73	70	40
Mobile crane	98	80	74	68	64	61	16
Small compactor	108	89	83	77	73	70	40
Chainsaw (vegetation clearance)	108	89	83	77	73	70	40

***** 75% on time during any 15min period

5.2 Vibration sources

Vibration predictions have been carried out using the empirical relations contained in BS 5228-2[1]. These relations are known to be conservative as they tend to over-predict compared to validation trials. Set back distances have been calculated for the main items of equipment and presented in Table 5.2 below.

[1] BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Vibration.

Table 5.2: Indicative vibration levels at distances

Distance from activity	Excavator with breaker attachment (14 t) PPV	Excavator with breaker attachment (30 t) PPV	Small compactor PPV	Excavator (> 20 t) PPV
5 m	3 – 4 mm/s	4 – 5 mm/s	2 – 3 mm/s	~ 2 mm/s
10 m	2 – 3 mm/s	3 – 4 mm/s	1 – 2 mm/s	1 – 2 mm/s
15 m	~ 2 mm/s	~ 3 mm/s	1 – 2 mm/s	1 – 2 mm/s
20 m	1 – 2 mm/s	2 – 3 mm/s	~ 1 mm/s	~ 1 mm/s

6 Noise and vibration levels

6.1 Receivers

Residential receivers are situated to the west and south west of the Project, and commercial receivers to the north and east. The majority of residential receivers are single storey buildings. A map of nearby properties is shown in Figure 6.1 with the approximate location of works and AUP zoning.

Any receivers not identified are predicted to be below the construction noise limits.

Table 6.1: Sensitive receivers

Address	Type of property	Nearest distance to rock breaking (m)	Nearest distance to excavation (m)
55A Marion Ave	Residential	5	22
55 Marion Ave ^		28	36
53A Marion Ave (closest works)		6	9
53 Marion Ave ^		29	29
2/51 Marion Ave		5	4
51 Marion Ave ^		32	30
2/49 Marion Ave		16	3
49A Marion Ave ^		36	30
47 Marion Ave ^		40	26
45B Marion Ave		39	9
43 Marion Ave		48	11
41A Marion Ave		62	7
60 Roma Road	Industrial	8	8
61 Roma Road		25	25

^ buildings are either partially or completely shielded from works by other buildings

Figure 6.1 Nearby receivers and zones of surrounding areas (taken from AUP online planning maps June 2024).

6.2 Predicted noise levels

Predicted noise levels at nearest sensitive receivers are provided in Table 6.2 with and without mitigation options of acoustic screening along boundary and shrouding/secondary screening in place. Predictions are shaded to identify low risk 70-80 dB L_{Aeq} (green), medium risk 80-85 dB L_{Aeq} (orange) and high >85 dB L_{Aeq} (red) risk ratings with the same shading as the hierarchy of mitigation Table 7.1.

This table along with the hierarchy of mitigation measures outlined in **Section 7**, shall be used by the Project Manager (or nominated person) prior to construction to inform what equipment will require mitigation and/or management and when specific engagement is required with affected dwellings. It will be kept up to date by the Acoustic Consultant when new information becomes apparent through noise monitoring or other means.

Where practicable, the 14 t excavator for rock breaking should be used instead of the 30 t excavator. If a 30 t excavator is used within 17 m of a receiver, enhanced mitigation with communication, consultation, and scheduling shall be applied.

Table 6.2: Predicted noise level at nearest receivers (with and without mitigation)

Address	Nearest distance from works (m)	Predicted noise level (dB, LAeq)	With mitigation of acoustic screening (5 dB reduction)^	With mitigation of acoustic screening + Shroud (10 dB reduction)*
Rock breaking (30 t)				
55A Marion Ave	5	97	92	87
55 Marion Ave ^	28	78	73	68
53A Marion Ave	6	85	80	75
53 Marion Ave ^	29	74	69	64
2/51 Marion Ave	5	92	87	82
51 Marion Ave ^	32	76	71	66
2/49 Marion Ave	16	83	78	73
49A Marion Ave ^	36	62	57	52
47 Marion Ave ^	40	67	62	57
45B Marion Ave	39	74	69	64
43 Marion Ave	48	73	68	63
41A Marion Ave	62	71	66	61
60 Roma Road	8	89	84	79
61 Roma Road	25	78	73	68
Rock breaking (14 t)				
55A Marion Ave	5	89	84	79
55 Marion Ave ^	28	70	65	60
53A Marion Ave	6	77	72	67
53 Marion Ave ^	29	66	61	56
2/51 Marion Ave	5	84	79	74
51 Marion Ave ^	32	68	63	58
2/49 Marion Ave	16	75	70	65
49A Marion Ave ^	36	54	49	44
47 Marion Ave ^	40	59	54	49
45B Marion Ave	39	66	61	56
43 Marion Ave	48	65	60	55
41A Marion Ave	62	63	58	53
60 Roma Road	8	81	76	71
61 Roma Road	25	70	65	60
Excavation				
55A Marion Ave	22	68	63	58
55 Marion Ave ^	36	51	46	41
53A Marion Ave (closest works)	9	74	69	64
53 Marion Ave ^	29	60	55	50
2/51 Marion Ave	4	84	79	74

