



SUBSTANTIVE ASSESSMENT – ACOUSTICS

PROPOSED RESIDENTIAL DEVELOPMENT
MIDDLE ROAD PROJECT

PREPARED FOR
CDL Land New Zealand Limited

DATE
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Assessment prepared by Styles Group for CDL Land New Zealand Limited.

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1.0 Introduction

CDL Land New Zealand Limited (the **Applicant** or **CDL**) has engaged Styles Group to assess the noise and vibration effects associated with the Middle Road Project (the **Project**) and to prepare this report in support of the substantive application under the Fast-track Approvals Act 2024 (**FTAA**).

The Project relates to a residential development at 92, 108, and 148 Middle Road and 139 Te Aute Road in Havelock North (the **Project Area**).

This report should be read alongside the planning report and other technical reports and drawings appended to the substantive application.

A glossary of acoustics terms is provided in Appendix A.

2.0 Purpose and scope of report

This report addresses matters relating to construction noise and vibration and operational noise associated with the Project.

The purpose of this report is to:

- a) Calculate the potential noise and vibration emissions during the proposed construction works based on typical and worst-case scenarios.
- b) Calculate the potential operational noise emissions from the proposed pump station.
- c) Assess the potential noise and vibration emissions in terms of the permitted standards of the Hastings District Plan (the **HDP**).
- d) Assess potential noise emissions from permitted activities in the surrounding zone to inform an assessment of potential reverse sensitivity effects.
- e) Recommend any mitigation measures required to ensure that noise and vibration do not exceed a reasonable level.
- f) Describe the potential noise effects of the Project in the context of the existing environment and the provisions of the HDP.

We have prepared noise level predictions using manual calculations and computer noise modelling software (DGMR iNoise) to inform our assessment. All calculations have been undertaken in accordance with ISO 9613-1/2 *Attenuation of sound during propagation outdoors* and with the following Standards and guidelines where applicable:

- NZS 6801:2008 *Acoustics – Measurement of environmental sound*.
- NZS 6802:2008 *Acoustics – Environmental noise*.
- NZS 6803:1999 *Acoustics – Construction noise*.

- Association of Australasian Acoustical Consultants (**AAAC**) *Guideline for Interpreting and Applying NZS 6803-1999*.

3.0 Statement of qualifications and experience

The author of this report, Jamie Exeter, is a Principal at Styles Group Acoustics & Vibration Consultants and has over 21 years' experience in acoustics. Jamie has specialised for more than 18 years in the measurement, prediction, and assessment of environmental noise and vibration under District Plans and the Resource Management Act. He has worked on several FTAA applications for both applicants and Councils. Styles Group has collectively worked on a significant number of FTAA applications.

Jamie holds a Diploma in Audio Engineering (2004) and is a professional Member of the Acoustical Society of New Zealand. He served as an elected council member from 2012 until 2018.

Jamie has contributed to a wide range of construction projects including large scale residential and commercial developments and many of New Zealand's largest infrastructure projects. He regularly undertakes peer review work for local authorities throughout New Zealand and provides expert evidence at hearings and during district plan processes. Jamie is one of three authors of the *AAAC Guideline for Interpreting and Applying NZS 6803-1999*, the New Zealand Standard for measuring and assessing construction noise.

The reviewer, Jon Styles has been the Director and Principal of Styles Group Acoustics and Vibration Consultants for over 22 years. He has twice served as the President of the Acoustical Society of New Zealand and has been an elected Council Member for more than 19 years. He is also on the Board of Directors of the AAAC.

Jon has over 26 years' experience providing advice on managing noise and vibration effects and is an experienced expert witness for Council, Environment Court, District Court, High Court, and Board of Inquiry hearings.

The author and reviewer both confirm that, in preparing and reviewing this report, they have read and complied with the Environment Court of New Zealand's Code of Conduct for Expert Witnesses (Practice Note 2023). This report addresses matters within their expertise. They confirm they have not omitted any material facts that could alter or detract from the opinions expressed. Information that has been supplied by the client or obtained from external sources is identified in this report and has been assumed to be accurate.

4.0 The Project

The Project provides for a comprehensively planned residential development including approximately 317 lots, open space, transport and stormwater infrastructure, a wastewater pump station (**WWPS**), and associated enabling works. The Project does not include any commercial activities. The Project Area and proposed activities are outlined in the following sections. The Project masterplan is shown below in Figure 1.



Figure 1: The Project Masterplan

4.1 The Project Area

The Project Area is held in five separate titles with a combined area of approximately 30.6 ha. The surrounding area is topographically flat.

The Project Area is on the southwest side of Havelock North. The wider land uses to the north, east and west are predominantly suburban residential in character, with a retirement village to the northwest and larger rural landholdings to the southwest.

Figure 2 shows the location of the Project Area in Havelock North. Figure 3 shows the HDP zoning of the area.



Figure 2: The Project Area in Havelock North

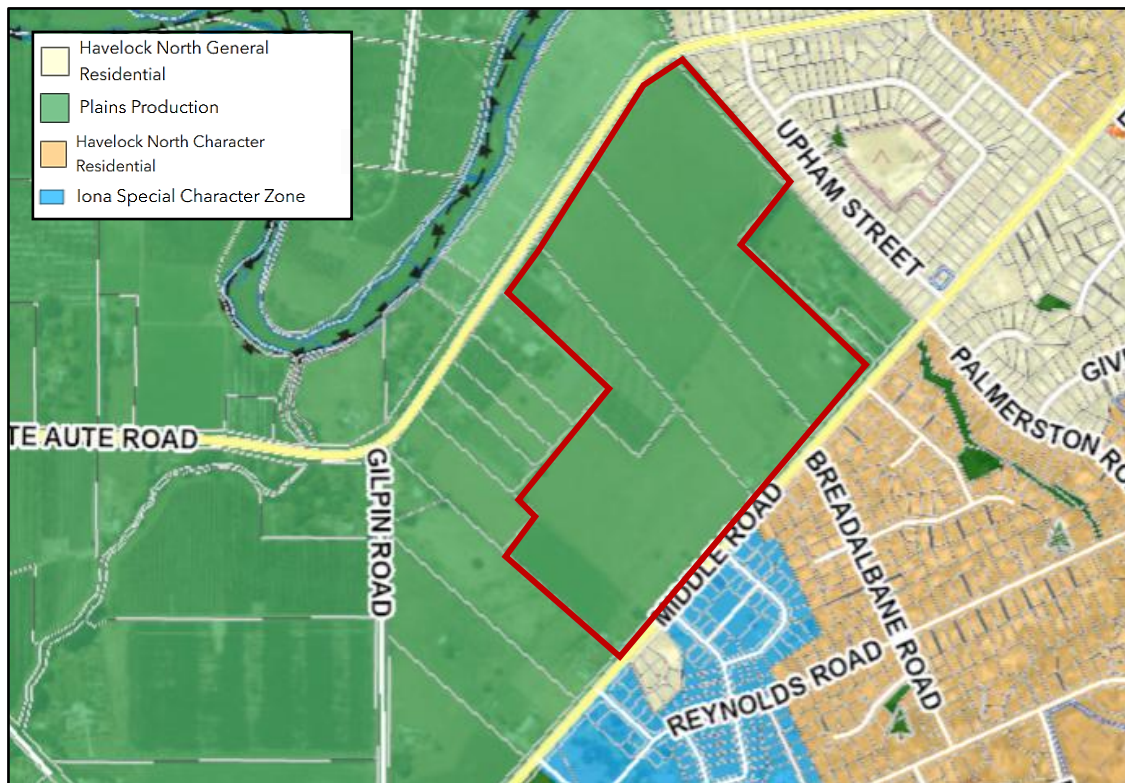


Figure 3: HDP Zoning

The Project Area and the adjacent properties to the northwest, west, and southwest are within the Plains Production Zone (**PPZ**). All other adjacent properties are residentially zoned (Havelock North General Residential or Havelock North Character Residential) or within the Iona Special Character Zone (**ISCZ**). The HDP standards for these zones are outlined in Section 6.0.

