



MARSHALL DAY
Acoustics 

**FNDC PROPOSED DISTRICT PLAN REVISION
NOISE AND VIBRATION REVIEW**

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Project: **FNDC PROPOSED DISTRICT PLAN REVISION**

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Report No.: **Rp 001 20200430**

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SUMMARY

Marshall Day Acoustics has been engaged by Far North District Council to provide feedback on the noise and vibration provisions of the proposed District Plan. Far North District Council have provided a Draft Noise Chapter for our review.

This report sets out the background information considered in our review. Where possible, it provides information on the implications of adopting specific noise rules.

Marshall Day Acoustics has recommended changes be made to the Draft Noise Chapter. These changes have included:

- General changes to the wording of the *overview* section of the Draft Noise Chapter;
- Revised *Objectives* to ensure the overarching requirements of the District Plan are stated;
- Revised *Policies* to set out and give direction as to how the noise objectives are to be achieved;
- Revised “zone specific” *Noise Standards* within and between zones. We have recommended permitted noise limits that we consider best address the level of amenity in each zone that is envisaged for the District, while balancing the utility required in each zone
- Revised *Activity Specific* noise rules to provide permitted noise limits that would apply to activities that are not adequately captured by the “zone specific” *Noise Standards*. We have recommended several additional draft rules that could be considered for sources such as construction vibration, new roads, explosives, wind turbines, etc.
- Revised *Sound Insulation* rules. The revised rules are intended to make the rules easier to understand and interpret while providing for a suitable internal noise environment to be achieved within dwellings and teaching areas in noisier areas.

We recommend that all the above recommendations are subject to further scrutiny within Council. The implementation of these rules should be considered and tested against the experience and knowledge of council officers, elected officials and the residents of the Far North District. In addition, the FNDC policy department must carefully review any recommendations for revision to ensure the rules result in the policy outcomes required.

TABLE OF CONTENTS

1.0	INTRODUCTION	7
2.0	NATIONAL PLANNING STANDARDS	7
3.0	GENERAL NATIONAL PLANNING STANDARDS AND NEW ZEALAND STANDARD REQUIREMENTS.....	7
3.1	Descriptors	7
3.2	Time interval	8
3.3	Assessment location.....	8
4.0	OVERVIEW, OBJECTIVES AND POLICIES	9
4.1	Overview	9
4.2	Objectives.....	10
4.2.1	NOISE-O1	10
4.2.2	NOISE-O2	11
4.2.3	Further considerations.....	11
4.3	Policies.....	11
4.3.1	NOISE-P1	12
4.3.2	NOISE-P2	13
4.3.3	NOISE-P3	14
4.3.4	Further considerations.....	15
4.3.5	Recommended Policies.....	15
5.0	ENVIRONMENTAL NOISE CRITERIA	16
5.1	NZS6802:2008.....	16
5.2	World Health Organisation	17
5.3	AS/NZS2107:2016.....	17
6.0	ZONE NOISE LIMIT REVIEW.....	18
6.1	Residential Zone	18
6.1.1	Operative Noise Limits.....	18
6.1.2	Draft Noise Provisions.....	19
6.1.3	Discussion	19
6.2	Rural Living, Rural Production, Rural Lifestyle, Rural Settlement, Māori Purpose Zone, Horticulture Zone	20
6.2.1	Draft Noise Provisions.....	22
6.2.2	Rural Production and Horticultural Zones.....	22
6.2.3	Rural Living and Rural Lifestyle zone.....	24
6.2.4	Māori Purpose Zone.....	24

6.2.5	Rural Settlement Zone	25
6.3	Business Zones	25
6.3.1	Mixed Use	27
6.3.2	Light <i>Industrial</i>	29
6.3.3	Draft Noise Provisions	29
6.3.4	Heavy Industrial	30
6.4	Open Space Zones	31
6.5	Horticulture Processing	33
6.6	Mineral Zones	34
6.7	Noise Limits between Zones	35
7.0	ACTIVITY SPECIFIC NOISE LIMITS	36
7.1	Construction Noise	36
7.1.1	Draft Noise Provisions	36
7.1.2	Recommended Noise and Vibration Limits	36
7.2	Temporary Activities	37
7.2.1	Draft Noise Provisions	37
7.2.2	Recommended Noise Limits	38
7.3	Temporary Military Training Activities	38
7.4	NZTA – State Highway Noise and Vibration	39
7.5	Mixed Use and Light Industrial Zone Sound Insulation Measures	40
7.5.1	Draft Noise Provisions	40
7.5.2	Recommended Noise Limits	41
7.6	Control and Air Noise Boundaries	43
7.7	Airport Engine Testing	43
7.8	Aircraft Landing Areas	43
7.8.1	Helicopters	44
7.8.2	Fixed Wing Aircraft	45
7.9	Peak Sound Levels from Explosives	45
7.10	Wind Turbines and Wind Farms	45
7.11	Bird Scaring Devices	45
7.12	Frost Fans and Wind Machines	45
7.13	Shooting Ranges	46
7.14	Road Traffic Noise	46
7.15	Emergency Generators and Mobile Plant	47
7.16	Vibration	48
8.0	SUMMARY	48

APPENDIX A RECOMMENDED ZONE NOISE LIMITS

APPENDIX B NATIONAL PLANNING STANDARDS NOISE GUIDELINES

1.0 INTRODUCTION

Marshall Day Acoustics has been engaged by Far North District Council (FNDC) to provide feedback on the noise and vibration provisions of the proposed District Plan (“the Plan”). FNDC have provided a Draft Noise Chapter for our review.

The brief for this project is to provide a “*technical review of the existing provisions in relation to current best practice standards and provide options as appropriate to address issues identified to efficiently manage noise and vibration effects*”.

This report provides a summary of recommendations for the District Plan review. Our recommendations are contained in Appendix A. The body of this report discusses each proposed section and provides supporting comment where necessary.

For clarity, the following terms have been used when referring to the various rules:

- **Operative** rules/Operative noise limits – refer to the currently Operative District Plan and its provisions
- **Draft Noise Chapter** / Draft noise provisions – refer to the wording provided by the FNDC to Marshall Day Acoustics for review and comment. These are the provisions that are discussed and, where considered necessary, changes recommended by us
- **Recommended** noise limits/objectives/policies – refers to the proposed amended wording that Marshall Day Acoustics considers appropriate

This report does not aim to provide a *final* set of noise and vibration regulations. Given the time constraints, we have aimed to carry out a thorough review of the draft provisions to enable FNDC to further refine the Draft District Plan. Further advice is likely to be required to refine the provisions prior to lodgement. It is FNDC’s responsibility to further review the Draft Noise Chapter to ensure it adequately controls activities to the required level of discretion. We are happy to assist with further review of the rules and attend meetings to exchange ideas as required.

A mark-up of the Draft Noise Chapter is provided in Appendix A of this report.

2.0 NATIONAL PLANNING STANDARDS

The District Plan will incorporate the *Mandatory Directions* of the National Planning Standards. Specifically, the National Planning Standards require that “any plan rule to manage noise emissions must be in accordance with the mandatory noise measurement methods and symbols in the applicable New Zealand Standards”.

It is not within our scope to consider or discuss alternatives to these directives. The National Planning Standards Rule 15 (noise and vibration) are set out in Appendix B.

3.0 GENERAL NATIONAL PLANNING STANDARDS AND NEW ZEALAND STANDARD REQUIREMENTS

This section provides supporting comments on the proposed District Plan noise rules in Appendix A.

3.1 Descriptors

The existing Operative District Plan noise rules are written as “dBA L₁₀” and “dBA L_{max}”. In this nomenclature, “dBA” referred to an overall decibel level to which an “A-weighting” had been applied. The “L₁₀” level referred to the level that was exceeded for 10% of the measurement period and the “L_{max}” level referred to the maximum noise level in any measurement period.

The above form of nomenclature is no longer used. New Zealand now follows international guidelines for describing noise¹. The following summarises the changes:

- “dBA L_{10} ” is no longer used to assess environmental noise, and is replaced by “dB L_{Aeq} ”
- “dBA L_{max} ” is now written “dB L_{AFmax} ”
- “dBA L_{eq} ” is now written “dB L_{Aeq} ”

The above terms are equivalent: dBA L_{eq} means the same as dB L_{Aeq}

The National Planning Standards reference New Zealand Standards NZS 6801:2008 “Acoustics – Measurement of Environmental Sound” and NZS 6802:2008 “Acoustics - Environmental Noise”. The mandatory noise measurement methods and symbols within the standards are required to be used. This means that noise rules must use the:

- “ L_{Aeq} ” noise level to provide amenity for outdoor activities during the day and for sleep during the night period, and
- “ L_{AFmax} ” noise level to provide a suitable level of amenity for sleep.

The L_{A10} noise level can no longer be used. This is in accordance with best practice.

The rules in the Operative District Plan were written in terms of “ L_{10} ” (or “ L_{A10} ” in the current nomenclature). For most sources of noise, the change from L_{A10} to L_{Aeq} would not result in materially different outcomes. In most cases, a change from a noise rule of (say) 50 dB L_{A10} to 50 dB L_{Aeq} represents either no perceptible change to the overall level of noise permitted or (at worst), a just perceptible increase. As a rule of thumb, for quasi-continuous noise sources that fluctuate in level the difference between L_{Aeq} and L_{A10} is $L_{A10} = L_{Aeq} + 2$ to 3 dB.

3.2 Time interval

NZS6802:2008 states that “the reference time interval (t) should be stipulated in minutes of any noise limit applicable to a specific site for example, $L_{Aeq(15\ min)}$. The default value (t) shall be 15 minutes.” This clause of the standard recommends that noise limits should be presented as “xx dB $L_{Aeq(15\ min)}$ ”. As NZS6802:2008 is directly referenced by the National Planning Standards, it appears to be a mandatory requirement to refer to noise limits using “xx dB $L_{Aeq(15\ min)}$ ” rather than simply “XX dB L_{Aeq} ”.

The provision of a specific time interval may lead to ambiguity, confusion or disagreement. Furthermore, the use of the prescriptive time interval could lead to disagreement over whether the “time averaging” provisions of NZS6802:2008 should be applied. In our view, the absence of a specific time interval would strengthen the rule (rather than weaken it) and would make it more robust as a result of diminished ambiguity. However the national planning standards approach must be followed.

In this report, “ L_{Aeq} ” can be considered to have the same meaning as $L_{Aeq(15\ min)}$.

3.3 Assessment location

We consider that noise levels should be assessed “within the boundary” (for urban and business zones) or “within the notional boundary” (for rural zones). This is preferable to “at or within the boundary” which indicates noise may be assessed at the boundary OR within the boundary, but perhaps not both. It is also in accordance with Section 8.4.3 of NZS6802:2008, which provides recommendations for assessment locations.

¹ As referenced by the National Planning Standards directive to use NZS6802:2008.

The following sections discuss our recommendations for each proposed zone. Note that where the word “noise” is used, this refers to “noise and vibration” (unless stated otherwise)².

4.0 OVERVIEW, OBJECTIVES AND POLICIES

Strong objectives and policies are important. Section 104D requires that non-complying activities are not contrary to the objectives and policies of the District Plan. If the noise objectives and policies are inappropriately drafted or do not cover matters that are important to the amenity of the District, there is a risk that non-complying activities may be eligible for consideration even if noise or vibration effects are more than minor³.

4.1 Overview

The *Overview* section of the Draft Noise Chapter sets out the reasons for the *Objectives, Policies and Rules*.

It is important that the *Overview* section of the Plan accurately describes potential noise issues and why they need to be addressed through the Objectives, Policies and Rules.

We recommend the following altered text be considered. Further modification can be considered by Council.

Our District is diverse. It is made up of large tracts of rural land, long coastlines, small rural communities and towns. The existing level of natural and man-made noise within these areas will vary based on the level of development, purpose and proximity to infrastructure. It is important that human activity within the District does not generate noise that would adversely affect people and the environment.

Manmade noise is an inevitable part of function of the District's economy. For instance, primary production and secondary manufacturing normally uses machinery to remain productive, and we all make use of roads, airports and other infrastructure in our day-to-day lives. Such economic activity benefits the District, however if noise levels are too high this can cause health effects for people and reduce human 'wellbeing'. People can become annoyed by noise that is louder or more intrusive than they expect to receive, and this can detract from the character and amenity values associated with their local environment.

The above issues require careful balance. Noise must be managed so that it does not exceed a reasonable level where people live, work and play. In contrast: noise makers engaged in productive activities that benefit our District's economy and lifestyle must be free of unreasonable constraints.

The noise rules in this District Plan have been set to provide an adequate level of protection from the noise within each zone. The rules aim to strike a balance between the need for land to be used for its intended purpose, while ensuring that other land users are not exposed to unreasonable levels of noise. Permitted noise levels are set to be consistent with the character and amenity values anticipated in each part of the District.

We all have a duty under the Resource Management Act to manage noise so that it does not exceed a reasonable level. The objectives, policies and rules that follow are intended to promote the purpose of the Resource Management Act.

² The RMA defines noise in this manner.

³ This relates to our understanding of s104 of the RMA which sets the gateway test for non-complying activities. To be eligible for consideration s104 requires non-complying activities to have minor effects OR to not be contrary to the objectives and policies in the District Plan.

4.2 Objectives

The noise objectives should state the overarching requirements of the noise rules together with what is to be achieved. It is the objectives that form the framework for the rules and policies that follow. The objectives must provide the required level of specific direction to the District Plan while remaining sufficiently broad in their scope.

The following objectives are proposed in the Draft Noise Provisions:

FNDC Proposed Objectives	
NOISE-01	Activities generate noise effects that are compatible with the role, function and character of each zone and do not compromise community health, safety and wellbeing.
NOISE-02	New noise sensitive activities are designed and/or located to minimise conflict and reverse sensitivity effects.

Our comments on each objective follows.

4.2.1 NOISE-01

NOISE-01: Activities generate noise effects that are compatible with the role, function and character of each zone and do not compromise community health, safety and wellbeing.

- Our view is that the use of the word “*effects*” should be avoided. Instead the objective should simply refer to “*noise*” or “*noise levels*”. The objective (as written) could be misinterpreted to infer that activities should generate [adverse] noise effects.
- The remainder of the objective intends to enable business and living activity (“...*compatible with the role, function and character of each zone...*”) without unreasonably compromising the amenity of living areas (“...*do not compromise community health, safety or wellbeing.*”). This is an appropriate overarching objective for the District and is consistent with the issues that have been outlined in the overview section.
- The words “*role, function and character*” suitably identify the key attributes of the zones that should not be compromised. The words “*health, safety and wellbeing*” do the same for the values of people that are to be protected. We note that “*safety*” is not really of any consideration in comparison to the main “*health and wellbeing*” aspects of the Plan⁴. We recommend “*safety*” is removed from the objective.
- The objective states noise should be “...*compatible with the role, function and character of each zone...*”. While noise effects *within* zones is important, noise *between* zones is often more important. Consideration should be given to stating “...*compatible with the role, function and character of all zones...*”
- The objective refers to “***community health, safety and wellbeing***”. Noise can affect individuals and communities, and consideration could be given to extending this to “***people and communities***”.

We therefore recommend the following revised objective is considered by FNDC:

NOISE-01	Noise levels are compatible with the role, function and character of all zones and do not compromise the health and wellbeing of people and communities.
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⁴ “Safety”, with regard to noise, really only relates to the requirement for heavy industrial noise sources not to generate noise levels that could damage hearing. This is normally an internal issue that is covered by separate legislation.

4.2.2 NOISE-O2

NOISE-O2: New noise sensitive activities are designed and/or located to minimise conflict and reverse sensitivity effects.

- The objective intends to ensure that reverse sensitivity effects are minimised. The objective states that “...noise sensitive activities are designed **and/or located** to minimise conflict and reverse sensitivity effects...”. It is our understanding that FNDC intend for *Mixed Use* and *Light Industrial* zones to allow for dwellings to be located in the same zone as business activities. In our opinion, the use of the words “and/or” may add ambiguity to what is to be achieved by the objective.
- Our view is that the NOISE-O2 objective reads more like a policy (one directed at requiring façade sound insulation). The objective could be revised to be broader in its scope to more accurately reflect the overarching objective of the Plan, rather than the specific need for sound insulation. The following is an objective that we have recommended in previous District Plan noise revisions:

“Activities that seek a high level of acoustic and vibration amenity do not unduly compromise the ability of other activities to operate.”

Such a revised objective would provide licence for the District Plan policies and rules to implement the necessary façade sound insulation measures within *Mixed Use* and *Light Industrial* zone. It also provides a clear objective that decision makers can reference if an application for a non-complying activity is likely to “*compromise the ability of other activities to operate*”.

We therefore recommend the following revised objective is considered by FNDC:

NOISE-O2	Activities that seek a high level of acoustic amenity do not unduly compromise the ability of other activities to operate.
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4.2.3 Further considerations

We note that no specific objectives are provided with regard to the following:

- Providing for the cultural and training needs of the community. Such an objective could be considered to give licence for temporary events that generate high levels of noise and for activities such as emergency and military training activities.

The above matter may be covered sufficiently by NOISE-O2. We have not recommended a specific draft objective on this matter, but one could be considered by FNDC. We have recommended a policy be developed. We recommend further discussion on this matter as the noise rules are further developed.

4.3 Policies

The noise policies should give direction as to how the noise objectives are to be achieved. The following policies are proposed in the Draft Noise Provisions:

FNDC Draft Policies	
NOISE-P1	New noise sensitive activities are designed and/or located to minimise conflict and reverse sensitivity effects.
NOISE-P2	Ensure noise sensitive activities proposing to locate within the Mixed Use, Light Industrial and Airport Buffer Area are located, designed, constructed and operated in a way which will minimise adverse noise on community health, safety and wellbeing by having regard to:

	<ul style="list-style-type: none"> a. any existing noise generating activities and the level of noise that will be received within any noise sensitive building; b. the primary purpose and the frequency of use of the activity; c. the ability to design and construct buildings accommodating noise sensitive activities with sound insulation and/or other mitigation measures to ensure the level of noise received within the building is minimised particularly at night.
NOISE-P3	<p>Ensure noise effects generated by an activity are of a type, scale and level that are appropriate for the predominant role, function and character of the receiving environment by having regard to:</p> <ul style="list-style-type: none"> a. type, scale and location of the activity in relation to any noise sensitive activities; b. hours of operation and duration of activity; c. the temporary or permanent nature of any adverse effects; <p>the ability to internalise and/or minimise any conflict with adjacent activities.</p>

The above draft policies are not particularly direct and focussed. Rather than stating exactly what the rules are required to achieve, the noise policies instead read like the matters of discretion that would normally be given to a resource consent. This may be intentional. However, it is our view that the policies should be made more direct. Legal advice may assist to clarify the risks and benefits of each approach.

Our comments on each policy follows.

4.3.1 NOISE-P1

NOISE-P1 New noise sensitive activities are designed and/or located to minimise conflict and reverse sensitivity effects.

- NOISE-P1 reads exactly the same as the proposed objective NOISE-O2. We do not recommend the policy simply restates an objective. Note however, we have recommended a change to the objective (refer previous section) and, if our recommended objectives are adopted, this policy would no longer be a restatement of the objective.
- We recommend that the word “conflict” is removed from the policy. The key matter is reverse sensitivity effects which is already stated. The use of the word “conflict” could be misinterpreted. If it is desired to retain the word, an option would be to state “...conflicting land use...” rather than “...conflict...”
- This policy should implement the overarching objective (via the rules). Our recommended objective (NOISE-O2) aims to avoid noise sensitive activities constraining important economic activity. The practical implication of this objective is that dwellings (and other noise sensitive activities) need to be sound insulated if they are to be located in noisy areas. **We recommend a simple, direct policy that states this.**
- The policy states that new noise sensitive activities should be “designed” or “located” or “designed AND located” in such a way that conflict and reverse sensitivity effects are minimised. In our view, the key matter is that noise sensitive activities are located in zones (or areas) with suitable permitted noise levels, OR if not then they are appropriately designed. We understand that FNDC proposes to allow dwellings within the *Mixed Use* and *Light Industrial* zones if suitable façade sound insulation requirements are met. If the policy is kept, it may be able to be strengthened by simply stating “...noise sensitive activities are designed **or** located to minimise reverse sensitivity effects”.

- Note that the policy as written would suggest that the reverse sensitivity requirements recommended by NZTA should be written into the District Plan. If there is concern about this matter than the policy should potentially give regard to the potential costs.