51 Marion Ave ^	30	63	58	53
2/49 Marion Ave	3	89	84	79
49A Marion Ave ^	30	66	61	56
47 Marion Ave ^	26	73	68	63
45B Marion Ave	9	80	75	70
43 Marion Ave	11	80	75	70
41A Marion Ave	7	83	78	73
60 Roma Road	8	56	51	46
61 Roma Road	25	60	55	50

^ A reduction of up to 10 dB can be achieved if working on the same bank as the acoustic screens i.e. screens are fully effective.

* Shroud around the rock breaker attachment, or a secondary three sided barrier around the immediate work area of the rock breaker.

6.3 Predicted vibration levels

Vibration predictions have been carried out using measured data from past T+T measurement database for earthworks and accepted vibration decay relationships[2]. Properties predicted to potentially exceed the AUP amenity limit of 2 mm/s PPV are presented in Table 6.3. No receivers are predicted to exceed the DIN 4150-3 limit of 5 mm/s PPV for residential properties or 20 mm/s for commercial properties.

Table 6.3: Properties predicted to exceed Project vibration limit

Address	Predicted vibration levels Rock breaking (30 t) (mm/s PPV)	Predicted vibration levels Rock breaking (14 t) (mm/s PPV)	Predicted vibration level Excavation (mm/s PPV)
55A Marion Ave	**4 - 5**	**3 - 4**	1 - 2
55 Marion Ave	1 - 2	1 - 2	< 1
53A Marion Ave	**4 - 5**	**3 - 4**	1 - 2
53 Marion Ave	1 - 2	1 - 2	< 1
2/51 Marion Ave	**3 - 4**	**2 - 3**	**2 - 3**
51 Marion Ave	1 - 2	1 - 2	< 1
2/49 Marion Ave	**2 - 3**	**2 - 3**	**2 - 3**
49A Marion Ave	1 - 2	1 - 2	< 1
47 Marion Ave	1 - 2	1 - 2	< 1
45B Marion Ave	1 - 2	1 - 2	1 - 2
43 Marion Ave	1 - 2	1 - 2	1 - 2
41A Marion Ave	1 - 2	1 - 2	1 - 2
60 Roma Road	3 - 4	2 - 3	1 - 2
61 Roma Road	2 - 3	1 - 2	< 1

[2] Charles H. Dowding, *Construction Vibrations*, 1996

7 Procedures for managing risk

7.1.1 Specific mitigation measures

Where medium and high-risk works are to be undertaken, as shown as orange and red in Table 6.1 and Table 6.3, works shall adopt the best practicable option to ensure that noise and vibration levels do not exceed a reasonable level.

A hierarchy of mitigation measures is set out in Table 7.1. The risk rating and colours correspond to those in Table 6.2 and Table 6.3. Specific mitigation measures are outlined in detail in Section 7.1.1.

