

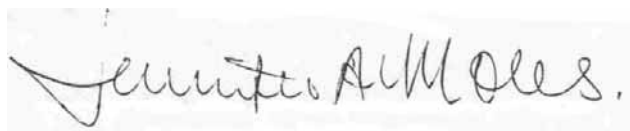
**REGIONAL RAIL LINK SECTION 2
NOISE IMPACTS AND MITIGATION**

ADVISORY COMMITTEE REPORT

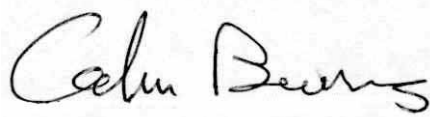
23 JANUARY 2012

REGIONAL RAIL LINK SECTION 2 NOISE IMPACTS AND MITIGATION

ADVISORY COMMITTEE REPORT



.....
Jennifer A Moles, Chair



.....
Colin Burns, Member



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Doug Munro, Member



.....
Robin Saunders, Member

23 January 2012

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Abbreviations

Exhibited Documents	
DNMP	<i>Noise Management Plan Rev G, 9 December 2010, KBR-Arup (referred to by us as a draft plan to distinguish it from the final plan (FNMP) recommended)</i>
NIMR	<i>Noise Impact Management Report Rev H, 10 December 2010, KBR-Arup</i>
Reference Documents	
ANZECC Guidelines	<i>Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration, September 1990, Australian and New Zealand Environment Conservation Council</i>
AS 2187	<i>Australian Standard 2187.2-2000 Explosives – Storage, transport and use, Part 2 Use of Explosives, Standards Australia</i>
AS 2377-2002	<i>Australian Standard AS 2377-2002 Acoustics - Methods for the measurement of railbound vehicle noise, Standards Australia</i>
DGPF	<i>Draft Government Policy Framework for Noise from Future Rail Investment in Victoria, August 2011, Department of Transport</i>
IGANRIP	<i>Interim Guideline for the Assessment of Noise from Rail Infrastructure, 2007, NSW Department of Environment and Climate Change</i>
NCG 1254	<i>Noise Control Guidelines, Publication 1254, October 2008, EPA</i>
NSW CNS	<i>Construction Noise Strategy (Rail Projects) - NSW Transport Infrastructure Development Corporation</i>
NSW ECRTN	<i>Environmental Criteria for Road Traffic Noise, May 1999, Environment Protection Authority NSW</i>
NSW Rail Noise Data Base	<i>Rail Noise Database: State 11 Noise Measurements and Analysis Report 00091 Version A, August 2000, Rail Access Corporation NSW</i>
section 251B	<i>section 251B of the Transport (Compliance and Miscellaneous) Act 1983</i>
SEPP N-1	<i>State Environment Protection Policy (Control of Noise from Commerce Industry and Trade) No. N-1</i>
SEPP N-2	<i>State Environment Protection Policy (Control of Music Noise from Public Premises) No. N-2</i>

VicRoads Noise Policy	<i>VicRoads Traffic Noise Reduction Policy, 2005, VicRoads</i>
VicRoads DN06	<i>VicRoads Road Design Note RDN 06-01, Interpretation and Application of VicRoads Traffic Noise Reduction Policy, 2005, VicRoads</i>
WHO Guidelines	<i>Guidelines for Community Noise - Beglund, B., Lindvall, T. and Schwela, D.H. (eds), 1999, World Health Organisation</i>
Other Documents	
FNIMR	Final Noise Impact Management Report
FNMP	Final Noise Management Plan
Victorian Government	
AAV	Aboriginal Affairs Victoria
DoT	Department of Transport
DPCD	Department of Planning and Community Development
DSE	Department of Sustainability and Environment
EPA	Environment Protection Authority Victoria
GAA	Growth Areas Authority
VCAT	Victorian Civil and Administrative Tribunal
VicTrack	Victorian Rail Track Corporation
RRLA	Regional Rail Link Authority
Companies and Groups	
KBR-Arup	KBR Arup Joint Venture
MDA	Marshall Day Acoustics
PTO	Public Transport Ombudsman
Dennis Family	The Dennis Family Corporation, Manor Commercial Company Pty Ltd & Manor Lakes (Werribee) Pty Ltd
Planning Scheme Terms	
B3Z	Business 3 Zone
ESO	Environmental Significance Overlay
FZ	Farming Zone
IN1Z	Industrial 1 Zone
PAO	Public Acquisition Overlay
PPRZ	Public Park and Recreation Zone
PSP	Precinct Structure Plan
PUZ	Public Use Zone

R1Z	Residential 1 Zone
RCZ	Rural Conservation Zone
RDZ	Road Zone
SPPF	State Planning Policy Framework
SUZ	Special Use Zone
UFZ	Urban Floodway Zone
UGB	Urban Growth Boundary
UGZ	Urban Growth Zone
Other	
CHMP	Cultural Heritage Management Plan
DMU	Diesel Multiple Unit train e.g. VLocity
EES	Environment Effects Statement
EMU	Electrical Multiple Unit train as used for metropolitan services
RRL1	Regional Rail Link Section 1
RRL2	Regional Rail Link Section 2
SEPP	State Environment Protection Policy
Continuous Apartments	A building or series of buildings (probably of two or more storeys) containing noise protected apartments or townhouses built on or immediately adjacent to the project area boundary, with external living areas located away from the project area and providing a complete barrier to railway noise for development further away from the railway.
Frontage Road	Development layout involving detached dwellings facing onto the project area and separated from it by a street with a landscaped area on the railway side and a conventional footpath and nature strip on the housing side, and with a 25m setback assumed between the project area and the front façade of dwellings
Rear Exposure	Development layout involving detached houses backing onto the project area, with external living areas at the rear, and 5-6m clearance between the project area and the rear of dwellings

Glossary

dB	Abbreviation for 'decibel', which is a measure of sound pressure level, i.e. noise level
'A' weighting	Method of frequency weighting of noise to simulate the way the human ear responds to a range of acoustic frequencies
dB(A)	'A' weighted noise level commonly used for assessment of noise impacts on people
Façade correction	An adjustment of +2.5 dB(A) made to a noise reading at a site to represent what the noise level would be with a building present.
Hz	Hertz, the unit of frequency, in cycles per second
L _{AeqT}	The equivalent continuous (average) 'A' weighted noise level over time period T
L _{Aeq15h(day)}	The L _{Aeq} noise level for the period 7:00 to 22:00 hours, commonly used for assessment of noise from railways during the 'day'
L _{Aeq9h(night)}	The L _{Aeq} noise level for the period 22:00 to 7:00 hours, commonly used for assessment of noise from railways during the 'night'
L _{Aeq16h(day)}	The L _{Aeq} noise level for the period 6:00 to 22:00 hours, used in the WHO Guidelines for assessment of noise during the 'day'
L _{Aeq8h(night)}	The L _{Aeq} noise level for the period 22:00 to 6:00 hours, used in the WHO Guidelines for assessment of noise during the 'night'
L _{Aeq24h}	The L _{Aeq} noise level for a 24 hour period, used in some jurisdictions for assessment of noise from railways
L _{Aeq1h}	The L _{Aeq} noise level for a one hour period, used in New Zealand for assessment of noise from railways
LA ₉₀	The 'A' weighted sound pressure level that is exceeded for 90% of a time period, specified in SEPP N-1 for the measurement of background noise level
LA ₁₀	The 'A' weighted sound pressure level that is exceeded for 10% of a time period
LA _{10,18h}	The LA ₁₀ for the period from 6:00 to 24:00, used by VicRoads for assessment of road traffic noise
PPV	Peak amplitude of vibration (Peak Particle Velocity), usually in mm/s

RMS	Average amplitude of vibration (Root Mean Square velocity), usually in mm/s
'L' weighting	Linear weighting of noise, i.e. no frequency based adjustment
dB(L)	'L' weighted sound pressure level commonly used for assessment of airblast overpressure from blasting

1. Summary

This Advisory Committee was appointed to assess the noise impacts and recommend required mitigation responses for Section 2 of the Regional Rail Link Project.

Regional Rail Link Section 2

What is proposed is a new railway of approximately 30 kilometres long that will run between west of Werribee and Deer Park, providing a north-south connection between the Ballarat Rail Corridor and the Geelong Rail Corridor.

The new railway will enable the diversion of regional Geelong rail services away from the track now shared with metropolitan passenger services on the Werribee line and connect them into the Ballarat regional line at Deer Park. The Regional Rail Link Project Section 1 (RRL1) will allow the trains to continue to Southern Cross Station along new dedicated regional rail tracks adjacent to the existing tracks which will continue to accommodate metropolitan passenger services.

The Regional Rail Link Project overall (Sections 1 and 2) will provide the benefits both of allowing regional trains faster access to central Melbourne as they will not be held up by stopping suburban trains and of freeing additional capacity on the suburban network.

Section 2 of the project will also offer local passenger service benefits to the developing suburbs along its route, such as Truganina, Tarneit and Wyndham Vale, with two stations proposed to service the growth areas in the short term and five in the longer term.

EES referral requirements

When Section 2 of the project was referred to the Minister for Planning for a decision as to whether an Environment Effects Statement (EES) was required to be prepared under the *Environmental Effects Act 1978*, the Minister determined that no EES was required subject to a number of requirements being met, most notably:

- The proponent, the Department of Transport (now the proponent is in effect the Regional Rail Link Authority (RRLA)), was required to prepare a noise impact management report (NIMR), containing a noise management plan (DNMP) before the project works could begin.
- The NIMR with its incorporated DNMP was later prepared for the RRLA by a consortium known as KBR Arup Joint Venture (KBR-Arup).

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- An expert advisory committee was required to be appointed by the Minister to:
 - consider the NIMR and public submissions in response
 - consult with submitters and relevant agencies and experts
 - provide a report including recommendations to the Minister to inform the Minister's decision on the endorsement of a final noise impact management plan.

This report is provided in compliance with those requirements and the terms of reference which were provided to the Committee.

Public submissions and hearings by the Advisory Committee

The Advisory Committee advertised for public submissions and 15 written submissions were received in response. Most submissions were from major landowners or developers with interests in future urban land along the route. We conducted a public hearing at which all but one of the submitters made presentations and many parties called expert acoustic evidence. The RRLA also made a presentation and called the author of the NIMR and DNMP to give expert evidence. We were also presented with views and information (some of this actively sought out by the Committee) from a number of government agencies.

This report

Our report is presented in a number of chapters:

- Chapter 1 is this summary
- Chapter 2 deals with background matters
- Chapter 3 discusses the definition of the project
- Chapter 4 provides the policy context for our considerations
- Chapter 5 deals with construction noise, and vibration both during construction and the operational phase
- Chapter 6 establishes recommended operational noise standards
- Chapter 7 assesses the operational noise impacts
- Chapter 8 discusses the operational noise mitigation options
- Chapter 9 discusses and makes recommendations concerning further steps in noise mitigation implementation including the completion of the 'Final Noise Management Plan'
- Chapter 10 contains consolidated conclusions and recommendations.

Advisory Committee comment on its task

The urban areas of this State and in particular the metropolitan area are already crossed by large numbers of rail lines most of which have been in

place for well over a century. While railways create noise which can affect the amenity of adjoining residential areas, this has generally not created major problems. In part this is because the railways have been there as long as the housing and in part because rail noise is relatively low on the scale of noise annoyances for the community. It may also be because of the railways are accepted as important for moving people and goods. Importantly, the community response will be determined in large measure by the absolute level of the noise.

The operational noise which will be generated by this project is expected to be considerably higher than the noise generated by most other existing urban rail systems. This is due in the main to the fact that trains will be travelling much faster through the urban area than they do at present. Speeds up to 160km/h are expected. Trains on the lower speed, electrified metropolitan system generate considerably less noise. Also while diesel-powered trains as will be used here (including those carrying freight) do already pass through the urban areas, they generally travel at much lower speeds than is proposed for RRL2.

This new railway is to be located in an area subject to rapid urbanisation. While some existing housing abuts the project area for RRL2, it is proposed that, within a few decades, along perhaps half of its length, there will be thousands more nearby dwellings. We have established that much of this housing could be expected to experience unacceptable levels of train noise without mitigation measures beyond the very limited noise amelioration proposals by RRLA being put in place. The simultaneous development of the rail line and the housing has presented particular challenges in determining how best to deal with noise mitigation.

Despite the further problem presented to the Committee by inadequate information about several key aspects of the rail project, we have been able to make a number of findings and recommendations on how to deal with the noise issue.

Before setting out our key findings and recommendations, we would comment that there are only a limited number of broad policy responses which might be taken to the high levels of operational noise from this railway:

- An objective might be set of containing all noise to the project area. To achieve this, a combination of quite deep cuttings, and bunds and barriers perhaps of 6m in height, would be required along much of the length of the project area boundary or alternatively substantial train speed reductions would have to be imposed. Cuttings for reasons of acoustic attenuation alone would be very costly; bunds and barriers of that height for such a distance are likely to be visually unattractive and incompatible

with urban design intents; substantial reductions in train speed to below 40km/h as would be required for large distances would be incompatible with the planned function of RRL2.

- A satisfactory noise environment for dwellings might be achieved by nothing more than imposing a nominated separation distance between the housing and rail line. In the absence of any other mitigation measures, the buffer on each side of the railway would need to be some 200 m or more. Whether or not this land area of approximately six square kilometres would be publicly acquired, the developable land loss would be untenable. Also this arrangement would inappropriately reduce convenient access by households to the rail services offered by the line.
- Alternatively, acoustic treatments of the dwellings themselves might be required. While, in the absence of any noise mitigation at source, quite extensive treatments may be needed to possibly many thousands of dwellings, this would or could achieve acceptable indoor noise levels. There would be some internal amenity implications for these dwellings (such as requiring forced ventilation) and, more importantly, the even higher noise levels occurring outside at those properties would not be abated.

We believe that the appropriate approach is one that draws on aspects of the above broad approaches. Our recommendations are that noise mitigation should involve:

- on-site measures including a final vertical alignment for the railway optimised in response not only to engineering but also to noise considerations, as well as barriers and bunds of modest height and possibly some limited speed restrictions; and
- planning responses including modest separation distances between the housing and the project area where the buffer can be usefully deployed for other land use purposes; housing arrangements whereby a closely built line of detached dwellings or an apartment building or terrace provides an acoustic barrier to dwellings further from the project area; and acoustic treatments of dwellings where needed.

Deployment of various mitigation measures enables a designed response to be made to the different characteristics and circumstances along the length of the railway. The opportunity for an integrated approach to land use and transport is afforded as well as the achievement of the most cost-effective outcome.

Key findings and recommendations

The following points summarise some of the principal findings and recommendations of the Advisory Committee.

-
- The project addressed in the NIMR and presented to the Advisory Committee for assessment by RRLA is not the complete project included in the EES referral and considered by the Minister under the *Environmental Effects Act*. We recommend that a more comprehensive analysis of the project involving the assessment of all future train traffic and noise sources is required. Other adjustments to the projection assessment methodology are also required.
 - The noise projections by the proponent as reported in the NIMR (even for the limited project addressed) have not been translated into noise impacts to be addressed in the DNMP. There is no identification of the extent of outdoor and indoor amenity impacts for sensitive uses.
 - The NMIR and the DNMP fail to deal reasonably and rationally with the operational noise impacts anticipated. Minimal noise mitigation at source is proposed and off-site noise levels well above acceptable residential acoustic targets will occur. The RRLA has indicated a preparedness to accept financial responsibility for mitigating noise for existing dwellings only.

To the extent that this was intended to result in adjoining landowners themselves having to assume responsibility for mitigation of the noise impacts for new dwellings, the RRLA approach appears to have overlooked the relevant legislative framework for compensation for disaffection. Under that legislative framework it would appear that the cost of mitigation will effectively have to be assumed by the project proponent/State even if the off-site works were to be undertaken by the owners of the affected adjoining land.

To the extent that the proponent's response has been led by the exemptions for operational train noise from nuisance actions and certain specified legislative obligations provided in section 251B of the *Transport (Compliance and Miscellaneous) Act 1983*, this is to overlook the Minister's intent that unacceptable noise should be mitigated via a FNMP for the project. Common law actions in nuisance and the two specified Acts and their subordinate instruments may not apply to train noise, but section 251B does not preclude other management or enforcement arrangements being put in place to deal with operational train noise such as the FNMP. That plan itself may include compliance obligations. If necessary, compliance could also be ensured via the Incorporated Document of the planning schemes.

- We recommend that the following be set as the operational noise standards for this project:

External noise targets at dwellings:

Day Time (7:00–22:00)	60 dB LAeq15h(day)
Night Time (22:00–7:00)	55 dB LAeq9h(night)

24 Hours	80 dB LAmax
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Internal noise limits for dwellings:

Living areas

Day time (7:00–22:00)	45 dB LAeq15h(day)
Night time (22:00–7:00)	45 dB LAeq9h(night)
24 hours	65 dB LAmax

Bedrooms

Day time (7:00–22:00)	45 dB LAeq15h(day)
Night time (22:00–7:00)	40 dB LAeq9h(night)
24 hours	65 dB LAmax

- These standards have been developed:
 - Following a review of rail noise standards adopted elsewhere and follow the guideline levels for external noise from new railways applying generally in New South Wales.
 - Taking into account both internal and external amenity impacts for sensitive uses and allowing for consideration to be given to either external noise mitigation measures such as noise barriers or internal noise mitigation measures such as double glazing in particular locations as circumstances warrant.
- We recommend that the noise standards apply to existing housing, lots for which subdivision approval has been granted, and for future dwellings in the Precinct Structure Plan areas adjacent to the railway.
- Our recommendations have been developed taking into account the fact that the railway and the adjoining housing areas are being developed in the same time frame.
- Some 1500 future dwellings are proposed to be located immediately adjacent to the project area with thousands of other future dwellings proposed close by. Without noise mitigation, operational noise impacts exceeding the recommended external noise targets can be expected at the closest dwellings to the project area as well as many of the others.
- Despite the adoption of a noise standard for the project, we have not been able to recommend the detailed content of the FNMP as it relates to the specific noise mitigation measures to be applied along sections of the project area. Rather we have made recommendations as to a further process to move towards the choice of mitigation measures and the required content of the final plan.
- The alignment available for our assessment was a ‘reference design’ only. We understand there have been recent changes to that alignment by the construction contractor, based on additional engineering considerations. We believe that there is a need to further review the vertical alignment to optimise engineering and other considerations.

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- This revised vertical alignment will then be used as an input to remodelling of revised operational noise predictions and acoustic impacts. The recalculation of predictions and impacts also needs to take into account improved source train noise inputs, the volumes and types of all reasonably-foreseeable future traffic on the project area, other elements of the acoustic environment not yet modelled such as horns and railway infrastructure noise, as well as planned and committed abutting land use.
 - The objective of the review should be to more accurately identify the noise impacts of the project. It will then allow the identification of the most cost effective on-site acoustic mitigation measures for sections of the project area within the framework set by the recommended external acoustic targets for dwellings.
 - Practicability considerations relating to on-site mitigation are expected to result in some residual noise impacts outside the project area. These will need to be managed through planning approaches involving the GAA and municipalities. These would include land use arrangements in new housing areas along the track whereby less sensitive uses would occupy the areas closest to the project area for some sections of its length, and the first housing to be developed in a subdivision or development area would be that closest to the track so as to acoustically shield housing further away. Architectural treatments (sound insulation and special ventilation arrangements as necessary) will also be required in some places to address the residual noise impacts at dwellings.
 - A Design and Development Overlay is recommended as the appropriate planning mechanism.
 - We have included an analysis of the costs and acoustic effectiveness of different types of acoustic measures to assist in the choice of measures and we have also suggested an approach to assist in identifying where mitigation on the project area is or is not practicable.
 - We nevertheless endorse the attenuation of noise at source as the most efficient and effective means to ameliorate operational noise problems for nearby sensitive uses via the use of cuts, low barriers and bunds.
 - Careful on-going track and wheel maintenance are elements of the required operational noise management regime, and speed restrictions may also play a part.
 - We also recommend that a noise monitoring and auditing system needs to be put in place.
 - We are satisfied that for the most part construction noise and vibration as well as operational vibration either do not present problems for nearby sensitive land uses or can be adequately managed under arrangements specified in the FNMP.