4.2 Proposed activities

The Middle Road Project will be developed in two phases:

- **Phase 1 – Land development:** CDL will undertake the subdivision, bulk earthworks, infrastructure, roads, stormwater works, reserves, landscaping and creation of the residential lots.
- **Phase 2 – Dwelling construction:** Build partners and future landowners will construct dwellings and undertake associated site works in accordance with the consent notices applying the relevant Havelock North General Residential Zone or Medium Density Residential Zone provisions.

The proposed noise-related activities are:

Construction stage

- Demolition of three existing dwellings.
- Vegetation removal using chainsaws and a woodchipper.

- Bulk earthworks including excavation, compaction, and truck movements.
- Retaining wall construction including drilling.
- Construction of a pedestrian footbridge across Herehere Stream.
- Construction of the WWPS including sheet piling.
- Construction of roads and crossings.
- Concrete pours.
- Landscaping.

Operational stage

- Operation of the wastewater pump station.
- Residential occupation.

We have modelled and assessed noise and vibration levels generated by these activities in accordance with the requirements of the HDP. Descriptions of the noise and vibration sources, our reference levels and methodology, and the results are provided further in this report.

All construction works associated with the land development phase of the Project will be undertaken in accordance with a Construction Noise and Vibration Management Plan (**CNVMP**). The CNVMP will be prepared and submitted to Hastings District Council for certification before construction works begin. Further details are provided in Section 7.1.

5.0 Receivers in the existing environment

This report refers to Receivers in the existing environment. Receivers are locations on another site where noise is assessed in accordance with the HDP and the relevant Standards.

For this project, the assessment locations for Receivers are:

- a) For assessing construction noise: at any occupied building on another site.
- b) For assessing operational noise:
 - i. Anywhere within the notional boundary of a dwelling in the PPZ.
 - ii. Anywhere within the property boundary of a site in the PPZ that does not include a noise sensitive activity.
 - iii. Anywhere within the property boundary of a site in a residential zone or the IS CZ.

Figure 4 identifies groups of Receivers within approximately 50 m of the Project Area. These are the Receivers who will be most exposed to noise and vibration generated by the Project. Table 1 identifies the individual properties within each Receiver group.



Figure 4: Receiver groups A – F

Table 1: The nearest Receivers

Receiver group (Figure 3)	Addresses	Description
A	4-32 Upham St (even numbers) 63, 67, 69, and 92 Te Aute Rd	Residentially zoned sites containing dwellings. North and northeast of the Project Area.
B	80, 84 Middle Rd	PPZ sites containing dwellings. Northeast of the Project Area.
C	99-109, 115-127, 121B, and 147-151 Middle Rd (odd numbers) 1A Breadalbane Rd	Residentially zoned sites either containing dwellings or under development. East of the Project Area.
D	129-143, 157, and 159 Middle Rd (odd numbers)	Sites in the ISCZ either containing dwellings or under development. East of the Project Area.
E	150 Middle Rd 147, 167, and 169 Te Aute Rd	Sites in the PPZ adjoined to the southern and western boundaries of the Project Area. 147 Te Aute Rd contains the Village Baptist Church. The other sites contain dwellings on large rural sites.
F	122 and 150 Te Aute Rd	122 Te Aute Rd contains a retirement village. 150 Te Aute Rd contains a residential dwelling. Both are within the PPZ to the west and northwest of the Project Area.

The adjacent sites all contain dwellings or are being developed for residential use, except 147 Te Aute Road which is occupied by the Village Baptist Church. We are not aware of any nearby Receivers being highly sensitive to noise or vibration (e.g. laboratories or heritage buildings).

6.0 Noise and vibration criteria

The relevant HDP construction noise and vibration and operational noise limits are summarised in this section and provided in full in Appendix B.

6.1 HDP permitted construction noise standards

The relevant HDP construction noise standards under 25.1.6I are summarised below. These apply at all properties outside the Project Area.

- a) Construction noise must be measured and assessed in accordance with NZS 6803: 1999 *Acoustics – Construction Noise*.
- b) Construction noise must comply with limits of 70 dB L_{Aeq} and 85 dB L_{Amax} when measured at 1 m from the most exposed façade of any occupied dwelling.

6.2 HDP permitted construction vibration standards

The HDP does not contain permitted standards for construction vibration.

We have recommended vibration limits for the Project in the following sections. They are included in our recommended conditions in Section 0. Compliance with these limits will ensure that vibration does not exceed a reasonable level by avoiding building damage and unreasonable amenity effects on the occupants of buildings.

6.2.1 Recommended vibration limits for avoiding building damage

High levels of vibration from construction work can cause cosmetic building damage, including cracks forming in plaster and enlargement of existing cracks and gaps. We recommend the following condition to avoid this:

All construction vibration must comply with the guideline values of the German Standard DIN 4150-3:2016 *Vibrations in buildings – Part 3: Effects on structures* when measured and assessed at any building in accordance with that Standard.

The DIN 4150–3:2016 Standard recommends vibration limits for avoiding cosmetic building damage 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).

The Line 2 criteria typically apply to residential dwellings. We are not aware of any nearby Line 3 structures e.g. heritage buildings.

The guideline values provided in DIN 4150–3:2016 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, measurements in low-rise structures typically show that construction vibration meets the short-term criteria. The construction vibration will be temporary and intermittent and is unlikely to generate resonance in the neighbouring dwellings, so the short-term criteria will apply.

The DIN 4150-3:2016 frequency-dependent values for short-term vibration are illustrated in Figure 5. Dominant frequencies generated by construction vibration are typically less than 50 Hz when measured in dwellings.

