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File Ref: AC24356 – 04 – R1

17 January 2025

Mary McConnell
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Email: m.mcconnell@harrisongrierson.com

Dear Mary,

Re: Selwyn District Council – NZTA SH1 Rolleston Access Improvements NOR Package 1
Peer review of acoustic technical assessments

As requested, we have undertaken a peer review of the acoustic technical assessment reports provided in support of a Notice of Requirement for the road access improvements works for State Highway 1 (SH1) in Rolleston – Package 1.

Package 1 of the works comprises the construction and operation of a new roundabout and associated access improvements at the intersections of SH1 and Dunns Crossing Road / Walker Road.

Our review is based on the following:

- Acoustic assessment titled *Rolleston Access Improvements Project Construction Noise & Vibration Technical Report – Package 1,* and *Rolleston Access Improvements Project Operational Noise Technical Report – Package 1,* as prepared by Marshall Day Acoustics and dated the 21st of October 2024.
- Assessment of Effects on the Environment titled *Assessment of Effects on the Environment,* as prepared by Beca and approved by NZ Transport Agency Waka Kotahi and dated the 30th of October 2024.
- Notice of requirement titled *NZ Transport Agency Waka Kotahi – Designation NZTA-1 – State Highway 1,* as prepared by NZ Transport Agency Waka Kotahi and dated October 2024.
- Response to RFI document titled *New Zealand Transport Agency Notice of Requirement SH1 Rolleston Access Improvements Package 1 (Roundabout) – s92(1) RMA Request for Information (RFI) Response,* as prepared by Beca and dated the 4th of December 2024.

Please find our analysis and recommendations below.

1.0 NOISE PERFORMANCE STANDARDS

1.1 Road traffic noise

Marshall Day Acoustics (MDA) have correctly identified NZS 6806:2010 *Acoustics – Road traffic noise – New and altered roads* as the relevant performance standard for assessing noise from the proposed changes to the roading layout.

They also correctly identify that the Partially Operative Selwyn District Plan does not include a performance standard specifically for road traffic noise, however NOISE-R1 *Activities not otherwise specified* stipulates that traffic and rail noise generated within a land transport corridor does not need to comply with the general zone noise rules.

NZS 6806:2010 provides separate criteria for assessments of new and altered roads. Where the noise levels resulting from the roading upgrades are predicted to exceed certain thresholds, a detailed assessment of mitigation options is required. Where the degree of change is predicted to be small, the noise effects are considered to be acceptable, and a detailed assessment and adoption of mitigation is not required.

MDA correctly identifies the following acoustic criteria for determining whether a detailed assessment is required:

- Criterion A – The Do-Minimum noise level is at least 64 dB $L_{Aeq(24h)}$ and the Do-Minimum level is at least 3 dB higher than the Do-Nothing level; or
- Criterion B – The Do-Minimum noise level is at least 67 dB $L_{Aeq(24h)}$ and the Do-Minimum level is at least 1 dB higher than the Do-Nothing level.

These criteria apply at any Protected Premises and Facilities (PPF's) as outlined in NZS 6806:2010 where the Do-Minimum noise level refers to the predicted future traffic noise levels in the chosen design year if the upgrade works are implemented without any further mitigation, and the Do-Nothing noise level refers to the predicted future traffic noise levels in the chosen design year if the upgrade works are not implemented.

Under NZS 6806 the design year is a point in time that is not less than 10 years but not more than 20 years after the alteration to an altered road. In this case MDA have chosen a design year of 2038, which we consider to be appropriate.

MDA have correctly identified all PPF's in the vicinity of the proposed works.

1.2 Construction noise

MDA correctly identifies that although the Selwyn District Plan does not refer to a specific standard, the construction noise limits outlined in the Plan mirror those in NZS 6803:1999 *Acoustics – Construction Noise.* This is the current best practice performance standard for assessing noise from construction activities in New Zealand.

The assessment states that the long-term duration noise limits outlined in NOISE-TABLE6 of the Partially Operative Selwyn District Plan are applicable. As the expected duration of works exceeds 20 weeks, we consider this to be appropriate.

1.3 Construction vibration

MDA have correctly identified that the vibration limits outlined in Rule R-14 NOISE-TABLE 4 of the Partially Operative Selwyn District Plan are derived from DIN 4150-3:1999 *Effects of vibration on structures*.

The Category A vibration limits of 5 mm/s PPV to prevent building damage, and 1 mm/s PPV to maintain residential amenity is correctly identified from the Standard.

2.0 ROAD TRAFFIC NOISE ASSESSMENT

2.1 Calculation assumptions

The MDA noise modelling calculation assumptions are thoroughly described in the assessment, with a clarification on the assumed speeds provided in the second RFI response. This includes an existing acoustic fence and bund on the southern boundary of State Highway 1. We generally consider the modelling assumptions to be appropriately conservative, and to provide a reasonable representation of the predicted noise levels.

2.2 Predicted noise levels

The predicted noise levels are of the general order that we would expect based on the modelling inputs.

For the majority of PPF's the predicted noise levels from the Do-Minimum scenario are within ±2 dB of the predicted Do-Nothing scenario. The largest increase in noise level is +1.5 dB at 380 Dunns Crossing Road. The noise level predictions are realistic for the following reasons:

- The horizontal realignment of State Highway 1 moving it closer to dwellings on Fountain Place, but not by a significant amount.
- The horizontal realignment of Dunns Crossing Road increasing the setback from the road to the dwellings on Dunns Crossing Road.
- Vehicles on State Highway 1 slightly slowing down when they approach the roundabout.
- The change in traffic volumes and heavy vehicle flow percentages on relevant roads.

