

Appendix H

Specialist's Evaluation – Noise and Vibration

Memo

To:	Paul Ryan – Hamilton City Council		
From:	Sharon Yung	Date:	6 May 2025
Subject:	Rotokauri Strategic Infrastructure Requirement – Technical Specialist Report for Section 42A Reporting		
Technical Area:	Acoustics (noise and vibration)		
Version:	Final		

Purpose

1. This memorandum has been prepared to provide technical assessment under section 42A of the Resource Management Act 1991 (RMA), in respect of noise and vibration in relation to the Rotokauri Strategic Infrastructure Requirement (the Requirement).

Introduction

2. My full name is Sharon Yu-Cin Yung. I am an Acoustics/Noise Specialist at T+T and have held this position since July 2021.
3. I have a Diploma in Noise and Vibration control and a Bachelor with Honours in Architectural Studies. I am a member of the Acoustical Society of New Zealand and a Member of the United Kingdom's Institute of Acoustics.
4. I have been employed in acoustics since 2013. I have held positions at AECOM (2019-2021) and AURECON (2017-2019) and have worked for the UK Environment Agency (2013-2017), where I was responsible for the regulatory assessment and auditing of industrial noise impact assessments.
5. I have undertaken numerous construction and operational noise and vibration assessments across New Zealand for a range of large transport network projects, including Auckland's Central Rail Link, O Mahurangi – Penlink and Te Tupu Ngatahi – Supporting Growth in Auckland. I am currently the lead acoustic specialist for the Otaki to North of Levin project for the southern Alliance where I have been involved in operational road traffic noise modelling and assessment, construction noise and vibration management plans and mitigation options.

Code of Conduct

6. I have read the Environment Court Code of Conduct for expert witnesses contained in the Environment Court Practice Note 2023 and agree to comply with it. I confirm that the opinions expressed in this memorandum are within my area of expertise except where I state that I have relied on the advice of other persons. I have not omitted to consider materials or facts known to me that might alter or detract from the opinions I have expressed.

Scope

7. This memorandum covers the following:
 - a. The relevant environmental effects of allowing the Requirement and whether any adverse effects will be acceptable,
 - b. Relevant matters raised, and relief sought, in submissions,
 - c. Statutory considerations,
 - d. Recommended amendments and/or additions to the Requiring Authority's proposed designation conditions¹.

Executive summary

8. The proposed Rotokauri Strategic Infrastructure Designation will involve the construction and operation of new and altered arterial road corridors that traverse through mainly rural areas with minimal buildings within close proximity.
9. Marshall Day Acoustics' (MDA) construction noise and vibration assessment identified noisy equipment typically used for roading projects. The MDA assessment calculated relevant set back distances for this equipment to achieve the long term-duration noise limits of NZS 6803:1999 "Acoustics – Construction Noise". The assessment concludes there may be some construction activities that exceed the applicable noise limits on occasions but that noise effects are generally acceptable provided that the construction activity causing the impact is appropriately managed. I agree with this conclusion.
10. Operational road traffic noise was assessed by MDA under NZS 6806:2010 "Acoustics – Road traffic noise – New and altered roads". The Acoustic report identified four Protected Premise Facilities² (PPFs) within the identified assessment area of 100 m from the road corridor. A noise reduction at three 'altered road' PPFs was predicted, and a less than 3 dB increase at one 'new road' PPF. The predicted noise level change due to the proposed road did not trigger a full assessment under NZS 6806:2010 and no mitigation was required. The Acoustic report concludes the operational effects from the proposed road are considered acceptable and generally neutral. I consider the MDA assessment approach is appropriate and was carried out in general accordance with industry best practice. I agree with its findings.

Documents considered

11. The following documents have been considered in the preparation of this assessment:
 - a. Rotokauri Strategic Infrastructure Designation: Notice of Requirement: Final Report 19 September 2024: Prepared by Beca Limited for Hamilton City Council, (the NOR).
 - b. Appendix B to the NOR – Design Plans, Roading Drawings, Rotokauri Arterial Development.

¹ See s10 of the NOR.

² NZS 6806 Clause 1.4 defines the term PPF and include existing houses, schools, marae and various other premises. Commercial and industrial premises do not fall within the definition of a PPF.