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- The FMNP also needs to manage noise from railway infrastructure by setting limits for that additional noise.

Adoption of our key recommendation that further work needs to be undertaken before the final NIMR and final NMP are approved will necessarily delay approval of these key documents relating to noise management. Given the requirement in the Minister's decision on the EES referral that the approval of the FNMP must precede commencement of works, this has implications for the commencement of construction of the railway.

The Advisory Committee is aware that a contract for construction of RRL2 has now been entered into. The further work we recommend is expected to result in further changes to the vertical alignment of the railway¹. These, together with the inclusion of additional noise mitigation works within the project area, will likely necessitate construction contract variations.

While immediate progress on the project's implementation may be constrained, we believe that the recommended further work can be done expeditiously within the framework of implementation we have suggested. We believe that the further work recommended is critical to achieving a project outcome which fairly deals with the noise impacts, will be less costly in the long run, and will provide a better living environment for the thousands of future residents along the railway.

¹ The RRLA submission at the Advisory Committee hearing (Exhibit RRL17 at paragraph 135 itself invited further noise modelling based on the ultimate (engineering) alignment.

2. Background

This is the report of the 'Noise Impacts of Regional Rail Link Section 2 - West of Werribee to Deer Park Advisory Committee' appointed by the Minister for Planning. Throughout this report, the simpler term of 'Advisory Committee' or 'Committee' is used.

The report deals with the noise impacts and mitigation responses associated with the approved alignment for Regional Rail Link Section 2 - West of Werribee to Deer Park (RRL2).

2.1 The Regional Rail Link Project

RRL2 is a new railway of approximately 30 kilometres long that will run between west of Werribee and Deer Park, providing a north-south connection between the Ballarat Rail Corridor and the Geelong Rail Corridor.

The new railway will enable the diversion of regional Geelong rail services away from the track now shared with metropolitan passenger services on the Werribee line and connect them into the Ballarat regional line at Deer Park. The Regional Rail Link Project Section 1 (RRL1) will allow the trains to continue to Southern Cross Station along new dedicated regional rail tracks adjacent to the existing tracks which will continue to accommodate metropolitan passenger services.

The Regional Rail Link Project overall (Sections 1 and 2) is said to provide the benefits both of allowing regional trains faster access to central Melbourne as they will not be held up by stopping suburban trains and of freeing additional capacity on the suburban network.

Section 2 of the project will also offer local passenger service benefits to the developing suburbs along its route, such as Truganina, Tarneit and Wyndham Vale, with two stations proposed to service the growth areas in the short term and five in the longer term.

2.1.1 The project in detail

The project was referred by the Director of Public Transport to the former Minister for Planning on 17 June 2009 for a decision on the need for assessment under the *Environment Effects Act 1978* (EES referral)².

² Referral document is entitled: 'Referral of a project for a decision on the need for assessment under the *Environmental Effects Act 1978*', 2 June 2009

The summary description of the project given in the EES referral is:

- *A two track railway with the potential in the longer term for expansion to a four track railway for most of the route*
- *Stations and associated infrastructure such as car parking*
- *Grade separations at road intersections*
- *Train stabling yards.*

The EES referral also describes the major components of the project in greater detail.

The project area

The EES referral describes the approximately 30 km long corridor that is being acquired as generally of 60m in width but wider at a number of locations to accommodate grade separated road bridges, waterway crossings, stations including car parking and bus stations, and train stabling. It includes that through Wyndham Vale it will share an existing 75m transport corridor with the proposed parallel four lane Armstrong Road.

The built infrastructure

The track arrangement is described as initially having two tracks to carry regional passenger trains. These two tracks would provide a connection between the two track railway in the Ballarat Rail Corridor just west of Deer Park station and the two track Geelong Rail Corridor to the west of Werribee station. It is indicated that, depending on surrounding urban development, two further tracks would be built in stages between near Middle Road, Ravenhall, to north of the Werribee River in Tarneit³. These additional tracks will allow so called *short starter* services to run between Southern Cross and Wyndham Vale stations. We understand that this will allow some express services and increase the capacity of RRL2 to accommodate growing demand from this developing urban area.

Initially stations will be provided at Tarneit and Wyndham Vale. Exhibits provided to the Advisory Committee at its hearing of the proposed layout of these two stations show them being designed for an initial two tracks with associated transport interchanges and car parking and with provision for two further tracks. The EES referral notes that land is provided in the reservation for future stations, identified to the Advisory Committee as Truganina, Davis Road and Sayers Road that can be built in response to urban growth in the surrounding areas.

³ Now planned to terminate at the stabling yards between Greens Road and Black Forest Road.

The EES referral indicates that bridges will be built to grade separate the railway from existing or future arterial roads. The Advisory Committee understands that, consistent with Government policy there are to be no rail/road level crossings.

Watercourse crossings are described as being needed at several locations, but particularly over the Werribee River, Laverton Creek⁴, Skeleton Creek, Davis Creek, Lollypop Creek and their tributaries. The railway is variously described as crossing 36 or 19 waterways (both named and unnamed) and dams within the catchments of the above streams. These waterway crossings will necessarily be elevated to avoid flood levels and so as to not adversely affect the hydrology of those waterways.

The document states that most of RRL2 will be constructed at or near natural surface level but that the vertical alignment will be subject to detailed design. It refers to the railway line being located in cuttings passing under the Western Freeway Deer Park Bypass at Ravenhall and through Wyndham Vale. The vertical alignment of the track, which has a major influence on noise predictions, has in recent months been reconsidered (though apparently not in relation to noise consequences) under the tendering process by construction companies.

The EES referral describes the probable construction at a later stage than the initial development, and depending on patronage, of a stabling area for regional (V/Line) trains between Greens and Black Forest Roads in Wyndham Vale. It is said that this facility would accommodate five 8 carriage trains for the *short starter* services mentioned earlier and would provide stabling, basic cleaning and depot facilities.

The possibility of eventual freight use is mentioned and provision is made for two freight tracks between the junction with the Ballarat Rail Corridor at Deer Park and Truganina (about 4–5 km to the south) for access to a possible intermodal freight terminal.

Lastly the EES referral advises of provision for the possible extension of the electrified metropolitan train service that at present terminates at Werribee. The proposal is that the existing Werribee train service would be extended further along the Geelong rail corridor for a distance of about 4 km to then branch northward to run in parallel with the two RRL2 tracks at the eastern side of the same corridor. A railway station, Wyndham Vale South, served only by the metropolitan trains, would also be constructed near Black Forest Road. This service would extend to Wyndham Vale station which would therefore then be served by both metropolitan and regional trains.

⁴ We believe this is has been confused with Dohertys Creek.

This extension to metropolitan services would ultimately require train stabling, cleaning and depot facilities. An area to the north of Ballan Road within the project area has been nominated for this. It has a capacity of thirty 6 carriage electric trains. It is said that this extension would create a four⁵ track railway between Ballan Road and about 2 km south of Black Forest Road.

Other project elements

The EES referral also lists a number of further elements that may be part of the project⁶. Some of these have or potentially have noise implications. They include:

- The implementation of a Construction Environment Management Plan
- ‘Investigate, during detailed design, **design outcomes of the railway that can reduce potential noise impacts**, eg. putting the rail below natural surface level where it does not compromise the operational or drainage performance of the railway’ (our emphasis)
- Encouraging appropriate future urban land uses to buffer noise impacts and ensuring development of sensitive uses near the project contain adequate noise attenuation measures
- Implementation of an urban design program that links in with the detailed design of the rail corridor to deal with visual amenity impacts and physical barriers at key locations where road and/or rail bridges impact on private or public spaces – especially at activity centres, heritage sites and dwellings

Advisory Committee comment

The major and other elements of the project above drawn from the EES referral have the following relationship to noise emissions:

- The chosen corridor to a large extent fixes the horizontal alignment of RRL2 - a basic element in determining noise outcomes for present and prospective nearby sensitive land uses
- The noise generated by the use of railway infrastructure is subject to separate legislative requirements from that applying to rail operations
- Particular noise management issues arise from the road overpasses provided in accordance with government policy. Elevation of the road traffic will increase its noise impact relative to that which would occur if the road was at grade.
- The installation and effectiveness of required noise mitigation works within the project area at or near waterway crossings present

⁵ Actually six tracks.

⁶ These additional elements are included as measures to mitigate potential ‘*social impacts [that] will be considered during the detailed design process*’.

considerable design difficulties, and if implemented are anticipated to be costly

- The vertical alignment of the track is a major influence on noise emissions and depressing the rail alignment can have major acoustic benefits
- Particular regulatory issues around the noise of stabling yard activities were drawn to the attention of the Committee
- The noise consequences of possible freight traffic on RRL2 received only scant attention
- Land use buffers, including the contribution to setbacks to housing by the shared pathway along the track and the use of noise mitigation works to dwellings are mentioned.

The Advisory Committee would observe that the EES referral says little on noise, but does recognise that there will be an increase in noise for residents close to the railway line from construction and operation, and from vibration during construction. Acknowledging that this is a new rail corridor which has therefore not previously experienced rail noise, the referral document indicates a preparedness to contemplate noise mitigation measures.

2.1.2 Operational detail

The EES referral contains no information about the proposed use of the line – the proposed engine types, train lengths, frequency of service, timetabling, etc. These are critical to assessment of the noise impacts of the railway and form part of the NIMR and DNMP required by the Minister’s decision on the referral.

To understand what is proposed in terms of railway operations, the Committee has drawn upon the material in the NIMR prepared on behalf of the proponent.

Train types

V/Line, the operator of passenger rail services expected to use the corridor, utilises a number of train types, but two will predominate:

- The greatest number of passenger services will utilise VLocity diesel multiple units (DMUs). Units are generally powered by an underfloor diesel motor and can be coupled to form a multiple carriage train. VLocities typically operate as 3 or 6 car units but can comprise up to 8 cars. These are new rail vehicles of which V/Line now has about 130. They are approved to run on much of the fast regional rail system at up to 160 km/h.
- Trains comprising locomotive-hauled passenger carriages - hauled by N class diesel-electric locomotives. These typically have 4 or more carriages.

This class of locomotives was commissioned in about 1985. These trains are permitted to run at speeds of up to 115 km/h.

Other passenger train types that might operate in the corridor are Sprinter DMUs with a maximum permitted speed of 130 km/h; and trains hauled by P class locomotives with a maximum permitted speed of 100 km/h or A class locomotives.

The noise predictions for 2014 assume the use of VLocity and Sprinter DMUs and trains hauled by N and P class locomotives. For 2030 the predictions are premised on locomotive-hauled trains having been phased out and the service being operated by VLocities and Sprinters. Trains up to a maximum length of eight cars are anticipated to use the route.

Train numbers

The NIMP draws on the *Regional Rail Link Rail Capacity Upgrade Phases* report and for modelling purposes presents the number of trains per hour during the day and night for 2014 and 2030.

About 55 trains each way each weekday (about 45 during the day and 10 at night) between Southern Cross Station and Geelong on RRL2 are indicated for 2014 compared with 30 trains currently using the Werribee to Geelong line.

For 2030 the number of services between Southern Cross Station and Geelong remains unaltered but 'short starters' are planned to be introduced in during Phase 3 in 2022 and increase in the period to 2030 (Phase 4). The number of trains each way each week day between Southern Cross Station and Wyndham Vale Station is expected double between 2014 and 2030.

There are uncertainties around these numbers. The *Regional Rail Link Rail Capacity Upgrade Phases* report comments at page 7 that:

... forecasts for 2021 and 2031 indicate that growth on the Tarneit corridor could be as much as 12% per annum for that period as high density residential areas develop around the railway.

and that:

In the event that growth on the Tarneit corridor is quicker than anticipated the implementation of...short starters could be brought forward to Phase 1...

2.2 The route and surrounds

2.2.1 Land form

The land along the project area route is typical of Melbourne's western suburbs: it is generally flat and incised by drainage lines. Soils are not deep, and overlay basalt which often occurs within a metre or two of the surface. The land rises about 40m from the southern end of the route to the northern end, a distance of about 30km.

The principal water courses that cross the project area are Dohertys Creek, Skeleton Creek, Davis Creek and one tributary, Werribee River and one tributary, Lollypop Creek and two tributaries, and Cherry Creek.

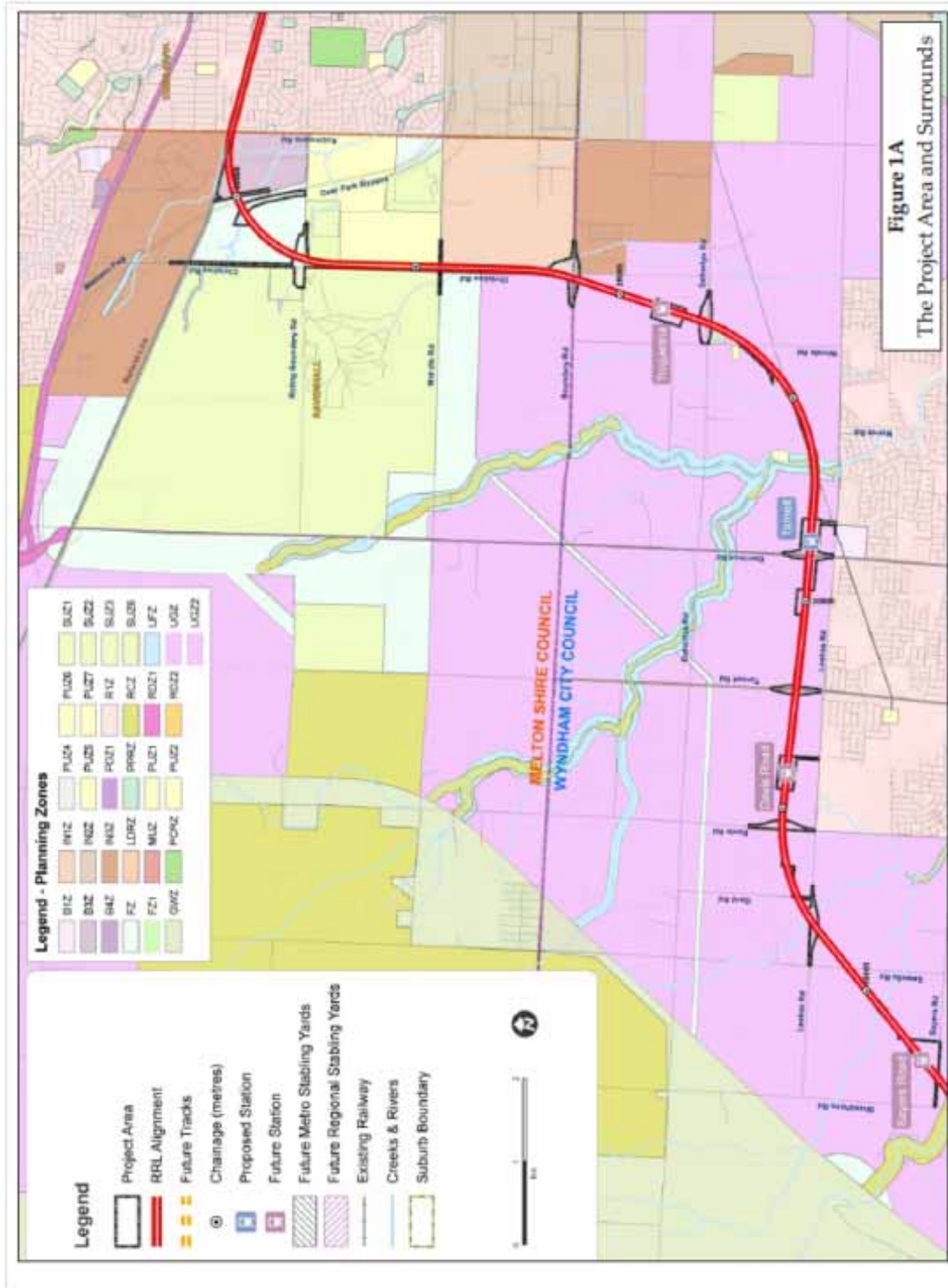
2.2.2 Land ownership

The northern end of the project area abuts the Boral Quarries at Ravenhall to the west, and the Dame Phyllis Frost Centre (Women's Prison) and the Metropolitan Remand Centre to the east. South of Middle Road the land is generally privately owned, with 15 to 20 quite large landholdings and some smaller land holdings. The Gasnet Brooklyn-Ballarat Gas Pipeline runs alongside Middle Road. Riverland Stockfeeds has a mill west of Hobbs Road. Where the railway would pass through residential areas (between Manor Lakes Road and Black Forest Road) there are a large number of residential lots in individual ownership.

2.2.3 Current land use and zoning

Zoning

The zoning of the land within and abutting the project area is shown on Figure 1.





Figures 1A (previous page) and 1B: The project area and surrounds (Source: Provided by RRLA upon request by Committee and based on Exhibit RRL1)

The northern end of the project area lies within the Shire of Melton. Under the Melton Planning Scheme it is variously included in the Farming Zone (FZ), Business 3 Zone (B3Z), Special Use Zone (Schedules 1 and 2) (SUZ1 and SUZ2), Industrial 1 Zone (IN1Z), Public Use Zone 7 (PUZ7) and the Urban Growth Zone (UGZ). A Public Acquisition Overlay (PAO3) running east-

west just south of Middle Road makes provision for a future freeway reservation between the Deer Park Bypass and the proposed Outer Metropolitan Ring Road.

South of Boundary Road the project area runs through the City of Wyndham. Under the Wyndham Planning Scheme, land within and abutting the corridor is mainly zoned as UGZ. The project area skirts small areas of Public Park and Recreation Zone (PPRZ) – the Truganina Progress Association Sports Ground - and Public Use Zone (PUZ5) – the Old Truganina Cemetery on Woods Road.

Derrimut Road and Ballan Road in a Road Zone 1 (RDZ1) and Tarneit Road in a Road Zone 2 (RDZ2) cross the project area.

South of Ballan Road the project area passes through the Residential 1 Zone (R1Z), with a small area of Business 1 Zone (B1Z) to the east at Wyndham Vale Square Activity Centre. South of Greens Road the project area has R1Z to the east and UGZ to the west. South of Black Forest Road it traverses UGZ until a short length of FZ at the end.

Overlays

A Development Plan Overlay (DPO) covers the Manor Lakes area on both sides of the project area from Ballan Road in the north, south to Greens Road. It extends south of Greens Road on the eastern side of the project area with predominantly residential development at Wyndham Vale until Black Forest Road. At the southern end of the project area, an arc of PAO6 to the east provides for the future connection for electrified metropolitan passenger trains back to Werribee on the Melbourne-Geelong rail line.

In both municipalities the project area crosses small areas of Urban Floodway Zone (UFZ) at rivers and creeks and Rural Conservation Zone (RCZ) in the immediate environs of some waterways. The Environmental Significance Overlay (Schedule 1) (ESO1) occurs at Werribee River combined with Environmental Significance Overlay (Schedule 2) (ESO2), and ESO1 applies alone at Lollypop Creek.

2.2.4 Future land use and development

The Growth Areas Authority (GAA) has responsibility for facilitating the coordination of planning and developing Melbourne's growth areas. Working with local Councils, developers and Government, the GAA implements urban development using corridor wide strategic land use and transport plans, and Precinct Structure Plans (**PSPs**) for individual suburbs of typically 10,000 to 30,000 residents.