Table 7.1: Hierarchy of mitigation

Risk	Properties affected for rock breaking	Hierarchy of mitigation*
Low (70 - 80 dB L_{Aeq})	55 Marion Ave 53 Marion Ave 51 Marion Ave 45B Marion Ave 43 Marion Ave 41A Marion Ave 61 Roma Road	General measures: • Staff training and awareness. (Section 8.1) • Stakeholder/community engagement (section 8.8.1) • General equipment measures (section 8.2) • 1.8 m Acoustic barriers along the property boundaries where practicable. (section 7.2.2)
Medium – within 47m (80 - 85 dB L_{Aeq})	53A Marion Ave 2/49 Marion Ave	Further mitigation measures: • Stakeholder engagement and confirmation of occupancy and times of greatest sensitivity to noise exposure (both residential and commercial). (Section 8.6) • Use of low vibration equipment or alternative construction methodology.
High – within 30m (>85 dB L_{Aeq})	55A Marion Ave 2/51 Marion Ave 60 Roma Road	Enhanced mitigation measures (in addition to the above refer to Appendix B for setback distance map): • Further engagement with affected parties for works to be arranged around times when properties will be unoccupied; • All works within 17 m using a 30 t excavator with attachment will generate noise levels greater than 90 dB LAeq (for 55A and 2/51 Marion Ave), schedule works to be completed efficiently within 1-2 days if practicable; and/or • Use of lower noise and vibration generating equipment where practicable, such as the 14 t excavator with rock breaker attachment. • Offer temporary relocation during times of high noise levels • Where practicable place additional acoustic screens including at the source of the noise, i.e., if percussive breaking use a shroud (combination of acoustic barriers and shroud to achieve 10-15dB reduction) • Methodology to be changed e.g., to crushing/grinding or hand breaking if practicable.

7.1.2 Barriers

Temporary acoustic barriers should be erected on the boundary of the site when working within 30 m of occupied residential buildings. Where practicable and when required, panels should be

positioned as close as possible to the construction activity to block line-of-sight between the activity and noise sensitive receivers. The panels should be a minimum height of 1.8 - 2 m, and higher if practicable to block line-of-sight. The panels must be abutted or overlapped to provide a continuous screen without gaps at the bottom or sides of the panels

Examples of temporary noise barriers include the following proprietary 'noise curtains':

- Echo Barrier Temporary Acoustic Noise Barrier (http://www.supplyforce.co.nz/).
- Duraflex 'Noise Control Barrier - Performance Series' (www.duraflex.co.nz).
- Soundex 'Acoustic Curtain - Performance Series' (www.ultimate-solutions.co.nz).
- Flexshield 'Sonic Curtain with 4 kg/m2 mass loaded vinyl backing' (www.flexshield.co.nz).

Movable plywood screens may also be suitable. The panels should be constructed from materials with a minimum surface mass of 10 kg/m^2, such as 18 mm plywood or 20 mm pine.

Additional localised screening on three sides of the rock breaking location must be erected when using the 14 t excavator. The opening of the screening shall be directed away from the closest neighbouring property. Alternatively, a rock breaking shroud can be used as secondary noise mitigation measure.

8 Noise management and mitigation

8.1 Training

All staff will participate in an induction training session prior to the start of construction, see **Appendix A**, with attention given to the following matters:

- Construction noise and vibration limits (Section 4).
- Activities with the potential to generate high levels of noise and/or vibration (Section 5).
- Noise and vibration mitigation and management procedures (Section 8).
- The sensitivity of receivers and any operational requirements and constraints identified through communication and consultation (Section 8.8); and
- Best practice for night works including.
    - Keeping doors to the shed closed.
    - Taking care when handling materials; and
    - No shouting or making other unnecessary noise.

Awareness of current noise and vibration matters on, or near active worksites, will be addressed during regular site meetings and/or 'toolbox' training sessions.

8.2 Equipment selection

When selecting construction equipment, where practicable:

- Prioritise quieter construction methodologies.
- Prioritise electric motors over diesel engines.
- Prioritise rubber tracked equipment over steel tracked equipment.
- Equipment should be suitably sized for the proposed task.
- Equipment should be maintained and fitted with exhaust silencers and engine covers; and
- Avoid tonal reversing or warning alarms (suitable alternatives may include flashing lights, broadband audible alarms or reversing cameras inside vehicles).

8.3 General measures

Complaints can arise whether or not noise levels comply with the thresholds. To avoid complaints, general mitigation and management measures include, but are not limited to, the following:

- Avoid unnecessary noise, such as shouting, the use of horns, loud site radios, rough handling of material and equipment, and banging or shaking excavator buckets.
- Avoid high engine revs through appropriate equipment selection and turn engines off when idle.
- Mitigate track squeal from tracked equipment, such as excavators (may include tensioning and watering or lubricating the tracks regularly).
- Minimise construction duration near sensitive receivers.
- Stationary equipment should be located away from noise sensitive receivers and site buildings and material stores used to screen them.
- Orient mobile machinery to maximise the distance between the engine exhaust and the nearest sensitive building façade (e.g. excavators).
- Utilise noise barriers where appropriate.
- Implement specialised mitigation measures for concrete cutting and percussive breaking.

