

Outcomes of two of the recommendations from the Queensland ombudsman’s report on the Pacific Motorway with respect to road traffic noise

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ABSTRACT

Following a Queensland Government public announcement on 15 April 1996, the Department of Main Roads (DMR) upgraded the Pacific Highway between the Logan Motorway and Nerang to motorway standard. Complaints were lodged with the Queensland Ombudsman (QO), by the community group known as “Residents Against Increased Noise (RAIN)”. The complaints concerned the actions of DMR in upgrading the Pacific Motorway, particularly its decision to construct some sections of the pavement surface with concrete rather than asphalt. The decision to use concrete had caused RAIN to be concerned about the effects of road traffic noise on their everyday lives. The QO’s responsibility under the Ombudsman Act is to investigate complaints involving the administrative decisions and actions of public sector agencies and to recommend remedial action where appropriate. The QO formed 16 Opinions and made 22 Recommendations. This paper comments on two of the Recommendations of the QO. These recommendations involved DMR offering treatments to individual noise sensitive premises in order to improve the acoustic amenity inside the premises. In general, where a predicted increase of 2dB(A) in noise level occurred at these premises between 1996 and 2011, then the owners are being offered the installation of mechanical ventilation so that windows can remain closed or partly closed to reduce the noise entering habitable rooms. As well, where a predicted increase of greater than or equal to 3 in noise level occurred at these premises between 1996 and 2011, then the owners are being offered the installation of mechanical ventilation and air conditioning so that windows can remain closed to reduce the noise entering habitable rooms.

INTRODUCTION

Prior to the construction of the motorway, the original Pacific Highway consisted of a four lane divided facility (two lanes in each direction) with a dense graded asphalt (DGA) pavement surface type.

On completion of construction, the new road facility comprised an eight lane divided Pacific Motorway (four lanes in each direction) from the Logan Motorway in the north to Nerang in the south (refer to Figure 1). After sections of the motorway became operational, some residents strongly indicated that, in their opinion, they were severely impacted by road traffic noise, mainly along the Portland Cement Concrete (PCC) pavement sections of the motorway. There is a section of PCC pavement approximately 28 km in length and a further 14 km consists of open graded asphalt (OGA) pavement surfacing. An extremely strong residents’ action group (RAIN) was formed and to date, had actively challenged the government and the DMR about their concerns. RAIN lodged their complaints with the QO despite a noise attenuation strategy being put in place which included the construction of approximately 23 kms of noise barrier in order to achieve the 68 dB(A) L₁₀ (18 h) criterion level at all noise sensitive receptors.

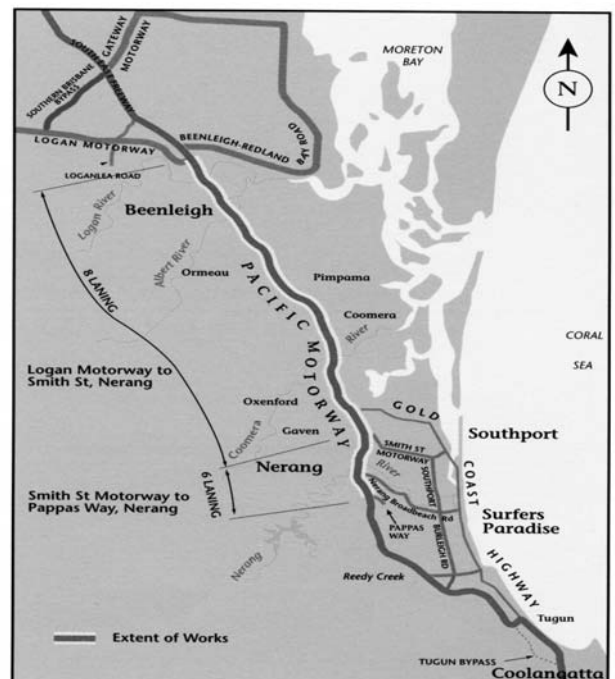


Figure 1. Pacific Motorway

BACKGROUND

The QO did not identify any unlawful or otherwise improper administrative action on the part of DMR or its officers. However the QO formed opinions that in some instances, the

