1 Introduction

My firm WSP prepared the impact assessment report titled **Mordialloc Bypass Noise and Vibration Impact Assessment** reference 2135645A-SE-26-TPL-REP-0004 Rev1 dated 12/10/18 (the Report), which is included as Appendix E to the Environment Effects Statement (the EES) for the Mordialloc Bypass Project (the Project).

I did not author or review the report, although I did carry out some technical review of the work which contributed to the Report. Other significant contributors to the Report and their expertise is set out as follows:

- Nicole Lanzer, an Acoustic Engineer with two years of experience working in acoustics
- Arvind Deivasigamani, a Senior Acoustic Engineer with seven years of experience working in acoustics and a Doctor of Philosophy (PhD) in the field of vibrations
- Adrian White, former National Head of Acoustics at WSP (no longer with the company) with nine years of experience working in acoustics

I have reviewed the Report and agree with its findings and conclusions, and I adopt it in combination with this document as my written expert evidence for the purposes of the Mordialloc Bypass Project Inquiry and Advisory Committee's consideration and reporting in respect of the Project.

2 Qualifications and experience

Appendix A contains a statement setting out my qualifications and experience, and the other matters in accordance with Planning Panels Victoria's 'Guide to Expert Evidence'.

A copy of my curriculum vitae is provided in Appendix B.

3 Further work since preparation of the Report

Since the Report was finalised, I have undertaken further work in response to concerns raised in the Public Submissions. The further work included carrying out more detailed surveys of the existing noise levels at additional receiver locations in the parkland and wetland zones in the immediate vicinity of the project area and conducting further noise modelling of the multi-function fauna barrier that forms part of the reference design, to predict the future noise level at these additional receiver locations.

The modelling assumed that the multi-function barrier conforms to the VicRoads requirements for noise barriers, which nominate a *non-porous construction with no gaps and a surface density of at least 20kg/m²*, and may be constructed from a variety of materials.

A summary of my findings in relation to this further work is provided below.

This further work has not caused me to change the opinions expressed in the Report, nor to recommend any modifications to the relevant Environmental Performance Requirements, apart from a minor change to include the design year for traffic noise modelling purposes.
3.1 Existing noise levels in parkland and wetland zones

Existing $L_{10,18hr}$ noise levels at a range of locations in parkland and wetland zones were estimated through a combination of the following:

- Long term noise logging at specific locations as detailed in the Report
- Short term hand-held noise measurements conducted on 21/01/19
- Noise modelling of existing traffic on local roads

The additional receiver locations in the parkland and wetland zones are shown in Figures 1a and 1b below.

The estimated existing noise levels at the additional parkland and wetland receiver locations are shown in Table 1 below.

It is noted that areas of Braeside Park, particularly to the north, are currently affected by aircraft noise from aviation activity associated with Moorabbin Airport, and that areas along the western boundary of Braeside Park are affected by noise from industry on the western side of the road reserve.
Figure 1a: Additional receiver locations in the parkland and wetland zones (Park section)
Figure 1b: Additional receiver locations in the parkland and wetland zones (Waterways section)
3.2 Predicted future noise levels in parkland and wetland zones

Future $L_{10,18hr}$ noise levels at the parkland and wetland receiver locations shown in Figures 1a and 1b were predicted by modelling the traffic noise levels based on the road alignment, topography and traffic conditions as detailed in the Report.

The estimated future noise levels at the additional parkland and wetland receiver locations are shown in Table 1, along with a comparison to the existing noise levels, showing the predicted increase in $L_{10,18hr}$ noise levels due to the contribution of traffic noise from the proposed Freeway alone (excluding the effect of local roads). Note that the predicted future traffic noise levels are based on the freeway roadside barriers shown in Attachment A below, and are free-field levels with no correction for facade reflection, since the receiver locations are out in the open, away from buildings and the facade reflection effect therefore does not occur in this case.

Note that the differences in noise level shown in Table 1 are not calculated by conventional arithmetical addition or subtraction but rather by logarithmic addition, e.g. if the existing noise level is 60dBA and the predicted future noise level from the freeway alone is 60dBA, then the combined total noise level would be 63dBA, which means the increase in noise level due to the freeway would be +3dBA.

Noise contour plots showing the areas predicted to be above and below $L_{10,18hr}$ 60dBA in the parkland and wetland zones due to the proposed Freeway alone, are shown in Attachment A below. This noise level has been utilised for illustrative purposes on the noise contour plots, because $L_{10,18hr}$ 60dBA has been identified in Appendix C – Flora and Fauna Impact Assessment of the EES as a suggested noise impact threshold with regard to the effects of noise on birds.