The West Growth Corridor Plan (Exhibit GAA34 at the Committee hearing) establishes the strategic transport network, broad land use categorisation and the location of major activity centres at Tarneit, Tarneit West and Wyndham Vale. A more detailed plan of the Draft Wyndham Vale PSP Layouts (subject to change) was submitted by GAA (Exhibit GAA24(b)) which illustrated interactions between draft PSPs between the Werribee River and the Melbourne-Geelong railway.

This more detailed plan was prepared for discussion purposes, and includes PSPs 93 (Mambourin East), 43 (Alfred Road), 42.2 South (Black Forest Road), 42.1 North (Black Forest Road), 41 (Manor Lakes) 40 (Ballan Road) and 92 (Westbrook). With the exception of PSP 43, all these PSPs directly abut the project area.

North of the Werribee River, PSPs 1091 (Riverdale), 1088 (Oakbank), 1089 (Tarneit North), 1090 (Truganina), 1087 (Derrimut Fields), and 1084 (Ravenhall (Quarry Site)) have not progressed as far as those south of the river, except for PSPs 29 (Robinsons Road Employment Area North) and 37 (Robinsons Road Employment Area South) which have been completed and approved.

GAA expects the broad land uses within the urban areas abutting the project area to comprise about 70 per cent residential, 10 per cent business and industrial, 8 per cent farming and conservation and the remaining 12 per cent other miscellaneous uses such as urban floodway (GAA24, p.4). GAA estimates that residential development will extend along the project area for around 27km, with 1500-2000 new residences immediately abutting the project area and about 4,000 to 6,000 new residences within 100m of it. GAA explained that the 70 per cent residential land use would include not only housing but also shops, open space and other uses such as schools.

GAA provided a plan showing 'Draft Indicative Abuttal (subject to change)' (see page 5 of Exhibit GAA 24). An updated and more detailed plan was submitted by GAA in supplementary information (GAA 53). The updated plan is reproduced as Figure 2 below, and shows the expected land uses along the project area (as planned at 11 November 2011). Compared with the estimates in GAA 24, the residential component has reduced by about 10 per cent (55 per cent residential and 6 per cent mixed use) with a corresponding increase in the area for industrial and employment.

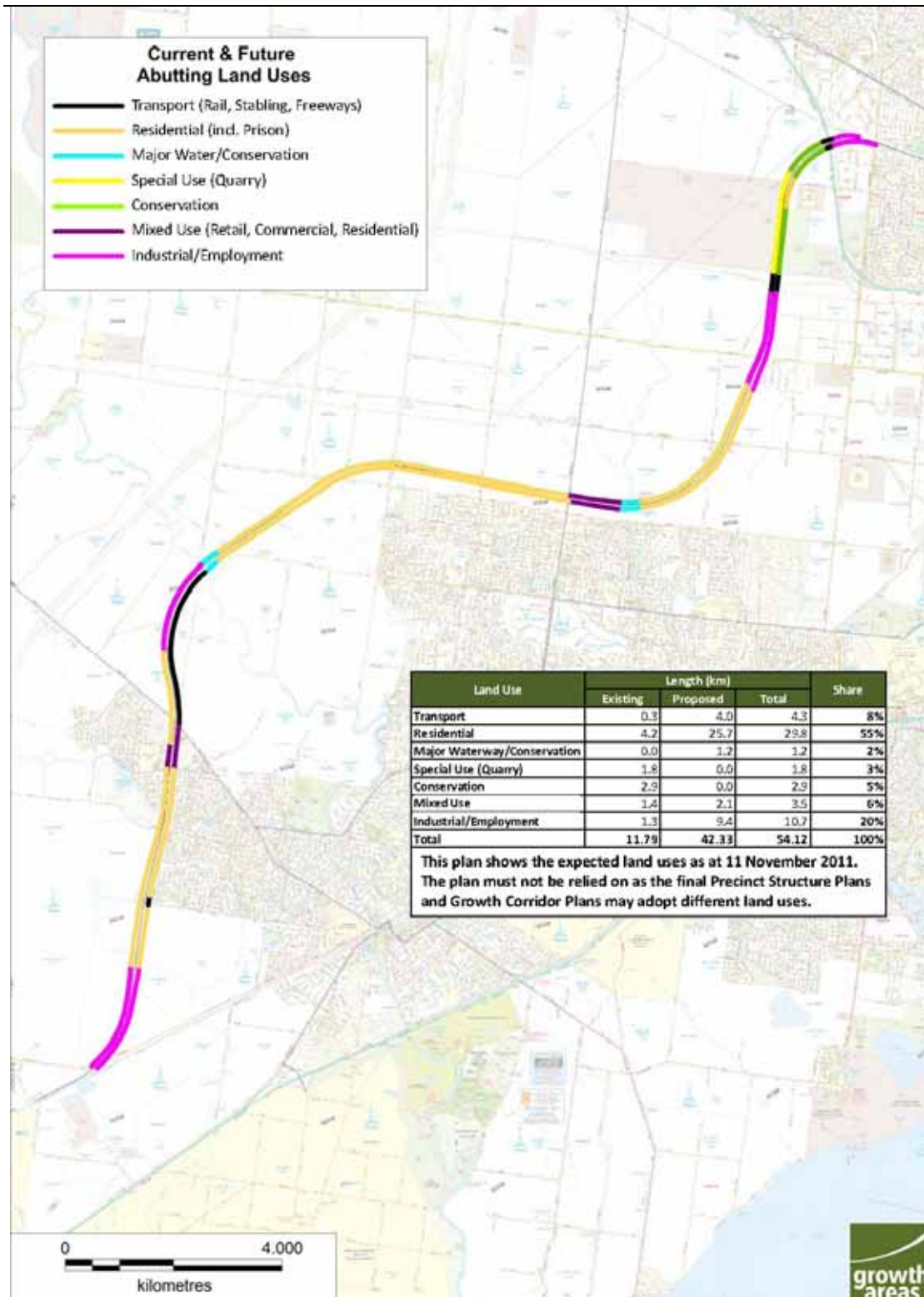


Figure 2: Future abutting land use types (Source: GAA based on Exhibit GAA 53).

2.2.5 Biodiversity and Aboriginal cultural impact management

While biodiversity and Aboriginal cultural impacts are matters which have separate project approval processes, the Committee was keen to ensure that any recommendations we might make concerning mitigation works would

not unwittingly adversely impact upon the biodiversity and Aboriginal cultural values of the area.

Biodiversity

The Department of Sustainability and Environment (DSE) made several submissions at the hearing. Dr Jeremy Hindle (Exhibit DSE7) provided a brief overview of the approach to the strategic assessment of the major development initiatives in the program for 'Delivering Melbourne's newest sustainable communities', the identification and implications for flora and fauna within the project area, and a summary of the outcomes of the work.

The strategic assessment was undertaken by the Victorian Government pursuant to an agreement with the Commonwealth under section 146 of the *Environment Protection and Biodiversity Conservation Act 1999*. Following the use of data bases and field surveys to map native vegetation and threatened species, mitigation measures were based on a hierarchy of avoidance, minimisation, rehabilitation, re-establishment and offset, to meet both Commonwealth and Victorian requirements. Dr Hindle advised (DSE7 p.2) that:

Offsetting was the primary way of mitigating impacts after avoiding and minimisation was complete. Victoria has committed to protecting two significant areas of native grassland to the west of Melbourne. The proposed Western Grasslands Reserves will total approximately 15,000 ha. Much of this will be used as an offset for any avoidable clearing of native vegetation and habitat within the urban area.

Areas in addition to the proposed Western Grasslands Reserves will be used to offset vegetation types or threatened species habitats that cannot be offset to the grassland reserves. An example of such vegetation is Grassy Eucalypt Woodland for which a separate conservation reserve of at least 1,200 ha will be created to the north of Melbourne.

A condition of approval for actions and activities associated with development and operation of the Regional Rail Link Section 2 (in accordance with the strategic assessment) required that an Ecological Management Plan be prepared and submitted to the Department of Sustainability and Environment and the Minister for Environment and Climate Change, respectively. These documents are expected to be submitted for approval in the coming month.

The flora and fauna values of the project area (having a width of the 60-75m) and a further abutting area of up to 50m beyond the alignment are documented in the 2011 report by Ecology Partners, *Regional Rail Link – Section 2: Flora and Fauna Assessment, Aquatic survey and Net Gain Assessment*. Dr Hindle further advised that:

The Regional Rail Link – Section 2 will impact on 108.59 hectares (ha) of native vegetation, including 107.45 ha of plains grassland, 0.83 ha of floodplain riparian woodland, and 0.32 ha of stony knoll shrubland. Loss of this vegetation will be offset in accordance with the prescription approved by the Commonwealth Minister under the endorsed Commonwealth Environment Protection and Biodiversity Conservation Act strategic impact assessment and Victoria’s Native Vegetation Framework.

The works will also impact on Commonwealth Environment Protection and Biodiversity Conservation Act listed spiny rice-flower and matted flax lily populations, and Victorian Flora and Fauna Guarantee Act listed Buloke and small scurf-pea. Impact to suitable habitat for Commonwealth Environment Protection and Biodiversity Conservation Act listed striped legless lizard, and growling grass frog, and known habitat for the golden sun moth, will occur.

In summary, Dr Hindle submitted that the native flora and fauna values had been identified for the project area, and that arrangements were in place to manage any flora and fauna effects that may arise from the project.

In subsequent appearances at the hearing at our request, Dr Hindle clarified that the basis of the assessment and offsetting requirements was that the whole project area would be treated as though it was intended to be cleared in its entirety. He also indicated, however, that, during construction, every effort would be made to protect habitats of value within the project area, and the offset required would be adjusted in response to areas of value which were in fact protected.

As it has transpired, the Advisory Committee has found itself unable to make particular recommendations concerning noise mitigation works for particular sections of the project area. Accordingly detailed information on biodiversity (and cultural heritage) values will need to be considered later when decisions are made on noise amelioration measures within the project area. Whatever mitigation works may be undertaken following a decision on our report, however, they will not add to the offsetting already required.

Aboriginal cultural heritage impact management

The *Aboriginal Heritage Act 2006* provides for the protection and management of Victoria’s Aboriginal heritage. Cultural Heritage Management Plans (CHMPs) enabled by that Act are a way of protecting and managing Aboriginal cultural heritage. They are prepared by a Cultural Heritage Advisor, and approved by the relevant Registered Aboriginal Party where one exists, or, failing this, the Secretary of the Department of Planning and Community Development or the Aboriginal Heritage Council.

Mr Webber of Aboriginal Affairs Victoria (AAV) addressed the Committee, and advised that one CHMP had been prepared by AAV, and a second had been prepared on behalf of the Wathaurong people. Neither CHMP had been completed at that stage, though a draft had been submitted for the area north of the Werribee River.

He advised that the area around the Werribee River is quite rich in Aboriginal heritage values, as is the area around Lollypop Creek. Essentially he recommended that it was appropriate that the area within 200m of the Werribee River should be avoided.

As indicated above, because the Advisory Committee has found itself unable to make particular recommendations concerning noise mitigation works for particular sections of the project area, the anticipated need for detailed information on cultural heritage (and biodiversity) values has not proved to be required. We would simply comment here that while noise mitigation works involving noise barriers in the immediate vicinity of the Werribee River or Lollypop Creek are not likely to be implemented (due to their likely high costs), should barriers be proposed to be provided within the project area in these locations, impacts upon Aboriginal cultural values would need to be given careful and early consideration. We believe that in general the legislative framework outlined above adequately provides for the protection of Aboriginal cultural heritage.

2.3 Referral of the project under the Environment Effects Act

As noted, the project was referred to the Minister for Planning under the *Environmental Effects Act 1978* on 17 June 2009 for a determination as to whether an EES was required.

The Minister decided on 13 August 2009 that no EES was required for RRL2 if developed generally in accordance with the project description included in the EES referral and subject to implementation of several conditions relating to the management of noise and ecological impacts, as well as the preparation of a development plan for the proposed works. A full copy of the Minister's decision and reasons for it are included as Appendix 1 to this report.

Relevantly, Condition 1 of the Minister's decision required the preparation of a noise impact management report before the project works would begin. The required content of that report is set out in the Minister's reasons for decision in Appendix 1. The report was directed *inter alia* to contain a draft noise management plan.

The required noise impact management report (NIMR) with its incorporated draft noise management plan (DNMP) was later prepared by a consortium of

two firms: KBR Arup Joint Venture (KBR-Arup). The NIMR (Revision H) is dated 9 December 2010.

Most relevantly, Condition 2 of the Minister's decision required that an expert advisory committee be appointed by the Minister for Planning to:

- i. consider the noise impact management report and public submissions in response;*
- ii. consult with submitters and relevant agencies and experts;*
- iii. provide a report including recommendations to the Minister for Planning to inform the Minister's decision on the endorsement of a final noise impact management plan.*

2.4 Statutory processing of RRL2

The required acquisition of land for the project was initially enabled by its inclusion in the Public Acquisition Overlay (PAO) of the Melton and Wyndham Planning Schemes via Amendment VC68 on 6 August 2010. These proposed planning scheme reservations were later removed (on 11 July 2011 by Amendment C149 and Amendment C106 to the Wyndham and Melton Planning Scheme respectively). This removal from the schemes followed the designation of the project area (including some land already reserved for rail purposes) on 13 October 2010 by the then the Minister for Planning under section 95 of the *Major Transport Projects Facilitation Act 2009*. That designation of the project area enables the project proponent to use the project delivery powers (including land acquisition) available under that Act.

The initial August 2010 amendment to the schemes also introduced provisions designed to enable the use and development of the land for the purposes of the Regional Rail Link. The provisions relating to RRL2 were and continue to be included in an Incorporated Document in the schedule to Clause 52.03 of each scheme. The later scheme amendments of July 2011, as well as removing the PAO, modified the Incorporated Documents so as to make them consistent with minor alignment changes made to the plans for the designated RRL2 project area and to reflect changes to the scope of works to be undertaken as part of, or in conjunction with, the project. These July 2011 amendments also made the Minister for Planning the responsible authority for the RRL2 project (see the schedule to Clause 61.01).

A copy of the Incorporated Document for the Wyndham Planning Scheme is included as Appendix 2 to this report. As we understand it, the Incorporated Document of the Melton Planning Scheme is in the same form.

2.4.1 Panel comment

Clause 52.03 of all planning schemes enables special provisions to be included in the scheme 'in extraordinary circumstances' to allow or facilitate a particular land use or development outcome for specified land.

Relevantly, it provides:

Land identified in the schedule to this clause may be used or developed in accordance with the specific controls contained in the incorporated document corresponding to that land.

The specific controls may:

- *allow the land to be used or developed in a manner that would otherwise be prohibited or restricted;*
- *prohibit or restrict the use or development of the land beyond the controls that may otherwise apply;*
- *exclude any other control*

in this scheme.

The clause is thus enabling or restricting. In the case of RRL2, the inclusion of the Incorporated Document was, we were advised, intended to be enabling.

The controlling provision at Paragraph 4 of the Incorporated Document provides as follows:

Despite any provision to the contrary or any inconsistent provision in the Planning Schemes, no planning permit is required for:

- *The use or development of the Section 2 Project Land for:*
 - *A passenger and freight railway, which includes but is not limited to railway stations (including community uses and the selling of food, drinks and other convenience goods and services), transport interchanges, car parking facilities, utility infrastructure, signalling, communications and electrical infrastructure, train stabling and maintenance facilities and storage facilities.*
 - *Works and structures facilitating pedestrian, road and watercourse crossings.*
- *On the Section 2 land area, activities ancillary to, or undertaken in conjunction with, any of the above-mentioned matters, including... [A list follows which includes creating construction areas, displaying business signs, removal of vegetation, demolishing buildings, constructing fences,*

subdivision, road works and creating or altering access to roads in a Road Zone].

The use, development and ancillary activities for Section 2 of the Regional Rail Project as specified, are only conditionally 'as of right', however, that is they are allowed provided they are undertaken generally in accordance with an approved Development Plan which in turn is specified as meeting certain requirements. Relevantly, it must be consistent with 'any Noise Impact Management Report required by the Minister for Planning' (see Paragraph 5 of the Incorporated Document). We were advised that this reference in the Incorporated Document to a Noise Impact Management Report should be interpreted as reference to the DNMP referred in the Minister's decision on the EES referral.

The planning scheme zone and overlay provisions applying to the project area have earlier been set out in Section 2.2.3. In the main the land is included in either the Urban Growth Zone or the Residential 1 Zone. In both those zones, the use and development of land for railway purposes is as of right. No conditions apply. The same as of right status applies to the use and development of land for railway purposes under the Rural Conservation Zone and the Special Use Zone (Schedules 1 and 2) which apply to limited parts of the project area. It can only be the case therefore that the scheduled Incorporated Document, in so far as it imposes conditions upon the as of right use and development of land for a railway is in effect restricting rather than enabling so far as these principal zone provisions are concerned.

Nevertheless there are various small sections of the project area that are affected by overlays or other zones. In some of these⁷, no exemption from the need for planning permission for the construction of buildings and works and/or vegetation removal is provided for railway works⁸. So far as these other scheme provisions affecting small parts of the project area are concerned (and perhaps in relation to the native vegetation provisions of Clause 52.17 which has permit exemptions relating to existing but not new railways), the Incorporated Documents can therefore be said to be enabling and have some effect.

⁷ Examples are the Environmental Significance Overlay (Schedules 1 and 2) of the Wyndham Planning Scheme and the Industrial 1 Zone.

⁸ Neither does Clause 62.02 provide a general exemption for railway uses or works.

2.5 The Advisory Committee process

2.5.1 Appointment

This Advisory Committee was appointed by the then Minister for Planning on the 27 October 2010 pursuant to Section 151 of the *Planning and Environment Act 1987*.

The Committee was later reconstituted by the present Minister for Planning on 5 May 2011 due to the unavailability of one of the earlier appointed members during the period when the Committee's investigations were expected to take place.

The Advisory Committee comprises the following members:

- Chair: Jenny Moles
- Member: Colin Burns
- Member: Doug Munro
- Member: Robin Saunders

2.5.2 Terms of Reference

The Terms of Reference for the Advisory Committee were provided on 31 March 2011 and are included in full in Appendix 3 to this report. The nature and extent of the Committee's function was a matter of some consideration at the Committee hearing.

In summary the Committee' function is to consider the noise impacts and mitigation responses associated with the project. We are directed to investigate and advise on measures to manage the construction and operational noise impacts having regard to the sensitivities of existing housing and proposed future urban areas as well the likely costs and technical feasibility of reducing noise in the context of both the project and the rail system. It is envisaged that the Committee will recommend a final noise management plan (FNMP) for the project as well as measures which might be adopted as part of growth area framework planning and more detailed urban planning and building development in the areas through which the railway will pass.

In undertaking these tasks, the Committee is directed to consider the noise impact management report (NIMR) and draft noise management plan (DNMP) prepared by the RRLA and the submissions received in response to public exhibition of those documents.

2.5.3 Deferral of commencement of Advisory Committee process

Around the time of its appointment, the Advisory Committee became aware that the State Government was preparing a policy on passenger rail noise and that its release was imminent. It appeared to the Advisory Committee that this policy was likely to be influential in the task set for it and accordingly it was only fair that it be made available to would-be submitters responding to the RRLA proposed DNMP. The Committee determined to await the policy before calling for public submissions.

As the release of the policy took rather longer than the Committee had anticipated, the Committee held a preliminary meeting of Government agencies on 27 May 2010 in an effort to expedite the process and to discuss the public availability of other documents.

As a result of the meeting, the Department of Transport undertook to provide the 'Draft Framework for Passenger Rail Noise' within 5 working days. This was not received, however, until 18 August 2011.

A copy of the 'Draft Government Policy Framework for Noise from Future Rail Investment in Victoria' (DGPF) is included as Appendix 4 to this report. Its content is discussed in Chapter 4 of this report.