DMR's actions amounted to defective administrative action which included the following:

- The DMR's Road Traffic Noise Management: Code of Practice did not cover night time criteria and single event maximum noise levels;
- It was probable that some statements made by DMR during the consultation process with respect to the extent of the impact of road traffic noise, were incorrect although there was no intention on the part of DMR's officers and/or its consultants to mislead the public;
- DMR incorrectly assumed from the advice from its consultants that the PCC Pavement surface had similar acoustic attributes to that of a dense graded asphalt (DGA) pavement surface; and
- DMR failed to make and/or keep adequate records of the reasons for key decisions in relation to the pavement surface type and locations for the motorway

Of the opinions formed by the QO, Opinion No. 10 was the one leading to the recommendations in question.

“Opinion No. 10

The DMR has not yet met its Impact Management Plan (IMP) noise commitment in relation to endeavouring to mitigate any sustained increase in baseline ambient noise levels at sensitive receptors adjacent to the motorway corridor. The time taken by DMR to complete this work comprising individual architectural treatments, constitutes unreasonable administrative action within the meaning of s.49(2)(b) of the Ombudsman's Act”.

“Recommendation 12

To satisfy the IMP commitment about baseline noise levels, DMR offer individual architectural treatments for all premises existing in 1996 that, based on the 1996 noise scenario as modelled in 2003, and within the 300 m zone of accuracy of the CoRTN model, will be exposed to a sustained increase in their respective baseline noise levels having regard to the predicted levels for the 2011 planning horizon. Such offers should not be limited to premises that will be exposed to an increase of at least 3 dB(A).

Recommendation 13

To satisfy the IMP commitment about baseline noise levels, DMR undertake modelling to determine premises existing in 1996, beyond the 300 m accuracy zone of CoRTN, that will be exposed to a sustained increase in their baseline noise levels having regard to the predicted levels for the 2011 planning horizon. Where a sustained increase is determined, the DMR offer individual architectural treatments for those premises. Such offers should not be limited to premises that will be exposed to an increase of at least 3 dB(A)” (Queensland Ombudsman March 2007).

In DMR's response to the QO, DMR maintained its concerns where the increase was less than 3 dB(A) and recommended that DMR adopt 55 dB(A) L_{10} (18 h) as the bench mark level below which no individual architectural treatments would be offered; the 55 dB(A) L_{10} (18 h) level being the typical noise level in an urban environment without the influence of a major urban road. Otherwise within 300 m of the motorway alone, over 200 dwellings would have an increase of 1 dB(A), a further 300 dwellings approximately would have an

increase of 2 dB(A). As well, DMR maintained that even with a greater than or equal to 3dB(A) increase, any dwelling subjected to a noise level below 55dB(A) L_{10} (18h) should not be considered as in fact some dwellings experienced a 3dB(A) increase but this increase was for example, from as low as 43 to 46 dB(A) L_{10} (18h).

The QO modified Recommendations 12 and 13 as follows:

“I note your proposal to generally adopt 55 dB(A) L_{10} (18 h) as the benchmark level on the basis that this represents the typical noise level in an urban environment without the influence of a major urban road. I also note that your proposal is consistent with the level of the acoustic quality objective in the Environmental Protection (Noise) Policy 1997.

I agree that your proposal is a reasonable one.

However, I do not agree with the view that premises with less than 3 dB(A) increases should not be offered architectural treatments.

In the circumstances, I consider that the following approach to implementing Recommendations 12 and 13 is a fair and reasonable one.

1. Where the noise level for residential premises will not exceed 55 dB(A) L_{10} (18 h) by 2011, but has increased by at least 3 dB(A) since 1996, the department offer appropriate architectural treatment to the owner of the premises, depending on the extent of the increase, on the basis set out in Chapter 3 of the Main Roads Noise Code 2007. The justification for this approach is that the department has already offered treatments to the owners of some premises in this category and should act, and be seen to be acting, consistently.
2. Where the noise level for residential premises will be equal to, or greater than, 55 dB(A) L_{10} (18 h) by 2011, but less than 68 dB(A) L_{10} (18 h), and the increase is 2 dB(A) or greater, the department offer appropriate architectural treatment to the owner of the premises, depending on the extent of the increase, on the basis set out in Chapter 3 of the Main Roads Noise Code 2007.
3. Where the noise level for residential premises will be equal to, or greater than, 68 dB(A) L_{10} (18 h) by 2011, the department offer appropriate architectural treatment to the owner of the premises on the basis set out in Chapter 3 of the Main Roads Noise Code 2007.

