IN THE ENVIRONMENT COURT
WELLINGTON REGISTRY

I TE KŌTI TAIAO O AOTEAROA
TE WHANGANUI-A-TARA ROHE

ENV-2023-WLG-000005

UNDER	the Resource Management Act 1991 (the Act)
IN THE MATTER	the direct referral of applications for resource consents and notices of requirement under sections 87G and 198E of the Act for the Ōtaki to North of Levin Project
BY	**WAKA KOTAHI NEW ZEALAND TRANSPORT AGENCY** Applicant

STATEMENT OF EVIDENCE OF SIIRI WILKENING ON BEHALF OF HOROWHENUA DISTRICT COUNCIL AND KĀPITI COAST DISTRICT COUNCIL

NOISE AND VIBRATION

Dated: 26 September 2023

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A. INTRODUCTION

[1] My name is Siiri Wilkening. I am a director at Marshall Day Acoustics. I have held that role since June 2021 and have been with Marshall Day Acoustics since 1998. I am a Fellow of the Acoustical Society of New Zealand.

[2] I prepared a report (required by section 198D of the Resource Management Act 1991 ("**RMA**")) on the Notices of Requirement ("**NoRs**") lodged with Horowhenua District Council and the Kāpiti Coast District Council (the "**District Councils**") relating to the Ōtaki to North of Levin Highway Project (the "**Ō2NL Project**" or "**Project**"). My report was prepared on behalf of the District Councils and was dated 28 April 2023 ("**s198D Report**").

[3] In my s198D Report, I reviewed the noise and vibration aspects of the NoRs.

[4] I confirm I have the qualifications and experience set out at paragraphs 7 - 10 of my s198D Report.

[5] Since filing my s198D Report I have reviewed the evidence of Waka Kotahi and participated in expert conferencing on noise and vibration matters. The output of that conferencing was a joint witness statement dated 27 July 2023 (the "**Noise and Vibration JWS**"). I confirm the contents of the Noise and Vibration JWS. I discuss any remaining issues and/or related conditions below.

B. CODE OF CONDUCT

[6] I repeat the confirmation provided in my s198D Report that I have read and agree to comply with the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2023. This evidence has been prepared in accordance with that Code. Statements expressed in this evidence are within my area of expertise.

C. SCOPE OF EVIDENCE

[7] My evidence addresses the following:

(a) The extent to which issues identified in my s198D Report have been resolved through Waka Kotahi evidence, expert conferencing and mediation.

(b) A response to section 274 party evidence.

(c) Conditions.

[8] In preparing this evidence I have reviewed the following:

(a) The Noise and Vibration Technical Assessment by Mr Smith attached as Technical Assessment B to the Assessment of Effects on the Environment for the Project.

(b) The Section 92 response dated 23 December 2022

(c) The statement of evidence of Mr Smith (Noise and Vibration) on behalf of Waka Kotahi NZ Transport Agency dated 4 July 2023.

(d) The Joint Statement of Planning Experts dated 10, 11 and 14 August 2023.

(e) Evidence of Karen Prouse, a s274 party (including the acoustic report prepared by Jepsen Acoustics (Appendix 3 of Ms Prouse's evidence)), and evidence from Ms Carter, planning consultant for Karen and Stephen Prouse (that evidence dated 12 September 2023 and 15 September 2023 respective).

(f) The version of the draft conditions proposed by Waka Kotahi following mediation, as lodged with the Court and provided to the parties on 4 September 2023 ("**Final Draft Proposed Conditions**").

D. OUTSTANDING ISSUES

[9] Most of the issues arising from my s198D Report have been resolved through the Noise and Vibration JWS, or the Final Draft Proposed Conditions.

[10] In particular, I note conditions DNV1, 2 and 4 (Construction Noise and Vibration)[1] and DRN 3 and 4 (Operational Road-Traffic Noise)[2], which have been amended to address issues I had raised with regard to clarity of outcome, and which have been discussed in the JWS. I comment on these further below.