- Ensure additional communication with affected building occupants is completed prior to commencing activities that are predicted to exceed the noise performance standards; and
- Undertake noise and vibration monitoring as appropriate.

8.4 Noise barriers

Acoustic panels must be abutted or overlapped to provide a continuous screen without gaps at the bottom or sides of the panels.

Examples of temporary noise barriers provided in Section 7.1.2

8.5 Percussive breaking

Where practicable:

- Use acoustic screens where extended percussive breaking in proximity to receivers is required.
- Use the correct chisel / tip shape for the type of material being broken.
- If within 10 m of any building, deploy vibration monitoring; and
- Schedule percussive breaking to occur between less noise sensitive times, e.g., 9 am – 5 pm, or through consultation with neighbours.

8.6 Scheduling

Scheduling of construction activities can be a key tool for managing construction noise and vibration effects. The time of day and the duration of the construction activities will be adjusted after consultation, where possible, to avoid particularly sensitive times for affected receivers.

The following should be considered:

- Identify any particularly sensitive times for high-risk receivers and where practicable avoid nearby noisy works during those times.
- Where practicable, avoid conflicts with community events.

Where there are no practicable alternative options to complete works and noise level exceedances are anticipated, it will be necessary to implement enhanced noise and vibration management measures. For example:

- Increase the frequency of communications with stakeholders.
- Carry out regular noise and vibration monitoring to confirm noise and vibration levels; or
- Offer temporary relocation to affected residents if unreasonable noise and/or vibration levels cannot be avoided.

8.7 Vibration mitigation

A hierarchy of vibration mitigation measures should be adopted through the CNVMP as follows:

- Managing times of activities to avoid night works and other sensitive times where practicable (communicated through community liaison).
- Liaising and consultation with neighbours prior to commencing works for vibration generating activities.
- Selecting equipment and methodologies to minimise vibration.
- Monitoring of vibration during activities predicted to exceed the 2 mm/s amenity limit.

Mitigation will therefore focus on effective communication with neighbours, and selection of appropriate equipment and methods.

8.7.1 Building condition surveys

DIN 4150-3 standard vibration limits are not predicted to be exceeded and risk of structural cosmetic damage is low. A pre and post construction building survey is not required at this stage.

8.8 Communication and complaints

This section details the communication procedures relating to noise and vibration for the Project as part of CI processes as well as the complaints process. The CMP and Communications Plan contain a more detailed discussion of communication activities for the Project.

8.8.1 Communication

Written communication (e.g. newsletter) shall be provided to occupiers of buildings within 100m of the site at least 1 week prior to the Project works commencing. It will acknowledge that some activities are predicted to generate high noise and/or vibration levels that may result in disturbance for short periods. It will include details of the overall works, its timing, duration and contact details for where complaints and enquiries should be directed.

Written communication during the works:

- Regular project updates will include details of impending activities that may result in disturbance, including rock breaking. It will include scheduled timing and duration of these activities and contact details where complaints and enquiries should be directed; and

8.8.2 Complaints

All construction noise and/or vibration complaints will be recorded in a complaints file that is available to Auckland Council on request. For each complaint, an investigation will be undertaken involving the

following steps as soon as practicable:

- Acknowledge receipt of the concern or complaint and record:
  - Time and date the complaint was received and who received it.
  - Time and date of the activity subject to the complaint (estimated where not known).
  - The name, address and contact details of the complainant (unless they elect not to provide).
  - The complainant's description of the activity and its resulting effects; and
  - Any relief sought by the complainant (e.g. scheduling of the activity).
- Identify the relevant activity and the nature of the works at the time of the complaint.
- If a reasonable complaint relates to building damage, inform the on-duty site manager as soon as practicable and cease associated works pending an investigation.
- Review the activity noise and/or vibration levels (Section 6) to determine if the activity is predicted.

to comply with the relevant performance standards (Section 4) at the complainant's building.

Consider attended monitoring to verify the underlying reference level assumptions.

- If the activity is measured to be non-compliant with the noise and/or vibration limits the following shall be undertaken.
- Implement mitigation measures (Section 8) and undertake additional monitoring to determine compliance (Section 8.9).
- If compliance cannot be achieved, halt works and prepare an ASCNMP (if not already prepared).
- Report the findings and recommendations to the Construction Manager, implement changes and update this CNVMP or the relevant ASCNMP as appropriate; and
- Report the outcomes of the investigation to the complainant, identifying where the relief sought by the complainant has been adopted or the reason(s) otherwise.