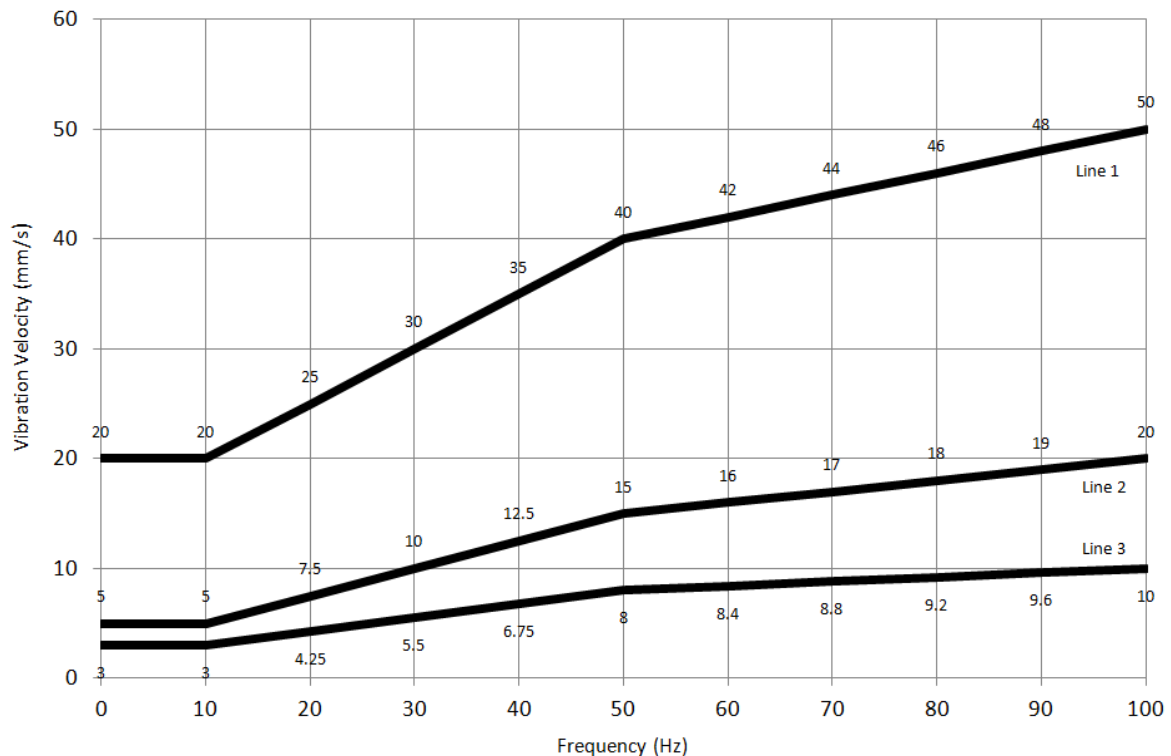


Figure 5: DIN 4150-3:2016 guideline values for short-term vibration

6.2.2 Recommended vibration amenity limits

Vibration from construction work has the potential to unreasonably disrupt residential activity and cause adverse effects on amenity. Vibration inside dwellings is typically perceptible above 0.3 mm/s and can cause complaint at levels above 1 mm/s if the vibration is unexpected. With prior warning, vibration levels up to 5 mm/s can be tolerated for short periods if the vibration is intermittent and the occupants have been advised that limits for avoiding building damage will not be exceeded.

We have recommended a vibration amenity condition that sets a standard limit of 2 mm/s PPV in occupied buildings but enables levels up to 5 mm/s if specific criteria are met. The criteria include implementing mitigation measures through the project CNVMP and providing the occupants with written advice before the works begin. The 2 mm/s PPV amenity limit would not apply at any building that is not occupied during the construction activity being monitored.

Our recommended condition will ensure that vibration emissions are minimised and do not exceed a reasonable level, without unreasonably restricting the construction works.

6.2.3 Operational noise limits outside the Project Area

HDP standards 25.1.4 and 25.1.6A require all operational noise to be measured and assessed in accordance with NZS 6801:2008 and NZS 6802:2008.

The relevant HDP permitted noise limits at the nearest properties outside the Project Area are:

- a) In the PPZ – at the notional boundary of all dwellings (HDP 25.1.6D):

0700 to 1900 hours	55 dB L_{Aeq} (15 min)
1900 to 2200 hours	50 dB L_{Aeq} (15 min)
2200 to 0700 hours the following day	45 dB L_{Aeq} (15 min) and 75 dB L_{AFmax}

- b) In residential zones or the ISCZ – within the site boundary (HDP 25.1.6C):

0700 to 1900 hours	50 dB L_{Aeq} (15 min)
1900 to 2200 hours	45 dB L_{Aeq} (15 min)
2200 to 0700 hours the following day	40 dB L_{Aeq} (15 min) and 70 dB L_{AFmax}

6.2.4 Operational noise limits inside the Project Area

The Applicant proposes a condition which applies the HDP residential noise limits under 25.1.6C for noise at all residential lots within the Project Area.

The proposed condition effectively adopts the noise standards that would apply if the land were zoned Residential, resulting in noise limits that are 5 dB lower than the permitted standards in the PPZ. This will provide for a better level of residential amenity in the Project Area than the PPZ permitted standards.

We consider that the proposed noise limits are appropriate for the residential lots in the Project Area. We recommend that the proposed condition should include or refer to the exclusions set out in 25.1.6B and the specific inclusions in 25.1.6C of the HDP (see Appendix B of this report).

6.3 Recommended noise limits for the WWPS

The permitted noise standards in the PPZ and the proposed residential noise limits between sites in the Project Area are not necessarily designed for the steady and continuous nature of noise generated by fans and pumps. Noise levels of 40-45 dB L_{Aeq} from the WWPS may be clearly audible at the neighbouring lots and perceived as a steady hum throughout the night when ambient and background noise levels are low. This may cause annoyance at the affected sites.

To avoid such effects, we recommend that the Noise Rating Level generated by the permanently installed plant used for the WWPS should comply with the following limits within the boundary of any neighbouring site:

- a. 7:00 am to 10:00 pm: 45 dB L_{Aeq} .
- b. 10:00 pm to 7:00 am: 35 dB L_{Aeq} and 65 dB L_{Amax} .

Compliance with these limits will ensure that noise from the WWPS is mostly inaudible inside the nearest dwellings and will avoid sleep disturbance and annoyance when ambient levels are low.

6.3.1 FTAA Schedule 5

FTAA Schedule 5 *Approvals relating to Resource Management Act 1991 Clause 7 Matters to be covered in assessment of environmental effects* states the following regarding the information required for substantive applications:

The assessment of an activity's effects on the environment under clause 5(4) must cover the following matters:

- a) *any effect on the people in the neighbourhood and, if relevant, the wider community, including any social, economic, or cultural effects:*
- b) *any physical effect on the locality, including landscape and visual effects:*
- c) *any effect on ecosystems, including effects on plants or animals and physical disturbance of habitats in the vicinity:*
- d) *any effect on natural and physical resources that have aesthetic, recreational, scientific, historical, spiritual, or cultural value, or other special value, for present or future generations:*
- e) *any discharge of contaminants into the environment and options for the treatment and disposal of contaminants:*
- f) *any unreasonable emission of noise:*
- g) *any risk to the neighbourhood, the wider community, or the environment through natural hazards or hazardous installations.*

To inform an assessment against (a), (b), and (f) above, this report outlines the potential effects of noise and vibration on people and buildings surrounding the Project Area and recommends mitigation measures to ensure that noise emissions are not 'unreasonable'. We have based our assessment of reasonable noise emissions on:

- a) the existing noise environment, which includes:
 - i. Noise emissions expected from permitted activities in the relevant HDP zones.
 - ii. Noise generated by other consented activities in the area.
 - iii. Road traffic noise levels generated by vehicles on local roads including Middle Road and Te Aute Road.
- b) The noise and vibration levels typically expected from the construction and operation of large residential developments.

7.0 Construction noise and vibration assessment

The proposed construction works include demolition, vegetation clearance, earthworks, piling, roading and infrastructure works, concrete pours, and the construction of dwellings. The equipment and plant required to undertake the proposed works are identified in Section 7.2.

The proposed construction period will be staged over approximately four years, including approximately 19 months of earthworks. No noisy construction work will be undertaken in the early morning, at night, or at any time on Sundays or public holidays.

7.1 Construction noise and vibration mitigation

We recommend the following mitigation measures to ensure that construction noise and vibration effects are reasonable on the neighbouring sites:

1. A CNVMP for the site clearance, earthworks, and civil works will be prepared and submitted to Hastings District Council for certification before construction works begin. The objectives of the CNVMP will be to:
 - a. Set out the procedures to identify and adopt the best practicable options for minimising adverse construction noise and vibration effects on neighbours.
 - b. Define the procedures to be followed to ensure that the project construction noise and vibration limits are being complied with.