2.5.4 Call for submissions

In accordance with the Minister's decision on the EES referral, a public advertisement was then placed in metropolitan daily newspapers on 31 August and 3 September 2011 and in local papers on 31 August and 7 September 2011 calling for public submissions concerning the work of the Advisory Committee. A copy of the public advertisement is included as Appendix 5 to this report.

2.5.5 Written submissions

In reply 15 written submissions were received with all but one submitter requesting to be heard by the Committee⁹. A list of all submissions received is included in Table 2.1 below.

Table 2.1: List of all submitters

Submitter	Organisation (if any)
Anush Martins	
Minter Ellison, lawyers	Davis Family and Leakes Pty Ltd
Minter Ellison, lawyers	Manor Commercial Company Pty Ltd and Manor Lakes (Werribee) Pty Ltd

⁹ Ms Martins did not request to be heard. Nine submitters were ultimately heard by the Committee.

Submitter	Organisation (if any)
Kerry Thompson, Chief Executive	Wyndham City Council
Steve Dunn, Director Structure Planning	Growth Areas Authority
Taylor's Development Strategists Pty Ltd	The Golden Group
Taylor's Development Strategists Pty Ltd	YourLand Development
Taylor's Development Strategists Pty Ltd	The Corcoris Group
Sweett (Australia) Pty Ltd	Walsh Building Services
Taylor's Development Strategists Pty Ltd	Paul Ryan
Peter Farrell, General Manager, Residential Developments	Dennis Family Corporation
Tom Trevaskis, Project Director	Lend Lease Communities (Australia) Pty Ltd
Watsons	Bozzo Group of Companies
Rob Burgess, State Manager, Victoria	Amex Corporation Pty Ltd
Janine Young, Ombudsman	Public Transport Ombudsman Limited

2.5.6 Issues raised in written submissions

The issues raised in the written submissions include:

- The need for noise barriers and/or separation of the proposed line from existing dwellings in Wyndham Vale to alleviate noise impacts
- The need for the noise and vibration modelling underpinning the NIMR and DNMP to be confirmed
- The need to assess variables affecting noise and vibration such as rail height relative to surrounding land, curvature of the track, train speed and climatic conditions such as wind
- The need for RRLA to disclose its view and invite landowner input on an acceptable noise levels
- The need for identification of the full suite of noise mitigation measures available
- The DNMP does not provide an appropriate response to the construction noise impacts including that construction noise impacts have not been fully modelled; and the construction noise management regime is incomplete
- The DNMP does not provide an appropriate response to operational noise impacts; possible freight use of the line and planned future stabling yards have not been accounted for; consideration needs to be given to noise from trains crossing the Werribee River, trains arriving and leaving railway stations and road and rail noise interaction at grade separated intersections; there is no definition of acceptable day and night noise limits for operational noise (or 'reasonable' limits established); at least 45

proposed dwellings on one submitter's holding would receive unacceptable noise levels; an overlay defined by a noise contour should be developed as a management tool; and the plan does not contain adequate noise mitigation works

- Operational noise is the principal concern given residential development may not precede the rail construction
- It is impossible to fully assess the noise without detailed construction plans and agreements with the preferred tenderer being available
- Sleep disturbance for dwelling residents should be a consideration and the NSW EPA criteria should be applied
- Noise emanating from sidings is a common cause of complaint to Public Transport Ombudsman and the effect of regulatory legislation is a matter in dispute
- Noise barriers and implementation of non-standard architectural treatments will be required to reduce noise to acceptable levels
- Devaluation of land, increased development costs of acoustic, landscape treatments and/or buffer distances to mitigate noise, and increased housing costs to mitigate noise
- RRLA should clarify precisely how noise attenuation measures will be funded
- Greater certainty about cost sharing for noise reduction treatments is required though the onus to mitigate noise should be on RRLA
- It would be inappropriate for the Growth Areas Authority (GAA) to try to impose the increased costs of noise mitigation through the Precinct Structure Plan (PSP) and Development Contributions Plan (DCP) process.

A summary of each individual written submission received is included in Appendix 6.

2.5.7 Advisory Committee hearings

The Advisory Committee held a directions hearing on 29 September 2011 at the offices of Planning Panels Victoria in East Melbourne. A project briefing was also provided on this day by the RRLA.

On the following day, written directions and a timetable for the public hearing were provided to those who had indicated that they wished to be heard by the Advisory Committee.

The accompanying written directions (a copy of which is included as Appendix 7 to this report) indicated that the Committee had requested that the Environment Protection Authority (Vic) (EPA), the Department of Sustainability and Environment (DSE) and Aboriginal Affairs Victoria (AAV) to address the Committee (all later did so). The directions also provided

advice concerning the Committee's provisional view on its function and invited input on the matter by the Department of Planning and Community Development (DPCD), Department of Transport (DoT) and RRLA. The directions further sought submissions on the Committee's provisional view that the Committee's task is set by its Terms of Reference and the DGPF would likely be treated as a submission or advice. Further, submissions were invited on the level of detail which might be possible concerning the cost mitigation measures and on funding responsibilities.

Those submissions were forthcoming at the Committee's hearing. They clearly supported the first element of the provisional approach adopted. It was agreed that the Committee had a wider brief than merely a review brief in relation to the KBR-Arup report. Submissions concerning the role of the DGPF and mitigation issues were less consistent. These matters are discussed in relevant sections of this report.

The Committee also wrote on 30 September 2011 seeking release by the Minister for Planning of the final Noise Impact Assessment Report for RRL1 which had been prepared with input by the EPA following the initial report being judged as unsatisfactory by the Minister. That report was released on 19 October 2011.

The main Advisory Committee hearing was subsequently held over seven non-consecutive days from 3 November to 15 November 2011 at the offices of Planning Panels Victoria.

The parties to the hearing are listed in Table 2. 2 below.

Table 1.2 Parties to the Advisory Committee Hearing

Party	Represented By
Regional Rail Link Authority	Chris Wren SC and Sarah Porritt, barrister instructed by Freehills, lawyers. Mr Wren called: Kym Burgemeister of KBR-Arup to give expert acoustic evidence Bret Summers, project manager for RRL2 to give expert engineering evidence
Department of Transport	Chris Canavan QC and Emily Porter, barrister
Growth Areas Authority	Adele Patterson, barrister, assisted by Steve Dunn, Mark Knudsen and Tim Peggi. Ms Patterson called: Neil Huybregts of Marshall Day Acoustics to give expert acoustic evidence

Party	Represented By
Department of Planning and Community Development	Trevor Blake
Environment Protection Authority	Eliot Palmer
Department of Sustainability and Environment	Jeremy Hindle
Aboriginal Affairs Victoria	Harry Webber
Wyndham City Council	Dean Ellis, traffic engineer
Public Transport Ombudsman Limited	Janine Young, Public Transport Ombudsman
Dennis Family Corporation and Davis Family Corporation	Chris Townshend SC instructed by Minter Ellison, lawyers ¹⁰ . He called: Robin Brown of Renzo Tonin and Associates to give expert acoustic evidence
Amex Corporation Pty Ltd	Paul Connor, barrister, instructed by Minter Ellison, lawyers
Lotus Oaks Pty Ltd (and Bozzo Group as landowner)	Ian Pitt SC, Best Hooper, lawyers. He called: Michael Smith (and Xun Li) of Vipac to give expert acoustic evidence Rob Milner of 10 Consulting Group to give expert planning evidence
(Seamus) Walsh Building Services	John Cicero and Teresa Bisucci, Best Hooper, lawyers. Mr Cicero called: Neville Goddard of Watson Moss Growcott Acoustics Pty Ltd to give expert acoustic evidence
Lend Lease Communities (Australia) Pty Ltd	Jennifer Trewalla, Norton Rose, lawyers

A list of exhibits from the Advisory Committee hearing is included as Appendix 8 to this report.

2.5.8 Inspections

We inspected the project area and surrounding areas in company with some of the parties to the hearing (representatives of all parties were invited but not all chose to attend) on 2 November 2011. The inspection which was conducted by bus was arranged on behalf of the Committee by the RRLA's legal advisers.

¹⁰ Mr Paul Connor also represented the Dennis family/Davis family in Mr Townshend's absence
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On 16 November 2011, the Advisory Committee made an unaccompanied visit to two public sites adjacent to existing regional rail routes – one west of Little River and one at Deer Park – to listen to the noise levels associated with various regional train pass-bys. We also took noise measurements using a calibrated Rion NL21 noise meter.

2.5.9 Further information requested

At the close of hearings on 15 November and again on a number of occasions in the post hearing period, we requested the provision of additional information by the RRLA. This principally related to identification of properties affected by a LA_{max} noise level exceeding 80 dB and the mitigation effects of various barrier arrangements.

The last of that information was provided on 14 December 2011. At all times all parties to the hearing were copied with the post hearing correspondence.

2.5.10 Ministerial qualifications to Terms of Reference

As is described above, the commencement of the Committee's task was delayed by nearly three months due to the late provision of the DGPF. This resulted in the eight week reporting period allowed by the Terms of Reference spanning the Christmas-New Year period with a submission date of early January 2012.

The Chair of the Committee therefore wrote to the Minister for Planning on 12 October 2011 seeking an extension of the submission date for the Committee's report. This was in anticipation that the full eight week period for writing would be required and would thus necessitate the Committee having to work through the Christmas week. That letter nominated some of the major issues requiring consideration by the Committee in support of this request.

The Minister replied by letter dated 21 November 2011 extending the submission date for the report to 23 January 2012.

Copies of both letters are included as Appendix 9 to this report.

The Minister for Planning's letter also responded to those issues that we had provided as explanation.

The following is the final paragraph of the Minister's letter:

I note the understanding of your task articulated in your letter of 12 October 2011. I advise that rather than seeking to set general noise parameters, the committee should make use of guidance from other Australian jurisdictions to assist the identification of any areas of particular sensitivity. Also, rather than requiring the committee to undertake its own predictive noise analysis, the Advisory Committee is asked by its terms of reference to evaluate the likely noise impacts of RRL2 in light of the draft noise impact management plan and relevant expert advice and submissions. Equally, rather than determining the allocation of costs between Regional Rail Link Authority and adjoining landowners, the Advisory Committee is asked to make recommendations with respect to both a final noise impact management plan for construction and operation of the RRL2 and noise mitigation measures that could be adopted as part of urban planning or building requirements in proximity to the approved RRL2 alignment.

As it transpired, the Minister's advice was consistent with the Advisory Committee's investigations and reporting in a fashion which the Committee itself had in the main already adopted.

One element of the Minister's advice, however, may not coincide with the Committee's Terms of Reference and its approach to its task. This is the matter of the financial responsibility for the implementation of noise mitigation measures. The Minister's advice could be read as suggesting that no findings on this matter are now required. The Terms of Reference at 17(iii) charge us specifically to have regard to costs. We had asked parties in our Directions of 30 September 2011 for presentations on costs (Direction 9).

The Committee and the parties had spent considerable time at the hearing addressing this matter. The hearing had been completed prior to receiving the Minister's letter.

We have decided that, in light of the effort already expended on the issue, some uncertainty in the Minister's letter, and the centrality of costing to submissions, we have decided that we should set out the issues in relation to the matter of financial responsibility, canvas some of the options and make comment. This approach is not inconsistent with the views expressed in the two letters which the Committee received from submitters (Minters Lawyers for the Dennis Family and Best Hooper Lawyers for Seamus Walsh) when the Minister's post-hearing correspondence was provided to them. It has also become apparent that we would have been unable to develop and recommend a method of seeking the most cost effective noise mitigation without having regard to costs.

We discuss cost issues in Chapter 9.

2.5.11 The Advisory Committee report

This report is presented in a number of chapters as follows:

- Chapter 1: Summary
- Chapter 2: Background
- Chapter 3: The project to be assessed
- Chapter 4: Policy context
- Chapter 5: Construction noise and vibration
- Chapter 6: Operational noise standards
- Chapter 7: Assessment of operational noise impacts
- Chapter 8: Mitigation of operational noise impacts
- Chapter 9: Implementation of operational noise mitigation
- Chapter 10: Conclusions and recommendations

3. The project to be assessed

3.1 The issue

The documents and submissions provided to the Advisory Committee have somewhat unusually been inconsistent in their approach as to which elements comprise the project for assessment. Most significantly, there is a considerable difference between the funded project as described to us by the RRLA and the project as described in the EES referral.

We have seen it as necessary to examine this issue as part of our assessment of the adequacy of the response by the RRLA to the requirements of the Minister's EES decision.

3.2 Noise Impact Management Report

The NIMR includes a project description that is summarised below:

- A two track railway within an approximately 60m wide corridor running from the Deer Park Bypass to the West Werribee junction
- Railway stations at Wyndham Vale and Tarneit
- Associated infrastructure and road overpasses
- The likely need for stabling yards in the future
- The use of the railway by Diesel Multiple Units (DMUs), including VLocity and Sprinter trains, and N and P class locomotive-hauled trains
- A note advises that freight is not proposed for the Regional Rail Link and has not been considered.

The NIMR includes a map on the existing cadastral base showing:

- The general horizontal alignment of the railway
- The locations of the stations at Wyndham Vale and Tarneit
- The locations of 'future stations' labelled Truganina, Davis Road, Sayers Road and Wyndham Vale South
- A metropolitan train stabling yard to the north of the Wyndham Vale station
- A regional train stabling yard near Black Forest Road
- Road overpasses
- Waterway crossings
-

3.3 Evidence and submissions

In the submission by Wyndham City Council it was stated that:

In addition, the RRL Section 2 Incorporated Document in the Wyndham Planning Scheme states,

... no planning permit is required for, and nothing in the Planning Scheme operates to prohibit or restrict the use or development of the Section 2 Project Land for:

- Train stabling and maintenance facilities and storage facilities.¹¹*
- A passenger and freight railway¹².*

It was therefore submitted that, in addition to the operation of regional passenger rail, train stabling and the use of the railway by freight trains should be considered as they are permitted uses.

Evidence and other submissions also included reference to noise from train stabling facilities thus indicating the view that such facilities should be considered to be part of the project:

- Mr Rob Milner of 10 Consulting Group, called by Lotus Oaks Pty Ltd
- Mr Neville Goddard of Watson Moss Growcott Acoustics Pty Ltd, called by the Walsh Building Services
- The Growth Area Authority (GAA)
- The Public Transport Ombudsman (PTO)
- Lend Lease Communities (Australia) Ltd
- Amex Corporation Pty Ltd
- Lotus Oaks Pty Ltd

The submission by Amex Corporation also included:

The fact that a metro rail corridor is proposed to be constructed between West Werribee and Wyndham Vale and that electrified services are expected to form a significant proportion of total services, indicates that metro rail services will run on RRL2 at some future time.¹³

The evidence of Mr Robin Brown of Renzo Tonin and Associates called by the Dennis Family Corporation and related entities (the Dennis Family), and some submissions included reference to noise from metropolitan trains and facilities for such trains, thus suggesting that metropolitan trains and facilities should be considered to be part of the project. The submissions referring to metropolitan trains were:

¹¹ Submission by Wyndham City Council, November 2011, Sec 3.2.2, Page 7

¹² Submission by Wyndham City Council, November 2011, Sec 3.2.5, Page 12

¹³ Submission by Amex Corporation Pty Ltd, 8 November 2011, Para 34

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- Walsh Building Services
 - The Dennis Family
 - The Davis Family
 - Lotus Oaks Pty Ltd

The evidence of Mr Brown and submissions made by the following also included reference to noise from freight trains thus indicating the view that such trains and facilities should be considered to be part of the project:

- Walsh Building Services
- The Dennis Family
- The Davis Family
- Amex Corporation Pty Ltd

Mr Brown and Lotus Oaks Pty Ltd also suggested that the possibility exists for the use of the railway by trains servicing the Avalon Airport and that such use also needs to be considered as part of the project.

The Dennis Family and Davis Family submitted that:

The community investment in this rail infrastructure carries the reasonable expectation that it would be used efficiently in order to maximise its utility. It will not always be just a regional service. Activities and operations that have the capacity to operate on the RRL2 without further approval (for example ,metro and freight trains, and increase in frequency) will increase the noise levels experienced and should be addressed.¹⁴

The RRLA submitted that the 'key elements' of RRL2 are:

- Two parallel railway tracks of about 30 km in length between Deer Park and west of Werribee to be mostly built at or near grade and with the potential for two further tracks between about Ravenhall in the north to just north of the proposed Wyndham Vale station in the south to accommodate 'short starter' regional train services from Wyndham Vale to Southern Cross station as patronage demands
- Stations at Tarneit and Wyndham Vale with associated services and provision for four further stations which would be built when demand is sufficient
- A number of road-over-rail grade separations to avoid any level crossings
- Bridges over Skeleton Creek, a tributary of Davis Creek, Werribee River, and Lollypop Creek.

The RRLA noted that:

¹⁴ Submission by the Dennis Family and Davis Family, 11 November 2011, Para 8
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While provision has been made for the stabling of regional trains to the south of Black Forest Road, it is not proposed to develop this as part of RRL2. Stabling is proposed to only be considered when or if 'short starter' train services from Wyndham Vale are initiated. This in turn will only occur when the population around the Wyndham Vale and Tarneit area reaches the point where its demand exceeds the capacity of train services from Geelong.¹⁵

The RRLA acknowledged that regional stabling yards and three further stations were included in the project as described in the EES referral and that the Incorporated Document of the planning schemes allows the development of these facilities in accordance with an endorsed Development Plan.

It was submitted by the RRLA that these facilities should not be considered as part of the project at this time, however. This was said to be because:

- Under the provision of the Incorporated Document there is scope for noise from these sources to be assessed as part of the approval of a revised or new noise management plan
- A much better assessment of the noise impacts could be made when more details of the proposed facilities are known
- Assessment could be made against any rail noise policy that might evolve from the DGPF.

The RRLA expressed the view that it is important to distinguish between what is currently proposed and the reservation of capacity by the RRL2 designers for possible future rail infrastructure and submitted that:

- The EES referral explains that RRL2 does not include the development of any train lines or other rail infrastructure for use by electric trains or stabling yards for such trains
- The EES referral explains that RRL2 'makes provision' for the future construction of two freight tracks between Deer Park and Truganina but to 'make provision' only means to ensure capacity within the rail corridor
- RRL2 does not include freight train infrastructure nor was such infrastructure included in the EES referral.

The RRLA noted that the proposed Avalon Airport Link Project is at an early stage of planning and said that there is no information which could be used in assessing the noise impact of trains servicing the Avalon Airport if they were to use the RRL2 corridor.

In the RRLA's reply, reliance was placed on the EES referral, the Minister's decision on the EES referral and the Committee's Terms of Reference. Mr Wren SC for the RRLA argued that:

¹⁵ Submission by Regional Rail Link Authority, Para 27

Each of these documents make it clear that RRL2 consists of train tracks to divert regional passenger train services from Geelong to Deer Park, as well as associated rail infrastructure such as train stations, train stabling yards, and grade separations. While not all aspects of this infrastructure will be developed at the same time, they do all form part of the RRL2 project. That is why the Incorporated Document allows the corridor to be developed in stages, and that each stage will require a Noise Management Plan to the Minister for Planning's satisfaction.¹⁶

3.4 Discussion

The starting points for consideration of the definition of the project to be assessed ('the project') must be:

- The description of the project provided in the EES referral which was the subject of the Minister's decision
- The Incorporated Document of the Wyndham and Melton Planning Schemes
- Designation of the project area under the *Major Transport Projects Facilitation Act*.
- The EES referral was effectively the commencement of a process designed to obtain all necessary permissions and authorisations to implement the project. It was on the basis of the project description provided in the EES referral that the Minister for Planning decided that an EES was not required providing a noise impact management report, incorporating a noise management plan, was prepared for the project.