In most cases, ceasing the activity would provide immediate relief. In some cases, this may not be practicable for safety or other reasons. The complainant shall be kept updated regularly during the time it takes to resolve the matter.

8.9 Noise and vibration monitoring

Construction noise and vibration levels will be monitored:

- At the start of high noise and vibration activities (as highlighted red in Section 6).
- As required by this CNVMP.
- In response to a reasonable noise or vibration complaint.
  - For noise – at 1 m from the most affected building façade, or proxy position and adjusted for distance and façade reflections where appropriate.
  - For vibration – at the foundation of the building or in accordance with DIN 4150-3.
- By a suitably qualified and experienced practitioner (e.g., Member of the Acoustical Society of New Zealand).
- For a representative duration, reported with the measured level (e.g., 70 dB $L_{Aeq\ (15\ min)}$); and
- The results should be used to update the noise and vibration source data used in the calculations if appropriate.

Noise and vibration monitoring will be undertaken in accordance with the requirements of NZS 6803 and DIN 4150-3 respectively.

A monitoring flowchart is presented as Figure 8.1 below.

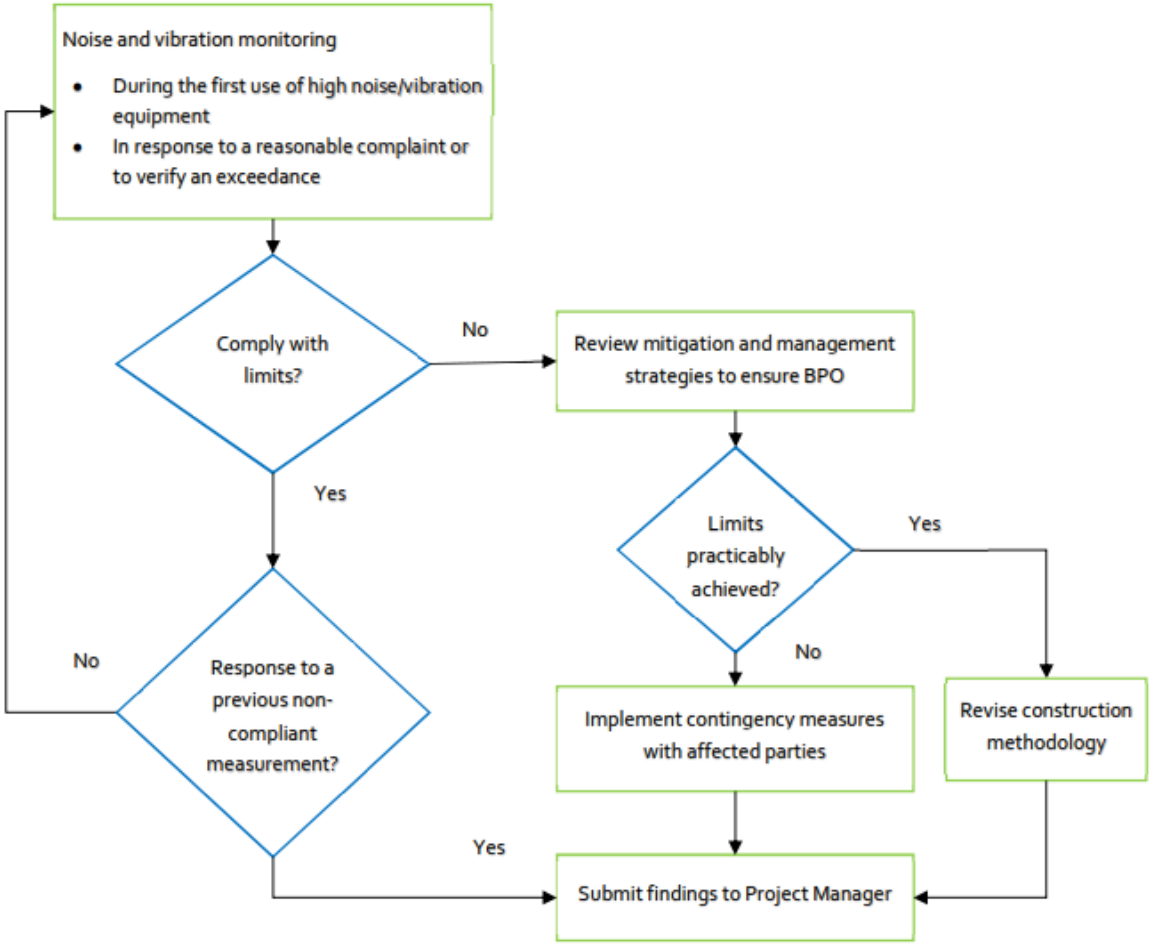


Figure 8.1: Noise monitoring flowchart.