The project CNVMP should be prepared in accordance with AAAC guidelines, which recommend that a CNVMP contents page should include the following:

- 1.0 Introduction
- 2.0 Project description
 - 2.1 Site and neighbours
 - 2.2 Construction methodology
 - 2.3 Timeframes and hours of operation
 - 2.4 Key personnel
- 3.0 Noise and vibration performance standards
- 4.0 Noise and vibration levels
 - 4.1 Reference levels for high-noise and vibration generating activities
 - 4.2 Compliance distances (without and with mitigation)
- 5.0 Community Engagement
 - 5.1 Consultation
 - 5.2 Communication

	5.3 Complaints response
6.0	Mitigation and management
	6.1 Scheduling
	6.2 Equipment selection
	6.3 Noise barriers and enclosures
	6.4 General mitigation measures
	6.5 Mitigation of specific activities
	6.6 Training
7.0	Monitoring
	7.1 Monitoring locations
	7.2 Attended monitoring
	7.3 Long-term monitoring
8.0	CNMP update process
	Appendix A – Glossary
	Appendix B – Site map

2. The occupants of dwellings within 50 m of the site (identified in Section 5.0) will receive written communication at least ten days before earthworks begin. This communication will provide an overview of the works, approximate dates and durations of the noisiest activities, and contact details for any questions or concerns.
3. Temporary construction noise barriers (**barriers**) will be installed on the site boundaries or around construction activities to reduce noise emissions where required for compliance with the permitted construction noise limits. The barriers will be at least 2.4 m high and will block the line of sight between the noisy activity and the occupied dwelling. They will be made from solid timber (e.g. 12 mm plywood) or proprietary construction noise panels.
4. One, or both, of the following measures will be adopted where necessary to ensure construction noise levels comply with the HDP limits at the upper level of an occupied dwelling:
 - a. Barriers will be positioned close to the equipment and made high enough to block the line of sight between the noisy activity and the upper level of the dwelling
 - b. Smaller, quieter equipment will be used.
5. Construction work will only occur between 7:30 am and 6:00 pm on Monday to Saturday. There will be no construction work at night or on Sundays and public holidays.
6. A mulcher or woodchipper will not be used within 50 m of any occupied building.

7. Petrol chainsaws will not be used with 30 m of any occupied building.

7.2 Construction noise levels

Table 2 shows the proposed construction activities and reference sound levels based on measurement data. We have used these references to calculate reasonable worst-case construction noise levels at the neighbouring sites. Our references are generally consistent with the data provided in NZS 6803:1999 Appendix C *Guide to Sound Level Data on Site Equipment and Site Activities* but are more relevant to modern construction equipment than the Standard.

Table 2 also displays the minimum separation distances for each activity to comply with the relevant HDP daytime permitted noise limits based on the following assumptions:

- The minimum distance stated is from the noise generating plant to the assessment position at 1 m from the most exposed façade of the building.
- The plant is being used continuously at the reference distance over a 15-minute sample period (i.e. 100% on-time) unless otherwise stated.
- The distances include a +3 dB adjustment to the noise levels for reflections from the façade of the receiving building (as required by NZS 6803:1999).
- Acoustically reflective ground is assumed between the noise source and the Receiver for distances up to 30 m, as recommended by NZS 6803:1999. Ground absorption has otherwise been considered in the calculations.
- The mitigated compliance distances are based on barriers effectively screening the assessment point from the noise generating activity and reducing the L_{Aeq} noise level by 10 dB.

Table 2: Reference noise levels and compliance distances

Construction activity	Unmitigated $L_{Aeq(15 \text{ min})}$ noise level at 10 m	Unmitigated compliance distance	Mitigated compliance distance (with noise barrier)
Sheet piling for temporary coffer dam during WWPS installation	88 dB	73 m	n/a
Mulcher / chipper	83 dB	43 m	19 m
Bored piling with a 20-t excavator	79 dB	30 m	12 m
Demolition of existing structures in the Project Area using a 20-t excavator	79 dB	30 m	12 m

Construction activity	Unmitigated L_{Aeq}(15 min) noise level at 10 m	Unmitigated compliance distance	Mitigated compliance distance (with noise barrier)
Petrol chainsaw felling trees (based on 33% on-time)	78 dB	30 m	11 m
D6, D7, or D8 bulldozer working in small area	76 dB*	27 m	9 m
Padfoot vibratory compaction roller 15-t – 20-t	76 dB*	27 m	9 m
Drilling with a 12-t excavator for retaining walls and construction of pedestrian footbridge	75 dB	24 m	8 m
Plate compactor	74 dB	22 m	7 m
Cut and fill, clearing, and loading trucks with a 40-t – 50-t excavator	72 dB	17 m	6 m
Cat 825 static compactor 30-t	72 dB*	17 m	6 m
55-t mobile crane	70 dB	14 m	5 m
Cut and fill, clearing, and loading trucks with a 20-t excavator	69 dB	12 m	4 m
Cat 815 static compactor 18-t	69 dB*	12 m	4 m
Vibratory compaction roller 5-t – 7-t	69 dB*	12 m	4 m
Concrete pump and truck discharging	69 dB	12 m	4 m
Cut and fill, clearing, and loading trucks with a 12-t excavator	67 dB	10 m	3 m
Single drum static compaction roller 5-t	67 dB*	10 m	3 m
Vibratory compaction roller 3-t	67 dB*	10 m	3 m
Large generator	66 dB	9 m	3 m
Single drum static compaction roller 3-t	65 dB*	8 m	3 m
Terrex TS14 30-t motor scraper	65 dB*	8 m	3 m

Construction activity	Unmitigated $L_{Aeq(15 \text{ min})}$ noise level at 10 m	Unmitigated compliance distance	Mitigated compliance distance (with noise barrier)
Use of handheld power tools	65 dB	8 m	3 m
Grader	62 dB*	6 m	2 m
Idling delivery truck, dump truck, moxy, tractor	62 dB	6 m	2 m

* Reference noise level is for a moving noise source.

The shortest distance between the proposed construction works and any neighbouring building is approximately 10 m. Therefore, several of the proposed activities will be separated by more than the unmitigated compliance distances displayed in Table 2 and will therefore not require barriers or other mitigation to comply.

All construction activities will be undertaken outside of the mitigated compliance distances displayed in Table 2.

The proposed construction works will comply with the HDP permitted construction noise limits by adopting the following measures:

- Undertaking all construction work between 7:30 am and 6:00 pm on Monday to Saturday.
- Using barriers for any work within the unmitigated compliance distances displayed in Table 2.
- Undertaking all construction work in accordance with a CNVMP that is certified by Hastings District Council. The CNVMP will set out the procedures and mitigation required to ensure the project limits are being complied with and that construction noise and vibration effects on the neighbours are minimised.

A summary of the barriers required for compliance is displayed in Table 3. This information will be included in the project CNVMP.

Table 3: Construction noise barrier requirements for compliance

Construction activity	Unmitigated compliance distance	Receivers within the unmitigated compliance distances where an acoustically effective barrier may be required for compliance
Sheet piling	73 m	None. Sheet piling will be undertaken >150 m from any Receiver.

Construction activity	Unmitigated compliance distance	Receivers within the unmitigated compliance distances where an acoustically effective barrier may be required for compliance
Mulcher / chipper	43 m	None. A mulcher or woodchipper will not be used within 50 m of any occupied building.
Bored piling with a 20-t excavator	30 m	None. Bore piling is not required within 30 m of any Receiver.
Demolition of existing dwellings with a 20-t excavator	30 m	Barriers required for 84 Middle Rd during demolition.
Petrol chainsaw felling trees (based on 33% on-time)	30 m	None. A chainsaw will not be used within 30 m of any occupied building.
D6, D7, or D8 bulldozer working in small area	27 m	Barriers may be required to screen: • Receiver Group A. • 147 Te Aute Rd (Church). • 150 Middle Rd. • 84 Middle Rd.
Padfoot vibratory compaction roller 15-t – 20-t	27 m	Barriers may be required to screen: • Receiver Group A. • 147 Te Aute Rd (Church). • 150 Middle Rd. • 84 Middle Rd.
Drilling with a 12-t excavator	24 m	Barriers may be required to screen 76 Middle Rd during footbridge construction.
Plate compactor	22 m	Barriers may be required to screen: • 147 Te Aute Rd (Church). • 84 Middle Rd.
Cut and fill, clearing, and loading trucks with a 40-t – 50-t excavator	17 m	None. Large excavators will not be required within 17 m of any Receiver.
Cat 825 static compactor 30-t	17 m	Barriers may be required to screen 84 Middle Rd.
55-t mobile crane	14 m	None. Crane will be located >14 m from any Receiver.
Cut and fill, clearing, and loading trucks with a 20-t excavator	12 m	Barriers may be required to screen 84 Middle Rd.
Compactor with an 18-t static roller or 5-t – 7-t vibratory roller	12 m	Barriers may be required to screen 84 Middle Rd.