- c. Appendix K to the NOR – Acoustic Assessment of Noise Effects, Rotokauri Arterial Development, Marshall Day Acoustics, Rp 001 r03 20190530, 30 June 2023 (Acoustic report).
- d. Appendix N to the NOR – Transport Assessment Report, Rotokauri Arterial Designation, Beca Limited, 24 April 2024.
- e. Section 92 response letter (Part 1) dated 31 January 2024 from Melissa Slatter on behalf of Hamilton City Council as the Requiring Authority.
- f. Section 92 response letter (Part 2) dated 24 April 2024 from Tony Denton on behalf of Hamilton City Council as the Requiring Authority, updated NOR and Appendices A – O.
- g. Submissions listed in Table 1.

Table 1: Submissions that raise noise or vibration matters

Number	Submitter
10	Allister Henry Gillam
16	Phillip Ross Laird and Franklaw Trust Ltd
17	Ministry of Education

- h. Summary of submissions provided by Hamilton City Council.

Site visit

- 12. I have not undertaken a site visit as I considered the noise effects at the four PPFs to be either low risk or negligible based on the MDA assessment.

Analysis

Environmental effects

Construction noise effects

- 13. The construction noise and vibration assessment considered construction commencing in 2028-2030 and lasting more than 20 weeks. Standards NZS 6803:1999 and DIN 4150-3:1999 are appropriate and have been correctly applied by MDA.
- 14. Given that detailed design and construction programming for the project is yet to occur, the MDA assessment could not be based on detail around the construction methodology, the programme of works and the duration of activities. Accordingly, some assumptions needed to be made by MDA in undertaking their assessment. In my view the assumptions made are realistic for a roading project of this type.
- 15. It was assumed that works will occur during standard hours between 0730 – 1800 Monday to Saturday but with some night works which may be required to avoid traffic disruption. The assessment is based on common construction equipment for roading projects and MDA has made predictions at various distances to determine the noise and vibration impacts. I agree

the equipment identified are typical for roading projects and the approach undertaken is appropriate to provide a high level, but worst-case assessment.

16. The Acoustic report concludes there may be some construction activities that exceed the applicable noise limits on occasions. It was considered by MDA that noise effects are generally acceptable provided that the construction activity causing the impact is appropriately managed, including notification to adjacent landowners and the use of acoustic barriers to mitigate the noise. Whilst the construction assessment lacks predicted noise levels at specific dwellings, I agree that the range of predicted impacts provided within the Acoustic report are not uncommon for roading projects of this scale. I agree that a construction noise and vibration management plan (CNVMP) can appropriately manage the noise and vibration effects and should be included as a designation condition.

Operational road traffic noise

17. Operational road traffic noise for the proposed arterial road was assessed under three discrete sections under 'New and Altered Road', as per NZS 6806:2010. I agree with this approach. NZS 6806:2010 is routinely used within New Zealand to allow for strategic infrastructure to develop while mitigating the adverse traffic noise effects on the environment and local communities. Other major infrastructure projects in Hamilton (for example, Hamilton Southern Links) have successfully applied the NZS 6806:2010 assessment procedure through the Notice of Requirement and construction phases of each project.
18. The assessment has been carried out in general accordance with NZS 6806:2010 with a minor exception. To consider the overall effects of traffic noise at PPFs, the Acoustic report included an assessment for existing local roads with the future project in place and operational to capture a more realistic future scenario. The Acoustic report acknowledged the ambient noise environment is dominated by traffic along the major transportation infrastructure (SH1C) at residential dwellings due to direct-line-of-sight and "are minimally affected by other local roads". I agree with the adapted approach undertaken.
19. The MDA predictions rely on future "existing" traffic volumes in 2030 when the proposed road is due to commence and predicted future traffic flows in 2050. There was no reference to where the traffic data had been sourced from within the Acoustic report. Traffic flow data is a key element of the NZS 6806:2010 assessment and a reliable source of data is required. The Section 92 response confirmed the future existing traffic volumes were derived using publicly available data on mobileroad.org (latest data available in 2020) with a 3% non-compounding increase per annum. The 2050 traffic flows were provided by Beca. I agree that the traffic flow data is appropriately sourced.
20. Four PPFs were identified within the applicable assessment area. The Acoustic report predicts a noise reduction at three 'altered road' PPFs (around Te Kowhai East Road and Te Kowhai Road) and a less than 3 dB increase for the one 'new road' PPF (29 Burbush Road³) due to the proposed road. The Acoustic report predicts none of the four identified PPFs within 100 m of the proposed road (altered and new) meet the threshold for a full assessment in accordance with NZS 6806:2010 and are predicted to achieve Category A. I have not been able to verify the results but agree that the assessment has been carried out in general accordance with NZS 6806:2010.