[11] On review of my s198D Report and the Noise and Vibration JWS, I am of the view that the only outstanding noise and vibration issues relate to the Site Specific Construction Noise and Vibration Management Plans. The issues are regarding the need for those plans to be prepared by a suitably qualified person ("**SQP**"), and whether their provision to the District Councils is for information or certification.

[12] I address these issues below. There are also some further matters of clarification that should be attended to in relation to the conditions, and I set these out below also, under the heading 'Conditions'.

Site Specific Noise and Vibration Mitigation Plans

[13] Site Specific Noise and Vibration Mitigation Plans ("**SSNVMPs"**) (condition DNV4)[3] respond to, and are intended to be used to manage, the highest noise and vibration events occurring during construction, those that are predicted to exceed the limits and would cause the highest impact on neighbouring building occupants and structures. For that reason, I consider it imperative that these are prepared by a suitably qualified and experienced person. If this is the case, I consider that the SSNVMPs may not need to be certified by the District Council, on the basis that the preparation of those

1 Pages 23-26 of Final Draft Proposed Conditions (Track Changes Version).
2 Pages 27-28 of Final Draft Proposed Conditions (Track Changes Version).
3 Pages 25-26 of Final Draft Proposed Conditions (Track Changes Version).

plans was done by a knowledgeable person with sufficient experience in this field of work.

[14] While condition DGA9[4] requires that SSNVMPs (and the CNVMP) be prepared by a SQP, I understand from Table 8 of Mr Smith's evidence that the SSNVMPs will not necessarily be prepared by a suitably qualified and experienced person but by project staff or the Environmental Manager of the Project. Often, project staff are not suitably qualified for this work, particularly in relation to the prediction and measurement of construction vibration which is less well understood and for which survey equipment is less readily available . Project staff may also be influenced by Project considerations (e.g. ensuring that no programme slipping occurs) as they are part of the delivery team. This is not to say that the SSNVMPs will not be accurate. However, there is a risk that noise and vibration effects are not given the relevant or correct weight beside other considerations.

[15] From my personal experience, I can confirm that I have worked with many construction contractors in preparing CNVMPs and the SSNVMPs. While Environmental Managers are well versed in the occurrences and activities across their sites, they are also required to address and manage other environmental effects such as dust, stormwater, traffic and similar. Noise and vibration are specialist areas that require specialist input. They are one of the more common issues that people are aware of when construction occurs, and cause complaints. I do not consider it sufficient to hand the full responsibility of preparation of plans to manage the noise and vibration effects of the activities predicted to cause the highest effects to a potential non-expert without consistent expert oversight and assistance.

[16] I therefore remain of the opinion that the SSNVMPs should be prepared or signed off by a suitably qualified and experienced person, ideally a specialist that is agreed to by the District Councils, as stated in my s198D Report and the Noise and Vibration JWS. Given that the condition DGA9(a)(ii) requires SSNVMPs to be prepared by a SQP, I consider that my concern has largely

[4] Page 20 of Final Draft Proposed Conditions (Track Changes Version).

been addressed, apart from the requirement to have the SQP agreed with District Councils.

[17] I note too that the turnaround required by the District Councils in response to receiving the SSNVMPs is very tight. Conditions DNV4 (c) and (d) require that the Councils respond within just two working days of receipt. In practice I doubt that the Councils would be able to meaningfully respond in the time available, and therefore I support the new (e) which provides for a feed-back loop if the Councils do obtain expert advice on the SSNVMPs (perhaps on a random selection of them) and wishes to provide comments on those plans.

E. RESPONSE TO SECTION 274 PARTY EVIDENCE

[18] I have reviewed the section 274 party evidence of Ms Prouse and Ms Carter relating to the Ashleigh Homestead.

[19] Ms Prouse resides at 1024 Queen Street East, Levin. The house is a double storey historic homestead, currently about 280 metres from SH1. While I understand that some agreement has been reached between Waka Kotahi and the Prouse family, including the provision of a 2 metre high timber boundary fence, Ms Prouse's submission seeks further acoustic treatment to the house to achieve an internal noise level of 40 dB $L_{Aeq(24h)}$. This is the noise level that would be applied internally for houses that receive external noise levels above 64 dB $L_{Aeq(24h)}$ (Category C for new roads) and, for this Project, also for houses that receiver external noise levels from 58 to 64 dB $L_{Aeq(24h)}$ (Category B for new roads).