Based on the above, we recommend the following revised policy is considered by FNDC:

NOISE-P1	To set noise rules that reflect the role and function of each zone while providing for the character and amenity values of each zone.
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4.3.2 NOISE-P2

NOISE-P2 Ensure noise sensitive activities proposing to locate within the Mixed Use, Light Industrial and Airport Buffer Area are located, designed, constructed and operated in a way which will minimise adverse noise on community health, safety and wellbeing by having regard to:

- a. ***any existing noise generating activities and the level of noise that will be received within any noise sensitive building;***
 - b. ***the primary purpose and the frequency of use of the activity;***
 - c. ***the ability to design and construct buildings accommodating noise sensitive activities with sound insulation and/or other mitigation measures to ensure the level of noise received within the building is minimised particularly at night.***
- NOISE-P2 appears to be dealing with the same issue as NOISE-P1. We consider that NOISE-P1 and P2 should be combined and simplified to achieve an equivalent or better outcome.
 - This policy references only specific zones and buffer areas (“...Mixed Use, Light Industrial and Airport Buffer Area...”). Although these are currently the zones where sound insulation is anticipated, consideration should be given to whether this policy could be less specific in referencing and more direct in outcome. The key matter that is to be achieved by this policy is that dwellings and other noise sensitive activities need to be sound insulated if they are to be located in noisy areas. **We recommend a simple, direct policy that states this.**
 - Should the policy not be redrafted, the following is noted:
 - o The requirement that noise sensitive activities are “...**located, designed, constructed and operated to minimise adverse noise...**” suggests that the noise section has control over location and operation of the activity within these zones. Noise rules typically deal with the requirement to *design* dwellings to achieve suitable internal noise levels. The other matters are normally beyond the scope of the noise rules (but maybe within the scope of other parts of the District Plan).
 - o The policy intends to “...**minimise adverse noise on community health, safety and wellbeing...**”. As with the objective, consideration could be given to stating this as “...**minimise adverse noise on the health and wellbeing of people and communities.**”.
 - o The policy requires that the District Plan has regard to “**the primary purpose and the frequency of use of the activity;**”. This is ambiguous: it is not clear whether regard needs to be had to the primary purpose and the frequency of use of the *noise sensitive activity* or the *noise generating activity*. If it is in reference to the *noise sensitive activity*, it is not clear why these matters need to be considered given that the activity is already defined as “noise sensitive”.
 - o The policy gives regard to “**the ability to design and construct buildings accommodating noise sensitive activities with sound insulation and/or other mitigation measures to ensure the level of noise received within the building is minimised particularly at night**”. Note the following:

- The intention of this policy is not to “minimise” noise, but to require practicable solutions to be implemented to ensure noise will be “generally acceptable” within noise sensitive activities in high noise areas⁵.
- We consider that the above clause should give regard to sound insulation and any required ventilation / cooling and not necessarily “...other mitigation measures...”.
- We also consider that the statement “*particularly at night*” is unnecessary and could be problematic⁶. The words can be left out of the policy without creating potential problems.

We therefore recommend the following revised policy is considered by FNDC: Note that this policy also includes a statement with regard to primary production activities (i.e. those in Rural Production zones)

NOISE-P4	<p>To avoid or mitigate reverse sensitivity effects by:</p> <ul style="list-style-type: none"> • Requiring noise sensitive activities to be appropriately located or designed. • Requiring high-noise generating activities to be located in zones that are suitable for the level of noise that will be generated. • Using methods such as noise control boundaries, buffer areas or building setbacks to protect existing or future high-noise generating activities. • Providing provisions that acknowledge the seasonal characteristics and transitory periods of noise generation from primary production activities.
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4.3.3 NOISE-P3

NOISE-P3 Ensure noise effects generated by an activity are of a type, scale and level that are appropriate for the predominant role, function and character of the receiving environment by having regard to:

- a. type, scale and location of the activity in relation to any noise sensitive activities;***
 - b. hours of operation and duration of activity;***
 - c. the temporary or permanent nature of any adverse effects;***
 - d. the ability to internalise and/or minimise any conflict with adjacent activities.***
- NOISE-P3 is the first policy that sets out how noise within zones must be made suitable for the intended amenity or function of each zone. This is an important policy as it is the main policy that would form the threshold test for non-complying activities gaining resource consent. As previously discussed, **we recommend the policy is made more direct.**
 - This policy(s) should give effect to the objective that states: “*noise levels are compatible with the role, function and character of all zones and do not compromise the health and wellbeing of people and communities.*” The key matters that the policy should state are that:

⁵ It is important to understand that providing façade sound insulation to dwellings in *Mixed Use* and *Industrial Areas* will not result in residents having the same level of amenity as they would if they lived in a living zone. The intention of the minimum sound insulation provisions of the District Plan is not to “minimise” noise, but rather to make it broadly acceptable for habitation. Residents of these areas may still be affected by noise at times.

⁶ Noise effects within dwellings in industrial areas may be more likely to arise during the daytime as most light industrial activities do not operate 24 hours per day. Other noise sensitive activities, such as schools or kindergartens, also are more sensitive during the day when they are operational, rather than at night.

- o That noise limits set within zones enable the envisaged activities to operate without adversely affecting the required amenity of the zone.
- o Ensuring that activities are located in zones that are compatible with the level of noise generated (or conversely that activities that generate high noise levels are not located in zones sensitive to noise).
- o Providing specific noise limits for activities that are not well regulated by normal zone standards (e.g. construction noise, wind turbines, bird scaring devices).

We therefore recommend the following revised policies is considered by FNDC:

NOISE-P2	To set activity specific rules where the zone rules do not adequately provide for an anticipated activity.
NOISE-P3	To ensure noise generated by an activity within a noise sensitive zone is suitably mitigated on-site to ensure that the character and amenity values of the zone are maintained.

4.3.4 Further considerations

We note that no specific policies are provided on the following matters. We recommend Council consider if these are required:

- Providing for periods of higher noise from public festivals and community events. Such a policy should recognise that these can generate transient noise effects, but that the infrequent nature of the events and benefits to the public can allow normal zone rules to be exceeded.

NOISE-P5	To set noise rules which recognise the value of public activities that may generate periods of high noise while still having regard to public and private amenity values.
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4.3.5 Recommended Policies

All recommended Policies are set out below:

Recommended Policies	
NOISE-P1	To set noise rules that reflect the role and function of each zone while providing for the character and amenity values of each zone.
NOISE-P2	To set activity specific rules where the zone rules do not adequately provide for an anticipated activity.
NOISE-P3	To ensure noise generated by an activity within a noise sensitive zone is suitably mitigated on-site to ensure that the character and amenity values of the zone are maintained.
NOISE-P4	To avoid or mitigate reverse sensitivity effects by: <ul style="list-style-type: none"> • Requiring noise sensitive activities to be appropriately located or designed. • Requiring high-noise generating activities to be located in zones that are suitable for the level of noise that will be generated. • Using methods such as noise control boundaries, buffer areas or building setbacks to protect existing or future high-noise generating activities. • Providing provisions that acknowledge the seasonal characteristics and transitory periods of noise generation from primary production activities.
NOISE-P5	To set noise rules which recognise the value of public activities that may generate periods of high noise while still having regard to public and private amenity values.

5.0 ENVIRONMENTAL NOISE CRITERIA

When considering appropriate noise rules for activities in Districts, we typically consider the following Standards and guidelines. This section does not contain a full summary of all standards and guidelines that have been considered in our review, it provides only a brief overview of the main documents.

5.1 NZS6802:2008

This standard is referred to in the *Mandatory Directions* of the National Planning Standards. Section 8 of the standard provides recommendations for environmental noise limits. However, the National Planning Standards do not explicitly require Section 8 of the standard to be implemented within District Plans. Nevertheless, this section of the standard provides useful guidance on environmental noise limits that could be appropriate for some of the zones proposed in the Far North District.

NZS6802:2008 provides the following “*Guideline Residential [and Rural] Upper Noise Limits*”

Daytime:	55 dB $L_{Aeq(15 \text{ min})}$
Evening:	50 dB $L_{Aeq(15 \text{ min})}$
Night:	45 dB $L_{Aeq(15 \text{ min})}$ and 75 dB L_{AFmax}

The standard is clear that these are provided only as guidelines and that District Councils should set their own limits and to make them “*more or less stringent to suit their needs*”. The standard recommends that more stringent outdoor limits be set “*...only after an assessment has been made of the expected health and amenity benefits of the increased levels of protection alongside the possible restrictions placed on affected activities*”.

The standard suggests that these limits be applied within the **notional boundary** of rural dwellings. The standard provides a clear recommendation that the use of a legal boundary assessment location should not be used “*where lot sizes are large and settlement density is low*”. This has direct application to the FNDC plan Draft Noise Chapter. We will recommend in this report that **site boundary** assessment positions are used in all *Industrial, Residential, Mixed Use and Open Space* zones whereas **notional boundary** assessment positions are used in all *Rural* zones, including *Māori Purpose* and *Horticulture*.

The standard provides guidelines for other zones. These are:

- For *Heavy Industrial* zones noise limits of up to 75 dB L_{Aeq} ⁷ may be appropriate.
- For *Town Centres* or *Mixed-Use* zones noise limits of up to 60 dB L_{Aeq} are appropriate during the day for the protection of amenity values for the character of a *Mixed Use* area⁸. The standard suggests varying night-time noise limits depending on whether the *Mixed Use* area contains **no noise sensitive activity** (60 dB L_{Aeq} and 85 dB L_{AFmax}) or **existing uninsulated noise sensitive activity** (45 dB L_{Aeq} and 75 dB L_{AFmax}). The standard notes that night-time noise limits of 45 dB L_{Aeq} would potentially restrict night-time bar and resultant noise.

NZS6802:2008 recommends that if noise needs to be assessed indoors, the guideline noise levels in Australian/New Zealand Standard AS/NZS 2107:2016 “*Acoustics - Recommended design sound levels and reverberation times for building interiors*” are referred to. This report summarises that standard.

⁷ The standard notes that “*no noise limits*” could be appropriate in some cases. The standard implies that the recommended noise limit of 75 dB L_{Aeq} provides for situation where industrial zones contain administration areas.

⁸ The standard states that within *Town Centers* and *Mixed Use* zones “*it can be challenging to define noise limits that enable the fulfilment of the objectives of the areas and zones while also protecting people’s health and amenity values*”.

5.2 World Health Organisation

The 1999 World Health Organisation (WHO) Guidelines on Community Noise state that during the daytime, few people are “seriously annoyed” by external noise levels of less than **55 dB L_{Aeq} (16 hour)** with few people “moderately annoyed” by noise levels of less than **50 dB L_{Aeq} (16 hour)**. These guidelines suggest that to ensure sleep disturbance does not arise, noise levels should be no greater than **45 dB L_{Aeq} (8 hour)** and **60 dB L_{AFmax}⁹** outside dwellings.

The WHO also publish other documents including the “*Night Noise Guidelines for Europe*”. This document provides more in-depth discussion on the long-term exposure effects of night-time noise on sleep, health and wellbeing. The research states that “biological effects” can be observed when night-time noise levels outside dwellings (**averaged over a year**) range from 30 dB (the “*no observed effect level*”) to above 55 dB (“*increasingly dangerous to public health*”). The research summarises that an average yearly noise level of **40 dB L_{Aeq}** outside dwellings represents the “*lowest observed adverse noise effects level*” for night-time noise. This research is most applicable to noise from urban noise sources such as road traffic or aircraft and care needs to be taken in applying its conclusions to noise from other sources in the Far North, such as transient rural or industrial activity. Nevertheless, the guidelines are useful with regard to the proposed objective which aims to “...not compromise the health and wellbeing of people and communities.”¹⁰

5.3 AS/NZS2107:2016

NZS6802:2008 recommends that AS/NZS2107:2016 *Acoustics—Recommended design sound levels and reverberation times for building interiors* be used when considering acceptable noise levels within dwellings. This recommendation is applicable for the Far North District, as it is proposed to allow dwellings within *Mixed Use* and *Light Industrial* zones. In these zones, consideration is required of what an acceptable internal noise level is.

AS/NZS2107:2016 provides recommendations on a wide range of types of occupancies or activities. The most relevant to the Far North District are summarised below:

Table 1: AS/NZS2107 Guidelines on Sensitive Spaces relevant to FNDC

Type of Occupancy / Activity	Design Noise Level dB L _{Aeq}
Houses and apartments in inner city areas	
- Living areas	35 to 45
- Sleeping Areas	35 to 40
Houses and apartments in suburban areas	
- Living areas	30 to 40
- Sleeping Areas	30 to 35
Houses and apartments in rural areas (sleeping areas)	
	25 to 30

⁹ The L_{AFmax} noise limit in NZS6802:2008 is significantly higher than that recommended by the WHO. The WHO guidelines are based on setting limits to achieve 45 dB L_{AFmax} inside bedrooms at night to provide a high level of protection from sleep disturbance. These guidelines are widely regarded as aspirational, unreasonably stringent and not necessarily representative of noise that is likely to be typically received in residential environments.

¹⁰ The WHO has also recently released guidelines on population noise exposure to environmental noise. These guidelines provide the evidence base and health outcomes for noise from sources such as road, railway, aircraft, wind turbine and leisure noise. As with the “*Night Noise Guidelines for Europe*”, the guidelines do not specifically relate to general human and business activity within zones and some care needs to be taken in applying the conclusions to noise from sources within zones in the Far North.

Type of Occupancy / Activity	Design Noise Level dB L _{Aeq}
Health Buildings	
- Wards	35 to 40
- Practice areas	40 to 50*
Educational Buildings	
- Teaching spaces	35 to 45
- Lecture theatres, assembly halls and performance spaces	30 to 40

* Typical range, not all practice areas fall within this range

In summary, night time noise levels of 30 dB L_{Aeq} in sleeping areas provide for an acceptable environment for sleep. We recommend that this is used as a general design criterion to provide a good internal noise environment. For living areas, a daytime noise level of 40 dB L_{Aeq} is considered to be an acceptable design target in *Mixed Use or Industrial* zones. These values will form our recommendations for noise inside sensitive spaces as those set out in the table above, in these zones.

6.0 ZONE NOISE LIMIT REVIEW

The following sections discuss the proposed Draft Noise Chapter and contain our recommendations for each zone or activity. A mark-up of the proposed zone noise limits is contained in Appendix A.

6.1 Residential Zone

The relevant description and character of this zone as provided by FNDC is: “*Areas used predominantly for residential activities with a mix of building types, and other compatible activities*”.

We expect that *Residential* zones will consist typically of smaller allotments where neighbours will be in closer proximity to each other than they may be elsewhere. We expect that other uses of the zone could include homebased businesses, childcare centres and small retail outlets.

6.1.1 Operative Noise Limits

The existing noise rules contained in the District Plan for *Residential* zones are:

- 50 dB L_{A10} during the daytime¹¹
- 45 dB L_{A10} and 70 dB L_{AFmax} during the night-time.

The operative noise limits are applied within the site boundary.

We consider these noise limits to be relatively conservative during the daytime, but more permissive at night.

¹¹ Note that in this report “daytime” refers to 0700 to 2200 hours and “night-time” refers to 2200 to 0700 hours unless stated otherwise

6.1.2 Draft Noise Provisions

The following is proposed by FNDC in the Draft Noise Chapter:

Effects Standards		
NOISE-S1	Maximum noise levels – Zone specific	
(1) Residential Zones	<ol style="list-style-type: none"> 1. Noise generated by any activity shall not exceed the following noise limits at any point within any other site in the residential zones: <ol style="list-style-type: none"> a. 7 am to 10 pm - 50 dB L_{Aeq} (15 min) b. 10 pm to 7 am - 45 dB L_{Aeq} (15 min) c. 10 pm to 7 am - 70 dB L_{Aeq} (15 min) 	<p>Matters of discretion if compliance not achieved:</p> <ol style="list-style-type: none"> 1. Ambient noise levels and any special character of noise from any existing activities, the nature and character of any changes to the sound received at any receiving site and the degree to which such sounds are compatible with the surrounding activities. 2. Management of effects from the activities with regard to the matters set out in NOISE-P3. 3. Any mitigation of the noise proposed, in accordance with a best practicable option approach (e.g. site layout and design, design and location of structures buildings and equipment and the timing of operations). 4. The ability to mitigate adverse effects through the imposition of conditions such as noise attenuation.

6.1.3 Discussion

A low level of noise in residential areas is normally desirable, especially if the objectives of the zone are to reference matters such as “*peaceful enjoyment*” and “*reasonable level of privacy*” (as they currently do in the operative District Plan). Plan rules typically exclude some “normal” residential activity, so low noise limits do not result in constraints on residential activity (e.g. home maintenance).

It is our opinion that the proposed *daytime* 50 dB L_{Aeq} noise limit is an appropriate noise limit for the residential zone. This limit will ensure that a good level of amenity is achieved and should avoid most people becoming moderately annoyed with noise.

In our view, the proposed *night-time* 45 dB L_{Aeq} noise limit may be too high for a residential permitted standard. 45 dB L_{Aeq} is a more liberal limit, which may be appropriate in a “living zone” which is proximate to noise sources in a central urban area or in a busy rural area. We consider that it is potentially less appropriate for the bulk of residential zones in the Far North, which are typically well removed from noise sources such as bars, food outlets and night-time service outlets. **Instead we recommend that the night-time noise limit is set at 40 dB L_{Aeq} .** The proposed 70 dB L_{AFmax} noise limit should remain.

Our recommended limits are more in line with what will provide a relatively high level of amenity through the District’s *Residential* zones. The limits are typical of many other District Plans and will allow for typical residential activities to occur in the zone without breaching the rule. Our

recommended noise rules do not mean that noise levels that are higher will necessarily have adverse effects on residential amenity. However, it is considered that if a non-residential activity wanted to create noise that was higher than the proposed limit, the onus would be on the applicant to demonstrate this was acceptable in a resource consent application.

We recommend that the noise limits continue to be applied within the **site boundary** in residential zones. This is appropriate as residential sites tend to be small allotments where the majority is used for “residential living”. It is typical for *residential* landowners to use their entire property for the purpose of relaxation (at times). For this reason, a site boundary noise rule is appropriate, as it provides the required level of protection to the entire property.

Note that the above rules would not generally allow for medium to large childcare centres to establish in *Residential* environments as permitted activities. It is noted that childcare centres may be quite acceptable where they exceed the above noise rules; however, it is considered appropriate to assess this on a case-by-case basis. Other activities, such as small home-based businesses, may more easily comply with the proposed noise limits.

We also note that these noise limits should not apply to typical residential activities such as mowing lawns, handywork, and entertaining. These noise sources may exceed the proposed noise limits at times, however, people in a residential environment can expect noise from neighbouring sites.

Our recommended wording is set out in 0.

6.2 Rural Living, Rural Production, Rural Lifestyle, Rural Settlement, Māori Purpose Zone, Horticulture Zone

Many of these zones do not exist under the Operative District Plan. The main rural zones that exist within the Operative District Plan are *Rural Living* and *Rural Production*.

