

Report pursuant to s42A Resource Management Act 1991

In the matter of: A Notice of Requirement to construct and operate a new intermodal rail and freight hub on land between Palmerston North and Bunnythorpe

And: A hearing by Palmerston North City Council pursuant to s100A

Requiring Authority: KiwiRail Holdings Ltd

Hearing date: Commencing 9 August, 2021

Section 42A technical evidence summary statement for hearing: Noise

By: Nigel Lloyd

1 Introduction

1. I have prepared a s42A technical report on noise issues. This summary statement responds to matters that have been discussed during the hearing.
2. Where I discuss conditions, I refer to the Requiring Authority's conditions ("**Requiring Authority's Conditions**") of the 13 August 2021 which, I understand, is the set the panel is using. Where I refer to the s42A officers' recommended conditions ("**the s42A recommended conditions**"), these are the set at the start of the hearing dated 9 August 2021 (although I have been advising Ms Copplestone on changes during the hearing). The s42A recommended conditions largely incorporated recommendations from my s42A report.
3. I note that I have conferenced with Dr Chiles and we prepared a Joint Witness Statement ("**JWS**") dated 19th August 2021.
4. In my s42A report I described the designation and identified that noise and vibration issues will arise from road traffic, construction activities and the operational activities of the Freight Hub.

2 Existing Aural Environment

5. Submitters neighbouring the Freight Hub describe the existing environment as a *relatively quiet rural environment*, and I agree that this description is mostly supported by the environmental noise monitoring.

3 The Perimeter Road

6. The closest dwellings on the western side (Te Ngaio Road, Clevely Line) will experience an increase in road traffic on the new Perimeter Road where no road traffic previously existed. There is likely to be a high percentage of heavy traffic on this road. Noise mitigation measures include a "*stone mastic asphalt*" road surface and acoustic barriers. Dr Chiles agrees that a condition should be included requiring quiet road surfacing for the perimeter road and he recommends the terminology "*an asphaltic mix*". I agree with this and note that this has been included in the Requiring Authority's Conditions at 90(c)(v).

7. Submitters¹ asked that, on the west side of the Designation, the proposed noise barrier be located to the west of the perimeter road to also screen their dwellings, and I considered this to be reasonable to screen the noise of heavy vehicles on this new road.

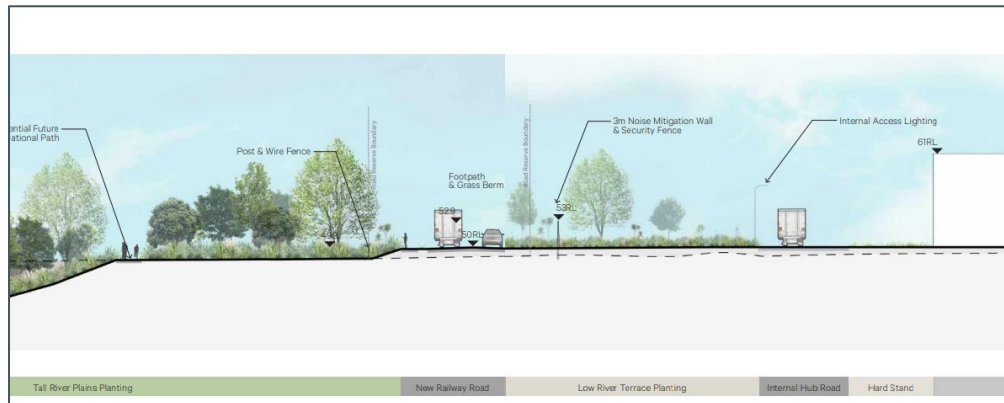


Figure 1. Extract from Landscape Evidence² showing Perimeter Road and Noise Barrier.

8. In Dr Chiles's evidence (9.16) he explains that placing the barrier to the west of the perimeter road would mean that it would be too low to screen noise sources on the site and should not be moved to the west of the road. I accept that the main noise barrier should be at the edge of the at-grade-area of the Freight Hub if the topography would make it otherwise ineffective. Having the barrier to the west of the new perimeter road would screen dwellings on Te Ngaio Road and on Clevely Line and looking at Sections 3, 4 and 5 it appears that there is the potential to achieve this though.
9. I accept that this would be part of the detailed design stage of the Freight Hub.