Construction activity	Unmitigated compliance distance	Receivers within the unmitigated compliance distances where an acoustically effective barrier may be required for compliance
Concrete pump and truck discharging	12 m	None. Concrete trucks will not be positioned within 12 m of any Receiver.
Single drum static compaction roller 5-t	10 m	Barriers may be required to screen 84 Middle Rd.
Vibratory compaction roller 3-t	10 m	Barriers may be required to screen 84 Middle Rd.
All other construction activities	<10 m	None

It is unlikely that multiple activities will be undertaken in the same area at once because the works will be staged, but the CNVMP will outline a process for dealing with cumulative noise to avoid non-compliance.

The highest construction noise levels for the nearest Receivers will be between 60 dB and 70 dB $L_{Aeq(15 \text{ min})}$. Construction noise will not be generated continuously or for long periods. It will be intermittent between 7:30 am and 6:00 pm on Monday to Saturday. The highest noise levels for any one Receiver will be generated while earthworks are completed in the nearest part of the Project Area.

The noise levels will generally be lower and range from 50 dB to 60 dB $L_{Aeq(15 \text{ min})}$ when the works progress and move further away.

There will also be periods for each Receiver when there is little or no construction noise e.g. when works are on the far side of the Site.

The L_{Amax} noise levels from the proposed construction activities will generally be 10-15 dB higher than the L_{Aeq} noise levels and will therefore comply with the permitted L_{Amax} noise limit of 85 dB L_{Amax} if our recommended mitigation measures are adopted.

7.3 Construction vibration levels

The highest construction vibration levels at the nearest Receivers will be generated during excavation, compaction, and heavy vehicle movements near to the boundary. The levels will depend on the separation distance, the size of the plant and how it is used, the ground conditions, and the response of the receiving structure.

Table 4 presents typical vibration levels for construction activities that will be undertaken near to the Project Area boundaries. These references are derived from previous measurements using a geophone buried in the ground. Measuring these activities from a dwelling may provide slightly lower results due to the loss of energy when the vibration transfers from the ground into the foundations.

Table 4: Typical construction vibration levels

Construction activity	Distance	Typical vibration level (PPV)
Vibratory compaction with a 15-t – 20-t roller	10 m	3-4 mm/s
Vibratory compaction with a 5-t – 7-t roller	10 m	2-3 mm/s
Compaction with a large static roller	10 m	1 mm/s
Cut and fill works, loading trucks, and tracking slowly with a 20-t excavator	10 m	1 mm/s
Heavy vehicle or tractor pass-by on even ground	10 m	<1 mm/s

The proposed works will comply with our recommended construction vibration limits in Section 6.2 for avoiding both cosmetic building damage and unreasonable effects on amenity. This is due to the distance between any vibration-generating activities on site and the nearest dwellings. It is unlikely that 2 mm/s PPV will be exceeded within any occupied dwelling unless vibratory compaction is needed at the boundary.

7.4 Potential construction noise and vibration effects

The proposed acoustic screening, setback distances, and construction hours will ensure that the HDP permitted construction noise standards are complied with. The proposed communication with the neighbours and CNVMP will minimise the potential effects.

The potential effects typically associated with construction noise are displayed in Table 5. The noise effects indoors are based on windows being closed and a noise level reduction of 20 dB through the façades. This is a typical reduction for older buildings with thinner glass and less air-tight joinery than modern buildings. The façades of modern or upgraded buildings will typically provide a greater reduction of at least 25 dB.

People will generally be able to seek respite indoors during periods of high noise when construction work is near the site boundary. For most of the project, the noise effects will be no greater than those shown for noise levels up to 65 dB L_{Aeq} outside. There will also be periods when little or no construction noise is generated.

Table 5: Temporary daytime construction noise effects

Noise level at 1 m from the façade (L _{Aeq} (15 min))	Potential noise effects outside the building	Potential noise effects inside the nearest room of the building	Compliance with HDP permitted construction noise limits
≤ 55 dB	Noise may be noticeable outside at a subjectively low level, but it is unlikely to cause annoyance or interfere with residential activities	Up to 32 dB L _{Aeq} inside. Mostly unnoticeable and unlikely to cause annoyance	Compliant with HDP limits by at least 15 dB
55-65 dB	Noise will be clear over most other sounds. Unlikely to be considered loud. Conversation may require raised voices	Up to 42 dB L _{Aeq} inside. Noise may be audible inside the building, but it is unlikely to cause annoyance or interfere with residential activities	Compliant with HDP limits by 5-15 dB
65-70 dB	Noise will be perceived by some people as loud or somewhat disruptive. Conversation will require raised voices. People are unlikely to spend time outside	Up to 47 dB L _{Aeq} inside. Noise may be noticeable inside the building and could affect concentration, but it is unlikely to interfere with residential activities	Compliant with HDP limits by up to 5 dB

Construction vibration may be perceptible intermittently when heavy machinery is used within approximately 50 m of a dwelling. The nearest residents will be advised before works begin that vibration may be noticeable but will comply with the Standard DIN 4150–3:2016 for avoiding building damage at all times.

Noise levels up to 70 dB L_{Aeq} and noticeable vibration are expected for short periods during the daytime while heavy machinery operates near to the site boundary. However, for most of the proposed construction period, noise generated by the Project will be considerably lower than the HDP permitted standards for long-term construction projects, and vibration will not exceed reasonable levels.

We do not expect construction noise and vibration to cause unreasonable disturbance on any neighbouring site if our recommendations in Section 9.0 are adopted.

8.0 Operational noise assessment

The Project is mostly comprised of residential development, with some open space areas and the WWPS. There are no proposed commercial activities or other noise sources that could generate adverse noise effects outside the Project Area or on the proposed lots.

The only proposed noise sources that require assessment against the HDP permitted noise limits are those associated with the WWPS on Lot 1004. This section addresses the potential noise effects of the proposed pump station.

8.1 Nearest Receivers

The WWPS will be at the approximate centre of the Project Area. The nearest Receivers will be the surrounding sites within the Project Area. These are Lots 307, 308, 317, and 60. Receivers outside the Project Area will be significantly further from the WWPS.

8.2 Noise sources

The noise sources and on-times for plant operated in the WWPS are outlined below:

- Wastewater pump below ground: 65 dB L_{Aeq} at 1 m (24/7).
- Explosion-proof odour extractor fan inside enclosure: 70 dB L_{Aeq} at 1 m (24/7).
- Control panel (soft starter) inside enclosure: 55 dB L_{Aeq} at 1 m (24/7)
- Truck movements during servicing and maintenance: 97 dB L_{WA} (occasional and daytime only).

Scheduled maintenance of the WWPS, including vehicle movements during servicing and inspections, falls under the definition of construction work in accordance with NZS 6803:1999. Maintenance will only be undertaken during daytime hours. The applicable noise limits are 70 dB L_{Aeq} and 85 dB L_{Amax} , which will readily be complied with. We have not included occasional vehicle movements for maintenance in the cumulative operational noise level predictions.