As earlier described, the project area was originally included in a PAO introduced into the planning schemes by Amendment VC68, but this overlay was subsequently removed and instead the total project area was designated in plans approved under the *Major Transport Projects Facilitation Act 2009*. This later designation was for a slightly larger area than had been included in the PAO; it includes other areas already reserved for railway use such as part of the Geelong rail line west of its intersection with the new RRL2 railway. For the purpose of our assessment of noise, we have, as has the RLLA, adopted as the project area only those sections of the wider designated area in which railway uses would occur for the first time.

It was suggested by the RLLA that the project elements listed below should be considered to define the project:

- The 'short project description' in the EES referral
- The project description in the Minister for Planning's decision on the EES referral

¹⁶ Regional Rail Link Authority-Submission in Reply, Para 5

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- The project description in the Committee's Terms of Reference

We have reviewed these documents. It is our view that:

- While the short project description in the EES referral comprises a list of what the project will provide, it is not clear that the list is meant to be exhaustive or that other elements will not be provided. In our opinion this description can only be seen as a summary of the more detailed description in the same document.
- The project descriptions in the Minister's decision on the EES referral and the Committee's Terms of Reference are again brief summaries, as is required in such documents, and should not be seen as comprehensive project descriptions. It is our view that if the Minister for Planning had intended to change the scope of the referred project, then he would have clearly said so. The fact that the decision of the Minister is a decision on the project as described in the EES referral, and the Committee's Terms of Reference then arise from that decision, means that, unless these documents include a statement that the project scope is changed, the project is that described in the EES referral.

We are therefore of the view that the definition of the project which we are required to advise on is unchanged by any other description made subsequent to the EES referral.

It is noted that there is general agreement that the construction and use of the following elements should be considered to be part of the project:

- Two tracks for the length of the project area and their use by regional passenger trains
- Stations at Wyndham Vale and Tarneit
- Road-over-rail overpasses
- Bridges over rivers and creeks.

The elements over which there is some dispute about their inclusion in the project can be divided into three categories:

- Elements that are considered to be part of the regional passenger rail project but will not be constructed initially, including:
 - Two additional tracks from the northern side of the Werribee River to Middle Road, Ravenhall, to enable regional rail services operating between Wyndham Vale and Southern Cross ('short starter' trains)
 - Stabling facilities for 'short-starter' regional passenger trains near Black Forest Road
 - Stations at Truganina, Davis Road and Sayers Road.
- Elements for which some provision is being made but which are not directly related to regional passenger rail, including:

-
- Tracks for the extension of the metropolitan train service from Werribee to Wyndham Vale
 - A station at Wyndham Vale South served only by metropolitan trains
 - Stabling and depot facilities for metropolitan trains north of Ballan Road
 - Two freight tracks between the junction with the Ballarat line at Deer Park and Truganina
 - Elements that are possible uses of the project area but were not envisaged at the time of the EES referral, including:
 - Freight trains travelling the length of the project area
 - Trains servicing Avalon Airport.

Each of the three above categories about which there is disagreement is discussed below.

3.4.1 Proposed elements for regional passenger rail not included in initial construction

The project description in the EES referral includes 'stabling and depot facilities for V/Line trains' but includes the following rider:

This element is dependant (sic) on likely patronage stemming from urban growth in the area and would be constructed at a later stage than the initial railway.

The project description in the EES referral also includes:

Depending on urban development in the surrounding areas, a further two tracks will be constructed in stages from north of the Werribee River in Tarneit to near Middle Road, Ravenhall. The extra tracks will accommodate 'short-starter' regional rail services operating between Wyndham Vale and Southern Cross.

It is noted that the later development of stabling facilities for regional passenger trains and additional tracks to accommodate short starter trains is said to be dependent on the level of patronage resulting from future urban growth. It was the RRLA's submission that this level of uncertainty should result in these elements being excluded from the project.

We do not agree with the submission of the RRLA on this matter for the following reasons:

- These elements relate to the provision of regional passenger rail services: they relate to what might be viewed as the core purpose of the project.
- The ongoing rate and extent of planned urban development in the area surrounding most of the project area are such that there can be little

doubt that there will be sufficient rail patronage to warrant the development of these elements of the project.

- The provisions of the Incorporated Document of the planning schemes allow the development of these elements without a planning permit. This is conditional on the development and use being generally accordance with a Development Plan that inter alia is consistent with 'any Noise Impact Management Plan required by the Minister for Planning'. However, the provisions also allow for staged preparation and approval of the plans and permit their later amendment.
- We believe that these provisions would not necessarily prevent further 'as of right' railway development and use with further acoustic impacts: the provisions make a further noise assessment possible but do not guarantee it. As a result, the only opportunity for assessment and development of appropriate mitigation measures for all elements of the project may well be now.
- It would, in our view, be prudent, so far as is practicable, to consider the noise impacts and mitigation requirements for all elements of the project as part of the current assessment. We recognise that it would be desirable and possible to alter the provisions of the Incorporated Documents so as to mandate further noise assessments when additional railway uses of the project area are proposed. While in this way any additional noise impacts of the new uses might be identified, it would not overcome the costs and other difficulties of implementing acoustic mitigation works incrementally.

The question of whether noise projections can be made for these elements so they can be included in the overall noise assessment of the project is considered in Chapter 7 of this report.

3.4.2 Possible elements not directly related to regional passenger rail

The project description in the EES referral includes the following:

Extension of Werribee suburban service

Reservation of the land for the RRL - West Werribee to Deer Park will also include land to extend the existing suburban electric railway service from Werribee to Wyndham Vale. This component can be constructed either simultaneously with the RRL - West Werribee to Deer Park or at a later time. However in order to maximise benefits and facilitate future development it is essential that land to accommodate the Werribee extension is reserved at the same time as the land needed for the RRL - West Werribee to Deer Park. If the extension to Werribee is constructed later than the RRL - West Werribee to Deer Park, connection between Geelong and Werribee will be maintained in the meantime by either bus

services between Wyndham Vale and Werribee or a rail shuttle between Geelong and Werribee.

The Werribee service would be extended via the existing Melbourne-Geelong railway corridor before branching northwards to parallel the two-track corridor for V/Line regional railway services, thereby creating a four-track railway corridor between Black Forest Road and Ballan Road, Wyndham Vale. A railway station served only by suburban trains would be constructed at Black Forest Road, Wyndham Vale, to serve future urban development in the surrounding area.

The Werribee extension also requires construction of stabling and depot facilities for suburban trains. The facilities are proposed to be located north of Ballan Road, Wyndham Vale, to allow trains to originate and terminate at Wyndham Vale. Ultimately these facilities would provide stabling and cleaning for thirty 6-carriage trains.

Freight

The project will make provision for construction of two freight tracks between the junction at Deer Park and Truganina for access to a potential intermodal freight terminal in Truganina. However, the project does not propose to reserve land or construct an intermodal terminal because demand from nearby industrial land uses and provision of separate funding will dictate the timing of any development.

It is noted that the above description indicates that:

- The works required to extend the metropolitan train service may be completed after the initial construction but there is no suggestion that such an extension will not occur
- The works required will be within the project area and will include construction and use of rail tracks, a station, stabling facilities and depot facilities
- The level of detail provided is equal to, if not greater than, that provided on the proposed regional passenger train infrastructure and services
- The construction of additional tracks for freight at the northern end of the project area is likely.

In light of the above, we are convinced that a reasonable reading of the project description would lead to a conclusion that the extension of the metropolitan train service and the additional tracks for freight trains are part of what is being proposed.

Again, these are facilities that might be constructed and used without the need for further planning permission. While the RRLA has suggested that this could only occur if a revised or new noise management plan was

prepared and approved, as we have said, we do not believe that the provisions of the Incorporated Document guarantees this.

We are therefore of the view that the extension of the metropolitan train service and the additional track for freight trains should also be considered to be part of the project.

We acknowledge that there may be some difficulty in including the metropolitan train service and freight trains in a noise assessment at this time, due to the lack of definitive proposals. This nevertheless does not mean that they are not part of the project. If it is found that by including metropolitan trains and freight trains the noise assessment is not possible at this time, then it would be appropriate to amend the planning schemes to make a new or revised noise assessment a requirement rather than a possibility.

The noise impacts of metropolitan rail and freight train services is further discussed in Chapter 7 of this report.

3.4.3 Possible project elements not envisaged at the time of the EES referral

Since the description of the project was provided in the EES referral to the then Minister for Planning, the incumbent State Government has announced a policy intent to further develop the Avalon Airport and fund investigations into the provision of passenger rail services to it from Melbourne and Geelong. The recent material publicly available suggests that potential options for a rail line branching off the Geelong line between Little River and Lara will be investigated.

It appears to us that use of the RRL by Avalon Airport passenger trains is highly likely given the unimpeded route it offers to central Melbourne. To direct the airport trains along the route to the city currently available would also appear to undermine the intent of freeing up capacity on suburban rail lines.

It is our view that the use of the project area by trains servicing Avalon Airport, as well as intra-State freight trains from Geelong or places further west, travelling the length of the project area are real possibilities. These uses of the RRL2 project area could and probably would occur without the need for planning permission and possibly without consideration of their noise impacts.

There is no doubt that they are not part of the project referred to the Minister for Planning and therefore technically cannot be considered to be part of the project.

The nature of railway development and railway noise mitigation measures, however, is such that they are best designed and constructed in an integrated fashion at the outset. Opportunities for cost effective noise mitigation in subsequent construction stages are severely limited. These factors support consideration of the noise impacts of the full range of proposed and possible railways uses of the project area at the outset to the extent that it is possible to do so.

As a result, if noise from Avalon Airport passenger trains or freight trains can be included in the assessment informing the selection of noise mitigation measures for RRL2 then it would prudent to do so.

The inclusion of Avalon Airport and freight trains in the noise assessment is considered in Chapter 7 of this report.

3.5 Conclusions and recommendations

It is concluded that:

- **The project is defined by the description of the project contained in the referral to Minister for Planning under *Environment Effects Act 1978* and includes the following construction and use elements:**
 - **Two tracks for the length of the project area and their use by regional passenger trains**
 - **Stations at Wyndham Vale and Tarneit**
 - **Road-over-rail overpasses**
 - **Bridges over rivers and creeks**
 - **Stabling facilities for regional passenger trains near Black Forest Road**
 - **Two tracks from the northern side of the Werribee River to Middle Road, Ravenhall to accommodate 'short-starter' trains**
 - **Stations at Truganina, Davis Road and Sayers Road**
 - **Tracks for the extension of the metropolitan train service from Werribee to Wyndham Vale**
 - **A station at Wyndham Vale South, served only by metropolitan trains**
 - **Stabling and depot facilities for metropolitan trains north of Ballan Road**
 - **Two freight tracks between the junction at Deer Park and Truganina**
- **There are significant benefits to be gained by including noise from other possible uses of the project area, including Avalon Airport trains and freight trains travelling the entire length of the project area in the noise assessment.**

4. Policy context

The common State Planning Policy Framework (SPPF) of all planning schemes in the State, the objectives of the *Planning and Environment Act 1987* and the purpose statements of the *Transport Integration Act 2010* provide part of the policy context for the consideration of the issues to be addressed by the Advisory Committee. The DGPF released in mid-August 2011 is also directly relevant.

4.1 Objectives of the Planning and Environment Act

Section 4 (1) of the Act sets out the objectives of planning in Victoria. They include:

- (a) *to provide for the fair, orderly, economic and sustainable use, and development of land...*
- (c) *to secure a pleasant, efficient and safe working, living and recreational environment for all Victorians and visitors to Victoria...*
- (e) *to protect public utilities and other assets and enable the orderly provision and co-ordination of public utilities and other facilities for the benefit of the community;*
- (f) *to facilitate development in accordance with the objectives set out in paragraphs (a), (b), (c), (d) and (e);*
- (g) *to balance the present and future interests of all Victorians (our emphases).*

Section 3A is also relevant to the Committee's task. It provides that:

This Act is interface legislation within the meaning of the Transport Integration Act 2010.

4.2 State Planning Policy Framework

Various clauses of the SPPF of the planning schemes are relevant. They include:

- Clause 13.04-1 *Noise abatement* which has the following objective: 'To assist the control of noise effects on sensitive land uses'. An associated strategy is to:

Ensure that development is not prejudiced and community amenity is not reduced by noise emissions, using a range of building design, urban design and land use separation techniques as appropriate to the land use functions and character of the area.

-
- Clause 18 *Transport* provides that:

Planning should ensure an integrated and sustainable transport system that provides access to social and economic opportunities, facilitates economic prosperity, contributes to environmental sustainability, coordinates reliable movements of people and goods, and is safe.

 - Clause 18.01-1 Land use and transport planning has the objective ‘To create a safe and sustainable transport system by **integrating land-use and transport**’. Related strategies include:
 - *Develop transport networks to support employment corridors that allow circumferential and radial movements.*
 - *Plan urban development to make jobs and community services more accessible by:*
 - *Ensuring access is provided to developments in accordance with forecast demand, taking advantage of all available modes of transport and to **minimise adverse impacts on existing transport networks and the amenity of surrounding areas.***
 - ...
 - ***Integrate public transport services and infrastructure into new development** (our emphases).*

 - Clause 18.01-2 Transport system has the following objective: ‘To coordinate development of all transport modes to provide a comprehensive transport system’. Related strategies include:
 - *Require transport system management plans for key transport corridors and for major investment proposals.*
 - *Reserve land for strategic transport infrastructure.*
 - ...
 - *Locate transport routes to achieve the greatest overall benefit to the community and with regard to making the best use of existing social, cultural and economic infrastructure, minimising impacts on the environment and optimising accessibility, safety, emergency access, service and amenity.*
 - ***Locate and design new transport routes and adjoining land uses to minimise disruption of residential communities and their amenity.***
 - ***Plan or regulate new uses or development of land near an existing or proposed transport route to avoid detriment to, and where possible enhance the service, safety and***

amenity desirable for that transport route in the short and long terms.

- *Encourage higher land use densities and mixed use developments near railway stations, major bus terminals, transport interchanges, tramways and principal bus routes. Pedestrian and cyclists access to public transport should be facilitated and safeguarded.*
- *Ensure transport practices, including design, construction and management, reduce environmental impacts.*
- *Ensure careful selection of sites for freight generating facilities to minimise associated operational and transport impacts to other urban development and transport networks (Committee emphases).*
-
- **Clause 18.02-3 Principal Public Transport Network has as its objective:**
 - *'To upgrade and develop the Principal Public Transport Network and local public transport services in Metropolitan Melbourne to connect activity centres, link activities in employment corridors and link Melbourne to the regional cities'.*

Related strategies include:

- *Establish fast train services that serve key regional cities and townships and connect them with Central Activities Districts, Principal and Major Activity Centres along the radial routes connecting to Central Melbourne.*
- *Provide a Principal Public Transport Network that allows for circumferential, in addition to radial movements.*
- *Identify key strategic transport corridors capable of providing fast, reliable and frequent public transport services.*
- *Support the Principal Public Transport Network with a comprehensive network of local public transport services.*
- *Improve the operation of the existing public transport network with faster, more reliable and efficient on-road and rail public transport by:*
 - ...
 - ***Improving the rail network by identifying and treating rail 'red spots' and expanding rail corridor speed and loading capacities (Committee emphasis).***

-
- Clause 19 *Infrastructure* states that:
 - *Planning for development of social and physical infrastructure should enable it to be provided in a way that is efficient, equitable, accessible and timely.*
 - *Growth and redevelopment of settlements should be planned in a manner that allows for the logical and efficient provision and maintenance of infrastructure, including the setting aside of land for the construction of future transport routes.*
 - *Strategic planning should facilitate efficient use of existing infrastructure and human services. Providers of infrastructure, whether public or private bodies, are to be guided by planning policies and should assist strategic land use planning.*
 - *Planning authorities are to consider the use of development contributions (levies) in the funding of infrastructure (Our emphasis).*

4.3 Transport Integration Act 2010

- The vision statement of the *Transport Integration Act 2010* is set out as follows:

The Parliament recognises the aspirations of Victorians for an integrated and sustainable transport system that contributes to an inclusive, prosperous and environmentally responsible State.
- The more relevant objectives of the Act (with Committee emphases added) are as follows:
 - Economic prosperity (Section 9)

The transport system should facilitate economic prosperity by—

 - (a) *enabling efficient and effective access for persons and goods to places of employment, markets and services;*
 - (b) *increasing efficiency through reducing costs and improving timelines;*
 - (c) *fostering competition by providing access to markets;*
 - (d) *facilitating investment in Victoria;*
 - (e) *supporting financial sustainability.*
 - Integration of transport and land use (Section 11)

-
- (1) *The transport system should provide for the effective integration of transport and land use and facilitate access to social and economic opportunities.*
- (2) *...transport and land use should be effectively integrated so as to improve accessibility and transport efficiency with a focus on—*
- (a) *maximising access to residences, employment, markets, services and recreation;*
 - (b) *planning and developing the transport system more effectively;*
 - (c) *reducing the need for private motor vehicle transport and the extent of travel;*
 - (d) *facilitating better access to, and greater mobility within, local communities.*
- (3) *...the transport system and land use should be aligned, complementary and supportive and ensure that—*
- (a) *transport decisions are made having regard to the current and future impact on land use;*
 - (b) *land use decisions are made having regard to the current and future development and operation of the transport system;*
 - (c) *transport infrastructure and services are provided in a timely manner to support changing land use and associated transport demand.*
- (4) *...the transport system should improve the amenity of communities and minimise impacts of the transport system on adjacent land uses.*
- Efficiency, coordination and reliability (Section 12)
 - (1) *The transport system should facilitate networkwide efficient, coordinated and reliable movements of persons and goods at all times.*
 - (2) *...the transport system should—*
 - (a) *balance efficiency across the network so as to optimise the network capacity of all modes of transport and reduce journey times;*
 - (b) *maximise the efficient use of resources including infrastructure, land, services and energy...*

4.4 Draft Government Policy Framework

At present Victoria has no standards, guidelines, goals or other quantified objectives that might assist with management of operational noise from passenger rail services. Indeed section 251B of the *Transport (Compliance and Miscellaneous) Act 1983* exempts noise from rail rolling stock from being considered as a nuisance and exempts that noise from the provisions of the *Environment Protection Act 1970* and the *Local Government Act 1989* together with subordinate instruments made under those Acts.

As earlier described in Section 2.5, at the outset of the Advisory Committee process, we were advised that we would be provided with an soon to be released draft Government policy for passenger rail noise. We were later provided with a copy of a 'Draft Government Policy Framework for Noise from Future Rail Investment in Victoria' (DGPF).

The document that was provided to the Committee was entitled: *Advice to the Regional Rail Link 2 Advisory Committee on Noise from Future Passenger Rail Investment in Victoria from the Department of Transport* (our emphasis). It was nevertheless later clarified that this was the policy framework itself and at the Committee hearing we were formally advised that the document had been approved by Cabinet. As also earlier indicated, a copy of the DGPF is attached at Appendix 4.

At the meeting of relevant agencies called by the Advisory Committee on 27 May 2011, the Department of Transport (DoT) indicated that the DGPF was the first step in establishing Government policy on managing noise from passenger rail services.

The introduction to the DGPF states:

The Victorian Government has decided to develop a principles-based framework for making decisions about noise from future passenger rail investments.

This paper explains the principles-based framework for noise from future passenger rail investments, the proposed set of principles within the framework, and the process for further developing a future passenger rail investment noise policy.

It describes the rationale for this approach as follows:

At present, there are broad legislative requirements relating to noise from future passenger rail investments. These are complex and have the potential to impose significant impacts upon the community, either through noise impacts or financial cost added to rail projects.

Each future passenger rail investment will differ in terms of size and scope, the impact of noise on the community and the range of treatment options available. ...