The relevant description and character of these zones as provided by FNDC are set out below. We have included our notes on the use and amenity required in each zone

Zone	Description/ Characteristics	Typical Issues
Rural Production	<p>Areas used predominantly for primary production activities that rely on the productive nature of the land and intensive indoor primary production. The zone may also be used for a range of activities that support primary production activities, including associated rural industry, and other activities that require a rural location.</p> <p>This will cover most off the district and therefore will have a wide range of activities enabled or provided for, however, its main purpose is still to support primary production activities.</p>	<p>These environments have periods where ambient and background noise levels are low. However, they can be subject to periods of high noise from farming and horticulture activity at times. It is typical for District Plan noise rules to ‘aim to protect the productive nature of Rural Production zones’ even if this causes reduced amenity for people who live there.</p> <p>Residents in the zone need to be reasonably protected from ‘non-rural production’ activity that may wish to locate in these zones. Examples include industrial manufacturing activity locating on <i>Rural Production</i> sites, especially where 24-hour operation is sought.</p>

Zone	Description/ Characteristics	Typical Issues
Rural Lifestyle	<p>Areas used predominantly for a residential lifestyle within a rural environment on lots smaller than those of the general rural and rural production zones, while still enabling primary production to occur.</p> <p>Provides for residential activities and still enable primary production such as calf rearing, or horticulture which does not require as much land.</p>	<p>These environments require the flexibility to carry out noisy rural work and residents should normally expect to receive some noise at times, especially during the day. However as this is also a living zone, there is typically an expectation that residents will be protected from ongoing noise effects. The noise rules should balance the required use of the zone with the amenity of the area.</p>
Rural Living	<p>Areas located on the fringe of existing Residential/Urban zoned areas that provide a transition to the Rural Production zones. Used for a range of larger lot residential development, with some areas used for productive purposes.</p>	<p>The issues are similar to the <i>Rural Lifestyle</i> zone, however residents will likely have a greater expectation of daytime amenity. As lot sizes are typically smaller and all the land is often used for living purposes, site boundary OR notional boundary noise limits can work well. We expect there will be less need to provide for higher noise activities in this zone.</p>
Rural Settlement	<p>Areas used predominantly for a cluster of residential, commercial, light industrial and/or community activities that are located in rural areas or coastal environments.</p>	<p>These zones require a balance to be struck between the amenity of residents and the ability to carry out commercial and <i>Light Industrial</i> work nearby. Such zones inevitably require compromise between landusers and conflict may arise. Noise rules that protect industrial activity are potentially problematic for residents and, conversely, noise rules that protect the amenity of residents may mean that industrial activity is constrained.</p>
Māori Purpose	<p>Provides for the use and development of ancestral Māori land administered under Te Ture Whenua Māori. It provides for the use and development of Māori land which can support the social, cultural and economic aspirations of tangata whenua and enables a range of activities which reflect Māori customs and values, while enabling tangata whenua to exercise kaitiakitanga.</p>	<p>These zones are likely to include dwellings and potentially businesses operating within the zone. Noise sensitive activities such as hui (meetings) can be envisaged. The land may be located in rural areas, near rural production zones.</p> <p>It is expected that the land would need to first and foremost protect the amenity of the residents, with some provision given to the productive and business use of the land.</p>
Horticulture Zone	<p>Areas used predominantly for horticulture primary production activities, which still allows other primary production activities to occur. It relies on the productive nature of the land. The zone may also be used for a range of activities that support horticulture production activities, such as packhouses, workers accommodation and manufacture or retail of products grown on site.</p>	<p>These zones are considered to have the same issues are <i>Rural Production</i> zones. These zones are likely to require provision for specific activities such as bird scaring devices.</p>

6.2.1 Draft Noise Provisions

The Draft Noise Provisions contains the following noise limits for the above zones:

NOISE-S1	Maximum noise levels – Zone specific	
(2)	1. Noise generated by any activity shall not exceed the following noise limits at any point within the boundary of any Rural Production Zone and/or Horticulture Zone site:	Matters of discretion if compliance not achieved: <ol style="list-style-type: none"> 1. Ambient noise levels. 2. Management of effects from the activities with regard to the matters set out in NOISE-P3. 3. Any mitigation of the noise proposed, in accordance with a best practicable option (e.g. site layout and design, design and location of structures, buildings and equipment and the timing of operations). 4. The ability to mitigate adverse effects through the imposition of conditions such as noise attenuation.
Rural Living Zone		
Rural Production Zone	a. All times - 55 dB $L_{Aeq}(15min)$	
Rural Lifestyle Zone	2. Noise generated by any activity shall not exceed the following noise limits at any point within the notional boundary of any residential unit in the Rural Production Zone and / or Horticulture Zone, or at any point within a site in the Rural Living Zone, Rural Lifestyle Zone, Rural Settlement Zone and/or Māori Purpose Zone:	
Rural Settlement Zone	a. 7 am to 10 pm - 50 dB $L_{Aeq}(15 min)$	
Māori Purpose Zone	b. 10 pm to 7am - 40 dB $L_{Aeq}(15 min)$	
Horticulture Zone	c. 10 pm to 7 am - 70 dB L_{Amax}	

The following sections address each zone in turn

6.2.2 Rural Production and Horticultural Zones

Operative Noise Limits (Rural Production)

The existing Operative District Plan noise rules for *Rural Production* environments are:

- 65 dB L_{A10} during the daytime
- 45 dB L_{A10} and 70 dB L_{AFmax} during the night-time.

The operative noise limits for the *Rural Production* zone are applied within at the “**site boundary of any other site in this zone**”¹². These noise rules are problematic as they allow high daytime noise levels to occur at the site boundary during the daytime. Often, the site boundary is an arbitrary location for potential noise effects on adjacent Rural Production sites. The way the Operative District Plan rules are drafted mean they can permit inappropriately high noise levels near dwellings (where site boundaries are close to dwellings, but far from the noise source). Alternatively, the site boundary noise control can result in overly restrictive noise limits (where site boundaries are close to the noise source, but far from any dwellings).

We recommend that the proposed plan change aims to resolve this issue. As discussed earlier, we consider that the best practice is to apply appropriate noise limits at the **notional boundary** of *Rural Production* zones.

¹² Note that the noise measurement assessment location is not particularly well drafted in the operative planning rule. It results in noise emitted from the *Rural Production* zone being assessed at the notional boundary of most rural and coastal zones, but at the site boundary of *Rural Production* zones

Draft Noise Limits (Rural Production and Horticulture)

The Draft Noise Chapter apply a site boundary AND a notional boundary noise limit to activity occurring in the Rural Production and Horticulture zones. **This is not recommended.** Applying a boundary and notional boundary noise limits will have the following effect:

- It will create an arbitrary and fairly stringent control on activity occurring on these sites. That may mean that farming or horticultural activity could technically not occur close to boundaries, even if there are no dwellings nearby
- It will increase assessment and compliance costs without providing any appreciable benefit to the environment.
- It will worsen (rather than resolve) the situation than already exists in the Operative Plan.

Proposed Noise Limits (Rural Production and Horticulture)

It is recommended that a suitable noise limit is applied at the notional boundary only within the Rural Production and Horticulture zones.

When considering appropriate numerical noise levels for these zones, it is typical to consider rural and horticultural environments primarily as “industrial areas” where the primary focus of the land use is for the production of goods. While people do live in these zones and require a certain level of amenity, the use of the land for production must be preserved. Rural areas may at times have very low background noise levels however activities occurring on rural land can be noisy during day and night. In order to provide for the efficient use of the land a noise rule that is well above the background noise level is generally considered appropriate.

One way of dealing with this issue is to exclude **limited duration agricultural, horticultural and forestry activities** from compliance with the zone noise limits¹³. This has been proposed in the Draft Noise Chapter. The effect of this exclusion is that it allows a more stringent limit to be applied to other “non-rural” and permanent activities.

Rural noise can arise from fixed plant such as generators and irrigation pumps. Noise from such static sources is much more readily controlled and can normally be located to comply with the relevant District Plan noise limits. This is not generally the case for mobile plant. For this reason, it is recommended that mobile plant be exempted from the noise rules, but not permanently fixed plant¹⁴.

It is recommended that during the daytime a noise limit of **55 dB L_{Aeq}** be applied **within the notional boundary**. This allows for permanent and fixed rural and horticultural plant to operate with relatively few restrictions. This more lenient limit favours rural and horticultural activity over amenity during the daytime.

During the night period, it is considered that the **proposed 40 dB L_{Aeq}** noise limit provides for a good level of amenity for the zones. Rural and horticultural activity does not *normally* occur at night, and the proposed exclusion of mobile plant would provide for many night works regardless (e.g. harvesting, milking, early feeding).

¹³ These sources would still be required to meet the duties imposed by Section 16 of the RMA.

¹⁴ An alternative approach to the above would be to allow for liberal noise limits during the daytime that would also apply to mobile plant in farming and forestry. Either approach has merits; however, we favour excluding mobile machinery used for a limited duration as part of agricultural or horticultural activities together with lower night-time noise limits. This maintains a more stringent approach to non-rural and permanent rural activities during the night-time.

It is recommended that the proposed night-time noise limit of **70 dB L_{AFmax}** be adopted. This will ensure there is only a low risk of sleep disturbance.

We recommend that an activity specific noise rule for bird scaring devices and frost fans is also provided.

Our recommended wording is set out in 0.

6.2.3 Rural Living and Rural Lifestyle zone

Operative Noise Limits (Rural Living)

The existing noise rules contained in the operative District Plan for *Rural Living* environments are:

- 55 dB L_{A10} during the daytime
- 45 dB L_{A10} and 70 dB L_{AFmax} during the night-time.

These noise levels are to be measured “at or within” the site boundary of *Rural Living* properties but at or within the notional boundary of *other rural zones*. The way the Operative Plan applies noise limits is inconsistent and this should be rectified.

The existing noise rules are potentially more permissive than what would normally be expected in rural living zones where a high standard of amenity is expected.

Draft Noise Limits (Rural Living and Rural Lifestyle)

The proposed noise limits in the Draft Noise Chapter for these zones are as follows:

- 50 dB L_{Aeq} during the daytime
- 40 dB L_{Aeq} and 70 dB L_{AFmax} during the night-time.

These noise limits are proposed to be applied within the notional boundary of dwellings within the *Rural Production* zone and / or *Horticulture* zone or within the site boundary of *Rural Living* zone, *Rural Lifestyle* zone, *Rural Settlement* zone and/or *Māori Purpose* zone.

Recommended Noise Limits (Rural Living and Rural Lifestyle)

Our recommendation is that a notional boundary approach should be used in all zones.

The draft noise limits will provide for a good level of amenity. They represent slightly more stringent noise limits than currently apply in the *Rural Living* zone however we consider this appropriate. We recommend the draft noise limits are adopted for the *Rural Living* zone.

For the *Rural Lifestyle* zones, it may be appropriate to provide a higher daytime noise limit of 55 dB L_{Aeq}, especially if mobile farm and harvesting machinery is only excluded within the more productive Rural zones. The decision to apply a **50 dB L_{eq}** or **55 dB L_{eq}** daytime limit could rest on whether the zone is to favour the amenity of residents or the productive capacity of the land and the ability of it to be used for business purposes. If a neutral weighting is proposed between these purposes, we favour the noise limit of 55 dB L_{Aeq} on the basis that *Rural Lifestyle* land will likely form a buffer between *Rural Living* and *Rural Production*.

The **40 dB L_{Aeq}** and **70 dB L_{AFmax}** noise limits should be retained at night in both zones to provide a good level of amenity for sleep.

Our recommended wording is set out in 0.

6.2.4 Māori Purpose Zone

The *Māori Purpose* Zone could be treated in the same way as either the *Rural Living* or *Rural Lifestyle* zone. If the primary purpose of this land is likely to be for living and cultural purposes, we would recommend similar noise limits as recommended for the *Rural Living* zone. If some sites within the

Māori Purpose Zone are likely to be used for productive or small business purposes, noise limits similar to the *Rural Lifestyle zone* are recommended.

We have drafted the rules with the latter approach in mind, but this should be reviewed by Council, possibly through consultation. Our recommended wording is set out in 0.

6.2.5 Rural Settlement Zone

The *Rural Settlement* zone appears to be intended as a kind of ‘rural mixed-use’ zone. In order to provide for an appropriate level of residential amenity together with the highest level of commercial activity within this zone, the following noise limits are recommended:

- 55 dB L_{Aeq} during the daytime
- 45 dB L_{Aeq} and 75 dB L_{AFmax} during the night-time.

These noise levels will be acceptable for residential land use and will permit some level of business and commercial activity. However, these noise levels **will likely constrain light industrial type activity within the zone**. To avoid these constraints would require higher noise limits to be set. However, allowing for daytime noise levels of 60 dB L_{Aeq} (or higher) without requiring new dwellings to be sound insulated could potentially result in poor levels of residential amenity. Without sound insulation measures, it is typically not possible to provide noise limits that allow busy light industrial type activity to operate without constraints while simultaneously providing for an acceptable level of residential amenity.

This matter may require FNDC to further consider what the main purpose of the zone is and what activities should be permitted within the *Rural Settlement* zones. If this is proposed as a true mixed-use business zone with possibility of future development, it may be appropriate to apply higher daytime noise limits with the requirement that new dwellings sound insulate their living and sleeping areas. If these zones will potentially introduce more *Industrial* type activity to areas which are current developed as residential areas, we recommend that noise levels are no higher than set out above.

6.3 Business Zones

The Operative District Plan contains *Commercial* and *Industrial* zones. The proposed District Plan would replace these with *Mixed Use*, *Light Industrial* and *Heavy Industrial* zones.

The relevant description and character of these zones as provided by FNDC are set out below. We have included our notes on the use and amenity required in each zone

Zone	FNDC Description/ Characteristics	Typical Issues
Mixed Use	<p>Areas used predominantly for a compatible mixture of residential, commercial, light industrial, recreational and/or community activities.</p> <p>The Mixed Use zone framework is designed to provide for commercial, community, civic and residential activities to co-exist. It enables a range of compatible activities with a focus on urban vitalisation and vibrancy.</p>	<p>Mixed use zones are inevitably a compromise between allowing for business activity to occur and providing a reasonable standard of amenity within dwellings. For mixed use zones to function adequately, residents cannot expect to receive the same level of acoustic amenity than they would in residential zones. This is especially true in outdoor living spaces where noise cannot be controlled as easily.</p> <p>It does not appear that the proposed District Plan will provide a Commercial zone. We assume that this will mean that urban commercial centres (e.g. as Kaikohe, Kerikeri, Kaitaia, Kaeo) may be predominantly zoned <i>Mixed Use</i>. Care needs to be taken that providing for residential activities in these spaces does not constrain the ability for businesses to operate. Commercial activities also</p>

Zone	FNDC Description/ Characteristics	Typical Issues
		<p>require some level of acoustic amenity as these environments are where many people spend a significant portion of their day.</p> <p>In order to avoid reverse sensitivity effects (as far as possible), dwellings and other noise sensitive uses within <i>Mixed Use</i> zones should be required to be adequately sound insulated, cooled and ventilated to ensure that residents can obtain respite from noise.</p>
<p>Light Industrial</p>	<p>Areas used predominantly for a range of industrial and associated activities with adverse effects (such as noise, odour, dust, fumes and smoke) that are reasonable to residential activities sensitive to these effects.</p> <p>Activities within this zone may include light manufacturing, contractor depots, automotive and marine repair and maintenance service industries with some compatible commercial activities.</p> <p>Compliments the Heavy Industrial zone.</p>	<p>Light industry is an essential activity to the District. It is important that suitable locations are provided for the activity that are as unconstrained as possible by sensitive land uses within and nearby.</p> <p>Light industrial noise can cause annoyance based on its level and character. The construction of standalone dwellings and apartments within these areas should typically be discouraged to avoid reverse sensitivity effects arising.</p> <p>Light industrial unit owners often wish to live above or within their businesses. These users may be less sensitive to industrial noise and may be less inclined to complain about industrial noise. If FNDC wish to permit this activity within <i>Light Industrial</i> zones, sound insulation is recommended for permanent dwellings within these sites.</p> <p>We recommend that noise from <i>Light Industrial</i> activity when received in noise sensitive zones is subject to higher noise levels than permitted within the zones themselves. This means that dwellings in (say) residential zones that are near to <i>Light Industrial</i> zones could expect to receive higher noise levels than from within the <i>Residential</i> zone</p>
<p>Heavy Industrial</p>	<p>Areas used predominantly for industrial activities that generate potentially significant adverse effects. The zone may also be used for associated activities that are compatible with the potentially significant adverse effects generated from industrial activities.</p> <p>Provides for a range of activities which contribute to the economic well being of the District.</p> <p>Provides for activities such as manufacturing, production and logistics and has limited focus on pedestrians and the provision of public space.</p>	<p>Heavy industrial processes can generate significant noise. Residential units and other noise sensitive uses should be prohibited within these zones. Heavy industrial activity often generates noise levels over adjacent sites that are above typical District Plan noise limits for Rural or Residential landuse.</p> <p>As for <i>Light Industrial</i>, we recommend that noise from <i>Heavy Industry</i> zones received in adjacent noise sensitive zones is subject to higher noise levels than permitted within the zones themselves. We also recommend that noise sensitive zones do not abut <i>Heavy Industry</i> zones as these are likely to be incompatible (this is a matter for FNDC to consider in the zoning maps).</p>

Zone	FNDC Description/ Characteristics	Typical Issues
	Characterised by larger lot sizes that provide for large scale buildings and large outdoor storage areas.	Heavy industry activity is relatively insensitive to activity from nearby. There is normally little need for noise control between <i>Heavy Industrial</i> sites other than to require that human hearing is not damaged.

We make the following recommendations for each environment.

6.3.1 Mixed Use

Draft Noise Provisions

The Draft Noise Chapter contains the following noise limits for *Mixed Use*:

NOISE- S1	1. Maximum noise levels – Zone specific	
(3) Mixed Use Zone	<p>2. Noise generated by any activity shall not exceed the following noise limits at any point within the zone:</p> <ul style="list-style-type: none"> a. 7 am to 10 pm - 65 dB L_{Aeq} (15 min) b. 10 pm to 7 am - 55 dB L_{Aeq} (15 min) c. 10 pm to 7 am - 80 dB L_{Amax} <p>3. Noise generated by any activity shall not exceed the following limits when measured at or within the boundary of any site in the Residential Zone, Māori Purpose Zone, Rural Living Zone, Rural Production Zone, Rural Lifestyle and Rural Settlement Zone:</p> <ul style="list-style-type: none"> a. 7 am to 10 pm - 55 dB L_{Aeq} (15 min) b. 10 pm to 7 am - 45 dB L_{Aeq} (15 min) c. 10 pm to 7 am - 75 dB L_{Amax} 	<p>Matters of discretion if compliance not achieved:</p> <ul style="list-style-type: none"> 1. Ambient noise levels. 2. Management of effects from the activities with regard to the matters set out in NOISE-P3. 3. Any mitigation of the noise proposed, in accordance with best practicable option (e.g. site layout and design, design and location of structures, buildings and equipment and the timing of operations). 4. The ability to mitigate adverse effects through the imposition of conditions such as noise attenuation.

The Draft Noise Chapter would set high daytime (65 dB L_{Aeq}) and night-time (55 dB L_{Aeq}) noise limits in the *Mixed Use* zone. The draft rules favour a relatively unconstrained level of daytime retail, commercial and potentially some industrial type landuse. This would come at the expense of residential amenity, as noise levels of 65 dB L_{Aeq} during the daytime are higher than would normally be accepted by residents.

Recommended Noise Limits

Because of the potential effects on residents within the *Mixed Use* zone and in order for the zone to provide for the “**compatible mixture** of residential, commercial, light industrial, recreational and/or community activities” we recommend that the daytime noise limit is lower than proposed. The lower noise limit is unlikely to constrain most business and retail activity, however it could potentially result in a constraint on busy loading docks, busy hospitality activities and many industrial activities. The recommended lower noise limit will mean that residents in the *Mixed Use* zone can expect to receive noise levels during the daytime that will not unreasonably affect their wellbeing.

The proposed night-time noise limit may mean that late night bars and pubs may face some constraint on their operation if dwellings establish nearby¹⁵. In areas with high densities of bars and

¹⁵ A noise rule of 60 dBA would allow for bars with moderate sized outdoor areas to establish within around 30 metres from dwellings. However, a 55 dBA noise rule would require setbacks of around 60 metres (this is indicative only). Where

residential areas (e.g. Queenstown) noise complaints can be frequent and ongoing. However even relatively low-density mixed-use areas suffer from this type of conflict (e.g. Paihia). Inappropriately managed mixed-use areas are undesirable as they lead to community dissatisfaction, health effects and economic uncertainty for business owners.

The lack of a true “commercial” zone within the Far North District has the potential for the above conflicts to materialise if only “mixed use” zones are proposed for business areas. No suite of noise limits for a *Mixed Use* zone can avoid this. FNDC may wish to give consideration to providing for a Business zone where dwellings are prohibited, and noise levels are only lightly regulated.

In residential or short stay accommodation in *Mixed Use* zones, an internal noise level of 30 dB L_{Aeq} provides for a good environment for sleep at night especially if modulating low frequency sound is present. In some areas, night noise levels of 35 dB $L_{Aeq(15\ min)}$ or more inside can start to become intrusive and lead to complaints. In order for dwellings to coexist business in the *Mixed Use* environment, the external noise limit must be appropriate and suitable sound insulation requirements must be included in the plan.

In order to allow for the future *Mixed Use* development, the following is recommended:

- Reduce the **daytime** noise limit to **60 dB L_{Aeq}** .
- Keep the **night-time** noise limit to **55 dB L_{Aeq}** . No control of low frequency noise is suggested. Low frequency controls may be useful in established bar areas where high levels of bass noise are likely to occur¹⁶, however the control over low frequency would provide further complication of assessment and for that reason has not been recommended.
- If vibrant bar and restaurant noise is envisaged, consider providing an extension of the daytime period until 12pm in the environment on Friday and Saturday nights¹⁷. This provides for a higher use of hospitality activity on the main nights of trade and accepts that there will be a reduction in amenity of dwellings during those times. Conversely it restricts loud non-residential activity on the other nights of the week when residential activity is more important.
- Provide a sound insulation requirement/internal noise limit that all new residential dwellings must achieve. The sound insulation measures should aim to ensure the following **internal noise** levels are achieved:
 - o **40 dB L_{Aeq}** in living areas (during the daytime)
 - o **30 dB L_{Aeq}** in bedrooms (during the night-time)

These design targets may require new buildings to be constructed to a higher standard than would be required in residential areas. Mechanical ventilation and cooling will also be required. These matters can impose some additional costs on residential development in a *Mixed Use* zone, and this should be considered where the *Mixed Use* zone is proposed¹⁸. The additional costs need to be considered against the improved level of amenity that is provided to people as required by the District Plan objective that aims to protect “...*health and wellbeing of people and communities...*”

The above approach is considered to be an acceptable compromise where commercial, industrial and residential coexist, however it is inevitable that such controls will affect business operation to a

outdoor areas do not form part of the bar operation, the noise limits can be achieved through the provision of suitable façade sound insulation, sound locks etc.