4 Construction Noise

10. Construction noise is to be measured, assessed and controlled by reference to NZS 6803:1999. Construction activity involves the use of heavy construction equipment for bulk earthworks over a three year period, plus three years for the construction of Stage 1. There will be further construction activity for Stage 2 (2040) and Stage 3 (2050). This will represent a major change to the aural environment that is currently enjoyed by the people in this area.

¹ Helen and Pita Kinaston (#27)

² Extract from Section 5 of Appendix B of Lisa Rimmer's Landscape and Visual Evidence

11. No predictions have been made of construction noise, and 50 metres and 200 metre *buffer* areas have been developed based on Dr Chile's "experience with comparable works on numerous other projects³". Buffer areas are normally empty tracts of land that are used to buffer noise sensitive neighbours but, in this case, there are dwellings inside the buffer area. Some of these dwellings may be exposed to noise levels that exceed the construction standard noise limits, but there is no indication where or when this might occur.
12. Care needs to be taken that high construction noise does not become a regular feature at any noise sensitive location. The Acoustic Assessment identifies that "*enhanced mitigation*⁴" might be required to maintain compliance with the construction noise and vibration limits, but does not go into any detail on any of these measures or of the timing or their practicality.
13. Heavy vehicles associated with construction works will be significant and are difficult to regulate on the surrounding road network. The Requiring Authority's draft condition 65(a) seeks to do this by limiting numbers of heavy vehicles through key areas at night but provides no guidelines around how this would be achieved. I accept that this is difficult to achieve by way of conditions.
14. The Acoustic Assessment considers that it is practicable for construction works near to houses to be undertaken during daytime only⁵. This would limit the hours for noisier equipment to 7.30 am to 6.00 pm. I originally recommended that, to remove any doubt, these hours of construction activity should be included in a condition. Given the size and the scale of this project, though, I anticipate that there would be pressure from earth moving contractors to operate on the fringes of daytime hours (especially during the summer months), and this might be possible while still meeting the noise limits in the construction noise standard (NZS 6803). This could shorten the overall duration of the construction works. There have been no predictions made in the Acoustic Assessment regarding construction noise, and this would need to be done if construction work was to be undertaken outside of daytime hours.
15. The Requiring Authority's draft conditions 68 and 69 require that the Requiring Authority prepare and implement a Construction Noise Management Plan

³ AEE - Acoustic Assessment - page 31 *Construction noise and vibration*

⁴ AEE - Acoustic Assessment - page 31 *Construction noise and vibration (final paragraph)*

⁵ AEE - Acoustic Assessment – page 34 & 35 *Assessment of effects*

with the objective being to achieve compliance with conditions 71 and 72, which set out noise and vibration limits.

16. Draft Condition 72(A) of the s42A recommended conditions (which I support) highlights that night-time construction work that exceeds the limits should only take place if they cannot be practicably undertaken during the day and require a specific noise assessment to determine appropriate mitigation measures. The assessment must be undertaken by a suitably qualified and experienced person.
17. Draft condition 72(A) also requires sensitive receivers to be notified and a copy of this information to be provided to Council. This condition accepts that there may be times when night-time construction work is inevitable and sets out to minimise any adverse impacts.
18. The Requiring Authority's draft condition 71A requires that night-time construction works only take place if it is impracticable to do them in the daytime. Measures to assess and control these works and for notification of sensitive receivers are provided for in the CNVMP as Condition 73.
19. I consider that night-time construction works that exceed the construction noise and vibration limits would have a high risk of impacting on the health and wellbeing of residents and, therefore, I prefer that all of these matters be included in a single condition similar to Draft Condition 72(A) of the s42A recommended conditions.

5 Operational Noise

20. The Acoustic Assessment of the Freight Hub identifies that operational noise emissions will be a significant impact for the neighbours to the designation. Dwellings located between the predicted 55 dB $L_{Aeq(1h)}$ and Designation boundary will be exposed to night-time levels that exceed the criterion in Category C⁶ and as such will experience noise that is incompatible with residential activity.
21. In considering the significance of this effect, I have previously expressed my opinion that a larger designation would have provided landowners with better opportunities, including the ability to ask the Requiring Authority to purchase

⁶ AEE - Acoustic Assessment – Table 5 Proposed Freight Hub Noise Criteria on page 18.

their dwellings. I also noted that a larger designation would also prevent the further establishment of inconsistent land uses which risks further establishment of potentially incompatible use of land in the time leading up to either the Freight Hub is built, or a district plan change can be progressed. This may be made worse with lengthy lapse dates.