³ See submission from P Laird from this address

21. I noted the PPF location of 29 Burbush Road has been assessed as 27 Burbush Road within the Acoustic report which could be a typographical error. I consider the results are still relevant to the property address of 29 Burbush Road.
22. There are inconsistencies in the traffic volumes as identified in the Acoustic report itself (Footnote 5) and between the Transport report (Table 6-1 of Transport report). The Section 92 response states this is due to the inclusion of traffic flows at intersections in the Transport report, whilst the Acoustic model does not. I agree these minor inconsistencies are not likely to change the overall conclusions of the Acoustic report as it requires a doubling or halving of traffic flows to result in a 3 dB increase or decrease in the predicted noise level.
23. The Acoustic report concludes the operational effects from proposed road are considered acceptable and generally neutral. I agree with this conclusion.

Matters raised in submissions

24. Three submissions were relevant to noise and vibration matters.

Submission no. 10 – Allister Henry Gillam (79 Te Kowhai East Road)

25. This submission includes:

“Opposed to the NOR requiring acquisition of land with reasons including causing significantly more noise and vibration which will affect the quiet enjoyment of the family home.

Seeking for project to purchase whole property including residential home or move the design.”

26. Whilst the proposed design does shift closer to the family home by approximately 30-35 m, noise is predicted by MDA to reduce by 4 dB at this property due to the proposed road. The reduction stems from a reduced traffic flow anticipated from approximately 9,114 AADT (Arthur Porter Drive to Roger Kauai PI) for the ‘Do nothing’ 2050 scenario to 2,000 AADT (Arthur Porter Drive North of intersection) for the ‘Do minimum’ 2050 scenario (with the proposed road). This is more than half of the original predicted traffic flow and the results reflect this change. Whilst I consider this is a positive effect with an anticipated lower or similar noise environment to that currently experienced, the perception of increased traffic noise may still occur due to direct line of sight of the closer road. However, the change will occur gradually over a 20-year period and the environment is dominated by traffic noise from other local and major roads. I consider the predicted noise level is acceptable in accordance with NZS 6806:2010.
27. The Acoustic report did not provide an assessment for operational vibration or address the reasons for its exclusion. In my experience, there are no applicable New Zealand standards for vibration from road traffic. Traffic vibration from new roads does not typically create issues. Road traffic vibrations are typically perceived due to heavy vehicles travelling over irregularities in the road surface. A key factor with new roads is the uniformity of the basecourse/pavement and the absence of near surface services. This is due to new or upgraded roads being designed to be smooth and even, thereby avoiding vibration being generated from passing traffic over uneven surfaces. I therefore consider operational traffic vibration to be negligible.
28. Whether or not the submitter’s property is totally acquired by the Requiring Authority is a land acquisition matter that is outside the scope of this technical review.

Submission no. 16 – Phillip Ross Laird and Franklaw Trust Limited (29 Burbush Road)

29. This submission includes:

“Effects of Noise, dust and vibration effects on the dwelling on the submitter’s property and surrounding residential site. The house was built some 60 years ago right on the boundary and in very close proximity to the existing road and even closer proximity to the proposed road. The property has a garden area that extends up to and partly into the road reserve.

Construction, traffic noise and vibration during construction and operation of the proposed road. Visual effects during construction and operation of the proposed road, due to the proximity of the dwelling and surrounding section to the proposed road.