¹⁶ Other districts such as Auckland (AUP) control low frequency noise in mixed use areas at night.

¹⁷ This was recommended in the revisions of the Whangarei District Plan.

¹⁸ Costs can only accurately be evaluated by a quantity surveyor. We are happy to discuss costs directly with FNDC if this requires further consideration.

degree. The establishment of a dedicated localised commercial zone may be a more suitable approach to avoiding inevitable mixed-use conflicts. It is recommended that this approach be considered by Council.

6.3.2 Light Industrial

Draft Noise Provisions

The *Draft Noise Chapter* contains the following noise limits for the above zones:

NOISE-S1	4. Maximum noise levels – Zone specific	
(4) Light Industrial Zone	<ol style="list-style-type: none"> 1. Noise generated by any activity shall not exceed the following noise limits at any point within the zone: <ol style="list-style-type: none"> a. All times - 65 dB L_{Aeq} (15 min) b. All times - 90 dB L_{Amax} 2. Noise generated by any activity shall not exceed the following limits when measured at or within the boundary if any site in the Residential Zone, Māori Purpose Zone, Rural Living Zone, Rural Production Zone, Rural Lifestyle and Rural Settlement Zone: <ol style="list-style-type: none"> a. 7 am to 10 pm - 55 dB L_{Aeq} (15 min) b. 10 pm to 7 am - 45 dB L_{Aeq} (15 min) a. 10 pm to 7 am - 75 dB L_{Amax} 	<p>Matters of discretion if compliance not achieved:</p> <ol style="list-style-type: none"> 1. Ambient noise levels. 2. Management of effects from the activities with regard to the matters set out in NOISE-P3. 3. Any mitigation of the noise proposed, in accordance with best practicable option (e.g. site layout and design, design and location of structures, buildings and equipment and the timing of operations). 4. The ability to mitigate adverse effects through the imposition of conditions such as noise attenuation.

The *Light Industrial* zone is understood to predominantly cater for activities such as fabrication, metal and woodwork, panelbeating and automotive repair, warehousing, construction and a wide range of other business based tasks. These tasks are typically insensitive to noise from adjacent sites, and no stringent control is required. Such activities generally operate during the day.

The *Light Industrial* zone is less appropriate for residential living than almost all other proposed zones in the District. Nevertheless, it is understood that the Far North District Council proposes to allow residential units to be established in the zone. It is important that the viability of the industrial zone be protected from the establishment of residential units.

The Draft noise limit of 65 dB L_{Aeq} at all times allows for a high level of business activity. It is likely that most manufacturing, fabrication or panel beating operations would typically comply with this limit. Such a rule would allow for joinery operations, panel beaters and other noise generating businesses which may not be appropriate in the *Mixed Use* zone.

Recommended Noise Limits

Because there is potential for residential development to occur, we recommend that the noise rule within the *Light Industrial* zone be retained at **65 dB L_{Aeq} during the day** but reduced to **60 dB L_{Aeq} and 80 dB L_{AFmax} during the night**.

If no prohibition on dwellings or other noise sensitive activities is considered appropriate by Council, it is recommended that any dwellings are required to achieve the same internal noise level as the *Mixed Use* environments (on the basis that internal noise levels will be higher than desirable at times). It is considered that this reduced level of amenity is appropriate given the generally industrial nature of the environment. It is considered that this approach strikes a balance between the needs of business operators and the amenity required by people who may choose to live in this potentially noisy area. However, it is noted that this approach does not ensure that reverse sensitivity effects would never arise.

We consider that the proposed approach of providing higher noise limits to noise from *Light Industrial* zones that is received in residential and rural zones is pragmatic and appropriate. This will mean that residents adjacent to industrial activity can expect a lower (but still acceptable) level of amenity than land owners further away. We recommend that the noise limits are applied at the appropriate location – that being the **notional boundary** of rural areas (rather than the site boundary as proposed).

If no dwellings and other noise sensitive uses are allowed in the Light Industry zone, we would recommend retaining the Draft limit of 65 dB L_{Aeq} at all times. The 90 dB L_{AFmax} could be kept, but is not essential and may not provide any necessary protection.

6.3.3 Heavy Industrial

Draft Noise Provisions

The Draft Noise Chapter contains the following noise limits for the Heavy Industrial zones

NOISE-S1	Maximum noise levels – Zone specific	
(4) Heavy Industrial Zone	<ol style="list-style-type: none"> 1. Noise generated by any activity shall not exceed the following noise limits at any point within the zone: <ol style="list-style-type: none"> a. All times - 70 dB L_{Aeq} (15 min) b. All times - 80 dB L_{Amax} 2. Noise generated by any activity shall not exceed the following limits when measured at or within the boundary of any site in the Residential Zone, Māori Purpose Zone, Rural Living Zone, Rural Production Zone, Rural Lifestyle and Rural Settlement Zone: <ol style="list-style-type: none"> a. 7 am to 10 pm - 55 dB L_{Aeq} (15 min) b. 10 pm to 7 am - 45 dB L_{Aeq} (15 min) b. 10 pm to 7 am - 75 dB L_{Amax} 	Matters of discretion if compliance not achieved: <ol style="list-style-type: none"> 1. Ambient noise levels. 2. Management of effects from the activities with regard to the matters set out in NOISE-P3. 3. Any mitigation of the noise proposed, in accordance with best practicable option (e.g. site layout and design, design and location of structures, buildings and equipment and the timing of operations). 5. The ability to mitigate adverse effects through the imposition of conditions such as noise attenuation.

Recommended Noise Limits

The *Heavy Industrial zone* is insensitive to noise. Dwellings will not be permitted to located in this zone. We recommend that the most stringent control that should apply between heavy industrial zones is increased to at least 75 dB L_{Aeq} at any point within the site boundary of any other site within the zone. We do not recommend that an L_{AFmax} noise limit is applied.

A noise limit of **75 dB L_{Aeq}** provides a level control that will ensure noise levels on adjacent *Heavy Industry* sites do not risk damaging the hearing of workers and will not unreasonably impact on administration and office work that could be occurring. An even higher noise limit could be applied without considerable risk. A higher limit would place less restriction on heavy industrial land use¹⁹.

As with the *Light Industrial zone*, we consider that the proposed approach of providing higher noise limits to noise from *Heavy Industrial* zones that is received in residential and rural zones is pragmatic and appropriate.

¹⁹ If hearing damage is of concern, noise limits should be no higher than 85 dB L_{Aeq}

6.4 Open Space Zones

Three open space zones are proposed as follows:

Zone	FNDC Description/ Characteristics	Typical Issues
Natural Open Space	<p>Areas where the natural environment is retained and activities, buildings and other structures are compatible with the characteristics of the zone.</p> <p>Mostly comprised of public land - DOC estate and some council owned reserves.</p> <p>Natural environment and character retained</p> <p>Little or no built infrastructure or facilities</p> <p>Large SNA component</p>	<p>Natural Open Space zones are characterised by the audibility of natural sounds and the typical absence (or low level) of manmade sounds. In coastal areas, ambient sound levels may be elevated due to surf noise. In remote bush and forest areas, ambient sound levels may be very low, especially at night.</p> <p>Noise limits for these areas typically apply at the site boundary as the amenity of the zone is not related to areas of human habitation. Low noise limits are normally set.</p> <p>It is noted that while low levels of industrial and human noise are ideal in these areas, this does not mean that moderate level of industrial noise will significantly affect amenity. There are areas of Northland where tracts of conservation land are exposed to appreciable noise from heavy industry. This alters the “character” of the Open Space but does not necessarily result in a poor overall amenity. Conversely, users of very remote and “pristine” areas may consider that the amenity of the conservation land is diminished by the regular presence of aircraft, traffic or other sources of noise.</p> <p>These zones are not generally used for activities that generate high noise levels. Activities such as track and vegetation maintenance can result in elevated noise levels, but generally only for limited periods.</p>
Open Space	<p>Areas used predominantly for a range of passive and active recreational activities, along with limited associated facilities and structures.</p> <p>Areas used for a range of passive and active recreational activities, however with limited facilities associated with them (e.g. parks, playgrounds, scout dens)</p>	<p>Parks and walking tracks can receive noise from adjacent land use without this resulting in poor overall levels of amenity. Users of these spaces are often transient and will accept some noise if it is an expected part of the known environment. A noise limit can be set to ensure that users of these areas can communicate and relax, but do not need to be set to avoid manmade noise from being audible.</p> <p>Parks and similar areas are used by a variety of people, and for a variety of activities. These may include gatherings, picnics, dog walking and similar activities. Generally. Noise levels from these areas is limited, and would only occur during daytime.</p>
Sport and active recreation	<p>Areas used predominantly for a range of indoor and outdoor sport and active recreational activities and associated facilities and structures.</p> <p>Areas used for a range of indoor and outdoor sporting and active recreation activities including facilities.</p>	<p>These spaces are fairly insensitive to noise, however communication between players and coaching staff must remain possible. These zones can be sources of intrusive noise themselves, especially when they are used regularly, including during the evening or night.</p> <p>Noise from sports fields, particularly those with artificial lighting, can be consistent and high, particularly on weekends, and may have special audible character due to the use of whistles and shouting of players.</p>

Draft Noise Provisions

The Draft Noise Chapter contains the following noise limits for the Open Space zones.

NOISE-S1	Maximum noise levels – Zone specific	
(6) Natural Open Space Zone	1. Noise generated by any activity shall not exceed the following noise limits at any point within the boundary of any Residential Zone, Rural Living Zone, Rural Production Zone, Rural Lifestyle, Rural Settlement and/or Māori Purpose Zone site:	Matters of discretion if compliance not achieved: <ol style="list-style-type: none"> 1. Ambient noise levels. 2. Management of effects from the activities with regard to the matters set out in NOISE-P3. 3. Any mitigation of the noise proposed, in accordance with best practicable option (e.g. site layout and design, design and location of structures, buildings and equipment and the timing of operations). 4. The ability to mitigate adverse effects through the imposition of conditions such as noise attenuation.
Open Space Zone	<ol style="list-style-type: none"> a. 7 am to 10 pm - 50 dB L_{Aeq} (15 min). b. 10 pm to 7 am - 40 dB L_{Aeq} (15min). c. 10 pm to 7 am - 65 dB L_{Amax}. 	
Sport and Active Recreation Zone		

Recommended Noise Limits

The draft noise limits do not restrict noise levels received at the *Open Space* zones themselves. The noise limits only control noise from within the *Open Space* zones when received at other noise sensitive zones.

It is not inappropriate to avoid applying noise limits within *Open Space* zones. Walkways or riverbeds adjacent to industrial and business areas are often zoned *Open Space*. The provision of noise limits that apply at the site boundary of these zones can be problematic for operation of the business or industrial site even where there are few regular users of the walkway. The lack of a noise limit applying to *Open Space* and *Sport and Recreation Zones* may seem permissive, however noise to these zones is often regulated in a de facto way by the proximity of other nearby zone boundaries anyway.

We recommend that if *Natural Open Space* zones are intended to have a high level of acoustic amenity and natural character, then appropriate noise limits should apply at the site boundary. We recommend noise limits of **50 dB L_{Aeq}** during the daytime **and 40 dB L_{Aeq} / 70 dB L_{AFmax}** during the night-time. However, we recommend that mobile machinery used for a limited duration as part of agricultural or horticultural activities be excluded from compliance with these noise limits.

The noise limits proposed from activity within *Open Space* zones to adjacent noise sensitive land uses can be broadly as set out in the draft provisions. This will mean that noise from parks and recreation areas must be lower than from other zones. This is not inappropriate as noise from these areas is not typically expected to be high, however it is recommended that an appropriate exemption be made for **sporting activity and temporary activities**. For ongoing use, we recommend that the night-time noise limit of 65 dB L_{AFmax} should be increased to **70 dB L_{AFmax}** to be consistent with other zone provisions.

We recommend that noise from *Open Space* zones (such as parks and sport grounds) be permitted to generate higher levels of noise on a small number of occasions per year or for limited periods throughout the week and weekend for intensive sport use. The rules contain an exemption for up to

20 hours of use per week – this should be checked by Council to ensure it is appropriate. This will enable activity from concerts and festivals to occur without constraints or applying for resource consent. We expect that the exclusions and the *temporary activity* rules in the Plan will provide for such events.

6.5 Horticulture Processing

The Horticultural Processing zone is proposed as follows:

Zone	FNDC Description/ Characteristics	Typical Issues
Horticulture Processing	<p>Areas used for a range of industrial activities that supports the horticulture industry (e.g. large scale packhouses with associated cool stores). This zone will be expanded out to other sites.</p> <p>The purpose of this zone is to provide for the operation of existing and future horticulture processing and storage facilities.</p> <p>Activities envisioned in this zone are for storage and/or processing produce, including cool stores, packing and distribution facilities as well as supporting administration.</p> <p>The characteristics of these operations are akin to heavy industry and have the potential to cause adverse noise, lighting, stormwater, traffic and amenity effects.</p> <p>Can operate 24 hours a day at certain times of the season and generally require large-scale buildings.</p>	<p>These zones are important to the region’s economy and must be provided for. The main noise source associated with the activity is industrial scale refrigeration plant as well as truck and forklift movements. They will typically be located near major roads where ambient noise levels are higher during the daytime, but still relatively low at night.</p>

Operative Plan

The *Horticultural Processing* environment exists within the District Plan. The Operative District Plan contains the noise limits in Section 18.4.6.1.6 of the Plan.

This section states that all activities within the *Horticultural Processing Zone* shall not exceed:

- 65 dBA L₁₀ between 0700 to 2200 hours;
- 55 dBA L₁₀ and 80 dBA L_{max} between 2200 to 0700 hours

These noise rules apply “...**at any other site in the zone...**”. The horticultural processing zones we are aware of in the Far North District encompass only one site under one ownership and the noise rule that applies *between sites* therefore has limited use.

The zone also includes the following noise rules:

- 55 dBA L₁₀ between 0700 to 2200 hours;

- 45 dBA L_{10} and 70 dBA L_{max} 2200 to 0700 hours;

These noise limits apply “...at or within the notional boundary²⁰ of any dwelling in any rural environment zone...”.

Draft Noise Provisions

The proposed Plan Change contains the following noise limits for the above zones

NOISE-S1	Maximum noise levels – Zone specific	
(5) Horticulture Processing	<ol style="list-style-type: none"> 1. Noise generated by any activity shall not exceed the following noise limits at any point within the zone: <ol style="list-style-type: none"> a. All times - 65 dB L_{Aeq} (15 min) b. All times - 90 dB L_{Amax} 2. Noise generated by any activity shall not exceed the following limits when measured at or within the boundary if any site in the Residential Zone, Māori Purpose Zone, Rural Living Zone, Rural Production Zone, Rural Lifestyle and Rural Settlement Zone: <ol style="list-style-type: none"> a. 7 am to 10 pm - 55 dB L_{Aeq} (15 min) b. 10 pm to 7 am - 45 dB L_{Aeq} (15 min) c. 10 pm to 7 am - 75 dB L_{Amax} 	<p>Matters of discretion if compliance not achieved:</p> <ol style="list-style-type: none"> 1. Ambient noise levels. 2. Management of effects from the activities with regard to the matters set out in NOISE-P3. 3. Any mitigation of the noise proposed, in accordance with best practicable option (e.e. site layout and design, design and location of structures, buildings and equipment and the timing of operations). 4. The ability to mitigate adverse effects through the imposition of conditions such as noise attenuation.

Recommended Noise Limits

The proposed rule is similar to the existing noise rule. We recommend the following:

- The provision of a noise limit between horticultural processing sites may be of limited use. We expect that most of these sites will be under one ownership. Even if competing companies were located on adjacent sites, it is unlikely that they would be sensitive to each other’s noise. If a limit is to be provided within the horticultural processing zone, it is recommended it is the same as the *Heavy Industrial* noise limit of **75 dB L_{Aeq} at all times**. No L_{AFmax} noise limit is recommended.
- As with the *Heavy Industrial* zone, we consider that the proposed approach of providing higher noise limits to noise from *Horticultural processing* than would otherwise apply to noise generated in residential and rural zones is pragmatic and appropriate. This will mean that residents adjacent to *Horticultural Processing sites* can expect a lower (but still acceptable) level of amenity than land owners further away. We recommend that the noise limits are applied at the appropriate location – that being the **notional boundary** of rural properties (rather than the site boundary as proposed).

6.6 Mineral Zones

It is understood that the *Mineral* zone is proposed as an overlay. Details of the overlay are not yet known; however, we recommend that appropriate noise limits be applied to this zone.

²⁰ The notional boundary is defined as a line 20m from any part of any dwelling or the legal boundary where this is closer to the dwelling.

- Suitable noise limits apply to operation. These should be similar to the noise levels received in Rural zones from *Horticultural Processing and Industrial* activity. We recommend the following noise limits are applied within the notional boundary of dwellings within the overlays.
 - 7 am to 10 pm - 55 dB L_{Aeq}
 - 10 pm to 7 am - 45 dB L_{Aeq}
 - 10 pm to 7 am - 75 dB L_{AFmax}

The above noise limits should apply to all activities within the site, including the pit, as well as vehicle movements on private roads. Temporary construction works (e.g. the construction of buildings, noise control bunds, etc) would be required to meet the construction noise standards

- *Mineral* zone activity received within the *Light Industrial, Heavy Industrial or Mixed Use* zones should meet the relevant noise limits that are recommended within those zones.
- The noise and vibration limits recommended for blasting noise should ensure that the use of explosives is not overly intrusive and do not result in cosmetic damage to buildings (e.g. cracking of plasterboard or façade panels²¹). Our recommended explosives/blasting noise guidelines are as follows:

Table 2: Mineral Zone Explosives Blasting Noise and Vibration Permitted Standards

Receiver	Permitted blasting time window	Number of blasts per year	Peak airblast sound limit dB L_{zpeak}	Ground Borne Vibration Limit PPV
Occupied noise sensitive activity	0700 to 1900 hours	≤ 20	120	10mm/s
		>20	115	5mm/s
Occupied commercial and industrial buildings	All hours	All	125	25 mm/s
Unoccupied buildings	All hours	All	140	AS2187.2:2006 Table J4.5(B) limits

Notes

- In assessing the above noise and vibration levels, airblast and ground vibration shall be measured and assessed in accordance with AS2187.2:2006 Explosives – Storage and Use Part 2: Use of Explosives.
- Noise shall be measured at any point within any Residential, Mixed Use, Natural Open Space or Industrial zone, or within the notional boundary of any noise sensitive activity in the Rural Production, Rural Living, Horticulture, Rural Lifestyle, Rural Settlement or Māori Purposes zone
- One blast per annum may exceed the peak airblast sound limits by 5 dB.

²¹ The most relevant standard for control of explosives noise source is Appendix J of AS 2187.2-2006 Explosives - Storage, transport and Use. Part 2: Use of Explosives. This standard was issued after NZS6803:1999 was issued. This standard sets out in detail the limits appropriate for various receivers. Our recommendations are based on this standard, notwithstanding that we recommend simplified limits in some cases.

6.7 Noise Limits between Zones

The Draft Noise Provisions do not provide for noise limits between zones for all zone combinations, e.g. there is no noise limit provided between *Mixed Use* and *Light Industry* zones.

We recommend a “catch all” rule that clarifies the appropriate noise limit in that case as follows:

Unless provided for in Sections XXX to XXX, where noise generated by any activity on a site in one zone is received by any activity on a site in a different zone, the activity generating the noise must comply with the noise limits and standards of the zone at the receiving site.

7.0 ACTIVITY SPECIFIC NOISE LIMITS

7.1 Construction Noise

Draft Noise Provisions

The Draft Noise Chapter contains the following noise limits for all zones.

NOISE-S2	Maximum noise levels – Activity specific	
(1) Construction Activity	1. The noise from any construction, maintenance, and demolition activity must be measured, assessed, managed, and controlled in accordance with the requirements of NZS 6803:1999 Acoustics Construction Noise.	<p>Matters of discretion if compliance not achieved:</p> <ol style="list-style-type: none"> 1. Ambient noise levels. 2. Management of effects from the activities with regard to the matters set out in NOISE-P3. 3. Any mitigation of noise proposed, in accordance with a best practicable option approach (e.g. site layout and design, design and location of structures, buildings and equipment and the timing of operations). 4. The ability to mitigate adverse effects through the imposition of conditions such as noise attenuation.

Recommended Noise and Vibration Limits

The above approach is generally appropriate. However, we recommend that instead of stating that noise “...must be measured, assessed, managed, and controlled..” the clause simply states that noise “shall comply with the guidelines and recommendations of New Zealand Standard NZS 6803: 1999 “Acoustics - Construction Noise”.

We also recommend that the NZS6803:1999 guideline values are placed within the District Plan text, as is often done in other jurisdictions. This provides reader access to the noise limits. It is important that the supporting text within the standard can also be used in the assessment criteria. The NZS6803:1999 guideline values could form a reference appendix.