22. I heard to the Panel's discussion with Dr Chiles about this topic, and whether this type of commentary or opinion is appropriate. I would simply say that had I been advising KiwiRail on noise issues in preparation of its NoR, I would have advised it that these NoR boundaries should have been widened on account of the predicted significance of the noise effects. I understand there are difficulties with expanding the boundaries now, and that is not my recommendation.
23. The point is that these significant noise effects will remain with little option for landowners but to accept reduced aural amenity compared to what they currently enjoy. Hearing neighbours' submissions about their concerns about noise, uncertainty, and lack of meaningful options have reinforced my opinion about this. Several submitters have eloquently expressed concerns about noise and the lack of options they face if they decide that they are not prepared to accept the reduced aural amenity.
24. Monitoring has now been undertaken of freight train marshalling and assembly (attached to Dr Chiles evidence as Appendix A) and Dr Chiles states that these *"are essentially the same as levels previously assessed from other aspects of the Freight Hub and the results do not alter the indicative noise contours, or my assessment findings"*. My concern though has always been that the contours are predicted as $L_{Aeq(1h)}$ i.e. the sound level averaged over a one hour duration and the shunting activities generate noise that is potentially impulsive in nature and is measured as L_{AFmax} . The reassurance I was seeking further monitoring was to determine if this impact noise will cause sleep disturbance beyond that assessed using $L_{Aeq(1h)}$.
25. From those measurements, I estimate that the noise levels at the nearest dwellings on Sangsters Road will experience between 70-75 dB L_{AFmax} from shunting impact noise at the closest track and noise levels will be well below the 85 dB L_{AFmax} limit in the Requiring Authority's draft condition 85 (Table 3) at the Noise Management Boundary. I estimate the Noise Management Boundary to be approximately 360 metres away from the nearest train track

in the marshalling yard. The implication is therefore that the Freight Hub operational noise will comply with both the 55 dB $L_{Aeq(1h)}$ and the 85 dB L_{Amax} noise limits at the Noise Management Boundary.

26. The Acoustic Assessment derives noise criteria specifically for the Freight Hub which are significantly less stringent than the District Plan Rural Zone limits. Category A criteria are claimed to be similar to the noise allowed from the North East Industrial Zone noise limits. While the Category A limits are numerically the same, there are differences in the averaging times for individual measurements, duration corrections and the assessment location, whereby NEIZ limits apply at other site boundaries outside of the zone rather than at the notional boundaries of dwellings.
27. Dr Chiles now agrees that penalties for special audible characteristics (such as bangs and squeals) should be applied when assessing any of the Categories. Any noise with special audible characteristics will be more intrusive than noise without, and more likely to cause sleep disturbance.
28. The Mid Central Health Board submission seeks for the penalty for special audible characteristics to be applied and for noise assessments to be made in accordance with NZS 6802:2008. If the noise being measured exhibited special audible characteristics, then this would result in the modelled contours increasing by 5 decibels e.g. the 55 dB $L_{Aeq(1h)}$ contour would become the 60 dB $L_{Aeq(1h)}$ contour.
29. Council's s42A draft conditions include assessment of special audible characteristics should they be present but there has been no adjustment to the location of the predicted contours. The Requiring Authority's recommended draft condition 85(a) sought to restrict the way in which Special Audible Characteristics are assessed so that only "objective" methods are used. Dr Chiles now agrees that special audible characteristics should be assessed in accordance with NZS 6802:2008 and we agree that, if appropriately designed and managed, the Freight Hub can operate without generating these.
30. I consider that New Zealand Standards should not be manipulated unless they are clearly deficient in some way. Special audible characteristics are assessed using the methodology set out in Appendix B of NZS 6802:2008 which provides for objective methods to be used "where there is doubt about the presence

of tonality". I note that there is not an objective test for impulsive noise in Appendix B of NZS 6802:2008.