From a technical perspective the options for treatment vary considerably in terms of cost, timing, effectiveness and practicality. Different treatments are more applicable to different situations and no single treatment is comprehensive enough to be appropriate for all cases of noise. Some treatment choices are prohibitively expensive and have negative effects on how easy or difficult it is to access locations on either side of the rail infrastructure, safety and security.

The decision making environment is also complex as it includes numerous stakeholders with a range of perspectives, interests and objectives...

Making decisions about noise from passenger rail investments requires balancing the objectives, views and interests of large number of stakeholders.

In describing a principles-based framework the DGPF states:

The Victorian Government has chosen a flexible principles based framework over a more prescriptive standards based framework. A principles-based framework will enable the impact of noise to be assessed and for decisions to be made about how to respond to noise from future passenger rail investments.

The principles based framework will be applied on a case by case basis. Each investment will have different noise impacts, constraints on solutions and potential noise treatment options.

The principles underpinning the framework can be applied at each stage of project development, from the earliest planning through to the final endorsement of the project. ...

The principles based framework enables the most cost-effective and practical solutions to managing noise to be adopted. The principles underpinning the framework recognise the need to balance differing objectives and take action in the best interests of the whole Victorian community.

The DGPF then articulates four draft principles which it states are intended to be applied jointly. It says:

During the further development of the framework (as set out in Section 5 of this paper), the principles will be refined and detailed guidance on how the principles should be applied will be developed.

The draft principles are:

Integrated early consideration

Impacts of noise from rail projects and options for noise reduction should be considered early in the development of a proposal for passenger rail investment and an integrated approach should be taken to identifying the options to avoid or reduce noise and its impacts.

This principle draws attention to the importance of reducing noise and its impacts through both planning and engineering treatments and that that should be done ‘...in the context of local circumstances and having regard to the broader social, environmental and economic interests of the state’.

Affordability and equity

Noise reduction should be cost effective, while sharing the costs and benefits of infrastructure and noise treatments equitably.

This principle advises that the costs, benefits and effectiveness of possible treatments and other management options should be considered with regard to local circumstances and in the context of financial prudence and not unreasonably compromising the objectives of the project.

Balancing objectives

Decisions about managing the impact of noise from future passenger rail investments should balance noise reduction against other objectives of the project.

This principle indicates that ‘...the highest priority should be given to treatments that generate the greatest overall public value’.

Best fit solutions

All reasonable efforts to limit impacts of noise should be made taking account of what is practicable, reasonable and cost effective, given the specific local circumstances and the broader public good.

The draft framework provides a discussion of the application of the principle-based framework noting that

The principles-based framework will require that assessments of noise impacts and decisions about managing noise from passenger rail investments will be made at several stages in the investment process.

4.5 Panel comment on policy context

The Advisory Committee comments that the policy context for our assessment clearly identifies the need to plan for land use and transport corridors in an integrated manner and to have regard to the adverse impacts

that the transport facility may have on the amenity of areas through which it passes.

So far as the DGPF is concerned, we note the emphasis on responding to passenger rail noise on a case by case basis. We also would observe that while some presenters at the Committee hearing asserted that the document favours a qualitative response to rail noise rather than one which involves the establishment of numerical noise standards, in our view the framework does not preclude a more quantitative approach to the assessment of noise and identification of appropriate mitigation options. It does, however, recommend that the quantitative approach should be tailored to specific situations.

In taking this view we recognise that any quantitative approach should embrace the four principles which, it might be said, are not dissimilar to the objectives of the *Planning and Environment Act*.

5. Construction noise and vibration

5.1 What are the issues?

The decision made by the Minister for Planning that an EES was not required for the RRL2 project includes a requirement for and specification of the scope of a NIMR for the project (see Appendix 1). The full list of matters to be addressed in the NIMR is as follows:

- Construction noise
- Groundborne vibration during construction
- Ground vibration and airblast overpressure from blasting
- Operational noise
- Operational vibration.

The Committee has considered the full scope of the NIMR and this chapter details its consideration of all aspects except for operational noise, which is covered in the following chapters.

The issues to be considered are as follows:

- The adequacy of the NIMR in terms of:
 - The appropriateness of the standards proposed to be applied
 - The impact assessment including:
 - The adequacy of the predictions of noise and vibration levels
 - The adequacy of the assessment of the impacts of the predicted noise and vibration levels
 - The acceptability of the impact of residual noise and vibration levels
- Additional noise and vibration mitigation possibilities
- The FNMP and its implementation
 - The adequacy of the DNMP
 - Modifications and additions to the DNMP to produce a Final Noise Management Plan (FNMP).

5.2 Construction noise

5.2.1 Standards

Noise Impact Management Report

The NIMR notes that there are no statutory limits for construction noise and vibration in Victoria but that the EPA has issued the following relevant guidelines for the control of noise during construction:

- Environmental Guidelines for Major Construction Sites, February 1996
- Noise Control Guidelines, Publication 1254, October 2008 (NCG 1254)

The NIMR also makes reference to the *Construction Noise Strategy (Rail Projects)* (NSW CNS) published by the NSW Transport Infrastructure Development Corporation.

The NIMR details the guidance provided in these documents which, in the main, is measures that should be implemented to control noise, procedures for community consultation and the restriction of operating hours.

The NIMR notes that NCG 1254 includes recommendations on working hours and limits on noise levels at sensitive receptors outside of 'normal working hours' with the relevant time periods defined as follows:

Normal working hours	7:00 am to 6:00 pm Monday to Friday 7:00 am to 1:00 pm Saturday Except public holidays
Weekend/evening work hours	6:00 pm to 10:00 pm Monday to Friday 1:00 pm to 10:00 pm Saturday 7:00 am to 10:00 pm Sunday 7:00 am to 10:00 pm on public holidays
Night period	10:00 pm to 7:00 am Monday to Sunday

While the NIMR makes no recommendation on the adoption of these guidelines, the DNMP includes the following:

It is a project requirement that construction noise and vibration be managed in accordance with:

- *the Victorian EPA guidelines for major construction sites; and*
- *EPA Noise Control Guidelines (EPA 1254)*

In addition, further controls are required to be applied where the works are particularly intrusive. These are particular to the construction of railway infrastructure and are based on guidance in the NSW transport infrastructure

development corporation (TIDC) Railway Infrastructure Construction Noise Guidance.¹⁷

The DNMP:

- Lists the measures to be taken with the measures being some of those recommended in NCG 1254.
- Specifies normal operating hours and noise limits outside those hours as per NCG 1254 but allows exemptions from this restriction and compliance with the limits for 'unavoidable works' and 'night period low-noise or managed-impact works'.
- Sets out the procedures to be followed if:
 - Unavoidable works are required including notification of residents of affected premises and approval from the relevant authority and the principal's¹⁸ representative.
 - Low-noise or managed-impact works are to be conducted requiring approval from the principal's representative.
- Includes additional community consultation as recommended in the NSW CNS when unavoidable, low-noise or managed-impact works are to be conducted.

Peer review

While reports on a peer review of the NIMR were provided and exhibited, the introduction to the first peer review report states:

*The Arup report presents a discussion of noise and vibration arising from Section 2 of the proposed Regional Rail Link – a new two-track railway between Deer Park Bypass and West Werribee Junction, west of Melbourne. As requested, this review is restricted to technical aspects of noise prediction and modelling as presented in Sections 6 - 9 of the report, and does not address questions of noise standards, impact assessment or the adequacy of the report.*¹⁹

Evidence and submissions

There were no submissions made or evidence provided on the limits or standards that should be applied to construction noise except for agreement with the content of the NIMR and the DNMP.

¹⁷Regional Rail Link Section 2 Noise Management Plan Rev G, KBR-Arup, 9 Dec 2010, Sec 4

¹⁸ As we understand it, the 'principal' will be RRLA during the initial construction period but later works may have another 'principal'.

¹⁹ Regional Rail Link Peer Review of Acoustic Assessment, Wilkinson Murray, Oct 2010, Sec 1

Discussion

We accept the proposition that NCG 1254 and some of the guidance in NSW CNS provide appropriate standards for construction noise and note that those standards include external noise limits for weekend/evenings as follows:

Weekends/Evenings

First 18 months ≤ 10 dB(A) above the background noise level

After first 18 months ≤ 5 dB(A) above the background noise level

For the night period, construction noise is required to be inaudible within any habitable room of any residential premises.

It should be noted that the reference to 'background noise level' is to that as is defined in *State Environment Protection Policy (Control of Noise from Commerce Industry and Trade) No. N-1 (SEPP N-1)* which is measured as a LA90. While NCG 1254 does not specify the metric for the permissible increases above background, it is considered safe to assume that it should be in accordance with SEPP N-1 where the metric specified is LAeq30min. For example, if the LA90 without construction works for the weekend/evening is 35 dB, the limit during the weekend/evening for the first 18 months is a LAeq30min of 45 dB and for subsequent months a LAeq30min of 40 dB.

In summary, we agree that the construction noise levels should be in accordance with NCG 1254; and, having regard to the advice from EPA, the background should be measured as LA90 and the construction noise should be measured as LAeq30mins both as defined in SEPP N-1.

Peer review

We also advise that we do not understand why the RRLA has chosen not to have the aspect of the NIMR relating to construction noise standards (nor indeed a number of other aspects of the NIMR) peer reviewed and see it as being contrary to the requirements for a peer review set out in the Minister's decision on the EES referral.

The Minister's decision clearly specifies that a noise impact management report is required and that it is to be accompanied by a report on a peer review by an independent specialist. The decision does not say a peer review only of certain aspects of the noise impact management report is required and decision can only be interpreted as a requirement that all aspects of the report be peer reviewed.

5.2.2 Impact assessment

Noise Impact Management Report

The consideration of construction noise detailed in the NIMR includes the following:

- Definition of 18 typical construction scenarios
- For each scenario, definition of a typical set of construction plant based on experience and advice from KBR-Arup civil design engineers
- Definition of noise emissions based on the following:
 - The assumption that all construction equipment at a particular location was operating simultaneously to represent a 'worst case'
 - Equipment sound power levels based on the UK Department of Environment Food and Rural Affairs Noise Database and Australian Standard 2436:2010 – 'Guide to noise and vibration control on construction, demolition and maintenance sites'
 - Piling rig noise levels based on a large rotary bored piling rig
- Noise propagation modelling, using the widely accepted CONCAWE techniques as applied in the noise modelling software package SoundPLAN 7.0, to produce predictions of sound pressure levels in the area surrounding the assumed construction activity.

Modelling results were provided in Section E2 of Appendix E to the NIMR in the form of a shaded noise contour plot on an aerial photograph for each construction scenario.

The results of the construction noise predictions were summarised in the NIMR as follows:

Noise levels up to 70 dB(A) are predicted at residential locations near to a typical construction works. This is consistent with measurements undertaken by Arup at recent railway construction works for the Springvale Rail Grade Separation Project.

Construction noise levels are therefore likely to be between 20-30 dB(A) above the prevailing background noise at many locations near the alignment. This indicates that any works undertaken near to residential areas during the evening or night-time period are likely to require specific noise mitigation or temporary relocation of nearby residents.²⁰

Peer review

A peer review of the modelling of construction noise described in a previous version of the NIMR (Revision C) was conducted by Wilkinson Murray. The

²⁰ Regional Rail Link Noise Impact Management Report Rev H, KBR-Arup, 9 Dec 2010 Sec 9.1
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peer reviewer raised a number of issues that were responded to in a subsequent version of the NIMR. Consideration of the responses of KBR-Arup on the matters raised and the amended NIMR (Revision F), by the peer reviewer, resulted in acceptance of all aspects of the construction noise modelling except for the following:

The updated report still contains no indication of short-term construction noise levels occurring during construction of the track. As indicated in my original comments, this does not need to be done through contours – a statement (accompanied by a table) of typical noise levels at various distances, and an indication of the duration of the noise, would provide warning that residents along the proposed route can expect to hear construction noise at some stage during the works.²¹

KBR-Arup responded to the comments of the peer reviewer with the following statement:

It is quite difficult to provide a description of the construction noise which accurately reflects the likely 'short-term' outcomes, without being overly conservative. This is particularly so, since the future construction methodology, equipment and detailed programme is yet to be determined, since it will depend, to some extent, on the selected contractor.

The current description of potential construction noise impacts provides a reasonably transparent and understandable description of the likely construction noise impacts that will be experienced. It is important to realise that there are no noise limits for short-term construction works, carried out in 'normal working hours' in Victoria.²²

The assessment of the impact of construction noise was not subjected to peer review.

Evidence and submissions

The only reference to the predictions and impact assessment of construction noise in written submissions received in response to the public notification was in the submission of Wyndham City Council. The Council submitted that:

- The modelling is incomplete as the entire length has not been modelled, in particular the Davis Road grade separation, the Werribee River bridge and the entire length of the Wyndham Vale cutting should have been modelled to enable adjoining residents to assess potential impacts.

²¹ Regional Rail Link Peer Review of Acoustic Assessment, Wilkinson Murray, Nov 2010, Sec 4

²² Regional Rail Link Response to Peer Review Rev B, 9 Dec 2010, KBR-Arup Sec 3.3

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- The results of the modelling of construction for grade separations are questionable as they indicate a circular zone of impact while such construction works are in fact linear in nature.
 - Construction at the intersection of the railway and Woods Road has been modelled but no grade separation is proposed at that intersection.

In response to the above criticisms, Dr Kym Burgemeister of KBR-Arup and principal author of the NIMR, called by the RRLA, defended the approach of considering 'typical' construction scenarios rather than modelling of all activities for the length of the railway on the basis that:

- The scenarios modelled were collectively representative of all proposed construction
- Since construction would not occur simultaneously on the full length of the railway, the results of modelling such a scenario would be extremely conservative and would be likely to result in an incorrect impact assessment.

At the hearing, Wyndham City Council reiterated its concerns in regard to the construction noise predictions.

Evidence provided by Mr Robin Brown of Renzo Tonin and Associates, called to give acoustic evidence by the Dennis Family, included an indication of his general acceptance of the definition of noise sources and noise generation scenarios used for the construction noise predictions, but noted that the predictions were representative rather than exhaustive.

- Mr Brown also advised that he had been unable to complete a definitive review of the construction noise modelling as he was denied access to SoundPLAN files used. Despite this Mr Brown concluded that:

Arup's numerical results for prediction of construction noise levels appear to be reasonable for daytime operations.

The predicted worst case construction noise levels of 70 – 75 dB(A) significantly exceed these limits (those prescribed in EPA Noise Control Guidelines [EPA 1254] for evening and night-time). It is therefore expected that where there are residential properties nearby, full construction works carried out during the evening (and presumably the night) will not comply with the project requirements.²³

All acoustic experts providing evidence at the hearing were asked if they had reviewed the construction noise sections of the NIMR and all indicated that, while they had not completed detailed reviews, the methodology applied appeared to be appropriate and the results were in line with their expectations.

²³ Expert Witness Statement – Robin Brown of Renzo Tonin & Associates, 26 Oct 2011

It was the RRLA's submission that the main criticisms of the construction noise impact assessment were made by Wyndham City Council. In response to the suggestion of incompleteness, the RRLA submitted that:

... both the Noise Report and Dr Burgemeister's evidence explained that the construction noise modelling is representative of typical 'worst case' construction noise at 18 selected locations, but acknowledged that it doesn't represent construction noise at every location. The only alternative would be to assume that construction noise was happening along the entire alignment at the same time. The Authority submits that the approach adopted by Dr Burgemeister to model construction noise at selected locations accompanied by an explanation of the rationale for this modelling approach was reasonable. Conversely, to model simultaneous construction noise along the entire alignment would have been so conservative as to be misleading.²⁴

Discussion

Adequacy of construction noise level predictions

On the basis of the evidence provided we are satisfied that the methodology and input data used for the modelling of construction noise is appropriate and that the predicted noise levels provide a reasonable basis for assessment of noise impacts.

The concerns expressed by Wyndham City Council are in fact concerns about the presentation of the data rather than the data itself. We agree with Dr Burgemeister and the RRLA that modelling a scenario that involved construction works simultaneously on the entire length of the railway would produce an overly conservative representation. We see no great difficulty in the reader applying the prediction at one location to that of another similar location.

Adequacy of construction noise impact assessment

The only content of the NIMR that might be considered to be an impact assessment of construction noise, rather than a noise level prediction, is the statement that L_{Amax} noise levels, up to 70 dB are predicted at residential locations.

Our reading of the contour plots of construction noise predictions provided in the NIMR shows that the statement in the NIMR of L_{Amax} noise levels up to 70 dB at residential locations, presumably meaning existing dwellings, is a significant underestimate.

²⁴ Regional Rail Link Authority – Reply at Hearing, Para 56, Page 9
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Some dwellings in the Manor Lakes area are predicted to be within the L_{Amax} 71 to 74 dB zone and possibly the >74 dB zone. It also needs to be noted that these predictions are of 'free field' and need to be increased by 2.5 dB(A) to account for façade reflection²⁵.

It is therefore apparent that maximum construction noise levels at existing dwellings in excess of 74 dB(A) are predicted. This prediction does not, however, provide an adequate assessment of the impact of construction noise.

To assess the impact of construction noise, the number of existing dwellings at which high construction noise levels are predicted and the duration of such events is required. Such an assessment requires definition of what might be considered to be a high level of construction noise. While no noise limits are proposed for construction noise during normal working hours, an indication of what might be considered a high noise level is provided in the *EPA's Interim Guidelines for Control of Noise from Industry in Country Victoria N3-80, 1989*. These guidelines prescribe the method to be used for the setting of limits on noise from industry and include the following:

*During construction of an industry the daytime limit shall be raised by 10 dB(A) except where this would result in a limit greater than 68 dB(A). In this case the daytime construction noise limit shall be 68 dB(A)*²⁶.

While we are not suggesting that such limits should apply, we are of the view that an analysis of the number of existing dwellings that are predicted to be subject to noise levels in excess of these limits would enable an assessment of the impact of construction noise.

We do not believe that the information provided in the NIMR can be viewed as an adequate assessment of the impact of construction noise.

Acceptability of residual construction noise

In light of our view that the information required to assess the impact of the predicted residual construction noise after implementation of the DNMP has not been provided, it is similarly not possible to make a judgement on the acceptability of that impact.

The following comments can be made, however.

²⁵ Façade correction is an adjustment of +2.5 dB (A) made to a noise reading at a site to represent what the noise level would be with a building present. This is because the noise outside the wall of a building facing a noise source is higher (due to reflection of noise from the building wall) than it would be at that location without the building being present.

²⁶ *Interim guidelines for the control of noise from industry N3-89*, 18 April 1989, EPA Para 4

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- The inclusion in the DNMP of a requirement that construction noise be managed in accordance with NCG 1254 means that, providing the DNMP is adhered to, the impact at residential dwellings will be limited by the requirements of the guideline that, except in exceptional circumstances:
 - Noise levels at sensitive receptors during the weekend/evening will not exceed background plus 10 dB(A) for the first 18 months and background plus 5 dB(A) thereafter
 - Construction noise will be inaudible within any habitable room in a residence during the night, defined as 10:00 pm to 7:00 am on all days.

We are of the view that adherence to these restrictions would result in the impact of construction noise being limited to what should be considered an acceptable level during the weekend/evening and the night.

We are much less certain of the acceptability of the impact of construction noise during the day as noise levels at sensitive receptors are not limited by NCG 1254 and, due to the lack of data on the extent of the impact in the NIMR, an assessment of its acceptability is not possible.

5.2.3 Additional noise mitigation measures

No evidence was led nor were submissions made on additional noise mitigation measures during construction and no further discussion of this matter is required.