The matters for discretion are important. Construction noise can often exceed the guidelines of NZS6803:1999. Whether this is “reasonable” and “appropriate” depends on the extent of the breach, the duration and type of the activity, the necessity for the works and the extent of practicable noise mitigation measures that can be included. It is ideal for Council to be able to grant consent to activities that have conclusively demonstrated how noise will be adequately managed and controlled to suitable levels without having to notify the application.

We recommend that essential work within road and on rail lines is excluded from compliance with the construction noise rules provided a suitable construction noise and vibration plan is provided. This will obviate the need for any consent to be obtained which is considered to be an efficient way of proceeding. This approach is also included in the Auckland Unitary Plan Operative in Part (AUP) and Whangarei District Plan and is considered an efficient means of allowing construction on transportation corridors in the district.

Vibration standards for construction vibration are also recommended within this clause. We recommend a permitted amenity standard as well standard to prevent building damage from vibration.

7.2 Temporary Activities

7.2.1 Draft Noise Provisions

The Draft Noise Provisions contain the following noise limits for the all zones:

NOISE-S2	Maximum noise levels – Activity specific	
(2) Temporary activities (excluding temporary military training activities) and emergency training activities	<ol style="list-style-type: none"> 1. Temporary activities (excluding temporary military training activities) and emergency management training activities must comply with the following requirements when measured at any point: <ol style="list-style-type: none"> a. within the boundary of any receiving site located within any Residential Zone, Settlement Zone or Rural Living Zone; or b. at the notional boundary within the Rural Production Zone, Rural Lifestyle or Māori Purposes Zone; or c. at any receiving site located within any other zone: <ol style="list-style-type: none"> i. a maximum of four events in any 12 month period on the same site provided the temporary activity and any pre-event rehearsal do no individually exceed four hours duration or the following maximum noise levels: <ol style="list-style-type: none"> a. 70 dB L_{Aeq} (1 hour) b. 85 dB L_{eq} (1 min) at 63 Hz; and c. 75 dB L_{eq} (1min) at 125 Hz; or ii. two events in any 12 month period on the same site provided that the temporary activity does not exceed 12 hours per day over a maximum duration of three consecutive days or the following maximum noise levels: <ol style="list-style-type: none"> a. 60 dB L_{Aeq} (1 hour) b. 75 dB L_{eq} (1 min) at 63 Hz; and c. 75 dB L_{eq} (1 min) at 125 Hz. 2. The above noise levels (1(c)(i) and (1(c)(ii) can increase by 10 dB (L_{Aeq}) where the receiving site is within the Mixed Use Zone, Light Industrial Zone, Heavy Industry Zone or Open Space Zones. 	<p>Matters of discretion if compliance not achieved:</p> <ol style="list-style-type: none"> 1. Ambient noise levels. 2. Management of effects from the activities with regard to the matters set out in NOISE-P3. 3. Any mitigation of noise proposed, in accordance with a best practicable option approach (e.g. site layout and design, design and location of structures, buildings and equipment and the timing of operations). 4. The ability to mitigate adverse effects through the imposition of conditions such as noise attenuation.

7.2.2 Recommended Noise Limits

We note the following with regard to the above rules:

- “Temporary activities” need to be clearly defined within the District Plan. At present the Draft Noise Chapter does not define these accurately and does not exclude these from compliance with the *Noise Standards*.
- The rules appear to apply to any temporary activity on any site. This may be intentional; however, it is noted that the rules would permit fairly high noise levels to be generated by activity on private sites without the need for a resource consent. Under these rules, it is possible that dwellings could be exposed to multiple “temporary events” on multiple adjacent sites which could lead to significant noise effects. To avoid this, consideration could be given to restricting permitted activities to only those occurring on public land and/or within sites zoned *Open Space, Natural Open Space or Sport and Active Recreation* or within the road reserve. Events or festivals held on private sites could be a Restricted Discretionary activity with discretion widened to include the number of events and festivals that are currently permitted and operated in the area (together with other matters such as the proposed hours of operation, total duration, noise levels, etc).
- The temporary noise levels are relatively high, and the number of events permitted are relatively generous. We do not recommend the number of events be further increased. The inclusion of low frequency controls makes the rules less simple but this inclusion will mean that high levels of bass are controlled (but not made inaudible). Notwithstanding the somewhat permissive nature of the proposed rule, we have not recommended changes to these noise rules in our review. We note that the provision of an objective covering community cultural activities may be appropriate given the proposed rule aims to provide for a relatively generous number of cultural events per year.
- The rule does not appear to control the times of day that the activity can occur. We recommend that these temporary activities be confined to the daytime (8am to 10pm). The rule as written does not appear to limit the time when activity can occur. The noise limits proposed are inappropriate for the night-time.
- The use of the word “or” in statements such as “two events in any 12-month period on the same site provided that the temporary activity does not exceed 12 hours per day over a maximum duration of three consecutive days **or the following maximum noise levels...**” is likely problematic. This suggests that the activity is not required to restrict noise levels if it occurs for 12 hours or less per day over three days or less. We consider that the word “and” should be used to require both the duration and noise level to be limited.
- Consideration could be given to providing rules for fireworks as part of festivals (refer section on explosives).

We have recommended proposed changes to these rules in Appendix A.

7.3 Temporary Military Training Activities

The Draft Noise Chapter *Specific Activities rules* section for temporary military training activities are incomplete. We note that the *Activities Rules* section contained provisions that may be more appropriately located in the *Specific Activities rules* section.

The provisions for temporary military training activities can be problematic. The NZDF has a suite of recommended noise rules that form the basis for their submissions on District Plan reviews. The provisions within the Whangarei District Plan were settled through mediation based on submission from the NZDF. We expect that the NZDF will submit on this District Plan and potentially appeal the decision if their noise framework is not implemented.

We recommend that the NZDF is contacted and a meeting arranged to discuss the actual and potential training activities that are likely to occur within the Far North District. A copy of the NZDF's proposed noise limits could be sought and reviewed – it is expected they will wish for provisions for small arms fire and explosives to be included. Noise limits such as those contained in the Whangarei District and Auckland Unitary Plans can be considered for the proposed District Plan, however a further review is recommended prior to lodgement.

7.4 NZTA – State Highway Noise and Vibration

The NZTA has provided initial comments on the Draft Far North District Plan. The submission on the noise chapter refers to the *NZTA Guide to the Management of Effect on Noise Sensitive Land Use Near to the State Highway network*. The submission requests that the Proposed District Plan implement these guidelines in the following manner:

- New noise sensitive activities within 100m of State Highways are subject to façade sound insulation measures to achieve specific internal noise limits (for dwellings this is an internal noise limit of 40 dB $L_{Aeq(24\text{ hr})}$). Other “noise sensitive spaces” may have higher noise criteria.
- New noise sensitive activities within 40m of State Highways are required to be designed to achieve compliance with NS 8176 class C.

Traffic volumes on SH1 in the Far North vary from <1000 vehicles per day north of Te Hapua to around 10,000 north of Kawakawa. SH10 carries traffic volumes of between 3,000 to 10,000 vehicles per day. Traffic noise levels adjacent to these roads will vary.

Traffic noise can start to have implications on façade design when external noise levels begin to exceed 60 dB $L_{Aeq(24\text{ hr})}$ ²². Above this level of noise, thicker glazing, ventilation and air-conditioning and thicker or additional layers of plasterboard may start to become necessary. These will may to the cost of construction, although it is noted that for new dwellings the increase in the cost of construction may not be significant. It is difficult to provide overall guidance on this matter as relocatable buildings located close to busy highways road could require significant façade improvement, whereas modern ventilated and cooled buildings located in proximity of quieter roads may require few or no improvements.

This will have the following implications:

- North of Awanui, traffic noise levels are expected to be below 60 dB $L_{Aeq(24\text{ hr})}$ at 20m from the road carriageway. In most rural zones, dwellings are located further from the road than 20m. Such noise levels would mean that dwelling façades in this part of the District would not require specific sound insulation measures and should be able to be constructed from relatively standardised constructions.
- On SH1 between Pakaraka and Awanui and on most of SH10, traffic noise levels are expected to be below 60 dB $L_{Aeq(24\text{ hr})}$ at 30 to 50m from the road carriageway. Dwellings established within 50m of the road carriageway in these areas could require improved façade sound insulation and ventilation measures.
- South of Pakaraka, dwellings established within 60m of the road carriageway could require improved façade sound insulation measures.

The following costs could be incurred by the required rule:

- Any dwelling²³ that is constructed within 40m of the road carriageway will require an assessment of vibration to be carried out. This will require on-site measurements, calculations and reporting.

²² This is dependent on building design and layout in relation to the road. This is a broad guide only.

²³ Or *noise sensitive activity*. We expect that it will predominantly be dwellings that are constructed within 100m of the road, however NZTA recommend that Education, Health and Cultural Buildings are also subject to these guidelines.

Depending on the location of the site, this may add around \$2,500 to \$3,500 + GST to compliance costs (includes both noise and vibration). If vibration measurements show appreciable soil borne vibration levels, it is possible that slab on grade dwelling constructions may need to be avoided and floors selected appropriately, or the dwelling located further from the road. However if the road surface is in good condition meaning soil borne vibration is low, slab on grade constructions are likely to be practicable. As we have not been required to carry out ongoing vibration measurements in the Far North, we do not hold sufficient data to comment on the likely outcome of this rule.

- Any dwelling located outside 40m of the road carriageway (but within 60m of the road carriageway) would require an acoustic assessment. These are typically completed as a desktop assessment and incur fees of around \$1,000 to \$1,500 + GST. Where thicker, denser or multiple layers of plasterboard are required to achieve the noise limits, dwelling costs of construction could increase by \$35 to \$100 per m² of wall and ceiling area²⁴. Thicker double glazing is likely to increase double glazing costs by around \$100 / m².
- Buildings that are exposed to noise levels of above 55 dB L_{Aeq} will require a ventilation / cooling system. NZTA guidelines include specifications for this system. A discussion on building ventilation and costs is contained in the *Mixed Use* sound insulation section below.

Adopting the NZTA guidelines will require those building dwellings to incur costs and fees. The guidelines are intended to reduce reverse sensitivity effects on the State Highway network by requiring those who wish to live next to the State Highway to pay for the required minimum standard of amenity. The decision as to whether to adopt NZTA's recommended rules is a matter for Far North District Council to consider based on an evaluation of the costs on landowners versus the potential improvement in amenity and reduction in reverse sensitivity risks.

We have placed draft rules in the revised Draft Noise Chapter that could be included. These refer to dwellings located within 40 metres of roads carrying 15,000 vehicles per day or higher. The rules does not refer to vibration and this could be included if concern exists. The rules is simply a starting point: if the rules are to be adopted in the District Plan, we can further review and provide comments on suitable rules.

7.5 Mixed Use and Light Industrial Zone Sound Insulation Measures

Draft Noise Provisions

The Draft Noise Chapter contains the following provisions

NOISE-S2	Maximum noise levels – Activity specific	
(2) Mixed Use Zone Light Industrial Zone	<ol style="list-style-type: none"> Any noise sensitive activity with a noise sensitive room in a new building or alteration or addition to an existing building shall be designed, constructed, and maintained to meet the following internal noise levels in: <ol style="list-style-type: none"> bedrooms – $D_{2m,nT,w} + C_{tr} > 35$ dB; other habitable rooms – $D_{2m,nT,w} + C_{tr} > 30$ dB. Compliance with (1) above shall be achieved if, prior to the construction of any building containing a noise sensitive room, 	<p>Matters of discretion if compliance not achieved:</p> <ol style="list-style-type: none"> Management of sensitivity to noise with regard to the matters set out in NOISE-P2. The provision of a report from an acoustic specialist which provides evidence that the level of acoustic insulation is appropriate to ensure the

²⁴ All costs are based on data contained in *NZTA State Highway Guide to Acoustic Treatment of Buildings*. Note that these are 2011 prices. The figures in that document are given as a guide – costs vary significantly between dwellings. Given the age of the NZTA document and the uncertainty, we recommend that all costs are reviewed by a quantity surveyor.

- | | |
|--|---|
| <p>an acoustic design certificate from a suitably qualified acoustic engineer is provided to the Council which certifies that the proposed design and construction of the building, alteration or additions will achieve the internal sound levels. The building shall be designed, constructed, and maintained in accordance with the design certificate.</p> | <p>amenity of present and future residents of the site.</p> |
| <p>3. A ventilation system shall be installed in the noise sensitive room(s).</p> | <p>3. The impact of any sensitive activity that does not provide the required noise insulation on the ability of existing or future permitted business activities to operate or establish without undue constraint.</p> |
-

The above approach specifies a façade sound reduction performance ($D_{2m,nT,w} + C_{tr}$) that would be applied in the *Mixed Use* and *Light Industrial* zones. The " $D_{2m,nT,w} + C_{tr}$ " value can be thought of as the noise level difference between inside and outside of an apartment assuming the external noise has a somewhat elevated level of low frequency sound²⁵.

Recommended Noise Limits

The FNDC Draft Noise Provisions of $D_{2m,nT,w} + C_{tr} > 35$ dB will not be straightforward to achieve. Masonry materials could be required for bedroom wall facades, together with two layers of dense plasterboard on the ceiling (possibly requiring ply sarking under the roof). Lightweight constructions are likely to need significant non-standard materials to meet the criterion. If there is a requirement to use masonry materials in bedrooms, it is likely this will pragmatically mean that the entire house or apartment will be constructed from masonry materials. Such a sound insulation requirement therefore has significant potential cost and urban design implications for the District. These should be carefully considered before such a criterion is considered – a quantity surveyor may need to be consulted.

Furthermore, the sound insulation requirements in the Draft Noise Provisions are likely to be too onerous for *Mixed Use* and *Industrial* areas unless it was desirable to allow for very high external noise levels. While *Mixed Use* areas could have bars and restaurants that may generate high levels of low frequency noise at night, it may not be efficient to assume such an activity could occur right throughout the *Mixed Use* areas (and to consequently require all dwellings to be built to mitigate such potential noise levels). The noise rules we have recommended have aimed to strike a balance between allowing some hospitality noise while providing for a reasonable level of amenity to residents in the zone. Our view is that if loud hospitality type activities are envisaged in parts of the Far North, it may be better to provide for these in a specific localised zone where dwellings are not permitted.

We do recommend that a façade sound insulation requirement is included. However, the requirement only needs to be sufficient to ensure that noise levels are around 30 dB L_{Aeq} within bedrooms²⁶ and around 40 dB L_{Aeq} in living areas.

Typically, there are two ways to specify façade sound insulation performance. Each has minor advantages and disadvantages. These are:

1. **Using the $D_{2m,nT,w} + C_{tr}$ parameter proposed.** This is a concise way of defining the required performance of the façade and no external noise level needs to be specified. However, the criterion applies to all building elements, which does not allow any discretion in specifying

²⁵ ISO 717 defines this as similar to what may occur in areas with "urban road traffic, railway traffic at low speeds, propeller driven aircraft, disco music and factories emitting low and medium frequency noise"

²⁶ Noise level specified for night-time in bedrooms and daytime in living areas.

façade treatment²⁷. The parameter is more abstract and is harder to understand for both acousticians and non-acousticians (e.g. processing planners, architects).

2. **Using a specified internal noise limit.** This approach is potentially less concise (as the external noise level requires definition). This approach has the advantage of being “performance based” and allowing finer resolution of the building design to be determined resulting in lower costs. The limit is also much easier to understand for non-acousticians.

Our recommendation for this clause is to state the **internal noise level** that must be achieved together with the assumed external noise level on the façade. We do not recommend the plan specify façade performance in terms of a $D_{2m,nTW} + C_{tr}$ criteria.

A noise rule such as the following is recommended:

1. Any **noise sensitive activity** containing the following uses shall be designed, constructed, and maintained to meet the following internal noise levels in:
 - a. Bedrooms and sleeping areas: 30 dB L_{Aeq}
 - b. Other habitable rooms in dwellings or teaching areas: 40 dB L_{Aeq}

The following external noise levels shall be used in the design and shall be assumed to be incident on the exposed wall façade(s). The suitably qualified acoustician may use discretion to determine noise levels on other building elements based on the zoning and future development of the adjacent sites:

Zone	Design noise level (dB L_{Aeq}) - incident							dBA
	63	125	250	500	1	2	4	
	Hz	Hz	Hz	Hz	kHz	kHz	kHz	
Mixed Use								
Bedrooms and sleeping areas	63	57	53	51	51	48	43	55
Other habitable dwelling rooms	68	62	58	56	56	53	48	60
Light Industrial								
Bedrooms and sleeping areas	56	58	59	59	54	52	50	60
Other habitable dwelling rooms:	61	63	64	64	59	57	55	65

2. Compliance with (1) above shall be achieved if, prior to the construction of any building containing a noise sensitive room, an acoustic design certificate from a suitably qualified acoustician is provided to the Council which certifies that the proposed design and construction of the building, alteration or additions will achieve the internal sound levels. The building shall be designed, constructed, and maintained in accordance with the design certificate. The design certificate shall also state the required HVAC design noise levels that are to be included in the ventilation design as well as any relevant assumptions.

We recommend that the clause that reads: “A ventilation system shall be installed in the noise sensitive room(s)” be made more specific. One way to do this would be to word the clause as a performance specification:

3. A ventilation and cooling system shall be provided to enable occupants to remain comfortable within the dwelling without having to open doors or windows for ventilation or cooling. Compliance with this clause shall be achieved if, prior to the construction of any building containing a noise sensitive room, a ventilation and HVAC design certificate from a suitably qualified practitioner is provided to the Council.

²⁷ For instance, facades that face away from noisy areas are still required to be treated to the same standard as those that face the source of noise. This incurs unnecessary costs.

The above requires all dwellings to be constructed with ventilation and cooling systems in place. This places a cost on those constructing dwellings in the *Mixed Use* and *Light Industry* zone. The cost of installation of a suitable system for Northland conditions would need to be checked with a HVAC design professional, however we note that guidelines provided by NZTA indicate that costs could be in the order of \$10,000 for a “heat recovery ventilation system” to \$15,000 +GST for a ducted “air-condition systems”²⁸.

If a performance standard is not desirable, FNDC should give consideration to drafting a specification for mechanical ventilation and cooling systems that meets the intention of the above rule. This would provide an alternative to developers who prefer to meet a prewritten specification. This would need to be drafted with advice from a suitably qualified HVAC practitioner as it may encompass the following:

- Minimum ventilation rates, together with additional ventilation rates required to achieve a higher number of air changes per hour at a prescribed increment of control; or
- A cooling and ventilation requirements to achieved specific ambient air temperatures together with appropriate levels of ventilation; or
- Specification of generic mechanical plant which meets the above requirements in specific building designs.

We recommend that appropriate design noise limits are also included within any specification. Noise levels of 30 dBA in bedrooms and 40 dBA within living rooms are typically acceptable. Higher noise limits may need to be set under certain operating conditions such as when high airflows are required to meet the specification. We recommend acoustic input to the specification is provided.

7.6 Control and Air Noise Boundaries

Marshall Day Acoustics has provided advice to Far North Holdings Ltd (FHL) on matters relating to the FHL airports. We do not propose to comment on the proposed District Plan rules that relate to those airports in this report.

7.7 Airport Engine Testing

No rules are provided for airport engine testing. This matter should be raised with FNH to determine whether this activity occurs at night or could occur at night in the future. The Draft Noise Chapter does not exclude engine testing from compliance with the *Noise Standards*²⁹ and thus night-time airport engine testing would need to meet the proposed *Rural Production*³⁰ night-time noise rule of 40 dB L_{Aeq}. It would not be unreasonable to allow for a set number of emergency testing activities to exceed the Rural Production zone night noise limit.

7.8 Aircraft Landing Areas

The noise rules propose to exclude “*aircraft operated in flight*” from compliance with the *Activities Rules* and *Noise Standards* (refer to Appendix A). We agree that it is appropriate to exclude fixed and rotary aircraft operation from compliance with the typical zone standards, as these zone standards are inappropriate for the assessment of aircraft noise³¹. However, no *Activity Specific* helicopter or fixed wing landing area provisions are proposed in the Draft Noise Chapter. If an *Activity Specific*

²⁸ Refer NZTA *State Highway Guide to Acoustic Treatment of Buildings*. Costs provided in 2015 and may be subject to inflation

²⁹ The Draft Noise Chapter proposes to exclude aircraft operated in flight, but this would not apply to on ground engine testing.

³⁰ This assumes the Far North District airports continue to be surrounded by *Rural Production* zone in the proposed Plan.

³¹ Note that the National Planning Standards reference NZS6805 (measurement only) and NZS6807 (excluding averaging)

noise rule is not provided, the District Plan would not regulate noise from private landing strips, helipads or future proposed heliports.