[20] In support of this request, Ms Prouse provided an acoustic report from Jepsen Acoustics. This report sets out sound insulation measurements undertaken in August 2023 on the Prouse homestead. The survey results suggest a very low noise reduction performance by the dwelling, assumed by Mr Jepsen to be mostly due to its age and no upgrades to façades, joinery or glazing.

[21] The surveys were based on existing ambient noise levels from the existing road some 280 metres away. This means that external noise levels are

relatively low, ranging from 46 to 49 dB L_{Aeq}, with equally low internal noise levels of 31 to 36 dB L_{Aeq}.

[22] ISO 140-5, the standard on which the survey was based, states that *"During the measurements the background noise in the receiving room shall be at least 10 dB below the measured equivalent sound pressure level."* It goes on to say: *"Avoid quiet periods, i.e. period when the traffic noise does not exceed the background noise by more than 10 dB."*[5]

[23] The ambient noise levels (inside and out) are low, and in my opinion are highly likely to fail the internal background noise test and potentially even the one relating to the external background noise test described above. I would have expected that the loudspeaker method would have been used, where a loudspeaker takes the role of the noise source to obtain reliable test data across all relevant frequencies with a controlled loud external noise source.

[24] While I acknowledge that the overall building envelope will provide lower sound insulation than modern dwellings which use heavier materials with insulated walls and double glazing, the measured sound insulation performance is lower than I would expect. This is particularly the case with windows ajar for ventilation. The normal noise level reduction achieved through a façade with windows ajar would be approximately 15 to 17 dB. This reduction is not normally dependent on the façade performance as the open windows will be the weakest path through which the noise passes. The low performance recorded may be due to the survey setup not fully conforming with the standard. I therefore have some doubt about the outcomes of the surveys and conclusions drawn.

[25] Based on Mr Smith's evidence, the predicted noise level at the upper floor of the Ashleigh Homestead is 57 dB $L_{Aeq(24h)}$. This is achieved with the use of a high performance low noise road surface and is at the upper end of Category A for new roads. I have confirmed with Mr Smith the alignment location on which the modelling referred to in his evidence is based. Mr Smith confirmed to me that his evidence refers to the alignment where it is

5 ISO 140-5:1998 , Section 6.3 Test requirements

at or above the surrounding land in the vicinity of the Ashleigh Homestead rather than a former alignment where it was in a cut. While there may still be further alignment changes, Mr Smith considers that the latest assessment of the BPO mitigation remains relevant.

[26] Ms Carter discusses how Waka Kotahi provides building modification mitigation for houses that are at a similar distance from the new road. I have reviewed the predicted noise levels and conditions put forward by Waka Kotahi and note that building modification is only considered for PPFs where the noise levels are in Categories B or C, but not A. Therefore, the Ashleigh Homestead would not fall under the considerations of these conditions.

[27] As noted above, I doubt the results of the sound insulation measurements undertaken on behalf of the Prouse family and consider that it is likely that the façade performs better than measured with windows ajar or closed.

[28] I do not consider that building modification mitigation will be required for the homestead. I am also not convinced that a 1.1m high barrier would achieve a noticeable change in noise level given that a 2m high barrier would not provide that outcome and a 3m barrier would achieve a small improvement.

[29] I also note that a 2m timber fence has been agreed between Waka Kotahi and the Prouse family. This fence could be constructed as an acoustic fence, i.e. without gaps between palings and between the panels and the ground, which would then provide mitigation for the outdoor area and ground floor of the Ashleigh Homestead. even if the upper floor cannot be protected. I agree that such fence could be included in the designation conditions (as sought by Ms Carter) unless the fence was covered by a side agreement between the parties.