31. While I have agreed with Dr Chiles that the Freight Hub can be operated without special audible characteristics being generated, this does not mean that the operation should be assumed not to have them. This is because special audible characteristics could arise either through poor design of the operations or from activities taking place carelessly. While the latter would best be controlled using a noise management plan, the ultimate recourse for both poor design and careless management of the operation would be enforcement action, with reference to the NoR noise conditions. This could be applied to the impulsive noise of marshalling activity, if trains/wagons regularly collide at unnecessary speed and the dropping of containers or logs. The potential of the application of penalties for the presence of special audible characteristics should be a necessary deterrent.
32. A Noise Management Boundary is proposed by Dr Chiles that approximates (and smooths) the modelled 55 dB $L_{Aeq(1h)}$ noise contour. This is the daytime criteria for the derived Category C criteria in the Acoustic Assessment.
33. If the Category C criteria are exceeded, then (according to the Acoustic Assessment) "*Freight Hub noise is likely to be incompatible with residential activity*". The night-time (10pm to 7am) Category C criteria are 55 dB $L_{Aeq(1h)}$ and 85 dB L_{Amax} .
34. There is some uncertainty in the Acoustic Assessment regarding how night-time noise will differ from daytime noise but, given the Freight Hub is proposed to operate 24/7, a worse case assessment would assume that a "*busy one hour*"⁸ would occur at night.
35. If that happened, then all of the dwellings located between the Noise Management Boundary (representing 55 dB $L_{Aeq(1h)}$) and the Designation Boundary would exceed the night-time Category C criteria and would be exposed to noise that is *likely to be incompatible with residential activity*. The range of Freight Hub noise levels modelled between the Noise Management Boundary and the boundary of the designation is predicted to be 55-65 dBA.

⁷ AEE - Acoustic Assessment – Table 5 Proposed Freight Hub Noise Criteria on page 18.

⁸ AEE - Acoustic Assessment – Top of page 5 and Table 11 Modelled operating scenario.

36. A reduction of 20-30 dB is required to noise insulate bedrooms against external noise levels of 55-65 dB $L_{Aeq(1h)}$. The recommended criterion for bedrooms is 35 dB $L_{Aeq(1h)}$ which is achievable with noise insulation and ventilation (to be able to keep windows closed).
37. I originally had considerable uncertainty regarding the assessment of special audible characteristics and how a penalty should be factored in when protecting the community from noise with such a characteristic. This has been simplified now because Dr Chiles now accepts that noise should be assessed in accordance with NZS 6802:2008 (except for corrections for duration) including special audible characteristics.

6 Noise Barriers

38. The Acoustic Assessment prescribes 5 metre high noise barriers to the east of the designation and 3 metre high barriers to the north (adjacent to Maple Street), and these have been included as noise management plan requirements. Land to the east of the designation is elevated above the finished ground level of the Freight Hub with the cross-sections provided as part of a Response to the s92 Request indicating that these barriers will not effectively screen all dwellings. The noise barriers next to Maple Street will not effectively screen the upper storeys of dwellings. I consider that there needs to be some design input to optimise local barrier heights, rather than a blanket prescription. This requirement is now proposed as the Requiring Authority's draft condition 90(c)(i) & (ii).
39. A datum must be used for the height of the barriers. My understanding of the design is that the barrier height is above the finished ground level "of the Freight Hub" (which was deleted in the Requiring Authority's draft condition 90) and I consider this reference needs to be retained in conditions. Otherwise, the datum becomes the *finished ground level*, for which there is no control.
40. The size (3 metres) and locations of barriers along the western boundary are now included as the Requiring Authority's draft condition 90(c)(iii), which is particularly relevant for dwellings on Te Ngaio Road and Clevely Line, if dwellings still remain within 500 metres of the Freight Hub when operation commences.

7 Submissions

41. I have discussed submission points in my evidence in chief.
42. Many of the submitters raise concerns about the noise and vibration impacts that will result from each aspect of the proposal. A proposal of this scale will inevitably have significant noise impacts on the semi-rural nature of this area. Concerns have been expressed about the lack of certainty in the Acoustic Assessment regarding the best level of mitigation for construction and operational noise, the timing of the instigation of any mitigation and who will be responsible for it.
43. Many submitters expressed sincerely held concerns about the noise impacts that would result from the Freight Hub construction and operation and about the restrictions on daily lives that would result from the Freight Hub noise and the required noise mitigation measures. It was explained that aspects of living in a semi-rural area would be curtailed and that the enjoyment of living with open windows and the cross ventilation of dwellings would be lost.
44. These will be the inevitable consequences on the closest neighbours to the Freight Hub given the significant levels of noise that will result.
45. There have been discussions throughout the hearing about the establishment of "hard" noise and vibration limits that can act as objectives for noise management plans to achieve. The draft conditions recommended by the Requiring Authority had no noise or vibration limits and these have been developed as part of the s42A process in something of a piecemeal fashion (which continues as I write this summary statement).
46. A number of submitters have provided statements and legal submissions which I have found to be extremely helpful, and I thank them for that.