A standby generator may also be installed to ensure continuous power. Noise from this source is exempt from the noise limits under HDP standard 25.1.6B(g) so has not been included.

Power transformers (included in the definition of 'network utilities' under the HDP) will be installed around the Project Area. The transformers will be within the road reserve and not on private land. They have not been included but we recommend they are also designed, installed, and operated to comply with the limits recommended in Section 6.3.

8.3 Noise mitigation

The proposed WWPS includes the following mitigation measures to ensure compliance with the recommended limits and avoid unreasonable noise effects:

- All fans, pumps, and controllers will be either beneath the ground or inside an acoustic enclosure.
- The acoustic enclosures will be designed and built to achieve a reduction of at least 15 dBA (this is readily achievable and the actual reduction from an enclosure is likely to be greater).
- There will be no truck movements associated with maintenance of the WWPS at night, except in the case of an emergency.

The noise level predictions do not include any mitigation provided by boundary fencing. A timber paling fence that blocks the line of sight between the noise sources on Lot 1004 and a neighbouring lot (e.g. a 1.8 m high fence constructed on the northeast boundary of Lot 1004) would reduce the noise levels further by up to 5 dB. An acoustically effective fence would reduce the noise levels on the receiving site by approximately 10 dB. Such a fence would only be required if at-source mitigation measures are insufficient to meet the proposed noise limits.

8.4 Noise level predictions

We have calculated operational noise levels at the nearest Receivers based on all WWPS plant operating continuously.

To derive a Noise Rating Level for comparison with the HDP permitted noise limits, the noise must be assessed for duration and special audible characteristics, and adjustments made in accordance with NZS 6802:2008 where applicable. Our assessments of duration and special audible characteristics are outlined below:

- Duration: the plant can operate continuously on any day, so the noise emissions do not qualify for any adjustment. No duration adjustments are permitted at night. Therefore, no adjustment for duration has been applied.
- Special audible characteristics: Any WWPS plant that could potentially produce noise with tonal characteristics will be located underground or inside an enclosure. The noise is unlikely to be clearly audible at the nearest lots and can be further mitigated if necessary. Therefore, no adjustment for special audible characteristics has been applied.

The predicted operational Noise Rating Levels at the nearest sites are displayed in Table 6.

Table 6: Predicted operational Noise Rating Levels

Location	Predicted Noise Rating Levels
Lot 307 (N of Lot 1004)	30 dB $L_{Aeq}(15 \text{ min})$
Lot 308 (adjoined to the NE boundary of Lot 1004)	32 dB $L_{Aeq}(15 \text{ min})$
Lot 317 (adjoined to the SE boundary of Lot 1004)	30 dB $L_{Aeq}(15 \text{ min})$
Lot 60 (SW of Lot 1004)	24 dB $L_{Aeq}(15 \text{ min})$
All sites outside the Project Area	Inaudible

The predicted Noise Rating Levels comply with the HDP permitted day and night-time noise limits for both the PPZ and residential zones, and with our recommended noise limits at all surrounding sites, including those within the Project Area.

The L_{Amax} noise levels are unlikely to be more than 5-10 dB higher than the L_{Aeq} noise levels and will readily comply with the HDP permitted L_{Amax} limits and our recommended limit of 65 dB L_{Amax} at night.

8.5 Potential operational noise effects

The operational noise emissions of the pump station are predicted to comply with the relevant permitted noise limits under the HDP. Due to the steady and continuous nature of the noise that is typically generated by water pumps, fans, and control panels, we have recommended noise limits more stringent than the HDP permitted standards. Our recommended noise limits will also be complied with.

Noise from the WWPS will not be audible inside neighbouring dwellings within the Project Area or at any point outside the Project Area.

Noise generated by the proposed residential activity in the Project Area will be similar in character to noise from activities permitted within the PPZ, including residential activity, workers accommodation, and recreational activities. The proposed noise limit condition for residential activity within the Project Area is 5 dB lower than the noise limits permitted within the PPZ. As a result, the proposed limits will provide a noticeable reduction to the potential noise emissions to existing sites outside the Project Area. We therefore consider that noise generated by the proposed residential activity will not exceed a reasonable level.

Overall, we consider that operational noise emissions generated by the Project will not cause annoyance or disruption to activities on any neighbouring site and will not exceed a reasonable level.

9.0 Noise from land-based primary production outside the Project Area

The Project Area and adjacent land to the northeast, northwest, west, and southwest are within the PPZ. The zone allows for land-based primary production as a permitted activity. Noise from crop protection devices, such as frost fans and audible bird scaring devices, is anticipated in the zone. The HDP includes specific noise performance standards for crop protection in the PPZ. These apply at the notional boundaries of existing dwellings in the area and the church at 147 Te Aute Road. They will also apply at the notional boundaries of the proposed dwellings in the Project Area. The Project therefore has the potential to introduce new compliance points that crop protection activities in the PPZ would need to comply with.

The relevant permitted standards for audible bird scaring devices outlined in 25.1.7A are summarised below:

- No device can be operated between half an hour after sunset and half an hour before sunrise.
- There are no restrictions on events or individual shots for sound levels less than 85 dB L_{Cpeak} at any point within the notional boundary of a noise sensitive activity in the PPZ.
- Sound levels generated by an audible bird scaring device may be up to 115 dB L_{Cpeak} at any point within the notional boundary of a dwelling in the PPZ for no more than four 'events' in a one-hour period, or 12 individual shots in a one-hour period (where an event is no more than three shots in a one-minute period).
- There must be only one device per every 4 ha of a site.

The relevant permitted standards for frost fans outlined in 25.1.7B are summarised below:

- Noise from a frost fan must not exceed 65 dB $L_{Aeq(15 min)}$ when measured outdoors at a distance which is the lesser of:
 - i. 300 metres from the device; or
 - ii. At any point within the notional boundary of a dwelling in the PPZ (other than on the site on which the frost fan is situated or any other adjoining site in the same ownership).

We are not aware of any existing cropping activities or crop protection devices on the PPZ sites adjacent to the Project Area.

We have used DGMR iNoise noise modelling software to identify the land surrounding the Project Area where frost fans and bird scaring devices would not comply with the permitted noise limits at the notional boundaries of the proposed dwellings. We have excluded any areas where the use of a frost fan or bird scaring device would already exceed the HDP noise limits at existing notional boundaries outside of the Project Area.

Our modelling of frost fans is based on our measurements of four-blade frost fans on other projects. The A-weighted frequency spectrum used in the modelling is displayed in Table 7.

Table 7: Sound power level spectrum for a four-blade frost fan

63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	L _{WA}
107 dB	103 dB	108 dB	107 dB	101 dB	92 dB	71 dB	55 dB	113 dB

Our assessment of noise from bird scaring devices is based on the indicative setback distance of 150 m provided under 25.1.7A(e) of the HDP.

The Project will introduce new houses in the PPZ which could constrain the future use of crop protection devices on neighbouring sites. However, the ability to use crop protection devices on neighbouring sites is already heavily constrained by existing dwellings, a church, and a retirement village outside the Project Area.

Figure 6 identifies the areas on the neighbouring sites where crop protection would be further restrained as a result of the Project. We understand that these areas are unlikely to be used for crops or the operation of frost fans and bird scaring devices.