Environment Court decisions have stated that noise from *helicopter* landing areas can be considered as part of a land use when they are within 500 feet of the ground in rural areas and 1000 feet above urban areas. *Activity Specific* noise rules should therefore provide for private helicopter operation where it occurs below these altitudes, and when operating at ground and flight idle on the landing pad.

Fixed wing aircraft operating on private landing strips should also be subject to *Activity Specific* noise rules.

It is recommended that on site crop dressing activity be excluded as a “limited duration rural activity” and that no specific noise rule be provided for this activity. Similar exclusions can be applied to emergency helicopter use when operating away from permanently established bases.

Limits for helicopters and fixed wing aircraft are discussed in the following sections.

7.8.1 Helicopters

For helicopters we recommend the District Plan references NZS6807:1994 “*Noise Management and Land Use Planning for Helicopter Landing Areas*”. The National Planning Standards exclusion of Section 4.3 of NZS6807³² can be interpreted to mean that noise levels would not be able to be greater than 50 dB L_{dn} on any day, but could still be 50 dB L_{dn} on all days. We do not consider this exclusion appropriate and our strong preference would be for this directive to be ignored. However FNDC have advised us that the mandatory directions cannot be ignored and we have therefore kept the exclusion in our proposed rule. However if the directive *can* be ignored, it should be.

The NZS6807 standard recommends a **50 dB L_{dn}** noise limit. Noise level at or below 50 dB L_{dn} are generally appropriate for helicopter operations near to noise sensitive premises and such a limit is often used in District Plan noise rules. The standard also recommends a night-time noise limit of 70 dB L_{AFmax}

An alternative to a helicopter noise rule of 50 dB L_{dn} would be to provide a lower permitted standard such as 40 dB L_{dn} . This very conservative approach would ensure that only a small number of helicopters could travel to large sites as a *permitted activity*. This limit would also be sufficient to prevent cumulative effects from permitted landing pads on adjacent sites. A controlled or restricted discretionary status should still be provided for within the District Plan provided the activity meets the noise limit of 50 dB L_{dn} (but with discretion reserved over cumulative noise levels and number of movements occurring over a weekly, monthly and annual basis). This approach is considered appropriate if there are concerns about the amenity of certain areas from helicopter noise or a conservative approach to private helicopter use was simply preferred. The noise rule has been prepared in this manner.

The NZS6807 standard specifically excludes emergency helicopter operations. This approach should also be considered for the Draft Noise Chapter. We consider that it is appropriate to provide no noise limit on emergency helicopter noise when operating on an emergency mission away from a base³³. However, it is recommended that proposed new emergency helicopter bases are assessed by the District Plan.

³² This is the “averaging” section

³³ Noise levels from frequent helicopter use at hospitals can be above 50 dB L_{dn} and 70 dB L_{AFmax} . Effects on amenity can arise within the townships that surround them. These effects are often tolerated due to the important nature of the service when the same level of noise from a private helipad may not be. As this is a critical and necessary public service it may be pragmatic to accept these noise effects and to permit helicopter operation at hospitals within the District Plan.

7.8.2 Fixed Wing Aircraft

This section relates to noise from private rural landing strips rather than noise from the FHL airports (which is outside the scope of this report).

Noise from fixed wing aircraft on private rural landing strips would normally be controlled using the guidelines in NZS6805:1992 “*Airport Noise Management and Land Use Planning*”. The relevant guideline in this standard is 55 dB L_{dn} when assessed at the notional boundary of any dwelling in a rural or residential zone.

7.9 Peak Sound Levels from Explosives

Permitted peak sound levels have been recommended for the *Minerals* zone. There is generally little need to use explosives elsewhere, except occasionally as part of some construction activities. We recommend that these noise limits can also apply to construction noise.

An exclusion of fireworks should be provided. The sale and use of fireworks to the public is restricted and we are not aware of significant noise issues arising from domestic use of fireworks, other than complaints on the effect of livestock. Annual festivals involving fireworks display could be considered controlled activities subject to the provision of a noise management plan. The key matter that the noise management plan should address is liaison and communication with the public.

7.10 Wind Turbines and Wind Farms

No noise limits are recommended in the Draft Noise Chapter for wind farms. It is considered appropriate for the plan to reference the New Zealand Standard NZS6808:2010 “*Acoustics - Wind farm noise*” as required by the National Planning Standards. This standard provides noise limits for general and “high amenity areas” as well as discussion of special audible characteristics, infra sound and ultrasound and methodologies for compliance assessment. The standard is comprehensive and provides a suitable approach for assessing noise from wind turbines and wind farms.

The standard states that it is not generally appropriate to apply the provisions to small wind turbines (those with a swept area of less than 200m²). On this basis, small wind turbines would be subject to the relevant environment noise limits contained elsewhere in the Plan. We are aware that small domestic wind turbines are located on some sites in the District.

7.11 Bird Scaring Devices

No rule for bird scaring devices has been included.

A rule for bird scaring devices that is consistent with other District Plan rules throughout New Zealand is recommended. The general format of this rule has been reviewed by a number of consultants in the industry and has generally been found to be reasonable for residential development near horticulture or viticultural areas. The rule is defined using the L_{AE} parameter for each shot (or succession of shots) which can normally be easily measured.

7.12 Frost Fans and Wind Machines

Frost fans are less of a concern in the Far North than in other Districts. Wind machines can be used for drying fruit as well as fighting frosts. It may still be sensible to apply a noise limit that permits their use in some circumstances where they would otherwise exceed the District Plan noise rule for the *Rural Production* zone

Our recommendation is that a noise limit of **55 dB $L_{Aeq(15\ min)}$** is applied to single or multiple frost fans operating on any site, when assessed at the notional boundary of any dwelling. This noise limit

We do not recommend that future rescue helicopter bases located in the District are permitted (or excluded from all rules) without consideration of the potential noise levels and effects.

would apply during the night period, as well as during the daytime. This should include mobile as well as fixed plant. In addition, the special audible character provisions of NZS6802 should not apply.

The “higher than normal” nature of the limits is set recognising that the use of these fans is likely to seldom occur and that residents will likely have their windows closed during frosty nights. The rules aim to strike a balance between the needs of landowners and residents.

Our recommended draft noise rules are somewhat simpler than some of the rules set out in the early Horticulture New Zealand submission. For instance we have not recommended any matters of control over the air temperature at which frost fans can be used given that conditions in the Far North are much different from those further south. Further refinement of the frost fan and bird scaring rules may be sensible. A meeting with Horticulture New Zealand to discuss issues and potential refinements may be useful to progress this.

7.13 Shooting Ranges

NZS6802:2008 specifically states that “*impulsive sound (such as gunfire and blasting), requires special techniques that are generally outside the scope of the standard*”. For this reason, noise from shooting ranges is often assessed using a different methodology compared with the zone standard. Zone noise limits of 50 to 55 dB L_{Aeq} are often considered too lenient for gun fire noise, and a lower daytime noise limit is required.

Noise from shooting ranges is a relatively complex topic that is complicated by a range of various metrics that are sometimes used to determine whether annoyance is likely to arise. These can include L_{AFmax} , L_{peak} , L_{Aeq} , L_E / SEL or CNR. Research on the effects of shooting noise has not yielded any absolute guidelines as to where annoyance is likely to arise, and the matter is often the subject of debate. Environment Court and resource consent decisions lack consistency on appropriate limits – this is typically due to the varying recommendations of expert witness testimony received during the case.

Recent shooting range projects have been considered against the following rules framework:

0700 to 2200 hours	Monday to Saturday	45 dB L_{Aeq} and 55 dB L_{AFmax}
0900 to 1800	Sunday	
for 18 Special events the noise limits shall increase to		50 dB L_{Aeq} and 60 dB L_{AFmax}

Noise levels shall be measured and assessed in accordance with NZS 6801:2008 “Acoustics – Measurement of Environmental Sound” and NZS6802:2008 “Acoustics – Environmental Noise” except Section 6.3 (special audible characteristics) shall not apply.

Noise levels shall be measured within the notional boundary of a dwelling on an adjoining property that is in existence at the time of granting consent

The above noise limits could form a permitted standard for shooting ranges. This would provide a greater level of control over the activity that the zone rules provide for in Rural zones. The implications on existing shooting ranges would need to be considered.

An alternative would be to make shooting ranges fully discretionary subject to an acoustic assessment.

7.14 Road Traffic Noise

Road traffic noise from new or altered roads in New Zealand is controlled through NZS 6806:2010 “*Acoustics - Road-traffic noise - New and altered roads*”. This standard is used for all roading projects

where the road falls within the scope of the standard. The National Planning Standards require the inclusion of this Standard in any District Plan.

This standard provides guidelines for appropriate levels of road traffic noise near new or altered roads. The standard takes a “best practicable option” approach in an attempt to ensure that any noise mitigation recommended for any project is cost effective; i.e. it provides a reasonable benefit for the given cost.

Referencing this standard within the District Plan would require any roading project to give consideration to noise mitigation measures. This will likely result in the following outcomes:

- Existing and future dwellings adjacent to new and altered roads will receive reasonable levels of external noise.
- Noise barriers would be erected at the expense of the project where this is necessary to achieve reasonable levels of noise.
- Where reasonable levels of external noise cannot be achieved from the new or altered road, dwellings will be provided with mechanical ventilation and potentially improved sound insulation at the expense of the project.
- The assessment of the above will incur consulting fees as part of any roading project that falls within the provisions of NZS6806.

The standard is the only current guideline in New Zealand for the assessment of road traffic noise and thus is the only obvious choice to control road traffic noise in accordance with section 16 of the RMA. We recommend that the standard is referenced in the District Plan rules.

7.15 Emergency Generators and Mobile Plant

The District Plan excludes emergency generator and mobile equipment operation for emergency services or lifeline utilities. The clause states the following:

The noise rules and effects standards do not apply to noise generated by the following activities:

...

the use of generators and mobile equipment (including vehicles) for emergency purposes, including testing and maintenance not exceeding 48 hours in duration, where they are operated by emergency services or lifeline utilities;

The clause appears to be intending to exclude plant that is mobile (e.g. ambulances, fire engines, civil defence or NZTA machinery required to make emergency repairs, etc). It is also intending to permit the operation and testing of emergency generators (such as the generators located in the John Butler centre that Top Energy use to power their critical control room). It is noted that the clause currently limits “testing and maintenance” to 48 hours in duration but does not limit the duration of the plant in emergency situation.

Emergency generator testing generally occurs on sites monthly, typically for 12 hours or less per annum in total. As the activity is of a short duration, it is reasonable to apply higher noise limits to this activity. We previously recommended suitable noise limits in the Whangarei District Plan and we recommend the same limits be used in the Far North District.

The recommended approach would mean that most generators can be tested without constraints but means that operators of very noisy generators must consider noise mitigation or location to avoid impacts on amenity from routine testing. The “emergency use” of the generators can be exempt from the plan rules to allow them to operate at night in an emergency.

7.16 Vibration

The Draft Noise Provisions do not include vibration limits. The National Planning Guidelines requires that any limit to control construction vibration is consistent with the metrics for peak particle velocity in *ISO 4866:2010 Mechanical vibration and shock — Vibration of fixed structures — Guidelines for the measurement of vibrations and evaluation of their effects on structures*. The ISO standard discusses metrics in terms of velocity (peak particle velocity (mm/s) and acceleration (m/s^2). It is recommended that the Proposed Plan use Peak Particle Velocity to characterise construction vibration.

Vibration can impact amenity. Higher levels of construction vibration can result in cosmetic damage to buildings, such as cracking in paint or plasterwork. High levels of vibration are required before damage that reduces the serviceability of buildings occur – such levels of vibration are not typically generated by construction activities.

Vibration limits for should ensure that permitted activities do not generate vibration levels that exceed the guidelines in German Standard DIN 4150-3:1999 *Structural Vibration - Part 3: Effects of Vibration on Structures*. This approach will ensure that cosmetic damage will not arise.

With regard to amenity, British Standard BS 5228-2:2009 “*Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration*” provides the following guidance on the amenity effects of vibration:

- 0.14mm/s PPV Just perceptible in the particularly sensitive environments
- 0.3 mm/s PPV Just perceptible in normal residential environments
- 1 mm/s PPV Typically acceptable with prior notification
- 10 mm/s PPV Likely to be intolerable for any more than a very brief period

An amenity limit of 2 mm/s PPV between 0700 – 2200 hours is recommended in some District Plans³⁴. In those Plans there is an allowance for up to three days of higher vibration levels received (5mm/s PPV) only if prior notification was given, at least three days in advance, to all occupied buildings within 50m of the works.

Vibration rules can also be provided for stationary machinery, although it is noted that vibration from these sources is seldom an issue between adjacent sites. These rules can be set in terms of rms velocity as per the ASHRAE guidelines from which they were sourced. The rules provide control over vibration occurring within buildings that is transmitted to adjacent premises. These have not been drafted into the revised Draft Noise Chapter at this stage.

8.0 SUMMARY

The Draft Noise Chapter of the proposed District Plan has been reviewed and recommendations have been made for a revision. These r changes are summarised in the Appendix A (overleaf). A discussion contained in the main body of this report.

The recommendations in the report and the marked-up provisions in Appendix A require further careful consideration and review by Far North District Council. The review should consider the matters raised in this report and should ensure that the Draft Noise Chapter adequately controls the status of all proposed activities. The criteria we have proposed will have cost implications as well as implications on the character and amenity of each zone. Further discussion and development with Marshall Day Acoustics are recommended prior to notification of the Draft Noise Chapter.

³⁴ When measured in the corner of the floor of the storey of interest for a multi-storey building or at the foundation

APPENDIX A RECOMMENDED ZONE NOISE LIMITS

Overview

Our District is diverse. It is made up of large tracts of rural land, long coastlines, small rural communities and towns. The existing level of noise within these areas will vary based on the level of development and proximity to infrastructure. It is important that human activity within the District does not generate noise that would adversely affect people and the environment.

Manmade noise is an inevitable part of function of the District's economy. For instance, primary production and secondary manufacturing activities use machinery to remain productive, and we all make use of roads, airports and other infrastructure in our day-to-day lives. Such economic activity benefits the District. However, if noise from these sources becomes too loud and too frequent this can affect people and reduce their overall 'wellbeing'. People can become annoyed by noise that is louder or more intrusive than they expect to receive, and this can detract from the character and amenity values associated with their local environment.

The above issues require careful balance. Noise must be managed so that it does not exceed a reasonable level where people live, work and play. In contrast: noise makers engaged in productive activities that benefit our District's economy and lifestyle must be free of unreasonable constraints.

The noise rules in this District Plan have been set to provide an adequate level of protection from the noise within each zone. The rules aim to strike a balance between the need for land to be used for its intended purpose, while ensuring that other land users are not exposed to unreasonable levels of noise. Permitted noise levels aim to provide for the character and amenity values anticipated in each part of the District.

We all have a duty under the Resource Management Act to manage noise so that it does not exceed a reasonable level. The objectives, policies and rules that follow are intended to promote the purpose of the Resource Management Act.

Objectives

NOISE-01	Noise levels are compatible with the role, function and character of all zones and do not compromise the health and wellbeing of people and communities.
NOISE-02	Activities that seek a high level of acoustic amenity do not unduly compromise the ability of other activities to operate.

Policies

NOISE-P1	To set noise rules that reflect the role and function of each zone while providing for the character and amenity values of each zone.
NOISE-P2	To set activity specific rules where the zone rules do not adequately provide for an anticipated activity.
NOISE-P3	To ensure noise generated by an activity within a noise sensitive zone is suitably mitigated on-site to ensure that the character and amenity values of the zone are maintained.
NOISE-P4	To avoid or mitigate reverse sensitivity effects by: <ul style="list-style-type: none"> • Requiring noise sensitive activities to be appropriately located or designed. • Requiring high-noise generating activities to be located in zones that are suitable for the level of noise that will be generated. • Using methods such as noise control boundaries, buffer areas or building setbacks to protect existing or future high-noise generating activities. • Providing provisions that acknowledge the seasonal characteristics and transitory periods of noise generation from primary production activities.
NOISE-P5	To set noise rules which recognise the value of public activities that may generate periods of high noise while still having regard to public and private amenity values.

Assessment Standards and Exclusions

Noise levels for comparison with the *Noise Standards* shall be measured in accordance with *NZS 6801:2008 "Acoustics - Measurement of environmental sound"* and assessed in accordance with *NZS 6802:2008 "Acoustics - Environmental noise"*. These standards shall also be used for any *Activity Specific* rules unless otherwise specified.

The zone *Noise Standards* NOISE-S1 and NOISE-S1a do not apply to noise generated by the following activities. *Activity Specific* NOISE-S2 rules may apply to these activities:

1. normal residential activity such as children's play, lawn mowing, house maintenance and entertainment provided such activity is reasonable in terms of duration and noise level and complies with the *Activity Specific* construction noise rules. This exclusion does not apply to non-residential land use such as childcare centres.
2. construction, maintenance, and demolition activities.
3. "temporary activities" as defined in the definitions section of the District Plan
4. temporary military training activities
5. aircraft operations (including helicopters and fixed wing aircraft) not including engine testing or maintenance.
6. vehicles being driven on a road (within the meaning of Section 2(1) of the Transport Act 1998);
7. trains on rail lines and crossing bells within road reserve, including at railway yards, railway sidings or stations. This exemption does not apply to the testing (when stationary), maintenance, loading or unloading of trains;
8. any agriculture, horticulture, pastoral farming activities, forestry planting and forestry harvesting in the Rural Production or Horticultural zones when undertaken on a seasonal, intermittent or limited duration basis, including using agricultural vehicles, machinery, top dressing aircraft (not including bases that aircraft operate from), bird scaring devices and frost fans. This exclusion does not apply to recreational machinery use or permanently installed plant (other than those items identified);
9. any warning device or siren used by emergency services for emergency purposes (including routine testing and maintenance of the siren);
10. the use of generators and mobile equipment (including vehicles) for emergency purposes, where they are operated by emergency services or lifeline utilities;
11. activities at emergency service facilities associated with emergency response and emergency response training;
12. wind turbines. This exclusion does not apply to wind turbines with a swept area of less than 200m²
13. crowd noise in an Open Space zone during a recognised public or community event;
14. noise from firearms at a shooting range or discharged during hunting
15. unamplified noise from organised sporting events in the Open Space Zones where these occur for up to 20 hours per week between 7am and 7pm; or
16. unamplified noise from standard outdoor activities at schools where this occurs between 7am and 7pm Monday to Sunday.

Activities Rules		
NOISE-R1	Emission of noise	
All zones	<p>Activity status: Permitted Where:</p> <ol style="list-style-type: none"> Noise from the activity complies with all <i>Noise Standards</i> in NOISE-S1 and NOISE-S1a unless excluded from compliance with the <i>Noise Standards</i> in NOISE-S1 and NOISE-S1a by the <i>Assessment Standards and Exclusions</i> section; 	<p>Activity status where compliance is not achieved: Restricted Discretionary</p> <p>Matters over which discretion is restricted:</p> <ol style="list-style-type: none"> The extent and effect of non-compliance with any Noise Standards Whether the activity is contrary to OBJECTIVE-O1 Management of effects from the activities with regard to the matters set out in NOISE-P3 and NOISE-P4. Ambient noise levels and any noise from any existing activities, the nature and character of any changes to the sound received at any receiving site and the degree to which such sounds are compatible with the surrounding activities. Any mitigation of the noise proposed, in accordance with a best practicable option approach (e.g. site layout and design, design and location of structures buildings and equipment and the timing of operations). The ability to mitigate adverse effects through the imposition of conditions. Any other relevant matters of discretion in the infringed Noise Standard(s).
NOISE-R2	Emission of noise from specific activities	
All zones	<p>Activity status: Permitted Where:</p> <ol style="list-style-type: none"> an <i>Activity Specific</i> rule has been provided for the activity in NOISE-S2 AND the activity complies with the <i>Activity Specific</i> rule in NOISE-S2; OR 	<p>Activity status where compliance is not achieved: Restricted Discretionary</p> <p>Matters over which discretion is restricted:</p>

	<ol style="list-style-type: none"> 2. The activity is excluded from compliance with the <i>Noise Standards</i> in NOISE-S1 by the <i>Assessment Standards and Exclusions</i> section and no <i>Activity Specific</i> rule has been provided for the activity; OR 3. The activity is specifically excluded from an <i>Activity Specific</i> rule 	<ol style="list-style-type: none"> 1. The extent and effect of non-compliance with NOISE-S2 and any relevant matters of discretion in NOISE-S2.
NOISE-R3	New buildings or additions to an existing buildings for a noise sensitive activity.	
All zones	<p>Activity status: Permitted Where:</p> <ol style="list-style-type: none"> 1. all new or altered habitable rooms comply with the <i>Sound Insulation</i> standards in NOISE-S3 that are relevant to the underlying zone or specific area identified. 	<p>Activity status where compliance not achieved: Restricted Discretionary</p> <p>Matters over which discretion is restricted:</p> <ol style="list-style-type: none"> 1. The extent and effect of non-compliance with any relevant Noise Standards and any relevant matters of discretion in NOISE-S3.

