

**Tuapiro Passing Lane
Applicability of NZS 6806:2010**

10 August 2010



Project: **Tuapiro Passing Lane
SH2 Tahawai
Applicability of NZS 6806:2010**

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1.0 INTRODUCTION

Marshall Day Acoustics (MDA) was engaged by Beca Infrastructure Ltd to complete an assessment of noise affects for the proposed Tuapiro Passing Lane project in June 2007. An updated assessment was prepared by MDA in September 2009.

Both assessments were completed in accordance with NZTAs (Transit) 'Guidelines for the Management of Road Traffic Noise – State Highway Improvements'.

Resource consent for the project was lodged on 30 March 2010 before the first New Zealand Standard NZS6806:2010 "Acoustics – Road Traffic Noise – New and Altered Roads" (Standard) was published on 30 April 2010.

MDA has been engaged to determine if NZS6806:2010 would apply to the proposed Tuapiro Passing Lane project.

2.0 NEW ZEALAND STANDARD NZS 6806:2010

2.1 Limitations of the Standard

Limitations are covered in Section 1.3 of the Standard, and this section is reproduced in full in Appendix 1.

As per Section 1.3.1 (c), the Standard does not apply to alterations to existing roads that are not altered roads as defined in the Standard.

Therefore the first step is to determine if the proposal is classified under the Standard as an 'altered road'.

2.2 Altered Road

Altered roads are defined in Section 1.5 of the Standard, and this section is reproduced in full in Appendix 2. The initial test for an altered road is described in Clause 1.5.2.

As noted in C1.5.2:

"Section 1.5.2 (a) means this Standard does not apply where alterations to an existing road are predicted to increase the do-minimum noise environment compared with the do-nothing noise environment, by less than 3 dB $L_{Aeq(24hr)}$..."

In order for the requirements of Clause 1.5.2 to be considered, the 'do-nothing' and 'do-minimum' $L_{Aeq(24hr)}$ noise levels must be predicted.

Definitions for 'do-nothing' and 'do-minimum' noise environments are included in Appendix 3.

3.0 PREDICTED NOISE LEVELS

Previous predicted existing and design noise levels were presented in Table 6-1 of MDA Report No. 2007271A 002 dated 1 September 2009. These noise levels included a façade correction of 2.5 decibels.

It is noted that noise levels predicted under NZS6806:2010 are ‘incident’ levels and do not have a façade correction included.

In NZS6806:2010 receivers considered are referred to as ‘Protected Premises and Facilities’ (PPFs).

3.1 PPFs R1 to R6

The predicted $L_{Aeq(24hr)}$ noise levels for receiver positions R1 to R6 have been recalculated in terms of NZS6806:2010 requirements and are presented in Table 3-1.

Table 3-1 – Predicted Noise Levels – dB $L_{Aeq(24hr)}$

PPF (Receiver)	Existing Noise Environment 2007	Do-Nothing Noise Environment 2021	Do-Minimum Noise Environment 2021	Noise level increase between Do-nothing 2021 and Do-minimum 2021
R1	62 [23]	66 ⁽²⁾⁽³⁾ [23]	66 ⁽²⁾⁽³⁾ [23]	0
R2	62 [18]	64 ⁽²⁾ [18]	65 ⁽²⁾ [14]	1
R3	63 [16]	65 [16]	65 [16]	0
R4	59 [58]	60 [58]	61 [50]	1
R5	60 [48]	62 [48]	64 [34]	2
R6	65 [15]	66 [15]	66 [15]	0

Notes to Table 3-1:

- (1) [] = Distance in metres between nearest carriageway edge and nearest façade of the dwelling being considered.
- (2) Assumes existing timber fences along front boundaries of R1 and R2 are retained.
- (3) Allows for reduced attenuation of the existing timber fence due to gaps between palings and at the bottom of the fence.

In relation to Clause 1.5.2 (a) of NZS6806:2010:

Inspection of the 4th column of Table 1 indicates that the Standard does not apply as the proposed alterations to the existing road (i.e. forming the passing lane) are predicted to increase the do-minimum noise environment compared with the do-

nothing noise environment, by less than 3 dB $L_{Aeq(24hr)}$ (i.e. increases are only 1-2 decibels).

In relation to Clause 1.5.2 (b) of NZS6806:2010:

The do-minimum noise environment is not equal to or greater than 68 dB $L_{Aeq(24hr)}$ at any of the PPFs in Table 3-1, therefore the proposed passing lane is not considered to be an 'altered road' and the Standard does not apply.