Conditionally opposed - Our submission is that the Council needs to rethink the location of the road, particularly to move it further from the submitter’s property, and to rethink the methods that are to be used to minimise the impacts of the proposed road on the submitter’s property during construction and operation of the road.”

30. Construction is temporary in nature, and effects will be for a limited duration. The dwelling and outdoor garden space along the rear of 29 Burbush Road are over 30 m from the proposed works and, whilst construction works will be noticeable from within the property boundary, it is possible to effectively manage and mitigate the noise impacts at the property via a CNVMP, using barriers and other management options as set out in Section 6.4 of the Acoustic report. The record of title plan shows Lot 5 registered to the submitters encompasses both property addresses of 27 and 29 Burbush Road. I recommend that a site-specific construction noise and vibration management plan (Schedule) be prepared for both property addresses.
31. Operational road traffic noise at this property is predicted to increase by 2 dB in 2050 when compared to the existing situation (2030) due to the proposed road. This change in noise level is a result of the increase in traffic volumes from under 2,000 AADT (2030) along Burbush Road located less than 5 m from the property to 6,000 AADT (2050) along the proposed minor arterial road located over 90 m from the property.
32. Whilst this change may be perceptible to occupants, it will be a gradual increase over a 20-30-year period. The noise contribution from the proposed road is considered low when compared to the combined noise from other local roads and the proposed roads (Future scenario), and well below the NZS 6806:2010 criteria for new roads. The connecting road moves the proposed road closer to the northern property boundary but has a lower traffic flow. According to the Acoustic report, the existing carriageway of Burbush Road will still be the more dominant source of road noise and any change will not be noticeable immediately. I consider that noise at 29 Burbush Road is at an acceptable level in accordance with NZS 6806:2010.

Submission no. 17 – Ministry of Education (MOE)

33. As shown on the figure in **Appendix 1** to this memorandum, the MOE has interests in 5 operational education facilities near the proposed arterial designation: Rotokauri School, Ngaa Taiaatea Wharekura, Te Kopuku High, Pukete School, and Te Rapa School. It also has a site designated for a future school in Rotokauri North (Designation B119) and is seeking to acquire an additional site for a school in the Rotokauri Structure Plan area. This latter site could potentially adjoin the designation subject to the NOR.

34. The MOE's submission includes:

"The Project is a large programme of works anticipated to be delivered in 3 stages. The quantum of construction required to deliver the projects will likely have temporary adverse effects on the surrounding environment. There are several educational facilities in proximity to the NoRs. There is potential for these educational facilities to be affected by traffic, noise and other nuisance effects arising from future construction works. The construction timing is yet to be determined, so there is uncertainty regarding the construction methodology, including the routes for construction vehicles and the location of construction laydown areas".

35. The proposed designation is over 500 m from any existing and proposed (designation B119) MOE facility and as such MOE facilities are not likely to experience any significant noise from construction works. The Acoustic report indicated receivers over 400 m away will meet the night-time criteria (45 dB L_{Aeq}). Any construction laydown areas within the designation will fall within the envelope of effects determined within the Acoustic report. I consider noise generated from construction works within the designation will be sufficiently low at the nearest MOE facilities and effects will be less than minor.
36. Construction related vehicle movements along the existing public roads are not subjected to noise limits in the district plan. It is unknown which route construction vehicles will take but the designation is significantly far (over 500 m) from the MoE sites with the closest being Te Rapa School along Church Road. With the existing environments along possible routes being dominated by traffic noise from the arterial roads and State highway, additional construction vehicle movements will generally be inseparable from general traffic on the existing roads during the day. Construction vehicle noise may be distinguishable along local residential roads where heavy vehicles do not typically go, such as around Rotokauri School. In these situations, I consider that the noise of construction vehicle movements can be managed by the CNVMP. For example, by considerate driver behaviour (no harsh acceleration or braking) and avoiding peak periods, including school drop off and pick up times.
37. It is understood that MOE is considering acquiring land for a future school located immediately next to the arterial road designation. Any noise and vibration effects due to construction of the arterial road will be dependent on when this new school is constructed and fully operational in relation to the construction of the road. If the school is operational after the construction of the road, construction noise effects will not occur. Any future MoE sites should consider the impacts of the designation as covered by the Hamilton District Plan (Rule 25.8.3.10).