Place Holder	Restricted Discretionary Activities	
NOISE-R6	Emission of noise from large scale renewable electricity generation activities	

Noise Standards – Within Zones		
NOISE-S1	Maximum noise levels – Zone specific – Noise <u>within</u> Zones	
(1) Residential Zone	<p>1. Noise generated by any activity within a Residential zone shall not exceed the following noise limits at any point within any other site in the zone:</p> <ul style="list-style-type: none"> a. 7 am to 10 pm - 50 dB L_{Aeq} (15 min) b. 10 pm to 7 am - 40 dB L_{Aeq} (15 min) c. 10 pm to 7 am - 70 dB L_{AFmax} 	<p>Matters of discretion if compliance not achieved:</p> <p>1. Those set out in NOISE-R1</p>
(2) Rural Production Zone Horticulture Zone Rural Lifestyle Zone Māori Purpose Zone	<p>1. Noise generated by any activity in the Rural Production zone, Rural Lifestyle zone, Māori Purpose zone or Horticulture zone shall not exceed the following noise limits within the notional boundary of any noise sensitive activity in the zones</p> <ul style="list-style-type: none"> a. 7 am to 10 pm - 55 dB L_{Aeq} (15 min) b. 10 pm to 7am - 40 dB L_{Aeq} (15 min) c. 10 pm to 7 am - 70 dB L_{AFmax} 	<p>Matters of discretion if compliance not achieved:</p> <p>1. Those set out in NOISE-R1</p>
(3) Rural Living Zone	<p>1. Noise generated by any activity in the Rural Living zone shall not exceed the following noise limits within the notional boundary of any noise sensitive activity in the zone.</p> <ul style="list-style-type: none"> a. 7 am to 10 pm - 50 dB L_{Aeq} (15 min) b. 10 pm to 7am - 40 dB L_{Aeq} (15 min) c. 10 pm to 7 am - 70 dB L_{AFmax} 	<p>Matters of discretion if compliance not achieved:</p> <p>1. Those set out in NOISE-R1</p>
(4) Rural Settlement Zone	<p>1. Noise generated by any activity within the Rural Settlement zone shall not exceed the following noise limits within the notional boundary of any noise sensitive activity in the zone.</p> <ul style="list-style-type: none"> a. 7 am to 10 pm - 55 dB L_{Aeq} (15 min) b. 10 pm to 7am - 45 dB L_{Aeq} (15 min) c. 10 pm to 7 am - 75 dB L_{AFmax} 	<p>Matters of discretion if compliance not achieved:</p> <p>1. Those set out in NOISE-R1</p>

<p>(5) Mixed Use Zone</p>	<p>1. Noise generated by any activity in the Mixed Use zone shall not exceed the following noise limits at any point within another site in the zone:</p> <p>Sunday to Thursday</p> <p>a. 7 am to 10 pm - 60 dB L_{Aeq} (15 min)</p> <p>b. 10 pm to 7 am - 55 dB L_{Aeq} (15 min)</p> <p>c. 10 pm to 7 am - 80 dB L_{AFmax}</p> <p>Friday and Saturday</p> <p>a. 7 am to midnight - 60 dB L_{Aeq} (15 min)</p> <p>b. midnight to 7 am - 55 dB L_{Aeq} (15 min)</p> <p>c. midnight to 7 am - 80 dB L_{AFmax}</p>	<p>Matters of discretion if compliance not achieved:</p> <ol style="list-style-type: none"> 1. Those set out in NOISE-R1 2. The effects of noise on existing and proposed dwellings and the ability of the District Plan sound insulation rules to mitigate noise effects.
<p>(6) Light Industrial Zone</p>	<p>1. Noise generated by any activity in the Light Industrial zone shall not exceed the following noise limits at any point within any other site in the zone:</p> <p>a. 7am to 10pm - 65 dB L_{Aeq} (15 min)</p> <p>b. 10pm to 7am - 60 dB L_{Aeq} (15 min)</p> <p>c. 10pm to 7am - 80 dB L_{AFmax}</p>	<p>Matters of discretion if compliance not achieved:</p> <ol style="list-style-type: none"> 1. Those set out in NOISE-R1 2. The effects of noise on existing and proposed dwellings and the ability of the District Plan sound insulation rules to mitigate noise effects.
<p>(7) Heavy Industrial Zone</p>	<p>1. Noise generated by any activity within the Heavy Industrial zone shall not exceed the following noise limits at any point within any other side in the zone:</p> <p>a. All times – 75 dB L_{Aeq} (15 min)</p>	<p>Matters of discretion if compliance not achieved:</p> <ol style="list-style-type: none"> 1. Those set out in NOISE-R1
<p>(8) Horticulture Processing</p>	<p>1. Noise generated by any activity in the Horticulture Processing zone shall not exceed the following noise limits at any point within any other site in the zone:</p> <p>a. All times – 75 dB L_{Aeq} (15 min)</p>	<p>Matters of discretion if compliance not achieved:</p> <ol style="list-style-type: none"> 1. Those set out in NOISE-R1

<p>(9) Natural Open Space Zone</p>	<p>1. Noise generated by any activity in the Natural Open Space zone shall not exceed the following noise limits at any point within the boundary of any other site in the Natural Open Space zone:</p> <ul style="list-style-type: none"> a. 7 am to 10 pm - 50 dB $L_{Aeq(15\ min)}$ b. 10 pm to 7 am - 40 dB $L_{Aeq(15\ min)}$ c. 10 pm to 7 am - 70 dB L_{AFmax} 	<p>Matters of discretion if compliance not achieved:</p> <ul style="list-style-type: none"> 1. Those set out in NOISE-R1 2. Any ecological effects arising due to noise levels
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<p>Noise Standards – Between Zones</p>		
<p>NOISE-S1A</p>	<p>Maximum noise levels – Zone specific – Noise <u>Between</u> Zones</p>	
<p>(1) Light Industrial Zone</p>	<p>1. Noise generated by any activity within the Light Industrial zone shall not exceed the following limits when measured at any point within the boundary of any site in the Residential zone, or within the notional boundary of any noise sensitive activity within the Māori Purpose zone, Horticultural zone, Rural Living zone, Rural Production zone or Rural Lifestyle zone:</p> <ul style="list-style-type: none"> a. 7 am to 10 pm - 55 dB $L_{Aeq(15\ min)}$ b. 10 pm to 7 am - 40 dB $L_{Aeq(15\ min)}$ c. 10 pm to 7 am - 75 dB L_{AFmax} 	<p>Matters of discretion if compliance not achieved:</p> <ul style="list-style-type: none"> 1. Those set out in NOISE-R1
<p>(2) Heavy Industrial Zone Horticultural Processing</p>	<p>1. Noise generated by any activity within the Horticultural Processing or Heavy Industrial zone shall not exceed the following limits when measured at any point within the boundary of any site in the Residential zone, or within the notional boundary of any noise sensitive activity within the Māori Purpose zone, Horticultural zone, Rural Living zone, Rural Production zone or Rural Lifestyle zone:</p> <ul style="list-style-type: none"> a. 7 am to 10 pm - 55 dB $L_{Aeq(15\ min)}$ b. 10 pm to 7 am - 45 dB $L_{Aeq(15\ min)}$ c. 10 pm to 7 am - 75 dB L_{AFmax} 	<p>Matters of discretion if compliance not achieved:</p> <ul style="list-style-type: none"> 2. Those set out in NOISE-R1

<p>(3) Mineral Zone</p>	<p>1. Quarrying and mining activities within the Mineral zone shall not exceed the following limits when measured at any point within the boundary of any site in the Residential zone, or within the notional boundary of any noise sensitive activity within the Māori Purpose zone, Horticultural zone, Rural Living zone, Rural Production zone or Rural Lifestyle zone:</p> <ul style="list-style-type: none"> a. 7 am to 10 pm - 55 dB L_{Aeq} (15 min) b. 10 pm to 7 am - 45 dB L_{Aeq} (15 min) c. 10 pm to 7 am - 75 dB L_{AFmax} <p>2. Explosives use within the mineral zone must comply with <i>Activity Specific</i> rule NOISE-S2 (9).</p>	<p>Matters of discretion if compliance not achieved:</p> <p>1. Those set out in NOISE-R1</p>
<p>(4) All Zones</p>	<p>3. Unless provided for in NOISE-S1A, where noise generated on a site in one zone is received by any site in a different zone, the activity generating the noise shall not exceed the noise limits and standards of the receiving zone as set out in NOISE-S1.</p>	<p>Matters of discretion if compliance not achieved:</p> <p>1. Those set out in NOISE-R1</p>

Activity Specific rules		
NOISE-S2	Maximum noise levels – Activity specific	
<p>(1) Construction Activity</p>	<p>1. The noise from any construction, maintenance, and demolition activity (excluding activities stated below) shall comply with the guidelines and recommendations of <i>New Zealand Standard NZS 6803: 1999 "Acoustics - Construction Noise</i>.</p> <ul style="list-style-type: none"> a. Excluded activities: Road maintenance or utility works undertaken within the road reserve where: <ul style="list-style-type: none"> i. it has been demonstrated to Council that these works cannot reasonably comply with NZS6803:1999 ii. A construction noise and vibration management plan, as prepared by a suitably qualified acoustician, has been provided to Council. <p>2. The vibration from any construction, maintenance, and demolition activity shall comply with the guidelines in <i>German Standard DIN 4150-3:1999 'Structural Vibration - Part 3: Effects of Vibration on Structures'</i>.</p>	<p>Matters of discretion if compliance not achieved:</p> <ol style="list-style-type: none"> 1. Ambient noise levels. 2. Whether the activity is contrary to OBJECTIVE-O1. 3. Management of effects with regard to the matters set out in NOISE-P3 and NOISE-P4. 4. The ability to mitigate adverse effects through the imposition of conditions. 5. The potential building damage effects of vibration and whether these can be avoided or mitigated through vibration monitoring, building condition surveys and remediation. 6. Whether construction noise and vibration levels that exceed the standards

	<ol style="list-style-type: none"> 3. Vibration from any construction, maintenance, and demolition activity shall not exceed 2mm/s PPV at any occupied noise sensitive dwelling for more than five consecutive days. 4. For the above rules, noise shall be measured and assessed in accordance with <i>New Zealand Standard NZS 6803: 1999 "Acoustics - Construction Noise"</i>. Vibration shall be measured and assessed in accordance with <i>German Standard DIN 4150-3:1999 'Structural Vibration - Part 3: Effects of Vibration on Structures'</i>. 5. Explosives use as part of a construction activity shall comply with and be measured and assessed using <i>Activity Specific</i> rule NOISE-S2 (9) 	<p>can have their effects mitigated through other means, such as restriction on days and times of operations, liaison and communication with affected parties, barriers, enclosures and the implementation of these measures through a noise management plan.</p>
<p>(2) Temporary activities (excluding temporary military training activities) and emergency training activities</p>	<ol style="list-style-type: none"> 1. Temporary activities as defined in the <i>Definitions</i> section shall not exceed the following limits at any point within the boundary of any Residential, Mixed-Use, Light Industrial or Natural Open Space zone, and within the notional boundary of any noise sensitive activity in any Rural Production, Rural Living, Horticulture, Rural Lifestyle, Rural Settlement or Māori Purposes zone: <ol style="list-style-type: none"> a. Events must not occur outside 8 am to 10 pm; and b. Events are limited to a maximum of four in any 12 month period on the same site, provided the temporary activity and any pre-event rehearsal do not individually exceed four hours duration. These events shall not exceed the following noise limits: <ol style="list-style-type: none"> i. 70 dB L_{Aeq} (1 hour) ii. 85 dB L_{eq} (1 min) at 63 Hz iii. 75 dB L_{eq} (1min) at 125 Hz; and c. Events are limited to a maximum of two events in any 12 month period on the same site, provided that the temporary activity does not exceed 12 hours per day over a maximum duration of three consecutive days. These events shall not exceed the following noise limits: <ol style="list-style-type: none"> i. 60 dB L_{Aeq} (1 hour) ii. 75 dB L_{eq} (1 min) at 63 Hz iii. 65 dB L_{eq} (1 min) at 125 Hz i. A maximum of one public fireworks display on the same site in any 12 month period that does not comply with the above noise limits provided: <ol style="list-style-type: none"> i. all <i>Rural</i> properties within 1000m of the 	<p>Matters of discretion if compliance not achieved:</p> <ol style="list-style-type: none"> 1. Whether the activity is contrary to OBJECTIVE-O1. 2. Management of effects from the activities with regard to the matters set out in NOISE-P3 and P5 3. The extent to which alternative locations and methods have been considered to avoid, or mitigate any adverse effects 4. The programme for notification and communication with occupiers and owners of affected sites prior to the activities commencing, including updates during the event. 5. The ability to mitigate adverse effects through a noise management plan 6. The method for following up any complaints received during or after the event including communications with the Council

	<p>fireworks are advised in writing at least seven days in advance.</p> <p>ii. The fireworks display finishes before 10:30pm.</p>	
<p>(3) Temporary Military Training activities</p>	<p>1. Noise generated by any Temporary Military Training activity shall not exceed the following noise limits at any point within any Residential zone, or within the notional boundary of any noise sensitive activity in the Rural Production, Rural Living, Horticulture, Rural Lifestyle, Rural Settlement or Māori Purposes zone:</p> <p>a. The noise generated from a Temporary Military Training activity involving mobile noise sources shall not exceed the limits in Tables 2 and 3 of NZS 6803:1999 <i>Acoustics – Construction Noise</i>.</p> <p>b. The noise generated from a Temporary Military Training activity involving fixed (stationary) noise sources shall not exceed the following noise limits:</p> <p>i. 7 am to 10 pm - 55 dB $L_{Aeq(15\ min)}$</p> <p>ii. 10 pm to 7 am - 45 dB $L_{Aeq(15\ min)}$</p> <p>iii. 10 pm to 7 am - 75 dB L_{AFmax}</p>	<p>Matters of discretion if compliance not achieved:</p> <ol style="list-style-type: none"> 1. The extent to which alternative locations and methods have been considered to avoid, or mitigate any adverse effects, recognising the practical constraints associated with temporary military activities. 2. The ability to mitigate adverse effects through the imposition of conditions. 3. The noise impact on noise sensitive activities, stock and wildlife, including the peak sound levels resulting from impulsive noise. 4. The provision of a noise management plan that specifically identifies the likely noise impacts for the area and describes the measures required to avoid or mitigate these. 5. The programme for notification and communication with occupiers and owners of affected sites prior to the activities commencing, including updates during the event. 6. The method for following up any complaints received during or after the event including communications with the Council.

(4) Road Traffic Noise from New or Altered Roads	1. Noise from any new or altered road shall comply with the provisions of <i>New Zealand Standard NZS 6806:2010 "Acoustics - Road-traffic noise - New and altered roads"</i> , provided that the road is within the scope of NZS 6806.	Matters of discretion if compliance not achieved: 1. Whether the activity is contrary to OBJECTIVE-O1. 2. Management of effects with regard to the matters set out in NOISE-P3 and NOISE-P4.
(5) Airport Noise Boundaries	[Placeholder for any rule requiring airport noise management]	Matters of discretion if compliance not achieved:
(6) Airport Engine Testing	[Placeholder for any rule permitting routine or emergency engine testing]	Matters of discretion if compliance not achieved:
(7) Helicopter Landing Areas	<p>1. Helicopter operations (excluding activities stated below) shall not exceed a noise limit of 40 dB L_{dn} at any point within any Residential zone, or within the notional boundary of any noise sensitive activity in the Rural Production, Rural Living, Horticulture, Rural Lifestyle, Rural Settlement or Māori Purposes zone when assessed in accordance with <i>NZS 6807:1994 "Noise Management and Land Use Planning for Helicopter Landing Areas"</i> except that Section 4.3 of NZS 6807:1994 shall not apply.</p> <p>a. Excluded activities:</p> <ul style="list-style-type: none"> i. Emergency or rescue helicopter operation occurring to or from Bay of Islands Hospital or Kaitaia Hospital (excludes permanently established helicopter bases on hospital land). ii. Emergency or rescue helicopter landings, departures, overflights or activity during operations that occur away from the permanently established helicopter base. iii. Agricultural work (including but not limited to: cropping, top dressing and spraying) carried out on a site in the Rural Production or Horticulture Zones on a seasonal, temporary or intermittent basis as part of normal agricultural or horticultural works for up to 30 days in any 12 month period. This exclusion does not provide for night-time frost fighting or permanently established helicopter bases. 	<p>Matters of discretion if compliance not achieved:</p> <ul style="list-style-type: none"> i. That compliance with a helicopter noise limit of 50 dB L_{dn} will occur (when assessed in accordance with the permitted standard provisions). ii. The potential for cumulative helicopter noise levels to exceed 50 dB L_{dn (7 day)} (when cumulatively assessed in accordance with the permitted standard provisions). iii. Any restrictions on a weekly, monthly or annual helicopter movements proposed. iv. Any potential wider social or community benefits from the operation of the helicopter. <p><i>Note: The restricted discretionary noise rule of 50 dB L_{dn} is the same as that</i></p>

		<p><i>recommended in NZS6807:1994 as the “limit of acceptability” for rural or residential landuse.</i></p> <p><i>The 40 dB L_{dn} permitted standard is intentionally set at a much lower level. Compliance with the permitted standard will typically have an insignificant effect on amenity.</i></p>
<p>(8) Fixed Wing Landing Areas</p>	<p>1.Noise from fixed wing aircraft (excluding activities stated below) operating from landing strips shall not exceed a noise limit of 45 dB L_{dn} any point within any Residential Zone, or within the notional boundary of any noise sensitive activity in the Rural Production, Rural Living, Horticulture, Rural Lifestyle, Rural Settlement or Māori Purposes zone when assessed in accordance with NZS6805:1992 “Airport Noise Management and Land Use Planning.”</p> <p>a. Excluded activities:</p> <p>i. Agricultural work (including but not limited to: cropping, top dressing and spraying) carried out on a site in the Rural Production or Horticulture Zones on a seasonal, temporary or intermittent basis as part of normal agricultural or horticultural works for up to 30 days in any 12 month period. This exclusion does not provide for permanently established aircraft bases in the Rural Production or Horticultural zones.</p>	<p>Matters of discretion if compliance not achieved:</p> <ol style="list-style-type: none"> 1. That compliance with a noise limit of 55 dB L_{dn} will occur (when assessed in accordance with the permitted standard provisions). 2. The potential for cumulative aircraft noise levels to exceed 55 dB L_{dn} (when assessed in accordance with the permitted standard provisions). 3. The daily, weekly and annual number of aircraft movements applied for and the consequential effects with regard to the matters set out in NOISE-P3. <p><i>Note: The restricted discretionary noise rule of 55 dB L_{dn} is the same as NZS6805:1992 recommends within which noise sensitive activities should be prohibited without acoustic insulation.</i></p> <p><i>The 45 dB L_{dn} permitted standard is intentionally set at a much lower level.</i></p>

		<p><i>Compliance with the permitted standard will typically have an insignificant effect on amenity.</i></p>																				
<p>(9) Explosives</p>	<p>1. Noise from the use of explosives (excluding fireworks as part of any temporary event) in the Minerals zone or as part of any construction activity in any zone shall comply with the following noise limits when measured at the specified receiver location in any zone:</p> <table border="1" data-bbox="389 674 1042 1256"> <thead> <tr> <th>Receiver</th> <th>Permitted blasting time window</th> <th>Number of blasts per year</th> <th>Peak airblast sound limit dB L_{zpeak}</th> <th>Ground Borne Vibration Limit PPV</th> </tr> </thead> <tbody> <tr> <td>Occupied noise sensitive activity</td> <td>0700 to 1900 hours</td> <td>≤ 20 >20</td> <td>120 115</td> <td>10mm/s 5mm/s</td> </tr> <tr> <td>Occupied commercial and industrial buildings</td> <td>All hours</td> <td>All</td> <td>125</td> <td>25 mm/s</td> </tr> <tr> <td>Unoccupied buildings</td> <td>All hours</td> <td>All</td> <td>140</td> <td>AS2187.2:2006 Table J4.5(B) limits</td> </tr> </tbody> </table> <p>Notes:</p> <ul style="list-style-type: none"> i. In assessing the above noise and vibration levels, airblast and ground vibration shall be measured and assessed in accordance with AS2187.2:2006 Explosives – Storage and Use Part 2: Use of Explosives. ii. Noise shall be measured at any point within any Residential, Mixed Use, Natural Open Space or Industrial zone, or within the notional boundary of any noise sensitive activity in the Rural Production, Rural Living, Horticulture, Rural Lifestyle, Rural Settlement or Māori Purposes zone iii. One blast per annum may exceed the peak airblast sound limits by 5 dB. 	Receiver	Permitted blasting time window	Number of blasts per year	Peak airblast sound limit dB L _{zpeak}	Ground Borne Vibration Limit PPV	Occupied noise sensitive activity	0700 to 1900 hours	≤ 20 >20	120 115	10mm/s 5mm/s	Occupied commercial and industrial buildings	All hours	All	125	25 mm/s	Unoccupied buildings	All hours	All	140	AS2187.2:2006 Table J4.5(B) limits	<p>Matters of discretion if compliance not achieved:</p> <ol style="list-style-type: none"> 1. The potential noise and vibration effects on human annoyance and whether these can be mitigated through a construction noise and vibration management plan. 2. The potential for airblast or ground borne vibration to result in building damage.
Receiver	Permitted blasting time window	Number of blasts per year	Peak airblast sound limit dB L _{zpeak}	Ground Borne Vibration Limit PPV																		
Occupied noise sensitive activity	0700 to 1900 hours	≤ 20 >20	120 115	10mm/s 5mm/s																		
Occupied commercial and industrial buildings	All hours	All	125	25 mm/s																		
Unoccupied buildings	All hours	All	140	AS2187.2:2006 Table J4.5(B) limits																		
<p>(10) Wind Turbines and Wind</p>	<p>1.Noise from wind turbines and wind farms shall comply with <i>NZS6808:2010 “Acoustics – Wind farm noise”</i> when measured and assessed measured and assessed in accordance with this standard.</p>	<p>Matters of discretion if compliance not achieved:</p> <ol style="list-style-type: none"> 1. TBC 																				