Measurements will be taken if any high-risk construction activities source levels need validating. These source measurements will be performed by the project's Acoustic Consultant. The results of these source measurements will be used to update the noise source data in this draft CNVMP.

If noise monitoring indicates that project criteria are being exceeded, and that was not anticipated in the draft CNVMP for the activity/location, then the management plan will be immediately reviewed. A construction noise management schedule will be prepared if one does not already exist. The schedule will provide an activity specific assessment together with management controls.

8.10 Documentation

All electronic files relating to construction noise and vibration will be kept by the Project Manager. This will include:

- Section 1: Construction noise and vibration management plans:
  - This draft CNVMP and any revisions; and,
  - Construction noise induction sheets.
- Section 2: Consultation and complaints registers.
- Section 3: Noise and vibration monitoring:
  - Site survey sheets and associated aerial photographs.
  - Site survey summary sheet.
  - Survey reports.
  - Survey and equipment operating procedures.
  - Current and past equipment kit details and calibration summary; and,
  - Copies of calibration certificates.

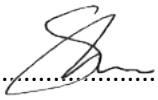
9 Applicability

This report has been prepared for the exclusive use of our client Watercare Services Ltd, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

We understand and agree that our client will submit this report as part of an application for resource consent and that Auckland Council as the consenting authority will use this report for the purpose of assessing that application.

Tonkin & Taylor Ltd
Environmental and Engineering Consultants

Report prepared by:



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Sharon Yung
Senior Acoustic Consultant

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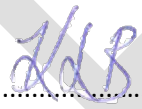

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Karen Baverstock
Project Director

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Appendix A Project induction form

There are residential neighbours in close proximity to the works, where noise and vibration criteria apply. To ensure criteria are achieved, all staff are responsible for good noise and vibration management.

1 When arriving at work, please drive slowly on site and keep revs to a minimum. Keep stereos off and do not slam doors.

2 No shouting or swearing on site. Either walk over and talk to somebody or use a radio/phone.

3 Be careful with tools and equipment. Place them down and do not drop them.

4 Do not drag materials on the ground. Place them down when you arrive at the work area.

5 Equipment and vehicles should not be left running when not in use.

6 When loading trucks try not to drop material from a height.

7 Stationary equipment such as pumps and generators should be located away from neighbours.

8 All equipment is to be well maintained.

9 No work that could cause noise and/or vibration disturbance shall be conducted outside the hours of 0700 h to 1800 h Monday to Saturday unless by arrangement with the Project Manager / Construction Site Management.

10 If you see anything/anyone making unnecessary noise, then stop it/them.

11 It is essential that good relationships are maintained with neighbours. Any queries from members of the public should be responded to politely and referred to the site manager. Staff shall assist the public to make contact with this person. Staff shall not enter into debate or argue with members of the public.

NAME	COMPANY	SIGNED	DATE

Appendix B Set back distance from receivers

C:\Users\shyu\Documents\ArcGIS\Projects\MyProject-Random\MyProject-Random.aprx Layout: T+T A4 Landscape Map Template 2024-Dec-05 1:22 pm Drawn by SHYU

Tonkin+Taylor
www.tonkintaylor.co.nz
Exceptional thinking together

NOTES:
Google Satellite: Google. NZ Navigation Map: Eagle Technology, LINZ, StatsNZ, NIWA, Natural Earth, ©OpenStreetMap contributors.

REVISIONS	NO.	BY
First version (DD/MM/YY)	0	XXXX

PROJECT No. 1015172.1701		
DESIGNED	SHYU	DEC 24
DRAWN	SHYU	DEC 24
CHECKED		
APPROVED		DATE

CLIENT **WATERCARE**
PROJECT **MAY ROAD**
TITLE SETBACK FROM RECEIVERS FOR 85DB LAEQ
SCALE (A4) 1:1,000 FIG No. FIGURE 1. REV 0

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