MARSHALL DAY Acoustics

Level 3 69 Cambridge Terrace
PO Box 4071 Christchurch Mail Centre
Christchurch 8140 New Zealand
T: +64 3 365 8455 F: +64 3 365 8477
www.marshallday.com

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MWH New Zealand
PO Box 4
Dunedin

Email: mike.k.brazil@nz.mwhglobal.com

Attention: Mike Brazil

Dear Mike

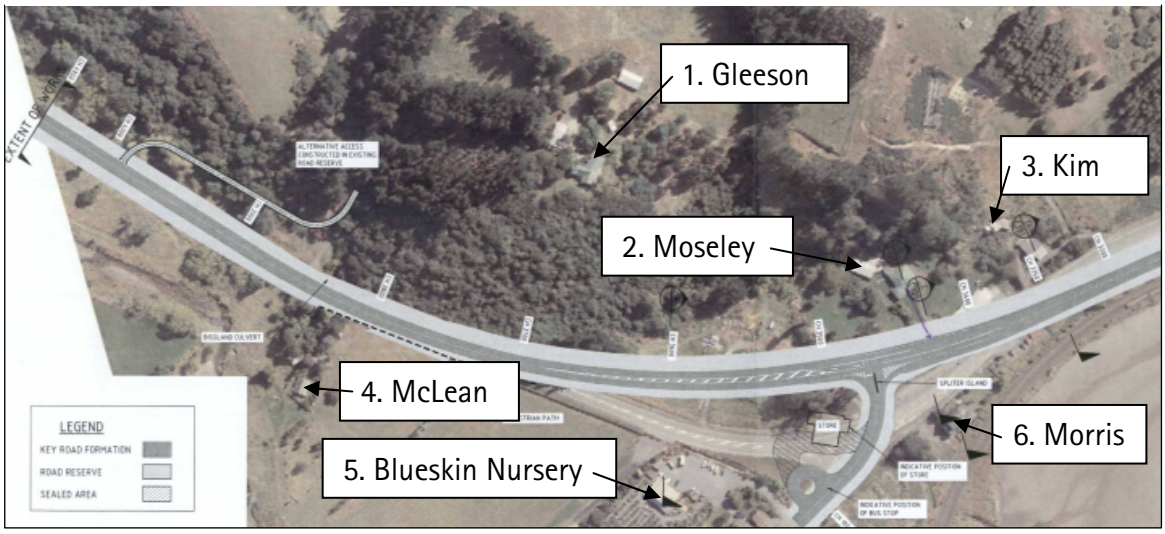
WAITATI CURVE REALIGNMENT NOISE ASSESSMENT

Further to our recent discussions, we have undertaken a desktop assessment of noise effects from a proposed realignment of a segment of State Highway 1 known as the Waitati Curve.

Discussion

The proposed realignment at Waitati will straighten an existing curve to provide a safer environment for motorists travelling at the open road speed limit. The general arrangement of the proposal and the location of surrounding properties in the area is shown in Figure 1

Figure 1: Site layout



From Figure 1, we make the following brief comments about each of the nearby properties. To understand these comments, it is useful to remember that traffic noise increases by 3 dB every time the distance halves (and conversely, decreases by 3 dB every time the distance doubles). Hence, a change from 20 metres to 10 metres will increase noise by 3 dB, and a change from 100 metres to 50 metres will also result in a 3 dB increase.

In terms of effects, a 1-2 dB change in noise level is generally considered to be insignificant, and a 3-4 dB effect to be minor.

- 1. Gleeson: The Gleeson house is approximately 120 metres from the existing road, and about 110 metres from the re-alignment. This is an insignificant change acoustically, and as such noise levels at this property will remain essentially unchanged.
- 2. Mosely: At present, the Mosely house is about 50 metres from the road, and this will reduce to about 30 metres. In addition, the existing store will be removed, and this will expose the house to slightly more traffic noise. We will discuss this property in more detail later in this report.
- 3. Kim: The road alignment remains essentially unchanged at the Kim property, and there will be a negligible change in noise level.
- 4. McLean: The road alignment at this location will move approximately 1.5 metres closer to the McLean house, and there will be additional camber on the corner, increasing the nearside road height. The additional camber will slightly reduce tyre noise. Our calculations show that noise levels at this house will be essentially unchanged, with less than a 0.1 dB increase.
- 5. Blueskin Nursery: The re-alignment at the nursery will move the road approximately twice as far from the nursery as at present, and as such, noise levels will reduce by about 3 dB.
- 6. Morris: At the Morris property, the road will move to about 3 times as far away as at present, which would result in a noticeable 5 dB decrease in traffic noise.

Of these properties, all except the Mosely property will experience either an insignificant change or a decrease in noise levels. We therefore believe that only the Mosely property requires a more detailed analysis.

Mosely Property

As already discussed, the Mosely property is the only one in the area which will experience a noticeable increase in traffic noise level.

We have undertaken a more detailed analysis of noise levels at this house, using the Internationally recognised CoRTN calculation procedure. This takes account of traffic speed, heavy vehicles, road surface, distance, and topography. It also allows for the addition of mounds or fences as noise mitigation.

Our calculations show that the re-alignment will result in an increase in noise level of almost 4 dB at the Mosely dwelling. This would be a noticeable increase.

To offset this increase, we recommend mitigation as follows;

- Traffic noise within the house can easily be reduced to be less than existing noise levels, by improving the windows in the house. Almost all the existing windows are timber framed with reasonably thin glass and no seals. We recommend upgrading to

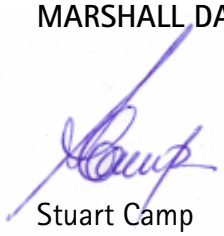
thermal double glazing and adding seals to all opening sashes. This could be achieved by either adding seals to the existing windows, or by retrofitting Aluminium Joinery. The existing ranchslider will need to be replaced because retrofitting seals is unlikely to be successful.

- An increase in noise level outside the house can be mitigated by construction of an earth mound or fence to a height of approximately 1.5 metres along the front of the property. At this height, we believe it will still be possible to sit on the front deck and admire the view of the sea. We understand that a mound is unlikely to be possible because of issues such as stormwater runoff, and that a fence may therefore be the best option. Fencing should be solid timber at least 20 mm thick, with no airgaps, particularly at ground level. We have reviewed the proposed location and construction for this fence as shown on MWH drawings number Z1630901, sheets C103-C (19/01/2010) and C104-A (22/12/2009) and confirm that this arrangement will achieve the required noise reduction.

With this mitigation in place, noise effects from the proposed re-alignment will be insignificant.

Please contact us if you have any further queries.

Yours sincerely
MARSHALL DAY ACOUSTICS LTD



Stuart Camp
Principal
stuart.camp@marshallday.co.nz