8 Draft Noise Conditions

47. There are a significant number of dwellings that will be exposed to high levels of noise, and other dwellings that will receive lower noise levels, but will need noise insulation and/or ventilation to mitigate the noise to achieve appropriate levels in bedrooms.
48. Since I wrote my s42A evidence the draft conditions proposed by the Requiring Authority have been amended to meet a number of my concerns and

matters raised in submissions. At the time of writing this statement, not all of these amendments are agreed.

49. I have been liaising with Ms Copplestone to refine the draft noise conditions that I consider should be included in this NoR to provide for noise mitigation and to protect residential amenity. At the time of writing this summary statement the situation was still developing regarding the precise wording of the noise conditions. I can discuss both of the versions of draft conditions as required and identify where disagreement still remains. Some key points are below
50. I consider that NIMT noise should be included with Freight Hub noise which would allow mitigation measures to be appropriately determined in relation to the actual aural environment (and sensible noise monitoring undertaken)
51. I have recommended that the words "*as far as practicable*" be deleted from the Requiring Authority's draft conditions 85 and 86. The operational noise and vibration limits in these conditions are intended to be bottom line enforceable standards. Allowing them to be exceeded if it is "not practicable" to comply will result in noise and vibration levels that are greater than the noise mitigation is designed to control. This would have adverse health and amenity impacts on neighbours to the Freight Hub.
52. I consider it appropriate to provide for exceedance of the construction noise and vibration limits where they cannot practicably be achieved, because construction work is a temporary activity and elements of this exceedance will be inevitable.

9 Remaining Areas of Disagreement

53. These have been set out in the JWS.
54. With respect to the JWS, a number of the areas of disagreement are self-explanatory but I will briefly expand on the reasons why I consider the NIMT noise should be included with the Freight Hub noise from an acoustical viewpoint.
55. In the first instance I consider that it is reasonable to design the noise mitigation for dwellings against all of the noise from the Designation, including NIMT noise. Not to do so means that the resultant noise levels inside dwellings may exceed

the internal noise criteria. No assessment has been made of NIMT noise, so we do not know what the difference would be with and without NIMT noise.

56. Secondly, there will be practical difficulties in noise monitoring if NIMT noise is to be excluded. For example, monitoring would need to be stopped while a train passes. This could be done by placing sensors on the tracks or by a software recognition program that would identify an approaching train and pause the monitoring. Again, I consider this to be illogical given elements of the noise will be of similar characteristics and is all emanating from within the Freight Hub.

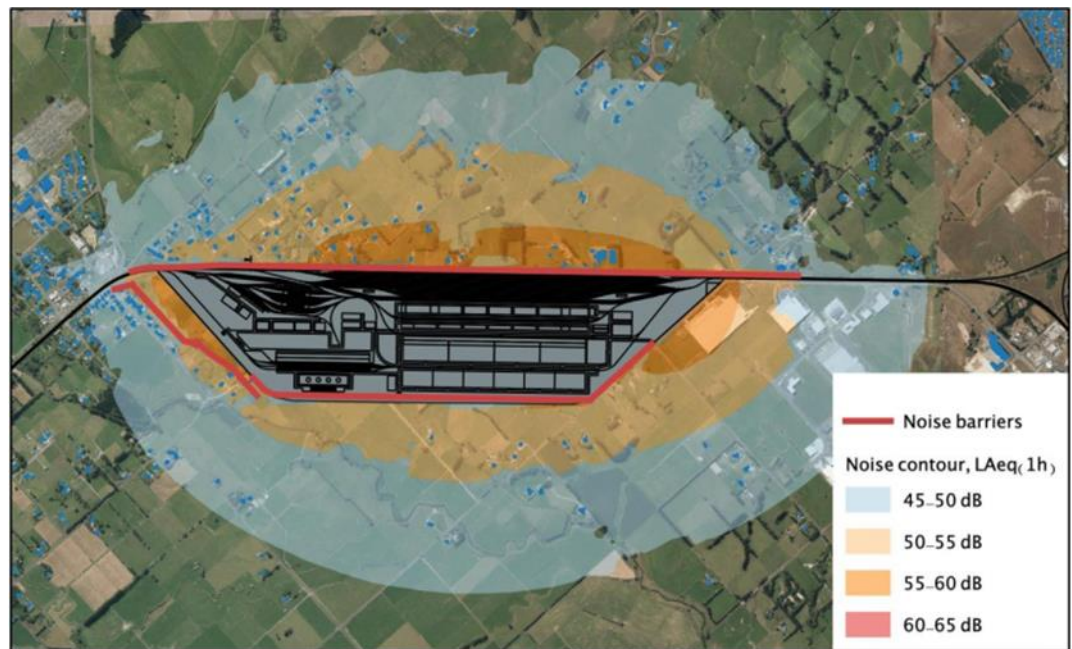


Figure 2 Indicative noise contours with barriers (Acoustic Assessment Fig 12)