3.2 Other PPFs within 200m of the Passing Lane

Under Clause 1.3.1 (e) PPFs located in rural areas which are within 200m of the edge of the closest traffic lane should be considered.

There are a number of additional PPFs located within 200m of the proposed works which are at similar or greater distances from the proposed passing lane than PPFs R1 to R6.

However, based on the assessments completed for PPFs R1 to R6 in Table 3-1 above, these other additional PPFs would not qualify the passing lane as being an 'altered road'.

4.0 CONCLUSION

Marshall Day Acoustics (MDA) has been engaged to determine if the road traffic noise standard NZS6806:2010 would apply to the proposed Tuapiro Passing Lane project.

Predicted noise levels at protected premises and facilities (R1 to R6) were re-calculated under the provisions of the Standard.

It was concluded that the proposed passing lane did not qualify as an 'altered road' and therefore NZS6806:2010 would not apply to the proposal.

An examination of the proposal in terms of NZS6806:2010 has demonstrated that no new mitigation measures would be required under this Standard.

This outcome is the same as that determined from the previous assessments of MDA using the 'Transit New Zealand's *Guidelines for the Management of Road Traffic Noise – State Highway Improvements*'.

APPENDIX 1 – NZS6806:2010 - LIMITATIONS

NZS 6806:2010

C1.2.4 Practical considerations mean abrupt changes in noise criteria should be avoided.

The best practicable option for mitigating the adverse effects of noise includes consideration of the financial implications and the current state of technical knowledge as well as of other factors such as safety issues and visual effects (see 6.3).

Reasonable criteria for measuring road-traffic noise are used for the criteria for designing new or altered roads. These criteria are to be used as guidance for road controlling authorities and local authorities. Examples of applying the criteria are given in Appendix A.

1.3 LIMITATIONS

1.3.1 This Standard does not apply to:

- (a) Existing roads;
- (b) New and altered roads predicted to carry less than 2000 AADT at the design year;
- (c) Alterations to existing roads that are not altered roads as defined in this Standard;
- (d) PPFs located in urban areas and located more than 100 m from the edge of the closest traffic lane for the new or altered road;
- (e) PPFs located in rural areas and located more than 200 m from the edge of the closest traffic lane for the new or altered road;
- (f) The control of noise generated by an individual vehicle;
- (g) Noise from the construction or maintenance of roads (refer to NZS 6803);
- (h) Vehicle-induced ground-borne vibration;
- (i) Vehicle noise from land that is not a road (refer to NZS 6802);
- (j) The development of PPFs or other noise-sensitive activities which can give rise to reverse sensitivity effects;
- (k) Private ways;
- (l) Premises other than PPFs (see 1.4);
- (m) The building of new roads or alterations to existing roads when the building or alteration of the road is a permitted activity in the relevant district plan, whether that road is designated and the permitted activity performance standards in the plan do not require this Standard to be applied;
- (n) New and altered roads that are designated in the relevant district plan and at the time of designation, mitigation of road noise was provided for by a condition or conditions (other than by any condition requiring this Standard to be applied).

C1.3.1 Noise criteria recommended in this Standard are not intended to apply to low volume roads, for example those in isolated rural areas servicing a small number of dwellings, agricultural industries, or other commercial or business activities which generate low traffic volumes. In these circumstances resource consent conditions controlling hours of operation and number of vehicles may be more appropriate.

It is not feasible to predict the ambient sound level at the design year for a new road. Instead 1.3.1(d) compares the predicted noise increase from a new road with the existing noise environment.

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APPENDIX 2 – NZS6806:2010 – ALTERED ROAD

NZS 6806:2010

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C1.4.2 For example, subject to 1.3.1(n), where there is a designation for an existing road which was obtained before this Standard was published, and alterations to that existing road do not require an alteration to the designation under section 181 of the RMA but do require an outline plan under section 176A of that Act, that outline plan would, for the purposes of this Standard, be the first RMA authorisation for that altered road.

Where the first RMA authorisation for a new or altered road identifies the PPFs in relation to that new or altered road and a noise-sensitive activity that is not identified in the RMA authorisation is established in proximity to the site of the new or altered road, that activity will for the purposes of this Standard, not be a PPF in relation to that new or altered road.