Farms		
(11) Bird Scaring Devices	<ol style="list-style-type: none"> 1. The use of bird scaring devices in the Rural and Horticultural zones shall not exceed the following noise limits: <ol style="list-style-type: none"> i. Bird scaring devices shall not operate between sunset and sunrise ii. Each device shall operate at not more than 6 “events” per hour where an “event” includes clusters of up to three shots from percussion type devices, or three individual shots from a firearm in quick succession. This rule does not apply to bird scaring devices that generate a noise level less than 55 dB L_{AE} within the notional boundary of any noise sensitive activity not owned by the operator of the device. iii. The sound level from any event shall not exceed 65 dB L_{AE} within the notional boundary of any noise sensitive activity not owned by the operator of the device. 2. The use of bird scaring devices in other zones is a restricted discretionary activity. 	<p>Matters of discretion if compliance not achieved:</p> <ol style="list-style-type: none"> 1. TBC
(12) Frost Fans or Horticultural Wind Machinery	<ol style="list-style-type: none"> 1. The use of frost fans or wind machines in the Rural Production or Horticultural zones shall not exceed the following limits: <ol style="list-style-type: none"> i. Noise generated by single or multiple frost fans shall not exceed 55 dB $L_{Aeq(15\ min)}$ at any time when assessed within the notional boundary of any noise sensitive activity on a site under different ownership. The noise limit includes a correction for the special audible characteristics of frost control fans, and no further penalty shall be applied to measured noise levels. ii. Operation of frost fans during the night period (10 pm to 7 am) shall be for protection of crops from frost only. Any other operation, such as for the purposes of maintenance, shall be undertaken during the day period. 2. The use of frost fans in any other zone is a discretionary activity. 	<p>Matters of discretion if compliance not achieved:</p> <ol style="list-style-type: none"> 1. TBC
(13) Shooting Ranges	<ol style="list-style-type: none"> 1. Shooting ranges shall comply with the following when measured at any point within any Residential or Natural Open Space zone, or within the notional boundary of any noise sensitive activity in the Rural Production, Rural Living, Horticulture, Rural Lifestyle, Rural Settlement or Māori Purposes Zone: 	<p>Matters of discretion if compliance not achieved:</p> <ol style="list-style-type: none"> 1. TBC

	<ul style="list-style-type: none"> i. Monday to Saturday 7 am to 10 pm Sunday 9 am to 6pm 45 dB $L_{Aeq(15\ min)}$ and 55 dB $L_{A_{fmax}}$ ii. Except that for 18 special events the noise limits shall increase to 50 dB $L_{Aeq(15\ min)}$ and 60 dB $L_{A_{fmax}}$ <p>2. Shooting ranges shall not operate outside the hours in (i) above.</p>	
<p>(14) Emergency Generator Use</p>	<ul style="list-style-type: none"> 1. The testing of emergency generators shall comply with the following: <ul style="list-style-type: none"> b. The duration of testing shall not exceed 12 hours total per annum; ii. Testing shall occur between 0900 and 1700 hours only; <ul style="list-style-type: none"> c. Noise levels during testing shall not exceed the following noise limits: <ul style="list-style-type: none"> a. 60 dB $L_{Aeq(15\ min)}$ at any point within any Residential or Natural Open Space zones, or within the notional boundary of any noise sensitive activity in the Rural Production, Rural Living, Horticulture, Rural Lifestyle, Rural Settlement or Māori Purposes zone b. 65 dB $L_{Aeq(15\ min)}$ at the façade of any noise sensitive receiver in the Mixed Use zone c. 70 dB L_{Aeq} within any other site ion the Mixed Use zone d. 85 dB $L_{Aeq(15\ min)}$ within any Horticultural Processing, Light Industrial or Heavy Industrial zone. 	<p>Matters of discretion if compliance not achieved:</p> <ul style="list-style-type: none"> 1. TBC

Sound Insulation rules		
NOISE-S3	Sound insulation standards for all noise sensitive activities	
<p>(1) State Highways – will need to see what concordance with zone there is.</p>	<ol style="list-style-type: none"> 1. Any noise sensitive activity in a new building or in an alteration or addition to an existing building, within 40 metres of a road carrying more than 15,000 vehicles per day, shall be designed, constructed and maintained to not exceed a noise limit of 40 dB $L_{Aeq(24h)}$. 2. Compliance with (1) above shall be achieved based on an existing noise level with a 2 decibel addition to allow for future traffic increase. 3. Compliance with (1) above shall be achieved if, prior to the construction of any building containing a noise sensitive room, an acoustic design certificate from a suitably qualified acoustic engineer is provided to the Council which certifies that the proposed design and construction of the building, alteration or additions will achieve the internal sound levels. The building shall be designed, constructed, and maintained in accordance with the design certificate. The design certificate shall also state the required HVAC design noise levels that are to be included in the ventilation design as well as any relevant assumptions. 4. Where design external noise levels in (2) above are greater than 55 dB $L_{Aeq(24\ hour)}$, a ventilation and cooling system shall be provided to enable occupants to remain comfortable within the dwelling without having to open doors or windows for ventilation or cooling. Compliance with this clause shall be achieved if, prior to the construction of any building containing a noise sensitive room, a ventilation and HVAC design certificate from a suitably qualified practitioner is provided to the Council. 	<p>Matters of discretion if compliance not achieved:</p> <ol style="list-style-type: none"> 1. TBC
<p>(2) Mixed Use Zone Light Industrial Zone</p>	<ol style="list-style-type: none"> 1. Any noise sensitive activity containing the following uses within the Mixed Use or Light Industrial zones shall be designed, constructed, and maintained to meet the following internal noise levels in: <ol style="list-style-type: none"> a. Bedrooms and sleeping areas: 30 dB L_{Aeq} b. Other habitable rooms in dwellings, or teaching areas: 40 dB L_{Aeq} 2. The following external noise levels shall be used in the design and shall be assumed to be incident on the exposed wall façade(s). The suitably qualified acoustician may use discretion to determine noise levels on other building elements based on the 	<p>Matters of discretion if compliance not achieved:</p> <ol style="list-style-type: none"> 1. Management of sensitivity to noise with regard to the matters set out in NOISE-P2. 2. The provision of a report from an acoustic specialist which provides evidence that the

	<p>zoning and future development of the adjacent sites:</p> <table border="1" data-bbox="453 264 1074 904"> <thead> <tr> <th rowspan="3">Zone</th> <th colspan="7">Design noise level (dB Leq - incident)</th> <th rowspan="3">dBBA</th> </tr> <tr> <th>63</th> <th>125</th> <th>250</th> <th>500</th> <th>1</th> <th>2</th> <th></th> </tr> <tr> <th>Hz</th> <th>Hz</th> <th>Hz</th> <th>Hz</th> <th>kHz</th> <th>kHz</th> <th>kHz</th> </tr> </thead> <tbody> <tr> <td colspan="9">Mixed Use</td> </tr> <tr> <td>Bedrooms and sleeping areas</td> <td>63</td> <td>57</td> <td>53</td> <td>51</td> <td>51</td> <td>48</td> <td>43</td> <td>55</td> </tr> <tr> <td>Other habitable dwelling rooms</td> <td>68</td> <td>62</td> <td>58</td> <td>56</td> <td>56</td> <td>53</td> <td>48</td> <td>60</td> </tr> <tr> <td colspan="9">Light Industrial</td> </tr> <tr> <td>Bedrooms and sleeping areas</td> <td>56</td> <td>58</td> <td>59</td> <td>59</td> <td>54</td> <td>52</td> <td>50</td> <td>60</td> </tr> <tr> <td>Other habitable dwelling rooms:</td> <td>61</td> <td>63</td> <td>64</td> <td>64</td> <td>59</td> <td>57</td> <td>55</td> <td>65</td> </tr> </tbody> </table> <p>3. Compliance with (1) above shall be achieved if, prior to the construction of any building containing a noise sensitive room, an acoustic design certificate from a suitably qualified acoustic engineer is provided to the Council which certifies that the proposed design of the building or additions will achieve the internal sound levels. The building shall be designed, constructed, and maintained in accordance with the design certificate. The design certificate shall also state the required HVAC design noise levels that are to be included in the ventilation design as well as any relevant assumptions.</p> <p>4. A ventilation and cooling system shall be provided to enable occupants to remain comfortable within the dwelling without having to open doors or windows for ventilation or cooling. Compliance with this clause shall be achieved if, prior to the construction of any building containing a noise sensitive room, a ventilation and HVAC design certificate from a suitably qualified practitioner is provided to the Council.</p>	Zone	Design noise level (dB Leq - incident)							dBBA	63	125	250	500	1	2		Hz	Hz	Hz	Hz	kHz	kHz	kHz	Mixed Use									Bedrooms and sleeping areas	63	57	53	51	51	48	43	55	Other habitable dwelling rooms	68	62	58	56	56	53	48	60	Light Industrial									Bedrooms and sleeping areas	56	58	59	59	54	52	50	60	Other habitable dwelling rooms:	61	63	64	64	59	57	55	65	<p>level of acoustic insulation is appropriate to ensure the amenity of present and future residents of the site.</p> <p>3. The impact of any sensitive activity that does not provide the required noise insulation on the ability of existing or future permitted business activities to operate or establish without undue constraint.</p>
Zone	Design noise level (dB Leq - incident)							dBBA																																																																							
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<p>(3) Outer Noise Control Boundary and Air Noise Boundary</p>	<p>1. To be completed by FNDC</p>	<p>Matters of discretion if compliance not achieved:</p> <p>1. TBC</p>																																																																													

Definitions Section

Term	Definitions
Air Noise Boundary	FHL to insert definition
Outer Control Boundary	FHL to insert definition
Day	means the period 7am to 10pm hours unless specified otherwise.
Night	means the period 10pm to 7am hours unless specified otherwise.
L_{dn} (Day/Night Level)	is the day-night sound level which is calculated from the 24 hour LAeq with dB10 dB penalty applied to the night-time (2200-0700 hours) LAeq to account for potentially increased annoyance during this time.
L_{Aeq} (15 min)	This is the Rating Level established in accordance with New Zealand Standard NZS 6802:2008 <i>“Acoustics - Environmental Noise”</i> as the time-averaged, A-weighted sound level measured in decibels (dB).
L_{AFmax}	is the maximum, A-frequency-weighted, fast-time-weighted sound level, in decibels (dB), in a given measurement period.
Noise Sensitive Activity or Activities	<p>are buildings within which activities occur that may be affected by noise and require a higher standard of amenity. These include: residential units, education, health and cultural facilities including rooms such as:</p> <ol style="list-style-type: none"> 1. Residential sleeping areas and living spaces 2. Educational assembly halls, classrooms, lecture theatres, libraries 3. Overnight medical area areas and consulting rooms 4. Marae and places of worship <p>Noise sensitive spaces do not typically include offices, commercial or industrial premises. These are termed “non- . Other spaces may be considered a noise sensitive activities by Council on a case-by-case.</p>
Noise Sensitive Zone	<p>is a zone that are intended to contain a noise sensitive activity which is not required to meet specific sound insulation requirements. These zones include:</p> <ol style="list-style-type: none"> 1. Residential 2. Māori Purpose 3. Rural (all) 4. Horticultural 5. Natural Open Space
High-Noise Generating Activities	Means noise from significant regional infrastructure, transportation and activity that is typically undertaken in industrial zones or commercial areas
Bedroom	Is a room within a Noise Sensitive Activity which is used primarily for the purpose of sleeping
Living Area	Is a habitable room within a dwelling which is not a bedroom

Term	Definitions
Notional Boundary	means a line 20 metres from the façade of any noise sensitive activity, or the legal boundary, where this is closer to the noise sensitive activity.
Bird Scaring Device	is a gas gun, avian distress alarm, firearm or other such device used primarily for the purposes of scaring birds
Frost Fans or Horticultural Wind Machines	is a machine used to move air around a horticultural or rural site for the purpose of drying fruit or mitigating the effects of frost
Wind Turbine	means a wind turbine used to extract kinetic energy from the wind and having a swept area of greater than 200-m ² .
Suitably Qualified Acoustician	means a recognised member of the Acoustical Society of New Zealand or equivalent as determined at Far North District Council's discretion
Suitably Qualified (HVAC) Practitioner	means a suitably qualified and experienced person in the design of building ventilation and air conditioning systems as determined at Far North District Council's discretion
Temporary activities	for the purposes of this chapter Temporary Activities are defined as events, festivals, markets or community gatherings on any <i>Open Space</i> or public land (including the road reserve) and also including any emergency management training activities that are on private or public land.
Temporary military training activities	FNDC to insert definition
Airblast	means sound or pressure generated during use of explosives measured as a linear peak noise level as a measure of the absolute maximum acoustic pressure.
Permanently Established Aircraft Bases	<p>Means a site where fixed wing aircraft are to be operated from on a regular basis as part of a commercial, industrial, rural or residential activity. This includes the following (all definitions exclude Kerikeri, Kaitaia and Kaikohe airports which are subject to other noise rules):</p> <ol style="list-style-type: none"> 1. A landing strips on any site which is used for passenger and/or pilot transportation on an ongoing basis 2. Any sites where aircraft are stored in a hanger 3. Any landing strips which are used as the primary base for a commercial aviation activity (even if the main business is providing rural or horticultural services) <p>It does not mean:</p> <ol style="list-style-type: none"> 1. A rural landing strip on a Rural or Horticultural site where the aircraft may land when carrying out normal agricultural or horticultural works on a seasonal, temporary or intermittent basis.

Term	Definitions
Permanently established helicopter bases	<p>Means a site where helicopters are to be operated from on a regular basis as part of a commercial, rural or residential activity. This includes the following (all definitions exclude Kerikeri, Kaitaia and Kaikohe airports which are subject to other noise rules):</p> <ol style="list-style-type: none"> 1. Marked or unmarked landing areas where a helicopter is used for passenger and/or pilot transportation to or from the site on an ongoing basis 2. Landing areas within a winery, hotel, resort, sporting club, tourist facility or similar private commercial activity. 3. Sites where a helicopter is stored in a hanger 4. Sites where a helicopter is based as part of a commercial aviation activity (even if the primary business is providing rural or horticultural services) 5. The primary departure, arrival, storage and servicing location of a rescue or emergency helicopter. <p>It does not mean:</p> <ol style="list-style-type: none"> 1. A location on a Rural or Horticultural site where the helicopter may land from time to time when carrying out normal agricultural or horticultural works on a seasonal, temporary or intermittent basis. 2. A marked landing area used for patient transfer or emergencies at Kerikeri or Bay of Islands Hospital. 3. A specific area within a public site which is marked for safe use by rescue or emergency helicopters (e.g. a marked area on a public sports field or park)
Quarrying and mining activities	Means the extraction, movement and processing of rock, sand, gravels or other minerals from the earth.
NZS 6801:2008	New Zealand Standard NZS 6801:2008 <i>“Acoustics – Measurement of environmental sound”</i>
NZS 6802:2008	New Zealand Standard NZS 6802:2008 <i>“Acoustics – Environmental Noise”</i>
NZS 6803:1999	New Zealand Standard NZS 6803: 1999 <i>“Acoustics - Construction Noise”</i>
NZS 6805:1992	New Zealand Standard NZS 6805:1992 <i>“Airport Noise Management and Land Use Planning”</i>
NZS 6806:2010	New Zealand Standard NZS 6806:2010 <i>“Acoustics - Road-traffic noise - New and altered roads”</i>
NZS 6807:1994	New Zealand Standard NZS 6807:1994 <i>“Noise Management and Land Use Planning for Helicopter Landing Areas”</i>
NZS 6808:2010	New Zealand Standard NZS 6808:2010 <i>“Acoustics – Wind farm noise”</i>
NZS 6809:1999	New Zealand Standard NZS 6809:1999 <i>“Acoustics – Port Noise Management and Land Use Planning”</i>

NZS6803:1999

As discussed in the report, the District Plan would ideally provide the noise limits set out in NZS6803:1999 for reference. These guidelines values are set out below:

Table 2 – Recommended upper limits for construction noise received in residential zones and dwellings in rural areas

Time of week	Time period	Duration of work					
		Typical duration (dBA)		Short-term duration (dBA)		Long-term duration (dBA)	
		L _{eq}	L _{max}	L _{eq}	L _{max}	L _{eq}	L _{max}
Weekdays	0630-0730	60	75	65	75	55	75
	0730-1800	75	90	80	95	70	85
	1800-2000	70	85	75	90	65	80
	2000-0630	45	75	45	75	45	75
Saturdays	0630-0730	45	75	45	75	45	75
	0730-1800	75	90	80	95	70	85
	1800-2000	45	75	45	75	45	75
	2000-0630	45	75	45	75	45	75
Sundays and public holidays	0630-0730	45	75	45	75	45	75
	0730-1800	55	85	55	85	55	85
	1800-2000	45	75	45	75	45	75
	2000-0630	45	75	45	75	45	75

Table 3 – Recommended upper limits for construction noise received in industrial or commercial areas for all days of the year

Time period	Duration of work		
	Typical duration	Short-term duration	Long-term duration
	L _{eq} (dBA)	L _{eq} (dBA)	L _{eq} (dBA)
0730-1800	75	80	70
1800-0730	80	85	75

DIN4150-3

The District Plan should also consider providing the guidelines from DIN4150-3 for reference. These guidelines values are set out below:

Table 1: Short-term (transient) vibration (DIN 4150-3 1999: Tables 1)

Type of structure	PPV at the foundation at a frequency of (mm/s)			PPV at horizontal plane of highest floor (mm/s)
	1 - 10Hz	1 - 50 Hz	50 - 100 Hz	
Commercial/Industrial	20	20 – 40	40 – 50	40
Dwellings	5	5 – 15	15 – 20	15

Table 2: Long-term vibration (DIN 4150-3 1999: Table 3)

Type of structure	PPV at horizontal plane of highest floor, all frequencies (mm/s)
Commercial/Industrial	10
Dwellings	5
Historic or sensitive	2.5

15. Noise and Vibration Metrics Standard

Mandatory directions

1. Any plan rule to manage noise emissions must be in accordance with the mandatory noise measurement methods and symbols in the applicable New Zealand Standards incorporated by reference into the planning standards and listed below:
 - New Zealand Standard 6801:2008 Acoustics – Measurement of environmental sound
 - New Zealand Standard 6802:2008 Acoustics – Environmental noise
 - New Zealand Standard 6803:1999 Acoustics – Construction noise
 - New Zealand Standard 6805:1992 Airport noise management and land use planning – measurement only
 - New Zealand Standard 6806:2010 Acoustics – Road-traffic noise – New and altered roads
 - New Zealand Standard 6807:1994 – Noise Management and Land Use Planning for Helicopter Landing Areas- excluding 4.3 Averaging
 - New Zealand Standard 6808:2010 Acoustics – Wind farm noise
 - New Zealand Standard 6809:1999 Acoustics – Port noise management and land use planning
2. Any plan rule to manage noise emissions must be consistent with the mandatory assessment methods in section 6 Rating Level and section 7 LMAX of New Zealand Standard 6802:2008 Acoustics – Environmental Noise (incorporated by reference into the planning standards), provided the type of noise emitted is within the scope of New Zealand Standard 6802:2008.
3. Any plan rule to manage damage to structures from construction vibration must be consistent with the metrics for peak particle velocity (ppv) in ISO-4866:2010 – Mechanical vibration and shock, incorporated by reference into the planning standards.