5.2.4 Implementation

The Draft Noise Management Plan

The DNMP includes the following:

It is a project requirement that construction noise and vibration be managed in accordance with:

- *the Victorian EPA guidelines for major construction sites; and*
- *EPA Noise Control Guidelines (EPA 1254)*

In addition, further controls are required to be undertaken where the works are particularly intrusive. These are particular to the construction of railway infrastructure and are based on guidance in the NSW transport infrastructure development corporation (TIDC) Railway Infrastructure Construction Noise Guidance²⁷

The DNMP lists 'specific construction noise controls' that are mainly taken from the NCG 1254 plus additional 'controls' that:

²⁷ Regional Rail Link Section 2, Noise Management Plan, Rev G, KBR-Arup, 9 Dec 2010, Sec 4
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- Prescribe the methods to be applied for communicating with affected residents if work is to be done outside the normal working hours as specified in NCG 1254, depending on:
 - The expected noise level at sensitive receptors
 - Whether the work will be done in the weekend/evening or night.
 - Include offers of respite or alternative accommodation if the expected noise levels are considered highly intrusive, defined as the $LA_{10,15min}$ being more than 30 dB above the background noise level.

The DNMP also states that environmental noise monitoring is required in the vicinity of noise sensitive residences at the beginning of each stage of construction and at any other time when disturbance outlines the community consultation required during the construction period.

Evidence and submissions

The RRLA submission included additional details of access and traffic management including:

- A contract requirement to establish the majority of construction work areas on the project area to maximise the separation distance between construction areas and the community
- The use of multiple site compounds and mobile storage areas plus the re-use of material to minimise vehicular traffic for the transport of people and materials
- The use of the project area as the primary traffic/haul route throughout construction resulting in minimal use of the surrounding road infrastructure for bulk haulage
- Management of traffic impacts through a tiered management system including:
 - A Traffic Management Plan detailing impacts on local roads, communications with motorists and management of traffic within the site
 - Traffic Implementation Management Plans for the management of individual events
 - A Traffic Communication Plan identifying impacts associated with disruption to traffic and specifying communications strategies to address these issues.

Mr Brown stated his view that the requirement in the DNMP to implement the NCG 1254 was a good outcome.

The submission made by the Dennis Family indicated acceptance of the application of the NCG 1254 and the additional mitigation measures included in the DNMP. It was also submitted that:

....where construction noise would not comply with the EPA Noise Control Guidelines during the evening as they relate to the Davis Homestead (located on Davis Land), the contractor should undertake a program of ongoing noise monitoring to demonstrate that compliance is achieved.²⁸

It is expected that ongoing monitoring be undertaken by the EPA to ensure continuous compliance with these policies throughout the construction period²⁹

Discussion

While there was general agreement by the participants at the hearing with the inclusion of a requirement for compliance with NCG 1254 in the DNMP, an inclusion with which we agree, we have some concerns about the drafting of the construction noise section of the DNMP and the certainty of compliance provided.

The DNMP states that compliance with NCG 1254 is a project requirement but specific noise control measures listed are a sub-set of the mitigation measures listed in NCG 1254.

We are of the view that having a statement that NCG 1254 must be complied with as well as a separate and different list of noise control measures, is open to an interpretation that may allow less than full compliance with the guidance provided in NCG 1254. The FNMP should make it clear that the use of all the mitigation measures listed in NCG 1254 is required.

Where the DNMP has a different description of what might be considered to be a similar mitigation measure in NCG 1254, we favour the description in NCG 1254.

We also note that some of the measures for the management and control of construction traffic will have the effect of minimising noise and should therefore be included, or least referred to, in the FNMP.

Our other concern with the construction noise section of the DNMP relates to ensuring the full implementation of NCG 1254.

While we acknowledge that the DNMP includes monitoring of construction noise, it appears that what is proposed is to monitor construction noise during normal working hours as defined in NCG 1254. We do not believe that such monitoring would be of any particular value since NCG 1254 does

²⁸ Submission for Dennis Family Corporation & Davis Family 11 Nov 2011, Para 47

²⁹ Submission for Dennis Family Corporation & Davis Family 11 Nov 2011, Para 49

not specify noise limits for normal working hours. As result there is no standard against which the monitoring results could be compared.

The acceptance of NCG 1254 as effectively 'setting the standard' for construction noise means that control of construction noise during normal working hours is achieved by requirements to take certain actions rather than by requiring a particular level of performance in terms of noise levels at sensitive receptors. While this approach is accepted, there is a need to ensure that the required actions are in fact taken. It is essential that both the relevant authorities and the community have a high degree of confidence that what needs to be done is being done. The level of concern and complaint can be expected to be greatly reduced by the knowledge that the 'right things' are being done. To provide the necessary confidence, an independent assessment of compliance with the requirements of NCG 1254 is required. An appropriate means by which such an assessment can be made is by way of audit against the requirements of NCG 1254.

We therefore believe that the FNMP should include requirements for:

- Audits to be undertaken by a suitably qualified specialist on a frequency which is to the satisfaction of the City of Wyndham and the Shire of Melton, provided that the first audit is to be conducted no later than two months after the commencement of construction and the audit reports are to be provided to the City of Wyndham and the Shire of Melton.
- The provision of the audit results to the community to the satisfaction of the City of Wyndham and the Shire of Melton.

While NCG 1254 does allow work outside of normal operating hours, such work must be conducted in compliance with prescribed noise limits as discussed and defined previously.

We are of the view that the setting of noise limits, as we think is appropriate for construction works outside of normal working hours, is of little or no value unless compliance with those limits is tested. We therefore believe that the FNMP should include a program for the monitoring of construction noise levels at sensitive receptors if work is performed outside normal working hours.

In addition, we wish to highlight the fact that the effectiveness of the construction noise monitoring program, in fact any monitoring program, depends on:

- Its integrity and credibility in the minds of those in the relevant authorities and members of the community
- Open and effective communication of monitoring results to the relevant authorities and the community.

In order to meet these requirements the FNMP should include requirements for

- The design of the monitoring program by a suitably qualified acoustic specialist
- Auditing of compliance and implementation of the program by suitably qualified independent specialists
- Reporting of monitoring and audit results to the relevant authorities and the community in the event of a detected non-compliance and on a regular basis.
- Another essential feature of an effective plan for management of construction noise, which is not included in the DNMP, is a requirement for action in the event of the detection of non-compliance. The FNMP should therefore include requirements for particular actions and/or lists of possible actions, such as partial or complete cessation of work outside of normal working hours and additional monitoring, that may or must be done if non-compliance is detected.

5.3 Construction vibration

5.3.1 Standards

Noise Impact Management Report

The NIMR includes the following statement:

Vibration from construction works has the potential to impact on sensitive receivers near the railway corridor. Since human response to vibration is much more sensitive than the structural sensitivity of buildings, construction vibration impacts are usually limited to some subjective discomfort for occupants in nearby buildings. The risk of cosmetic or structural damage to buildings is only found to be due to extreme vibration levels, relative to what humans would find tolerable.³⁰

The NIMR also includes a review of international vibration standards. With the exception of the standards that apply to particularly sensitive structures such as heritage buildings, the most stringent level said to be applied as a limit is 5 mm/s peak particle velocity (PPV). It is recommended in the NIMR that this is an appropriate limit for the construction of RRL2.

³⁰ Regional Rail Link Noise Impact Management Report Rev H, KBR-Arup, 9 Dec 2010 Sec 5.5
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The DNMP states:

Groundborne vibration from general construction works is required to comply with a limit of 5 mm/sec (RMS) between 4–250 Hz at vibration sensitive receivers³¹.

Peer review

The matter of vibration standards was not the subject of a peer review.

Evidence and submissions

There were no submissions made or evidence provided on the limits or standards that should be applied to construction vibration.

Discussion

We note the inconsistency between the NIMR and the DNMP on the standard to be applied. We support the more stringent 5 mm/s RMS limit in the DNMP.

5.3.2 Impact assessment

Noise Impact Management Report

Predictions of vibration from construction were not obtained by way of modelling but were provided by reference to the recommended 'Safe Working Distances' specified in the *Construction Noise Strategy, Transport Infrastructure Development Corporation NSW, November 2007*.. The NMIR concludes that:

For general construction works, vibration impacts are expected to be negligible.

It can be seen that, where vibratory rollers are required, there is a low risk of building damage at distances up to around 20 m from the works, while some adverse human impacts could be expected up to 75-100 m.³²

Peer review

The Wilkinson Murray peer review of Revision C of the NIMR raised a number of issues concerning the prediction of vibration from construction, but the peer reviewer's consideration of KBR-Arup's responses to the matters raised and Revision F of the NIMR led the peer reviewer to the view that all matters of concern relating to construction vibration had been fully addressed.

³¹ Regional Rail Link Noise Management Report Rev G, KBR-Arup, 9 Dec 2010 Sec 4.6

³² Regional Rail Link Noise Impact Management Report Rev H, KBR-Arup, 9 Dec 2010 Sec 9.2

The assessment of the impact of predicted construction vibration levels was not the subject of a peer review.

Evidence and submissions

It was Dr Burgemeister's evidence on the impact of construction vibration that:

There is a low risk of building damage up to around 20 m from the works, while some adverse human impacts (primarily loss of amenity, and annoyance) could be expected for up to 75–100 m.³³

This evidence was not challenged.

Discussion

While an assessment of impact of the expected vibration levels from construction, would have made the NIMR more complete, Dr Burgemeister's evidence on the extent of the impacts, which was not challenged, is accepted.

This enables us to safely conclude that such impacts will be so limited that they can be considered to be negligible and therefore acceptable.

5.3.3 Additional mitigation measures

No evidence was led nor were submissions provided on additional vibration mitigation measures during construction. Further discussion on additional mitigation measures is not required.

5.3.4 Implementation

Draft Noise Management Plan

The DNMP includes requirements that:

- Construction vibration be managed in accordance with NCG 1254 and the Victorian EPA guidelines for major construction sites
- Vibration impacts on buildings of importance such as heritage listed buildings be considered on a case by case basis with detailed engineering analysis, including documentation of building structure and condition and pre and post crack exposure reporting, being carried out if necessary
- Groundborne vibration from general construction works comply with a limit of 5 mm/sec RMS between 4-250 Hz at vibration sensitive receivers.

³³ Expert Witness Statement – Dr Kym Burgemeister, Arup Pty Ltd, 20 Oct 2011, Par 4.2.7.3

Evidence and submissions

There was no evidence provided or submissions made suggesting the need for modification of the DNMP to include additional management of construction vibration.

Discussion

We see no need for the addition to the DNMP of requirements for mitigation measures to limit the impact of construction vibration.

We do note, however, that the DNMP states that:

Environmental noise and vibration monitoring is required to be undertaken in the vicinity of noise and vibration sensitive residences at the beginning of each new stage of construction work (eg. excavation, concreting, laying ballast etc), and at any other time when disturbance is likely, such as work particularly close to residential properties (particularly in the Manor Lakes/Wyndham Vale and Tarneit areas), or using impulsive construction activities. Monitoring will be undertaken at locations representative of noise or vibration affected properties.³⁴

While this requirement seems to us to be appropriate in relation to noise monitoring, in light of the evidence on potential impacts of ground vibration from general construction, it appears to require an excessive amount of vibration monitoring. It appears to us that monitoring of vibration from general construction should be more targeted and the DNMP should be modified to clearly specify the criteria for determining when such monitoring is required.

5.4 Impacts of blasting

5.4.1 Standards

Noise Impact Management Report

The NIMR provides information on the guidance provided in *Australian Standard 2187.2-2000 Explosives – Storage, transport and use, Part 2 Use of Explosives*, Standards Australia 2006 (AS 2187) and *Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration*, Australian and New Zealand Environment and Conservation Council, September 1990 (ANZECC Guidelines) both of which provide suggested limits on ground vibration and airblast overpressure at sensitive receptors.

It is noted in the NIMR that the ANZECC Guidelines are the more stringent because they:

³⁴ Regional Rail Link Section 2, Noise Management Plan, Rev G, KBR-Arup, 9 Dec 2010, Sec 4.4
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- Do not allow higher levels for operations lasting less than 12 months or involving less than 20 blasts as AS 2187 does
- Restrict blasting to between 9:00 and 5:00 pm Monday to Saturday
- Recommend only one detonation per day.

The NIMR recommends application of the guidance provided in AS 2187 and this is reflected in the DNMP.

Peer Review

The matter of standards for ground vibration and airblast overpressure from blasting was not the subject of a peer review

Evidence and submissions

There were no submissions made or evidence provided on the limits or standards that should be applied to ground vibration or airblast overpressure from blasting.

Discussion

As noted, the NIMR details two guidelines that might be applied to establish standards for the control of ground vibration and airblast overpressure from blasting, AS 2187 and the ANZECC Guidelines.

While the NIMR recommends the adoption of the guidance provided in AS 2187 and the similarity of the two guidelines is acknowledged, we believe a more detailed comparison of the two guidelines is required before choosing between them. The following tables show the relevant provisions in both AS 2187 and the ANZECC Guidelines.

Table 5.1 Comparison of blast impact guidelines

Operations		AS 2187	ANZECC
Duration	Blasts		
>12 Months	>20	5 for 95% of blasts 10 maximum unless other limit agreed with occupier	5 for 95% of blasts, 10 Maximum
<12 Months	<20	10 max. unless other limit agreed with occupier	5 for 95% of blasts, 10 maximum

Table 5.2 Comparison of blast impact guidelines: airblast overpressure in dB(L)

Operations		AS 2187.2	ANZECC
Duration	Blasts		
>12 Months	>20	115 for 95% of blasts 120 Max. unless other limit agreed with occupier	115 for 95% of blasts 120 Maximum
<12 Months	<20	120 for 95% of blasts 125 max. unless other limit agreed with occupier	115 for 95% of blasts 120 maximum

The ANZECC Guidelines also include provisions relating to blasting times and frequency. They provide that blasting should generally:

- Only be permitted during the hours of 9:00 am – 5:00 pm Monday to Saturday and should not take place on Sundays or public holidays
- Take place no more than once per day, excluding minor blasts.

It is our view that:

- In this case, the setting of higher limits for shorter term operations is an unnecessary complication that removes certainty in the minds of the community members and would make little difference to the construction of the railway.
- The provision to allow higher levels of ground vibration and airblast overpressure by agreement with occupiers is not appropriate because:
 - It would lead to occupiers having to consider matters on which they have little or no expertise
 - Ground vibration and airblast overpressure levels above the specified maximum are at or approaching the levels at which structural damage to building could occur
 - Unnecessary uncertainty would be created in the minds of community members.
- The controls on blast times and frequency in the ANZECC guidelines would result in a significant reduction in impact without seriously limiting construction.

In light of the above we consider that the ANZECC guidelines should be adopted.

5.4.2 Impact assessment

Noise Impact Management Report

It was stated in the NIMR that it is expected that charge sizes and blast design can be optimised to ensure that the ground vibration and overpressure limits specified in AS 2187 are complied with. This statement is effectively a prediction that ground vibration and overpressure will not exceed those limits.

Peer review

On the matter of impacts from blasting, the report on the initial peer review included the following statement:

With respect to blasting, and again without commenting on criteria, given the distance between the rail corridor and residences in Wyndham Vale I would be surprised if standard blast methods could achieve the criteria in Table 3 at all residences while still providing the required fragmentation. Some mention should be made of possible alternative methods such as PCF, or else treatment of residences or relocation of residents, should standard blast design not be acceptable. The use of small trial blasts to determine a local site law before proceeding with large-scale blasting should also be required.³⁵

The response to this comment by KBR-Arup was as follows:

Independent blast experts retained for the project have developed concept blast designs, and have indicated that it is expected that noise and vibration criteria are likely to be achievable while still providing the required fragmentation.³⁶

The peer reviewer accepted this comment as fully addressing the matter.

The assessment of impacts from ground vibration and airblast overpressure was not otherwise subject to a peer review.

Evidence and submissions

There were no submissions made or evidence provided on the assessment of the impacts of ground vibration and airblast overpressure from blasting.

Discussion

Adequacy of predictions of ground vibration and airblast overpressure from blasting

³⁵Regional Rail Link Peer Review of Acoustic Assessment, Wilkinson Murray, Oct 2010, Sec 4

³⁶Regional Rail Link Response to Peer Review Rev B, 9 Dec 2010, KBR-Arup Sec 2.3

While the NIMR does not provide predictions of ground vibration or airblast overpressure from blasting, it recommends that the DNMP include a commitment to meet the limits suggested in AS 2187.

While we are satisfied that compliance with these limits is possible and therefore accept them as a prediction of the maximum levels of ground vibration and airblast overpressure, we have indicated previously that we consider the alternative ANZECC guidelines cited to be more appropriate. The ANZECC guidelines we recommend for ground vibration and airblast overpressure are the same as those adopted in the DNMP for operations lasting more than 12 months or involving more than 20 blasts, but without the provision for higher levels with the agreement of the occupier. We consider the practicality and feasibility of compliance with our recommended standards to be very similar to that of the standards adopted in the DNMP. As a result, we consider that our recommended standards can be taken as a prediction of the maximum levels of ground vibration and airblast overpressure that will occur.

Adequacy of assessment of impacts of ground vibration and airblast overpressure from blasting

The prediction of compliance with the limits we recommend should not be seen as a prediction of no impact. Like most limits of this kind, they are set to balance what are considered to be reasonable expectations of amenity protection and the ability to conduct works. We are of the view that, while compliance with the recommended limits will be sufficient to limit adverse impact on buildings to a negligible level, the limits are well above what are known to be the limits of human perception. There is no doubt that there will be some adverse impact on amenity even if the proposed limits are complied with.

We have not been provided with sufficient information to enable an assessment of the impact of blasting. No indication has been given of the number of residences at which an impact is expected nor the number and frequency of blasts that will occur.

On the other hand it may be argued that the limits proposed were developed after consideration of the balance that is required. Accordingly the impact resulting from compliance with the limits can be considered to be acceptable irrespective of the number of residences at which the impact occurs or how often. We favour this view.

Our view is that our recommended limits are appropriate and we have a high degree of confidence that compliance can be achieved. This leads to our conclusion that the impact resulting from ground vibration and airblast overpressure caused by blasting, though perceptible, will be acceptable.

5.4.3 Additional mitigation measures

No evidence was given or submissions provided on additional mitigation measures to manage impacts from ground vibration and airblast overpressure from blasting and further discussion on additional mitigation measures is not required.

5.4.4 Implementation

Draft Noise Management Plan

The DNMP includes requirements that:

- Ground vibration and airblast overpressure from blasting limits comply with limits suggested in AS 2187
- Ground vibration and airblast overpressure from blasting be measured at representative locations with the results being kept on permanent record along with other blast data
- Pre-construction dilapidation surveys of potentially affected buildings, including dwellings are carried out.

Evidence and Submissions

Wyndham City Council's written submission in response to the public notification and its submission to the hearing noted that the DNMP did not include any identification of potentially affected buildings in terms of proximity to blasting for which dilapidation surveys are required.

At the hearing the RRLA submitted that:

In regard to the Council submission on dilapidation surveys, the Authority submits that the Noise Management Plan should not prescribe the area within which dilapidation surveys should be carried out. The dilapidation survey should be seen as having two purposes: to protect dwellings that are potentially affected by blasting, but also to protect the contractor from false claims about the impacts of blasting on nearby dwellings. A prudent construction contractor would not expose itself to such risk, by relying on specialist blasting advice to define the extent of area which would be subject to dilapidation surveys. This is the normal approach taken to this issue, and is required by the Authority of the construction contractor.

We therefore respectfully submit there is no basis on which to pre-empt the contractor's assessment of this risk.³⁷

³⁷ Regional Rail Link Authority – Reply at hearing, Para 58-59, Page 9
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Discussion

We agree with the RRLA's position that dwellings that will be the subject of dilapidation surveys do not need to be prescribed in the DNMP but should be left to a risk assessment by the construction contractor. This view is based on the fact that the limits on ground vibration and airblast overpressure that we recommend are well below the levels that would be expected to cause damage to buildings. As a result, the risk of false claims, which will be borne by the construction contractor, is far greater than the risk of structural damage.