1.5 ALTERED ROAD

1.5.1 This Standard applies only to limited types of roading projects.

1.5.2 Subject to 1.5.4, an altered road means an existing road that is subject to alterations of the horizontal or vertical alignment where at any assessment position at any one or more PPF:

- (a) The do-minimum noise environment would be greater than or equal to 64 dB $L_{Aeq(24h)}$ and, if no specific noise mitigation was undertaken, the alterations would increase road-traffic noise at that assessment position by 3 dB $L_{Aeq(24h)}$ or more at the design year, when compared with the do-nothing noise environment; or
- (b) The do-minimum noise environment is greater than or equal to 68 dB $L_{Aeq(24h)}$ and, if no specific noise mitigation was undertaken, the alterations would increase road-traffic noise at that assessment position by 1 dB $L_{Aeq(24h)}$ or more at the design year, when compared with the do-nothing noise environment.

C1.5.2 Section 1.5.2 (a) means this Standard does not apply where alterations to an existing road are predicted to increase the do-minimum noise environment compared with the do-nothing noise environment, by less than 3 dB $L_{Aeq(24h)}$. For a change of exactly 3 dB $L_{Aeq(24h)}$, the do-nothing noise environment for consideration would therefore be 61 dB $L_{Aeq(24h)}$ since the most stringent external noise criterion is 64 $L_{Aeq(24h)}$. For a change greater than 3 dB $L_{Aeq(24h)}$ a lower do-nothing noise environment may be relevant if the do-minimum noise environment is 64 $L_{Aeq(24h)}$ or more.

1.5.3 This Standard shall be applied to all PPFs described in 1.4 providing one or more of the thresholds specified in 1.5.2 are exceeded at one or more PPFs.

1.5.4 An altered road does not include the following alterations to the horizontal or vertical alignment of an existing road:

- (a) Resurfacing;
- (b) Surface treatment;
- (c) Rehabilitation.

C1.5.4 Alterations of the kind described in 1.5.4 are mostly associated with the maintenance of existing roads. Such works may cause an incidental increase in noise but are outside the scope of this Standard.

APPENDIX 3 – NZS6806:2010 – DEFINITIONS

NZS 6806:2010

dBA	See Time-average A-weighted sound pressure level
decibel (dB)	The term used to identify 10 times the logarithm to the base 10 of the ratio of two like quantities proportional to intensity, power, or energy
Design year	A point in time that is not less than 10 years but not more than 20 years after the opening of a new road, or the opening of alterations to an altered road, to the public
Do-minimum noise environment	The predicted road traffic noise level at the assessment position(s) of protected premises and facilities at the design year, with the project implemented including safety barriers and other structures, which may provide incidental noise mitigation. The do-minimum noise environment does not include any mitigation measures that would be undertaken for the sole purposes of reducing noise effects
Do-nothing noise environment	The predicted road traffic noise level at the assessment position(s) of protected premises and facilities at the design year assuming no alterations are made to the existing road
Emission	Sound emitted from a source or sources at a defined location
Existing noise environment	The ambient sound levels at the assessment positions of protected premises and facilities at the date of an assessment carried out under this Standard
Existing road	A road that is a formed legal road at the time when the noise effects of a new or altered road are assessed in accordance with this Standard. The term 'existing road' does not include an unformed legal road
Free-field location	A location at least 3.5 m from any significant reflecting surface other than the ground
Habitable space	A space used for activities normally associated with domestic living, but excluding any garage, bathroom, laundry, toilet (water closet), pantry, walk-in wardrobe, corridor, hallway, lobby, clothes-drying room, or other space of a specialised nature occupied neither frequently nor for extended periods
L₁₀ (18h)	The A-frequency-weighted centile level equalled or exceeded for 10% of an 18-hour measurement time interval. It is determined from measured or predicted A-frequency-weighted F-time weighted sound pressure level, or A-frequency-weighted, short-LEQ. L ₁₀ (18h) may also be written as L _{A10} (18h) and is the basic noise descriptor used for traffic on a length of road in the Calculation of Road Traffic Noise (CoRTN) prediction procedure (refer to United Kingdom Highways Agency 2008)
LEQ or Leq (Leq (t))	See Time-average A-weighted sound pressure level
Legal road	Land which the public has a right to pass along at all times, and includes a local road and a state highway (including a motorway as that term is defined in section 2(1) of the Government Roadway Powers Act
Measurement time interval	The duration of a single measurement
New road	Has the meaning set out in 1.6

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