Statutory considerations

38. I have reviewed the discussion in Section 9 of the NOR (p94 Section 25.8) on the provisions in the Hamilton District Plan relating to noise and vibration and I agree with the comments on those provisions. In my opinion, based on that analysis, the Requirement is consistent with those provisions.

Conclusions

39. In my opinion:

- a. The proposed works, managed by appropriate designation conditions, including the new and modified conditions that I recommend below⁴, or similar conditions, will:
 - i. Have adverse noise and vibration effects that are at worst minor, and
 - ii. Comply with the relevant statutory requirements discussed in paragraph 38 above.
- b. Confirming the Notice of Requirement would be consistent with Rules 25.8.3.2, 25.8.3.3, and 25.8.3.4 in the Hamilton City District Plan.

Recommendations

Recommended modifications to the Requirement

40. I do not recommend any modification to the Requirement.

Designation conditions

41. Condition 9.1 excludes site investigations and enabling works from requiring a CNVMP. I agree with this exemption as the stated activities typically do not involve noisy equipment such as those identified for earthworks and other construction activities.
42. I recommend the following amendments and/or additions to the requiring authority's proposed designation conditions⁵. See ~~striketrough~~ for deletion, and underline for addition:

Construction Noise and Vibration Management Plan

...

9.3 The objective of the CNVMP is to provide a framework for the development and implementation of the Best Practicable Option for the management of construction noise and vibration effects to achieve the construction noise and vibration standards set out in Conditions 9.4 and 9.5 to the extent practicable. To achieve this purpose, the CNVMP shall be prepared in accordance with Annex E2 of the New Zealand Standard NZS6803:1999 'Acoustics – Construction Noise' (NZS6803:1999, and shall as a minimum, address the following:

....

- x *identification of areas where compliance with the noise [Condition 9.4] and/or vibration standards [Condition 9.5] ~~Category A or Category B~~ will not be practicable and the specific management controls to be implemented and consultation requirements with owners and occupiers of affected sites;*

....

9.6 Schedule to the CNVMP

....

- a iii. A Schedule to the CNVMP must be prepared for 27 and 29 Burbush Road and implemented when construction activities are undertaken within 100 metres of these properties' boundaries.

⁴ See paragraph 42.

⁵ See s10 of the NOR.

Reasons for the recommended amendments to the Designation Conditions

43. I recommend the amendments set out in paragraph 42 for the reasons set out in Table 2.

Table 2: Reasons for the recommended amendments to the Designation Conditions proposed in the NOR