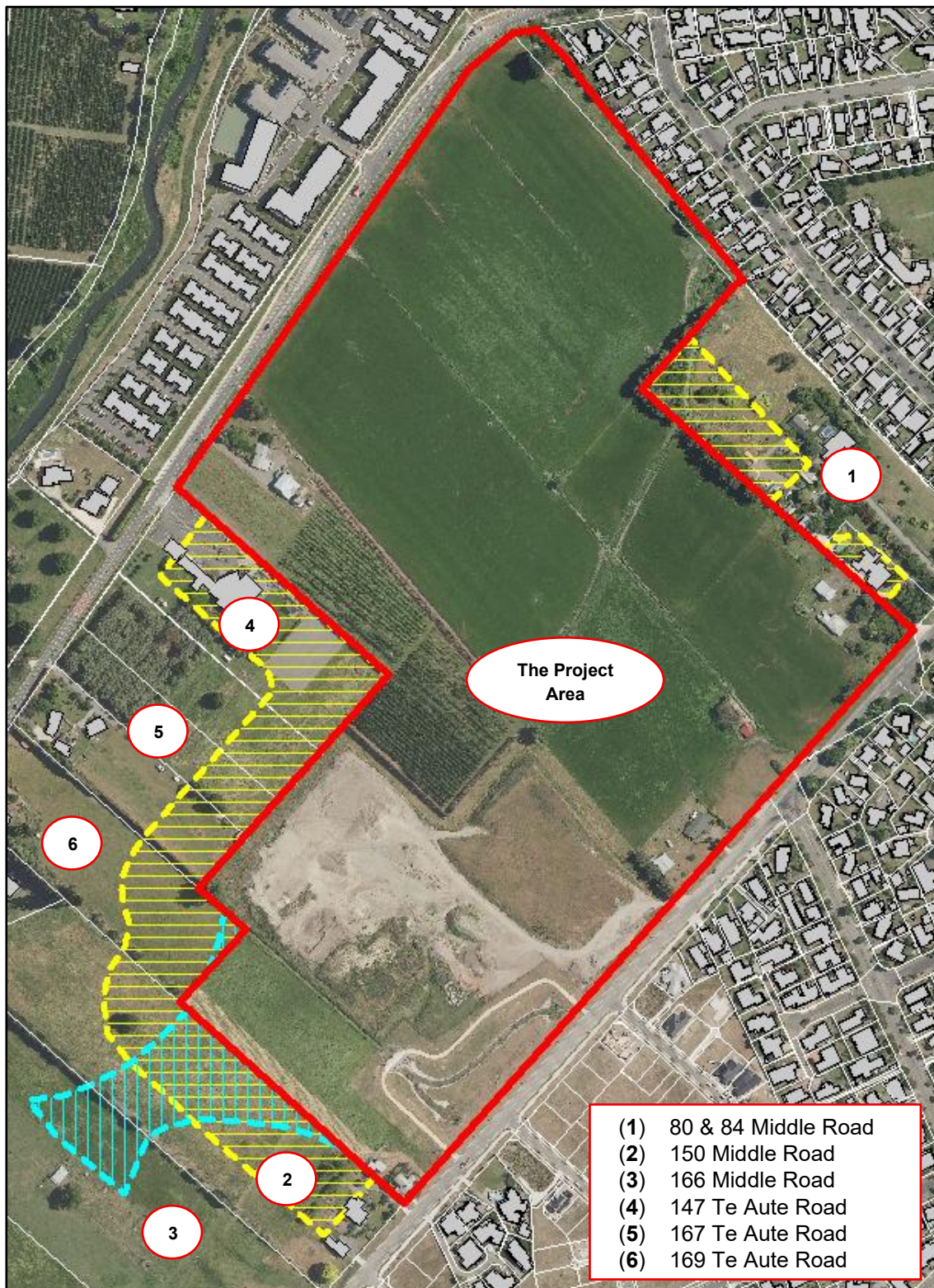


Figure 6: Areas where new frost fans (yellow) and bird scarers (blue) on neighbouring properties would exceed HDP noise limits at new compliance points introduced by the Project

The Project would result in the areas on the neighbouring properties identified in Figure 6 not being usable for crop protection devices without consent. There are currently no crop protection devices in these areas, and we understand it is unlikely that there would be in the future.

10.0 Recommendations

We recommend the following mitigation measures are included as conditions for the Project:

1. A Construction Noise and Vibration Management Plan (**CNVMP**) for the site clearance, earthworks, and civil works must be prepared by a suitably qualified person and submitted to Hastings District Council for certification at least ten days before any construction works authorised by the approval begin.

The objectives of the CNVMP must be to:

- a. Set out the procedures to identify and adopt the best practicable options for minimising adverse construction noise and vibration effects on neighbours.
- b. Define the procedures to be followed to ensure that the project construction noise and vibration limits are complied with.

The CNVMP must address the requirements of Annex E of NZS 6803:1999 *Acoustics – Construction Noise* as a minimum and must be prepared in accordance with the Association of Australasian Acoustical Consultants Guideline for interpreting and applying NZS 6803:1999.

Construction works must not begin until certification has been received in writing from Hastings District Council. All construction works on the site must be carried out in accordance with the certified CNVMP.

2. The occupants of all dwellings within 50 m of the site boundary must be advised of the construction project at least ten days before earthworks begin. The advice must be provided in writing and must include the following information:
 - a. A general description of the construction works including the duration of the project and the working hours on site; and
 - b. A contact name and phone number for any questions or complaints during the project.
3. All construction works, as defined by NZS 6803:1999 *Acoustics – Construction noise*, must only take place between 7:30 am and 6:00 pm, Monday to Saturday. No works are permitted on Sundays or public holidays. The timing restrictions in this condition do not apply to quiet activities such as site meetings, site inspections, administration, and internal works (e.g. painting and plastering) providing that any noise generated complies with limits of 40 dB L_{Aeq} and 70 dB L_{Amax} when measured at the notional boundary of any dwelling.
4. Chipping and mulching must not take place within 50 m of any occupied building.

5. Petrol chainsaws must not be used with 30 m of any occupied building.
6. All vibration generated by construction activities must comply with:
 - a) The guideline vibration limits in the German Standard DIN 4150-3:2016 when measured and assessed at any building in accordance with that Standard (for the purpose of avoiding building damage); and
 - b) A vibration limit of 2 mm/s PPV at the foundations of all occupied dwellings (for the purpose of avoiding adverse effects on amenity).

Where predictions or monitoring indicate that 2 mm/s PPV may be exceeded, the Approval Holder must implement vibration mitigation measures in accordance with the CNVMP and review the construction methodology and plant to minimise vibration levels.

Where compliance with the 2 mm/s PPV vibration limit cannot be achieved following implementation of those measures, the Approval Holder must provide the following information to the occupants of the affected dwelling(s) at least three days before the vibration-generating works begin (or continue):

- i. The dates and approximate times during which vibration levels may exceed 2 mm/s PPV;
- ii. The name and telephone phone number of a contact person who can respond to enquiries and receive advice regarding any vibration-sensitive activities or times at the dwelling; and
- iii. Confirmation that construction vibration will be managed to comply with the cosmetic building damage limits in DIN 4150-3:2016 *Vibrations in buildings – Part 3: Effects on structures*.

Following completion of the above requirements, vibration at the foundations of the affected dwelling must not exceed 5 mm/s PPV.

7. All fans, pumps, and controllers associated with the operation of the wastewater pump station must be located either underground or inside an acoustic enclosure. All acoustic enclosures must be designed and constructed to achieve a reduction of at least 15 dBA to the noise emissions.
8. The Noise Rating Level generated by permanent fixed plant associated with the operation of the Wastewater Pump Station must comply with the following limits when measured and assessed in accordance with NZS 6801:2008 and NZS 6802:2008:
 - a. 7:00 am to 10:00 pm on all days: 45 dB L_{Aeq} .
 - b. 10:00 pm to 7:00 am on all days: 35 dB L_{Aeq} and 65 dB L_{Amax} .

11.0 Conclusion

Construction noise will comply with the HDP permitted limits. This will be achieved by undertaking construction between 7:30 am and 6:00 pm on Monday to Saturday, applying minimum setback distances, and using temporary construction noise barriers.