57. The second matter of disagreement I will discuss further is around what Future Freight Hub operational noise should be assumed for Condition 85C in the reporting officers' conditions. This condition provides for dwellings to be noise insulated at a time when the development of the Freight Hub is to take place and the detailed design of Stage 1 has been completed. This triggers the requirement for the Requiring Authority to offer and install noise insulation and/or ventilation. There is agreement that Future Noise Contours for the Rail Hub should be established but I disagree with Dr Chiles on the basis for these. The disagreement is with the level of Future Noise that should be assumed.
58. I consider that the Future Noise Contours should be based on the maximum noise allowed by Condition 85B (65 dB LAeq(1h) beyond the designation boundary) and Condition 85 (55 dB LAeq(1h) at the Noise Management

Boundary) (of the s42A recommended conditions). This informs the location of the 45 dB $L_{Aeq(1h)}$ contour. These Future Noise Contours would be at similar locations to the contours shown in Figure 1 above.

59. I consider that it is important to establish these Future Noise Contours now because:
- a. They become established (hard) noise design criteria that can be seen now and into the future;
 - b. They will not be exceeded by Freight Hub activities (because they relate to noise limits that are applied strategically in the conditions);
 - c. They will provide for noise mitigation measures (noise insulation of dwellings) to be applied only once (i.e. without the need for further insulation in the future);
 - d. They will be apparent to people buying into the area or developing new dwellings;
 - e. They will allow Council to develop land use management controls of surrounding land to require noise insulation and control new development (as part of a separate District Plan process) should it be considered necessary.
60. This condition would work in a similar manner to the sound insulation programme at Auckland International Airport (AIAL). At AIAL the Annual Aircraft Noise Contours (AANC) are projected every year to ensure that compliance with the noise contours is achieved and to determine who should be offered noise mitigation. The noise mitigation is then offered to protect against the maximum noise allowed by the Future Airport Noise Contours (in 1 dB increments), rather than the interim noise levels that are being predicted at that time.
61. The Future Airport Noise Contours at AIAL are calculated as L_{dn} so cannot be compared to the Freight Hub contours which are $L_{Aeq(1h)}$. What I propose for the Freight Hub is a graduated prediction for maximum future noise levels ranging from 65 dB $L_{Aeq(1h)}$ at the boundary of the Designation to 55 dB $L_{Aeq(1h)}$ at the Noise Control Boundary then to the 45 dB $L_{Aeq(1h)}$ contour. These would be called the Future Noise Contours.

62. I anticipate that the Noise Control Boundary and 45 dB $L_{Aeq(1h)}$ contour would subsequently be included in the District Plan to allow land use management controls to be established for the area surrounding the Freight Hub. Examples of such reverse sensitivity controls are the Palmerston North Airport and Wind Farm set-backs which have been provided for in the District Plan.

10 Conclusions

63. I have advised Council on the noise aspects of the Freight Hub. This included preparing a s42A noise report and evidence for this hearing.

64. I undertook conferencing with the Requiring Authority's acoustic adviser, Dr Chiles, and together we prepared a joint witness statement that narrowed our areas of disagreement and identified the remaining matters of contention.

65. At the time of writing this Right of Reply these outstanding matters include:

a. night-time construction works should have a specific condition (72A) that regulates the activity, provides for mitigation, informs sensitive receivers and notifies Council of the works,

b. noise impacts should be controlled by reference to "hard" noise conditions where possible (rather than by reference to future noise and vibration management plans) and operational noise and vibration limits should not be exempted on the basis of impracticability,

c. While recognising there are separate legal arguments, for acoustical reasons, NIMT noise should be included in the Freight Hub Designation controls,

d. The assessment of special audible characteristics from the Freight Hub should be in accordance with the NZ Standard,

e. The baseline for Future Noise Contours should be the maximum levels provided for by conditions and should approximate to Figure 12 of the Acoustic Assessment (included as Figure 1 of this Right of Reply).

66. I am happy to answer any questions the Panel may have.



Nigel Robert Lloyd
30 September 2021