..... I consider that allowance should be made in favour of residents for margin of error as the noise levels have (mostly) been calculated from modelling and predictions. I accept it is possible that a modelling error of up to 1.5 dB(A) (one standard deviation) may have occurred for premises adjacent to the concrete pavement on the motorway.

..... I accept that premises with a modelled noise increase of only 1 dB(A), even allowing for a possible error of up to 1.5 dB(A), would still have an overall increase of less than 3 dB(A). However, premises with a modelled noise increase of 2 dB(A) would exceed 3 dB(A), if the same possible modelling error is allowed for.

Therefore, I believe it would be reasonable for the department not to offer architectural treatments in respect of premises with a modelled noise increase of 1 dB(A) but to offer

such treatments in respect of premises that will experience a modelled noise increase of 2 dB(A)". (Queensland Ombudsman October 2007).

The QO's definition of 'sustained increase' was 2 to 3 dB(A) between 1996 and 2011.

The QO's definition of architectural treatments (in-house treatments), as per Chapter 3 of the Main Roads Noise Code is as follows:

"The range of possible building treatments will be determined by the predicted noise level outside the façade(s) of habitable room(s) including those for educational, community and health buildings within a ten year horizon and based on sustainable development principles such as equity, energy efficiency and economics as follows:

Where predicted outdoor noise levels do not exceed the criterion level, no treatment of the building will be offered.

Where predicted outdoor noise levels exceed the criterion level by 1 dB(A) or greater, but less than 3 dB(A), provide mechanical ventilation so that windows can remain closed or partly closed to reduce the noise entering habitable rooms.

Where predicted outdoor noise levels exceed the criterion level by 3 dB(A) or greater, but less than 10 dB(A), provide air-conditioning and mechanical ventilation so that windows can remain closed to reduce the noise entering habitable rooms.

Where predicted outdoor noise levels exceed the criterion level by 10 dB(A) or greater, provide architectural upgrade treatments if necessary, air-conditioning and mechanical ventilation in order to meet an internal noise level at least 10 dB(A) below the external noise criterion level" (Department of Main Roads 2007).

DMR is in the process of implementing these recommendations as appropriate.

DATA COLLECTION AND ASSESSMENT

All noise sensitive receptors that were constructed post 31 December 1996 were not included for consideration of architectural treatments (in-house treatments) with respect to the 2 or 3 dB(A) increase from 1996 to 2011.

The original road traffic noise assessment for the Pacific Motorway project was undertaken between 1996 and 2000. Due to the community complaints following the opening of the motorway with respect to the impact of road traffic noise, the Minister for Main Roads requested that a reassessment of the impact be undertaken. It was completed in 2002 and published in 2003. All these assessments considered the impact on all noise sensitive receptors with respect to the 68 dB(A) L_{10} (18 h) criterion level and further noise barriers were constructed in order to achieve the criterion level for a 2011 horizon.

As part of the reassessment, an investigation was undertaken into the acoustic attributes of various pavement surface types utilising the Statistical Bypass Technique (ISO11819-1, 1997). Relative to DGA, the following pavement surface correction factors were determined:

PCC = +5dB(A)

OGA = -2dB(A)

DGA = 0dB(A)

Australian Acoustical Society

These correction factors are an important input to the evaluation, calibration and validation of the CoRTN model for the whole length of the motorway. The process was reported in Samuels et al 2004. The road traffic noise assessment for the prediction of the 1996 and 2011 noise levels was based on the reassessment into the impact of road traffic noise in order to determine which dwellings would be eligible for consideration of in-house treatments.