We have recommended construction vibration limits to avoid building damage and unreasonable effects on amenity. These will also be complied with.

Construction noise and vibration effects will be mitigated by communicating with the neighbours before the works begin and undertaking all construction works in accordance with a CNVMP that is certified by Hastings District Council.

Construction noise will be noticeable outside the neighbouring dwellings and may dominate the noise environment during the day while the nearest earthworks are completed. Vibration may be noticeable during the nearest works, but this will be for a short duration, and the building occupants will know when and for how long to expect it.

Noise from the proposed operation of the WWPS will comply with the HDP noise limits for permitted activities in the PPZ and residential zones. We have recommended more stringent noise limits based on the steady and consistent nature of pump and fan noise. Compliance with our recommended limits will ensure that noise from the WWPS will not be audible inside dwellings within the Project Area or at any point outside the Project Area.

Noise between lots in the Project Area will be controlled by a proposed condition that adopts the HDP residential noise standards, as if the area were zoned residential. This will deliver a higher level of residential amenity than the HDP noise standards for the PPZ, which would otherwise apply.

The Project will introduce new houses in the PPZ which could constrain the future use of crop protection devices on neighbouring sites. However, the ability to use crop protection devices on neighbouring sites is already heavily constrained by existing dwellings, a church, and a retirement village outside the Project Area. We understand that crop protection devices are unlikely to be used on the adjacent land.

Overall, we consider that noise and vibration emissions from the proposed residential development will not be unreasonable if our recommendations are adopted.

Appendix A Glossary

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.
Ambient noise	The total of all noise within a given environment including sounds from sources near and far.
$L_{Aeq(t)}$ (dB)	The A-weighted equivalent sound pressure level with the same energy content as the measured varying acoustic signal over a sample period (t). The preferred metric for sound levels that vary over time because it considers the total sound energy over the period of interest.
L_{AFmax} (dB)	The maximum A-weighted sound pressure level recorded during the measurement period using a fast time-weighting response.
L_{WA} (dB)	Sound power level (L_{WA}) is the acoustical energy emitted by a sound source. It is an absolute value and is not affected by distance or the environment. The L_{WA} is used in computer noise modelling to calculate the sound pressure level (e.g. L_{Aeq}) at a given distance.
Noise Rating Level	A noise level derived in accordance with NZS 6802:2008 <i>Acoustics – Environmental noise</i> .
Notional boundary	A line 20 metres from any side of a residential unit or other building used for a noise sensitive activity or the legal boundary where this is closer to the building.
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.
CNVMP	A Construction Noise and Vibration Management Plan is a document developed by a suitably qualified person to set out the procedures for a contractor to manage and mitigate construction noise and vibration effects.

Appendix B HDP permitted standards

The relevant parts of the HDP permitted standards under Part C *District Wide Activities 25.1 Noise* are reproduced below.

Noise Standards and exemptions to noise limits

25.1.4 METHODS

The following New Zealand Standards will be followed for assessing noise emission controlled by the District Plan:

- NZS 6801:2008: Acoustics - Measurement of Environmental Sound
- NZS 6802:2008: Acoustics - Environmental Noise
- NZS 6803:1999: Acoustics - Construction Noise
- NZS 6805:1992: Airport Noise Management and Land Use Planning
- NZS 6806:2010: Acoustics - Road Traffic Noise - New and Altered Roads
- NZS 6807:1994: Noise Management and Land Use Planning for Helicopter Landing Areas.
- NZS 6808:2010: Acoustics - Wind Farm Noise

25.1.6B EXEMPTIONS FROM MAXIMUM NOISE LIMITS

The Noise Standards in this Plan, unless specifically stated, will not apply to the following:

- (a) In any Zone, to the emission of noise from the use of vehicles, machinery or other mobile or portable equipment for Land Based Primary Production. Except where a Specific Performance Standard applies in 25.1.7, this exemption does not apply to any fixed or permanently installed plant.
- (b) In any Zone, to residential activities and recreational activities of a normal recreational nature, such as sporting events and playground activities (including the use of outdoor school grounds between the hours of sunrise to sunset) that do not involve motorised activities, gunfire or amplified music. This exemption does not apply to playground activities associated with an Early Childhood Centre.
- (c) In any part of the District where the noise source is a warning device used by emergency services.
- (d) To vehicles travelling on a road (this does not apply to stationary vehicles).
- (e) To trains, other than when stationary or when on private sidings.

(f) To aircraft:

- i) operating during, or immediately before or after flight;
- ii) landing in an emergency, or diverted aircraft;
- iii) emergency flights required to rescue people from life threatening situations or to transport patients, human vital organs or medical personnel in a medical emergency;
- iv) the operation of unscheduled flights required to meet the needs of a declared national or civil defence emergency;
- v) owned or operated by the Defence Force of the New Zealand Government or another sovereign state;
- vi) for essential unscheduled aircraft engine testing.

(g) In any zone to the emission of noise from the temporary emergency use of generators for continued power supply.

Notes:

(1) Notwithstanding the above exemptions, all land uses shall be subject to Section 16 and Part XII of the Resource Management Act 1991.

(2) The Act defines 'noise' as including vibration. Section 16 of the Resource Management Act 1991 refers to the adoption of best practicable option to ensure that the emission of noise from land or water does not exceed a reasonable level, while Part XII relates to excessive noise.

Noise limits

25.1.6C RESIDENTIAL ZONES

The following noise conditions shall apply to all land uses within all Residential Zones (including noise from fixed plants such as air conditioning units and other similar devices but excluding noise from emergency service facilities), other than those exempted in Rule 25.1.6B:

(a) The following noise limits shall not be exceeded at any point beyond the site boundary:

<u>Control Hours</u>	<u>Noise Level</u>
0700 to 1900 hours	50 dB L_{Aeq} (15 min)
1900 to 2200 hours	45 dB L_{Aeq} (15 min)
2200 to 0700 hours the following day	40 dB L_{Aeq} (15 min)
2200 to 0700 hours the following day	70 dB L_{AFmax}

(b) The following noise limits apply to emergency service facilities (other than those exempted in Rule 25.1.6B) and shall not be exceeded at any point beyond the site boundary:

<u>Control Hours</u>	<u>Noise Level</u>
0700 to 1900 hours	55 dB L_{Aeq} (15 min)
1900 to 2200 hours	50 dB L_{Aeq} (15 min)
2200 to 0700 hours the following day	40 dB L_{Aeq} (15 min)
2200 to 0700 hours the following day	75 dB L_{AFmax}

25.1.6D RURAL ZONES

The following noise conditions shall apply to all land uses within all Rural Zones, other than those exempted in Rule 25.1.6B and 25.1.7E (Wind Farm Noise):

(a) The following noise limits shall not be exceeded at any point within the notional boundary of any noise sensitive activity on any other site within a Rural Zone, or at any point within the boundary of any site, in any Zone other than an Industrial Zone:

<u>Control Hours</u>	<u>Noise Level</u>
0700 to 1900 hours	55 dB L_{Aeq} (15 min)
1900 to 2200 hours	50 dB L_{Aeq} (15 min)
2200 to 0700 hours the following day	45 dB L_{Aeq} (15 min)
2200 to 0700 hours the following day	75 dB L_{AFmax}

25.1.6I CONSTRUCTION NOISE

(a) Any noise arising from construction, maintenance and demolition work in any Zone shall comply with NZS6803:1999 Acoustics - Construction Noise.

(b) Construction noise shall be measured and assessed in accordance with NZS6803:1999 Acoustics - Construction Noise.

(c) To avoid doubt, Standards 25.1.6C to 25.1.6H above shall not apply to construction noise.