[30] Ms Carter also discusses the potential effects from construction noise and vibration on the Ashleigh Homestead. The house is at a reasonable distance from the proposed works (more than 100m) and based on my experience with the MacKays to Peka Peka and Peka Peka to Otaki Expressways I consider that it is unlikely that construction vibration will reach levels at the

house that any (including cosmetic) vibration damage would occur. Vibration may be felt from time to time, but will be at a relatively low level.

[31] Construction noise levels at distances of more than 100m can generally comply with the relevant noise limits. Mr Smith's predictions suggest that compliance with the relevant noise limit can generally be achieved. Ms Carter accurately notes that there may be some disturbance to residents during the construction period. Even when compliance with the construction noise limits is achieved, the levels will be higher than would occur for day to day activities that would be undertaken on a site. This is an inherent characteristic of construction that can only be mitigated to a limited degree.

[32] I consider that the proposed methodology of managing construction noise and vibration through the CNVMP and SSCNVMP is appropriate to control effects to a reasonable level. I consider that the establishment works such as the construction of the haul road and vegetation removal should be managed and mitigated the same way as the construction of the Project.

F. CONDITIONS

[33] I have reviewed the Final Draft Proposed Conditions, being those updated by Waka Kotahi following mediation and circulated to the parties on 4 September 2023. I am generally comfortable with the conditions, subject to amendments to address the matters I have raised above, and the following other specific amendments which I consider are necessary. A summary table for each amendment I recommend is included below.

[34] The definition for PPF/PPFs for this Project relates to both construction and traffic noise conditions (being the DNV and DRN conditions). Those in relation to traffic noise (i.e. referenced in the DRN conditions) are further specified by referencing Schedule 9 which contains predicted noise levels for all traffic noise PPFs. The Definition for PPF/PPFs includes "playgrounds that are part of educational facilities that are within 20m of buildings used for teaching spaces". This definition relates to outside playgrounds in childcare and school facilities and is directly transcribed from NZS 6806:2010. While it is relevant for traffic noise, it is not relevant in relation to construction noise.

[35] I therefore recommend that the last bullet point in this PPF definition is deleted. This will ensure that construction noise and vibration is assessed at appropriate locations only and does not have an impact on the traffic noise PPFs as they are already specified in Schedule 9.

Definition for PPF/PPFs	Delete last bullet point.

[36] Condition DNV3 discusses the CNVMP which is conditioned in detail in Schedule 2. The wording of Schedule 2 contains a significant amount of information relating to the SSNVMPs. Since the SSNVMPs are conditioned in DNV4, including their content, I remain of the opinion that everything relating to the SSNVMPs should be contained in one condition. This is also reflected in the Noise and Vibration JWS. I have recommended replicating the relevant wording from (o) of Schedule 2 CNVMP into Condition DNV4 as follows (so long as the wording is identical, I am not concerned if subsection (o) remains in Schedule 2):

Condition DNV4	Amend to read (addition <u>underlined</u>, deletion ~~struck through~~): (b) The site specific mitigation required by clause (a) must be described in Site Specific Noise and Vibration Mitigation Plans prepared using the methodology set out in the Construction Noise and Vibration Management Plan required by Condition DNV3 <u>and DNV4(c)</u>. […] <u>(c) The Site Specific Noise and Vibration Mitigation Plans must be prepared having regard to:</u> <u>i. the matters listed in Condition DNV3(b);</u>

	ii. the characteristics of the noise or vibration, including frequency (rate) of occurrence, intensity (noise and vibration level), duration, and likelihood that such noise and vibration may cause offense, annoyance, disturbance or damage; iii. effects on public and worker health and safety of implementing the mitigation; iv. the effectiveness of options for mitigation; and vi. any construction programme implications of options for mitigation. [Re-number remaining clauses as necessary.]

[37] Condition DNV1 sets out the construction noise limits. Buildings that are to be assessed in relation to construction noise should, by definition, be occupied. Noise is assessed in relation to its effects on people. Therefore, while the body of condition DNV1 already states that buildings need to be occupied, I note that Table DNV-1 only includes the word "occupied" for PPFs, but not for commercial buildings. I recommend that the two receiver types are labelled the same, i.e. including or excluding "occupied" in the table for both equally.