While there was little or no evidence or submissions on the adequacy of the DNMP in respect of the management and control of ground vibration and airblast overpressure from blasting, the Committee has a number of concerns.

In light of our recommendation that the guidance provided by the ANZECC Guidelines should be preferred over that of AS 2187, the references to AS 2187 in the DNMP should be replaced by references to the ANZECC Guidelines and include the restrictions on blast times frequency that are part of those guidelines.

The DNMP states that:

All blast vibration and overpressure levels are required to be measured at representative locations (typically the nearest affected residences)³⁸

We are concerned that this may mean that ground vibration and airblast overpressure levels from all blasts are not normally required to be measured. Also, if this is so, the circumstances in which exemptions might be allowed are not defined.

Our views on the need for quality assurance and reporting of the monitoring of construction noise apply equally to the monitoring of ground vibration and airblast overpressure. We therefore believe the FNMP should include requirements for:

- The design of a blasting monitoring program by a suitably qualified specialist including specification of the circumstances in which exemptions from the monitoring of all blasts might be allowed
- Auditing of compliance and implementation by a suitably qualified independent specialist
- Reports by a suitably qualified specialist to the relevant authorities
- Reports to the community

³⁸ Regional Rail Link Section 2, Noise Management Plan, Rev G, KBR-Arup, 9 Dec 2010, Sec 4.7
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- Implementation of a specified action plan in the event of a detection of non-compliance.

5.5 Operational vibration

5.5.1 Standards

Noise Impact Management Report

The NIMR does not consider the setting of standards for operational vibration on the basis that the levels of such vibration are expected to be negligible.

Peer review

Matters relating to standards for operational vibration were not subjected to a peer review.

Evidence and submissions

There were no submissions made or evidence provided on appropriate standards for operational vibration.

Discussion

The proposition that standards for operational vibration are not required is accepted.

5.5.2 Impact assessment

Noise Impact Management Report

While the NIMR acknowledges that groundborne vibration is emitted from operating railways: it stated that:

For 'at grade' railways (i.e. built directly at or near the natural ground surface), the airborne noise impacts are typically higher and therefore more critical than the impacts of groundborne noise and vibration. It is usually only underground railways or railways with significant shielding (e.g. in deep cuttings), where the airborne noise is reduced to a very large extent, that vibration and groundborne noise are the predominant impacts.³⁹

As a result of this view, the NIMR further states that:

Operational vibration from the railway is not considered in detail in this report. While railways do generate vibration, for surface tracks such as

³⁹ Regional Rail Link Noise Impact Management Report Rev H, KBR-Arup, 9 Dec 2010 Sec 2
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that proposed for RRL, the impact of groundborne vibration from the railway is generally insignificant compared with the impacts from airborne noise.⁴⁰

Peer review

The assessment of impacts from operational vibration was not subjected to a peer review.

Evidence and submissions

Mr Michael Smith of Vipac Engineers and Scientists, called by Lotus Oaks Pty Ltd, provided evidence on groundborne vibration during railway operation by reference to a report on an investigation conducted by Marshall Day Acoustics (MDA) in January 2010 with a copy of the MDA report being provided to the Committee at the hearing.

MDA had made vibration measurements at 2, 20 and 35 metres from the tracks during pass-bys of five regional passenger trains and one dual freight train. MDA used the results of those measurements to predict vibration levels at proposed residential properties in the Manor Lakes and Rose Grange subdivision projects of the Dennis Family. The predicted results were compared with criteria specified in Australian and British standards and found to comfortably meet that criteria leading to the conclusion that:

The predicted ground-borne vibration and noise is significantly low relative to the criteria and for the rail to building separation of 35m as utilised in this assessment.

Mr Smith stated that:

We agree in principle with the assessment methodology and conclusions in the MDA report.⁴¹

The expert acoustic evidence of Mr Neville Goddard of Watson Moss Growcott Acoustics called by Mr Cicero for Walsh Building Services included the following in regard to operational vibration:

It is the experience of this firm that vibration from rail traffic can and has been an issue at distances of the order of 10m from rail lines. At residential setback distances of at least 25m, vibration may at times be perceptible, but is unlikely to be of concern to most residents.

At distances of 25 metres from the rail line and beyond, airborne noise would normally be the primary concern.⁴²

⁴⁰ Regional Rail Link Noise Impact Management Report Rev H, KBR-Arup, 9 Dec 2010 Sec 1.2

⁴¹ Expert Witness Statement – Mr Michael Smith, Vipac Engineers and Scientists, 18 Oct 2011

⁴² Expert Witness Statement – Mr Neville Goddard, Watson Moss Growcott Acoustics, 20 Oct 2011

Discussion

Adequacy of operational vibration impact assessment

In light of an accepted prediction of low levels of operational vibration, we make the assessment that the impact of such vibration will be negligible.

Acceptability of residual operational vibration

Since it is accepted that the impact of operational vibration will be negligible, it is safe to conclude that impact will be acceptable.

5.5.3 Additional mitigation measures

No evidence was given or submissions provided on additional mitigation measures relating to operational vibration and further discussion on these is not required.

5.5.4 Implementation

In light of the negligible impact expected from operational vibration, no discussion on implementation is required.

5.6 Conclusions and recommendations

Our conclusions in regard to the issues related to construction noise, construction vibration and operational vibration are as follows:

- **The NIMR does not satisfy the conditions relating to the NIMR in the Minister's decision on the EES referral because:**
 - **No report has been provided on a peer review of the consideration of appropriate noise standards for construction noise**
 - **No assessment of the impacts of construction noise has been provided.**
- **The predictions of construction noise have been made on the basis of reasonable assumptions and an appropriate modelling technique and can be accepted as a fair representation of noise levels that will be experienced at dwellings during the construction of the railway.**

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- The EPA *Noise Control Guidelines Publication 1254* provides appropriate noise standards for general construction. The relevant limits are:

Weekend/Evenings

First 18 months	$L_{Aeq30min} = \text{Background } LA_{90} + 10 \text{ dB}$
After first 18 months	$L_{Aeq30min} = \text{Background } LA_{90} + 5 \text{ dB}$

Night

Inaudible within all habitable rooms of residential premises.

- The commitment in the DNMP to compliance with the EPA *Noise Control Guidelines Publication 1254* means that the impact of construction noise during the 'Night' and 'Weekend/Evening' will be acceptable; however, the acceptability of impacts from construction noise during the 'normal working hours' is not guaranteed and cannot be determined from the information provided.
- Vibration levels at sensitive receptors resulting from general construction and operations will be very low and have a negligible and therefore acceptable impact.
- The guidance on limits for ground vibration and airblast overpressure from blasting provided in Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration, Australian and New Zealand Environment Conservation Council, September 1990 is appropriate and compliance with those limits will result in an acceptable impact.
- The DNMP does not provide an adequate response to potential noise impacts during construction because:
 - It is unclear as to the specific noise control measures required during construction
 - There are no procedures to provide assurance of full implementation of the EPA *Noise Control Guidelines, Publication 1254*
 - There is no requirement for noise monitoring of construction noise levels of work performed outside of 'normal working hours'
 - The prescribed limits on ground vibration and airblast overpressure from blasting are not appropriate
 - There are no procedures to ensure the integrity of the construction noise and blast monitoring
 - There are no requirements or procedures for the reporting of monitoring results to the relevant authorities or the community
 - There is no prescription of actions to be taken in the event of monitoring results identifying excessive noise, ground vibration or airblast overpressure

In relation to construction noise and vibration is recommended that:

- The Regional Rail Link Authority be required to prepare a Final NIMR that includes:
 - An impact assessment of predicted construction noise levels in terms of the number of existing and approved dwellings and lots that would be subject to noise levels greater than those specified in *State Environment Protection Policy (Control of Noise from Commerce, Industry and Trade) No. N-1 plus 10dB*, and the duration of such impacts.
 - Views on the acceptability of the impacts and justification of those views.
- The FNMP not be approved unless it includes:
 - A clear statement of the requirement for application of all the guidance provided in *EPA Noise Control Guidelines, Publication 1254* during all stages of construction.
 - Requirements for compliance with the limits on ground vibration and overpressure from blasting specified in *Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration*, Australian and New Zealand Environment Conservation Council, September 1990, and the restrictions on blasting times and frequency specified in that document.
 - An environmental monitoring program that includes:
 - The monitoring of construction noise at sensitive receptors when work is performed outside 'normal working hours'
 - The monitoring of ground vibration and airblast overpressure at, at least, the closest sensitive receptor to all blasts
 - Procedures for the design of the program by a suitably qualified specialist to the satisfaction of Minister for Planning
 - The prompt reporting of the detection of non-compliances with construction noise, ground vibration and airblast overpressure limits to the relevant municipal authority
 - The regular reporting to the Minister for Planning, the City of Wyndham and the Shire of Melton of the results of monitoring of all construction noise, ground vibration and airblast overpressure monitoring results by suitably qualified specialists
 - The reporting of construction noise, ground vibration and airblast overpressure monitoring results to the community to the satisfaction of the City of Wyndham and the Shire of Melton
 - Specification of actions that must and may be taken in the event of detection of non-compliance with limits

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- **Appointment of suitably qualified and independent specialists to audit the design and implementation of the monitoring programs and to provide reports on such audits to the City of Wyndham and the Shire of Melton.**

6. Operational noise standards

6.1 What are the issues?

As we have said, the decision made by the Minister for Planning that an EES was not required for the RRL2 project included a requirement for the preparation of a noise impact management report. The Minister's requirement was that the NIMR was to, *inter alia*:

- (i) provide a clear justification of proposed noise standards for operation of the railway;
- (vi) be accompanied by a peer review report prepared by an independent specialist.⁴³

The issues to be considered in relational to operational noise include the following:

- The clarity and validity of the justification provided for the proposed standards
- The appropriateness of the standards proposed to be applied
- The standards that should be adopted.

6.2 Noise Impact Management Report

6.2.1 Train operation

The NIMR states:

Victoria does not currently have any legislative requirements or guidance limits on noise and vibration from passenger railway movements. Section 251B of the Transport (Compliance and Miscellaneous) Act 1993 specifically excludes noise emanating from passenger rolling stock as constituting a nuisance, and states that the Environment Protection Act 1970 does not apply to noise from rolling stock. Therefore a series of project specific qualitative standards are proposed to manage operational noise.⁴⁴

The 'qualitative standards' proposed in the NIMR and included in the DNMP are:

- The route is selected so as to reduce and mitigate operational railway noise

⁴³ Decision Under *Environmental Effects Act 1978* – Regional Rail Link West Werribee to Deer Park

⁴⁴ Regional Rail Link Noise Impact Management Report Rev H, KBR-Arup, 9 Dec 2010 Sec 5.2

-
- All new intersections with roads will be grade separated, which avoids noise from bells, signals and braking traffic
 - The track alignment must be designed with a minimum curve radius of 450 m to prevent wheel squeal and limit wheel–rail contact noise
 - Bridges and viaducts must be constructed from concrete or composite steel–concrete structures with ballasted decks to decrease noise radiation
 - The track must be constructed using continuous welded rail to minimise the number of rail joints and minimise the wheel-rail contact noise
 - The operator of the rail system must undertake regular maintenance of the track profile and the train wheels to reduce noise caused by wheel and rail roughness.

The DNMP lists each of the above as project requirements and includes the following specific operational noise controls that are to be adopted:

- Maintenance and operation:
 - New trains added to the fleet will be more modern VLocity type rolling stock
 - Track and wheel roughness and profiles to be maintained to the Accredited Rail Operator’s maintenance and engineering standards.
- Planning:
 - Consideration of amenity of future noise sensitive developments in the vicinity if the rail alignment and, if necessary, the inclusion of specific development controls.

6.2.2 Railway infrastructure

The NIMR includes the following statement:

Operational noise associated with fixed infrastructure sites, including stations, maintenance facilities and stabling is required to comply with the State Environment Protection Authority (Control of Noise from Commerce Industry and Trade) No. N-1 (SEPP N-1)⁴⁵.

6.2.3 Road traffic

The NIMR makes no reference to noise from road traffic or standards that may be applied to limit such noise.

6.2.4 Peer review

While reports on a peer review of the NIMR were provided and exhibited, the matter of noise standards was not subjected to a peer review.

⁴⁵ Regional Rail Link Noise Impact Management Report Rev H, KBR/ARUP, 9 Dec 2010 Sec 5.3
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6.3 Evidence and submissions

6.3.1 Train operation

Quantitative standards for operational noise

Are quantitative standards required?

A number of the written submissions received in response to the public notification suggested that quantitative limits on noise at sensitive receptors were required to enable assessment of the acceptability of predicted noise levels.

In response to this suggestion, Dr Kym Burgemeister of KBR-Arup Joint Venture and principal author of the NIMR and the DNMP, called by the Regional Rail Link Authority (RRLA), stated that, since there is no Victorian policy or standard that specifies acceptable noise levels, a quantitative assessment is not possible.

In the RRLA's submission at the hearing, it was made clear that the decision not to consider quantitative standards was made by the RRLA and was part of the brief given to Dr Burgemeister. The RRLA confirmed that the decision not to consider quantitative standards was based on the fact that no such Victorian standards exist.

The RRLA submitted that:

The Department of Transport has submitted that the Draft Framework for Passenger Rail Noise (Draft Noise Framework) should be given a high priority by this Committee. The Draft Noise Framework enunciates a series of principles that should be applied to assessing noise from passenger rail projects as an alternative to a numerical noise standard or guide. The Authority, as part of the Department adopts and reiterates the Department of Transport's position on this issue.⁴⁶

The RRLA also submitted that, since future development of the DGPF is planned, such development should not be pre-empted by the application of quantitative noise standards in this case.

Dr Burgemeister, the RRLA and DoT were asked by the Committee if they could provide examples of jurisdictions in which qualitative standards had been applied to noise from railway operations but were unable to do so.

The EPA submitted that, while the DGPF provided for a flexible approach, this did not preclude the setting of quantitative standards specific to all or

⁴⁶ Submission in Reply – Regional Rail Link Authority Para 60

part of RRL2. It was the EPA's view that, to conform with the DGPF, standards considered appropriate for RRL2 should not necessarily be considered appropriate for other rail projects. The EPA expressed the view that assessment of noise impacts from RRL2 would be difficult without comparison of predicted noise levels against a quantitative benchmark.

Mr Neville Goddard of Watson Moss Growcott Acoustics Pty Ltd, called by Walsh Building Services to provide acoustic evidence, provided a discussion of the development of noise standards in other areas. Mr Goddard pointed out that prior to the 1980s there were no quantitative limits on noise from freeways, commerce, industry, trade or music from public premises but the development and implementation of the *VicRoads Traffic Noise Reduction Policy*, VicRoads 2005, (VicRoads Noise Policy), *State Environment Protection Policy (Control of Noise from Commerce Industry and Trade) No. N-1* (SEPP N-1) and *State Environment Protection Policy (Control of Music Noise from Public Premises) No. N-2* (SEPP N-2), each of which introduced quantitative limits, has provided effective yet balanced control of noise from these sources.

Mr Goddard expressed the view that it is not surprising that noise from railways has not received the attention required to develop quantitative noise standards because there is no recent history of new rail infrastructure. Mr Goddard stated:

It is now accepted that control of noise emissions to a set of adopted 'standards' is fair and reasonable in relation to noise emissions from commerce/industry/trade, music and road traffic sources and, it is arguable that noise from new rail infrastructure projects should be treated in the same way.

The Regional Rail Link presents an opportunity to bring rail noise into line with other significant noise sources in the community, by addressing noise emissions in a meaningful way at the time new infrastructure is established.⁴⁷

Mr Goddard also noted that the current application of the VicRoads Noise Policy includes quantitative noise standards that are similar in some ways to the guidance provided on railway noise in NSW, leading Mr Goddard to the conclusion that:

There is therefore a significant and well-established precedent for control of noise emission from transport sources on new alignments in Victoria, which is similar in magnitude and hours of application to the Leq 'day' period trigger level proposed in the NSW interim rail noise guidelines⁴⁸.

⁴⁷ Expert Witness Statement – Mr Neville Goddard, Watson Moss Growcott Acoustics, 20 Oct 2011
Sec 3

⁴⁸ Expert Witness Statement – Mr Neville Goddard, Watson Moss Growcott Acoustics, 20 Oct 2011
Sec 4.2

It was submitted by Mr Cicero for Walsh Building Services that:

Whilst the NMP includes a section entitled “Proposed Noise Standards of Operation of the Railway”, this does not include noise standards as they are normally interpreted, that is, as quantitative noise levels to be achieved at noise sensitive locations.⁴⁹

Ms Patterson for the GAA submitted that, in order to determine appropriate mitigation measures, that:

.... the best method cannot realistically be decided without a noise measure of some sort against which to assess the effectiveness and cost of the alternative noise attenuation treatments.⁵⁰

It was submitted by Mr Dean Ellis representing Wyndham City Council that:

The Noise Management Plan needs to define the acceptable (day & night) decibel levels using the appropriate metrics, to assist planning authorities with determining the extent to which planning controls are required.⁵¹

On the matter of quantitative standards, the RRLA submitted that:

The Authority does not think it fair or reasonable to criticise the Noise Report on the basis that a ‘quantitative’ standard was not proposed. The Minister’s condition required that a Noise Report ‘provide a clear justification of proposed noise standards for the operation of the railway (our emphasis). Part 5.2 of the Noise Report meets this requirement by providing clear justification for qualitative noise standards.⁵²

If quantitative standards are applied, what should they be?

The EPA advised that the World Health Organisation publication *Guidelines for Community Noise - Beglund, B., Lindvall, T. and Schwela, D.H. (eds)* (WHO Guidelines) provides the external (outside dwellings) guideline values shown in the following table.

⁴⁹ Hearing Submission for Seamus Walsh, 9 Nov 2011, Para 27, Page 5

⁵⁰ Submission to Regional Rail Link Advisory Committee, GAA, Nov 2011, Sec. 5

⁵¹ Submission to the Noise Impacts of Regional Rail Link Section 2 – West Werribee to Deer Park Advisory Committee, Revised Submission, Wyndham City, Nov 2011, Sec. 3.2.1

⁵² Regional Rail Link Authority – Reply at Hearing, Para 56, Page 43

Table 6.1 WHO Guidelines on community noise (external)

Location	Critical Health Effect(s)	Noise Level		
		Average dB		Maximum dB(A)
Outdoor living area	Serious annoyance	55	LAeq16h(day)	-
	Moderate annoyance	50	LAeq16h(day)	-
Outside Bedrooms	Sleep disturbance	45	LAeq8h(night)	60

It was the EPA's submission that the WHO Guidelines are levels below which there are no health effects but that the strict application of these limits is generally impractical.

It was submitted by Mr Pitt SC for Lotus Oaks Pty Ltd that the WHO Guidelines should not be ignored because there was no epidemiological evidence that provided a reason to question the limits suggested.

All the acoustics experts providing evidence agreed with the EPA's view on the WHO Guidelines and Dr Burgemeister advised that:

As far as I am aware, no governmental policy for transportation noise adopts noise limits as low as those from the WHO guideline.⁵³

Mr Neil Huybregts of Marshall Day Acoustics, called to give acoustic evidence by the GAA, and Mr Michael Smith of Vipac Engineers and Scientists Ltd, called to give acoustic evidence by Lotus Oaks Pty Ltd, included reviews of noise limits and guidelines that are applied in other Australian jurisdictions. The evidence they provided on external noise limits for new railways is summarised in the following table.

⁵³ Expert Witness Statement – Dr Kym Burgemeister, Arup Pty Ltd, 20 Oct 2011, Sec 6.1.10
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