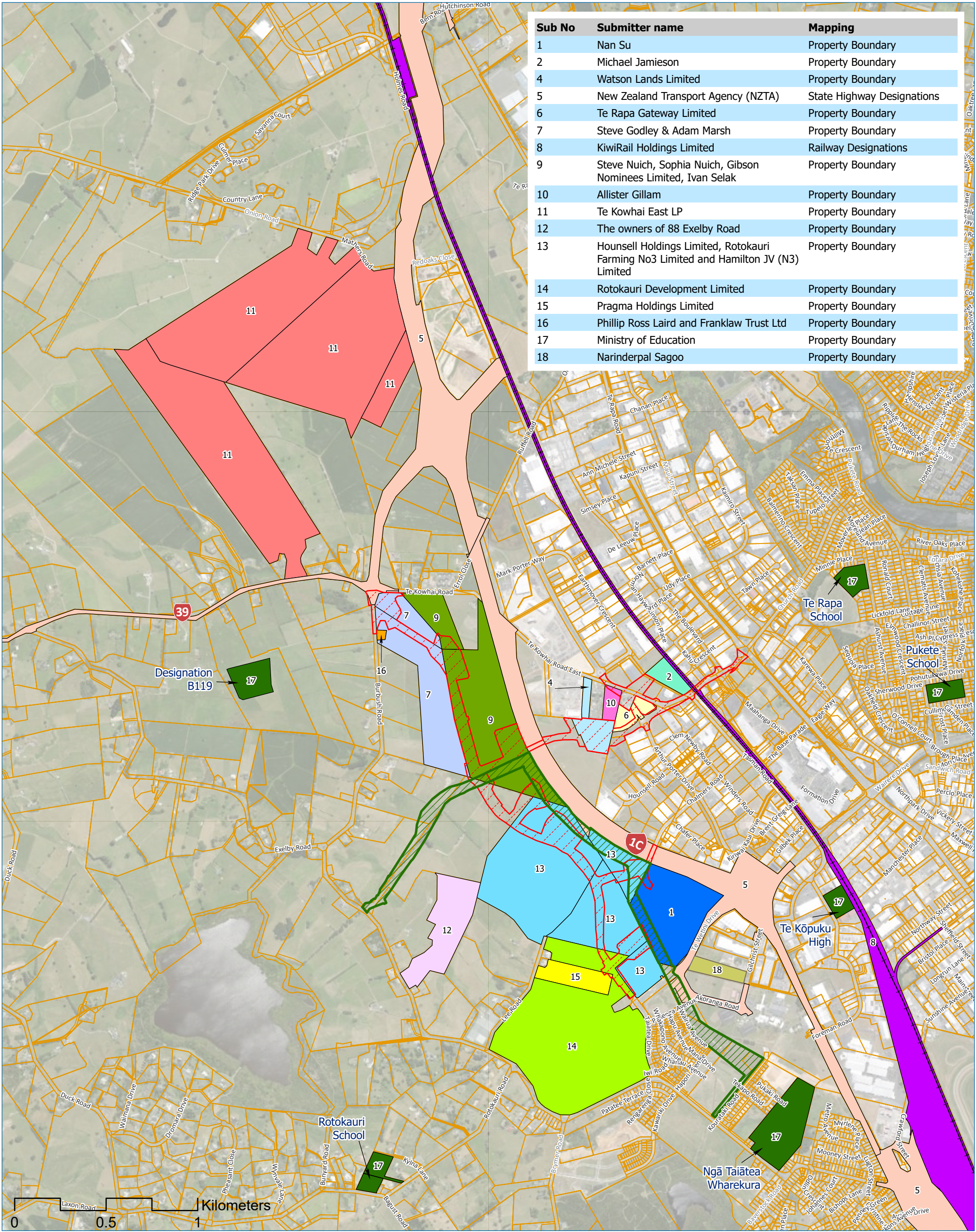
Condition Number in the NOR	Reasons for the amendments
9.3 x	Category A and B are not applicable to the noise and vibration standards of condition 9.4 and 9.5.
New Condition 9.6 a iii	Addressing submitter's concern regarding construction noise. The Schedule will allow for noise effects to be managed and mitigated accordingly - see paragraph 30 above.

6-May-25

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Appendix A

Submitters' Properties



Sub No	Submitter name	Mapping
1	Nan Su	Property Boundary
2	Michael Jamieson	Property Boundary
4	Watson Lands Limited	Property Boundary
5	New Zealand Transport Agency (NZTA)	State Highway Designations
6	Te Rapa Gateway Limited	Property Boundary
7	Steve Godley & Adam Marsh	Property Boundary
8	KiwiRail Holdings Limited	Railway Designations
9	Steve Nuich, Sophia Nuich, Gibson Nominees Limited, Ivan Selak	Property Boundary
10	Allister Gillam	Property Boundary
11	Te Kowhai East LP	Property Boundary
12	The owners of 88 Exelby Road	Property Boundary
13	Hounsell Holdings Limited, Rotokauri Farming No3 Limited and Hamilton JV (N3) Limited	Property Boundary
14	Rotokauri Development Limited	Property Boundary
15	Pragma Holdings Limited	Property Boundary
16	Phillip Ross Laird and Franklaw Trust Ltd	Property Boundary
17	Ministry of Education	Property Boundary
18	Narinderpal Sagoo	Property Boundary

- KEY**
 - Parcel Boundaries
 - Proposed Rotokauri Strategic Infrastructure Designation
 - Rotokauri Greenway Designation
 - Rail
 - Submitter Number
 - 1
- 2
 - 4
 - 5
 - 6
 - 7
 - 8
- 9
 - 10
 - 11
 - 12
 - 13
 - 14
- 15
 - 16
 - 17
 - 18