The increase in noise level of +1.5 dB at 380 Dunns Crossing Road is larger than the average +0.5 dB experienced by other dwellings on Dunns Crossing Road. The following MDA response was provided:

> *This dwelling is at the southern extent of the modelled area and the noise level difference is likely to be due to sound propagation anomalies caused by the traffic noise source terminating close to this dwelling – this can be seen in the noise contour plot in Appendix F of the Noise report. However, the changes in noise level for 380 Dunns Crossing Road, and adjacent dwellings at 376 and 382, are all negligible in the context of what is subjectively perceptible.*

The termination of the road noise source close to the receiver is a reasonable explanation for the anomaly at this location and we generally agree that in the context of the assessment the noise level change at this dwelling remains inconsequential.

As recommended by MDA, we agree that any reasonably practicable measures that could minimise the need for, or severity of truck engine braking, should be adopted in the design of the roundabout such as road design clearly indicating a drop in speed environment.

We asked MDA whether they have considered any potential development in the plot land to the south of Dunns Crossing Road (as permitted through Consent Order [2024] NZEnvC 269, resolved as of 31st October 2024). Specifically, dwellings constructed before the access improvement works progress, resulting in additional PPF's not addressed by the assessment.

The MDA response was that the developer is unable to commence development on this land prior to the proposed intersection upgrade, meaning that any dwellings on this site would not be classified as PPF's under the definition provided in NZS 6806. Furthermore, MDA stated that future residential development on this land within the State Highway Noise Control Overlay is subject to traffic noise insulation Rule NOISE-R3 of the District Plan, and therefore would be adequately protected from traffic noise. We are satisfied with this response.

2.3 Conclusions regarding noise effects

The MDA assessment outlines that the detailed assessment thresholds from NZS 6806:2010 for altered roads are not met, as the predicted change in noise level is small.

MDA note that the character of traffic noise may change if the proposed roundabout is adopted; however, residents are expected to gradually habituate to this change in noise environment over time, and any initial annoyance response will diminish. We agree that the effect of this change in character can be mitigated with good design of the road enabling trucks to pre-empt the requirement to reduce speed and avoid engine braking.

The report concludes that any change in traffic noise effects, with regard to living or sleep amenity, will be negligible for nearby residents. We agree.

3.0 CONSTRUCTION NOISE AND VIBRATION ASSESSMENT

3.1 Construction noise

At this stage it is not possible to carry out a detailed assessment of construction noise emissions, and so MDA have provided a high level review of the setback distances to receivers to determine if compliance with the construction noise limits is realistic. This is a common approach in similar scenarios, and is generally appropriate provided a suitable Construction Noise and Vibration Management Plan (CNVMP) is produced.

MDA have provided a table outlining the setback distances that would be required for various construction machinery to achieve the NZS 6806 long term daytime construction noise limit of 70 dB $L_{Aeq.}$ For the loudest machinery, this includes 58 metres for a Hydro Excavator, and 48 metres for a Milling machine. For moderate-noise generating machinery such as a 20 tonne excavator and vibratory toller, a setback of 25 metres is required. The sound power level assumptions for the various machinery are within a realistic range.

Based on the dwelling setbacks it is likely that a number of dwellings on Dunns Crossing Road will experience noise levels above 70 dB L_{Aeq} during moderate to louder noise-generated activities. MDA state that the implementation of a Construction Noise and Vibration Management Plan (CNVMP) will be the most appropriate way to reduce noise effects at these sites and confirm that a condition requiring the implementation of one has been volunteered.

MDA have provided a description of mitigation measures that should be included within the CNVMP. We recommend that an additional requirement that outlines the steps taken in the event of a reasonable complaint is added. Otherwise, we consider that the mitigation descriptions provided are appropriate.

MDA conclude that it is realistic for construction noise to not result in significant noise effects if the best practicable option (an appropriate CNVMP) is provided and standard good practice construction practices are followed. Overall, we agree with this conclusion.

3.2 Construction vibration

At this stage it is not possible to carry out a detailed assessment of construction vibration emissions, and so MDA have provided a high level review of the setback distances to receivers to determine if compliance with the construction vibration limits is realistic. This is a common approach in similar scenarios, and is generally appropriate provided a suitable Construction Noise and Vibration Management Plan (CNVMP) is produced.

The assessment details the setback distances required to meet the Category criteria for Cosmetic Building Damage and Occupied dwelling setback. The required setback distances vary from 2 metres for a 60 – 80 kg plate compactor and up to 14 metres for a 10 – 12 tonne vibratory roller. Vibration levels will vary depending on local ground conditions; however, these are realistic vibration values for this type of machinery.

Based on setback distances, there is some risk that there is some risk that the Category A vibration criteria might be exceeded at some dwellings close to the works. MDA have provided an example of appropriate mitigation for compaction activity.

The assessment states that detailed consideration of setback thresholds for different equipment should be identified, and if required, mitigation strategies such as low-vibration methods and increased communication with affected parties. These should be implemented into the CNVMP. We agree that this is an appropriate approach to manage vibration effects. In particular:

4.0 SUMMARY

AES have undertaken a peer review of the MDA acoustic technical assessment reports provided in support of a Notice of Requirement for the road access improvements works for State Highway 1 (SH1) in Rolleston – Package 1. Overall, we agree with the assessment methodologies and conclusions in the MDA assessments.

- We also agree that operational traffic noise effects associated with the Package 1 works will result in minimal noise effects.

- We agree that any construction noise and vibration effects can be adequately managed with the implementation of appropriate mitigation measures as outlined above including a Construction Noise and Vibration Management Plan.

Please do not hesitate to contact us further as required.

Kind Regards,

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Acoustic Engineering Services Ltd