Table DNV-1	Amend heading (addition underlined) to read: "Other occupied buildings that accommodate commercial activities".

[38] Condition DNV4(b) sets out the requirements for a SSNVMP. One of the aspects agreed in the Noise and Vibration JWS is that the SSNVMPs must be prepared by a suitably qualified and experienced person, which is reflected

in the conditions (condition DGA9(a)(ii)). However, I consider that there should be a suitably qualified person or persons agreed between Waka Kotahi and the District Councils who is overseeing or auditing preparation of the SSNVMPs. This is particularly important given the timing for District Councils' review of the SSNVMPs is so tight as to likely be unrealistic – the Councils will want to have a level of comfort that appropriate expert oversight is occurring. If that occurs, then I consider that the SSNVMPs do not need to be certified by the District Councils.

[39] I note that the preparation of the SSNVMPs should be either overseen or audited by a SQP agreed between the Requiring Authority and the District Councils. There is no need to have such person both 'overseeing' and 'auditing'. If the SQP is agreed, this means that the Councils will have comfort that either during the preparation phase or at the very least prior to implementation, the agreed SQP will be involved and the outcome will be appropriate.

Condition DNV4(b)	Amend to read (addition <u>underlined</u>, deletion ~~struck through~~): The site specific mitigation required by clause (a) must be described in Site Specific Noise and Vibration Mitigation Plans prepared using the methodology set out in the Construction Noise and Vibration Management Plan required by Condition DNV3 <u>and DNV4(c). Preparation of the Site Specific Noise and Vibration Mitigation Plans must be overseen or audited by a suitably qualified person approved by the District Councils.</u> <u>They</u> ~~and~~ must include, but not be limited to:

[40] Condition DRN1(a) retains the potential for chip seal road surface to remain for up to 18 months following opening of the road. I remain of the opinion, as stated in the s198D Report and the Noise and Vibration JWS, that this is an excessive timeframe and unusual compared with all other roads I have

been involved with. I therefore reiterate that ideally, low noise road surface – the main noise mitigation measure – should be implemented on day 1, or at the very least as quickly as possible, but certainly within 12 months of opening of the road in line with all other roading projects.

Condition DRN1(a)	Amend to read (addition underlined): "…must be installed within eighteen (18) months <u>at the latest (and within twelve (12) months unless it is not reasonably practicable to do so)</u> from the date the Project is opened for public use, …"

[41] Condition DRN3(b)(ii) requires that during the design of mitigation at the OPW stage, where a change in mitigation or alignment leads to an increase in noise criteria category, *"it is confirmed that the design change is the Best Practicable Option"*. It is unclear to me who confirms this and to whom. I would expect this confirmation to be set out in the report required by subsection (c) of this condition. However, this is currently not one of the contents required to be reported. Therefore, the conditions as currently worded do not allow oversight by the District Councils for situations where effects are potentially higher than assessed at present (i.e. where the predicted traffic noise levels are currently in less stringent noise criteria categories). I therefore recommend that wording is added to condition DRN3(b)(ii) to make it clear that it is the report referred to in (c) of the condition that must provide the referenced 'confirmation'.

Condition DRN3(b)(ii)	Amend to read (addition underlined): "… and it is confirmed <u>(in the report referred to in clause (c) below)</u> that the design change is the Best Practicable Option."

[42] I also recommend that a condition is added as DRN3(c)(iv) that requires the Best Practicable Option ("**BPO**") assessment to be undertaken, and confirmation of the detailed design to be the BPO to be included in that report.

Condition DRN3(c)	Add a new (iv) as follows: "<u>confirmation that the noise mitigation measures represent the Best Practicable Option in accordance with clause (b).</u>"

[43] Other condition changes in the Final Draft Proposed Conditions largely reflect the discussions in expert conferencing and sufficiently reflect the intended amendments.

G. CONCLUSION

[44] I have reviewed the documentation provided by Waka Kotahi, submitters, and submitters' experts. Overall, I consider that with the minor amendments I have recommended to the conditions, the Project can be constructed and operated within reasonable noise and vibration levels.

Siiri Wilkening

26 September 2023