The outcomes of the modified QO recommendations resulted in road traffic noise assessments being undertaken to determine the L_{10} (18 h) road traffic noise levels for the following scenarios for all noise sensitive receptors within 300 metres of the motorway in the first instance and subsequently for those between 300 m and 1 kilometre of the motorway:

- noise sensitive receptors that existed by 31 December 1996, and
- the same noise sensitive receptors in 2011

Road traffic noise calculations were undertaken using the Calculation of Road Traffic Noise model (CoRTN) (UK Department of Transport 1988). With respect to use of the CoRTN model for calculation of road traffic noise levels beyond 300 metres, the CoRTN manual provides the following statement:

"The charts which form part of the memorandum include, where appropriate, a formula which is definitive over the quoted range of validity. While extrapolation outside these ranges can lead to progressive and significant error, calculations can be extended outside the quoted ranges for the purpose of assessing changes in noise levels, for example, environmental appraisal of road schemes at distances greater than 300 metres from a road, and generally for situations where reduced accuracy in predicting absolute levels can be accepted." (UK Department of Transport 1988).

Thus it is considered acceptable to use CoRTN to calculate noise levels beyond 300 metres from the motorway for the purpose of assessing the difference in noise level between 1996 and 2011.

Outcomes

The assessment has been completed for all noise sensitive receptors within 300 metres of the motorway. Receptors that are eligible for in-house treatment are being treated as follows:

- 415 dwellings, 1 community hall, 2 state schools, 1 scout hall and 3 churches have been identified as eligible to receive in-house treatment with air conditioning and mechanical ventilation at an estimated cost of \$10.5 m.
- As at 30 September 2009, 239 dwellings, 2 schools and 2 churches have been fitted with air conditioning and mechanical ventilation at a cost of \$6.3 m.
- Another 69 dwellings have also been identified to receive in-house treatment with mechanical ventilation only (not air conditioning) at an estimated cost of \$250,000. Letters advising property owners of eligibility were sent in June 2009.

- All in-house treatments within 300 metres of the motorway are anticipated to be completed by June 2010.

Further Work

Independent acoustic consultants have been engaged to undertake additional noise modelling to predict road traffic noise levels at receptors located between 300 metres and up to 1 kilometre from the motorway. Collecting data to undertake this noise modelling is more time consuming than the department originally anticipated. Noise modelling for receptors beyond 300 metres is now expected to be completed by late 2009.

If additional receptors beyond 300 metres from the motorway are identified for in-house treatment, further funding will be required. No estimate is currently available until results of noise modelling is completed to determine the exact number of eligible receptors.

CONCLUSION

The road traffic noise assessment for this project has been one of the most comprehensive and time consuming noise modelling studies ever carried out on any road in Australia.

The data collection, particularly with respect to terrain models for the 42 km of motorway and to 1 km from the motorway, and the determination of eligible noise sensitive receptors, has been rather difficult and tedious.

The community engagement process to advise eligible and non-eligible residents has been extremely comprehensive.

The project management of the whole project including community engagement and installation of the in-house treatments has required an extensive collection and recording of data and information.

This has included the development of the following documents:

- Legal agreement between DMR and the dwelling owners;
- Schematic diagram of each dwelling identifying the proposed treatment.;
- Dwelling owners acknowledgement of installation;
- Frequently Asked Questions sheet;
- Contractor's Advice including approval to commence work, final inspection, contractor's performance etc.
- Status of works (with respect to progress for example, number of residents visited, number of property agreements signed off, number of installations commenced and number finalised.

In all, a positive response has been observed from most residents living beside the motorway and obviously from those who have received in-house treatments.

Due consideration has been given to sustainable development principles such as equity, energy efficiency, economics and

greenhouse issues with respect to the installation of in-house treatments. All air conditioning units installed have been reverse cycle, inverter systems which are the most energy efficient and thus the most expensive. The compliance with the QO's recommendations has resulted in in-house treatments being applied to whole buildings and not just to noise sensitive rooms behind most exposed facades. The 2 or 3 dB(A) increase applies to all facades of a noise sensitive building no matter what the absolute L_{10} (18 h) levels might have been. Where a roof cavity was sufficient, a fully ducted system has been installed otherwise split systems have been utilised.

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