Table 1: Estimated existing and predicted future $L_{10,18hr}$ noise levels (free-field) at the additional receiver locations in the parkland and wetland zones

<table>
<thead>
<tr>
<th>Receiver location</th>
<th>Estimated existing $L_{10,18hr}$ dBA</th>
<th>Predicted future $L_{10,18hr}$ from Freeway alone dBA</th>
<th>Combined predicted future $L_{10,18hr}$ dBA</th>
<th>Estimated increase in $L_{10,18hr}$ dBA</th>
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<tbody>
<tr>
<td>P1</td>
<td>60</td>
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<td>Receiver location</td>
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Interpretation of these results is provided below in Sections 4.3.2 and 4.3.3.
4 Written Submissions

4.1 Submissions Received

I have read the public submissions in respect of the EES and draft Planning Scheme Amendment for the Project and identified those that are relevant to the Report and my area of expertise. These include the following submissions:

1, 11, 12, 17, 22, 23, 25, 28, 29, 30, 32, 35, 40, 41, 47, 53, 54, 56, 58, 59, 60, 61, 62, 63, 66, 67, 68, 69, 70, 71, 72, 74, 75, 76, 77, 81, 83, 84, 86, 87, 88, 90, 92, 93, 94, 97, 98, 101, 102, 103, 106, 108, 109, 110, 111 and 112

4.2 Summary of Issues Raised

The submissions have raised the following issues relevant to my area of expertise:

1. Noise to residential areas
2. Noise to wetlands
3. Noise to parklands
4. Noise to industrial/commercial properties
5. Concerns relating to effectiveness of traffic noise barriers
6. Concern that the Project Objective Noise Levels (PONLs) are not consistent with the traffic noise criteria provided in the 2018 guidelines developed by the World Health Organization (WHO)
7. Additional issues raised in specific submissions (refer below)

4.3 Response to Issues Raised

Set out below are my comments and response to the issues raised by the written submissions relevant to my area of expertise.

4.3.1 Noise to residential areas

Project Objective Noise Levels (PONLs) have been nominated for the project under the Environmental Performance Requirements (EPRs). EPR NV1 (Noise and vibration (design)) nominates PONLs for noise-sensitive receivers as defined in the VicRoads Traffic Noise Reduction Policy (TNRP), as follows:

- 63dBA L$_{10,18ht}$ for the new bypass, and
- 68dBA L$_{10,18ht}$ for the Mornington Peninsula Freeway works

As per the requirements of EPR NV1 and the guidance provided in the EES Scoping Requirements and the Inquiry & Advisory Committee’s Terms of Reference, i.e. the use of relevant standards, objectives and guidelines, the VicRoads TNRP has been used to conduct the assessment of traffic noise associated with the Project.

The VicRoads TNRP requires that residential areas affected by noise from the project must be protected against traffic noise impact by the provision of mitigation measures as required to achieve the PONLs.
The reference design includes noise mitigation treatment to protect residential areas as follows:

- Low-noise Open Graded Asphalt (OGA) to all new road pavements on the proposed freeway and ramps
- Road traffic noise barriers up to 6m in height.

The successful contractor would be required to design and construct the road to achieve compliance with the PONLs nominated in the VicRoads TNRP.

4.3.2 Noise to wetlands

There is no policy or standard in Victoria regulating noise to wetlands or acoustic requirements that must be achieved.

Noise to wetlands is covered in Chapter 10 – Biodiversity and Appendix C – Flora and Fauna Impact Assessment of the EES. Section 10.8.2 of the Biodiversity report states that:

Operational noise risk related to effects on threatened fauna species was identified as an initial high risk. The incorporation of a multi-function fauna barrier in the key wetland areas to reduce noise impacts would reduce the residual risk to medium (EPR B1).

Additionally, Section 10.8.3 of the Biodiversity report states that:

For all bird species, impacts from noise and light, loss of connectivity and road mortality will be reduced through the implementation of fauna sensitive design and mitigation measures. Although some of the impacts and the likely effectiveness of mitigation measures are difficult to quantify, the overall residual impact upon these species is expected to be minor.

The Acoustic Report provided information regarding estimated existing and predicted future $L_{10,18\text{hr}}$ noise levels in wetlands. Additional information on existing and future noise levels at a greater number of receivers in the wetlands is provided in Section 3 above and in Attachment A below.

Additional information on this issue has also been sourced from a report published by The California Department of Transportation in June 2016 titled Technical Guidance for Assessment and Mitigation of the Effects of Traffic Noise and Road Construction Noise on Birds (Caltrans Study), which provides guidance on the effects of road traffic noise and construction noise on birds.

It is important to consider the spectrum of bird hearing sensitivity and the spectrum of traffic noise generation. The Caltrans Study states that:

Generally, birds hear best at frequencies between about 1 and 5 kHz ..., with best sensitivity ... usually in the region of 2–4 kHz and Traffic noise ... often show(s) a sloping spectrum ... with less energy in the region of 2–4 kHz than at lower frequencies. Thus, in many cases, the overall level of the noise measured as dBA does not provide an accurate estimate of the noise level in the frequency region where birds communicate. Depending on the overall spectrum of the noise, it could underestimate, or more often overestimate, the masking effects of traffic noise on hearing and vocal communication in birds.

The Caltrans Study also states that:

The typical bird hears less well than humans and over a narrower bandwidth and Much of the energy in traffic and construction noise falls in lower frequencies, while bird vocalizations fall in mid- to higher frequencies.
Put simply, the peak hearing sensitivity of birds is in a region of the frequency spectrum where traffic noise is typically lower than at other parts of the frequency spectrum, indicating that the hearing of birds is less sensitive than humans to typical traffic noise spectra. The Caltrans Study shows typical traffic noise spectra peaking at 1kHz, with significantly lower acoustic energy in the region of maximum bird hearing sensitivity in the range 2-4 kHz.

To assess the impact of traffic and construction noise on birds, the Caltrans Study utilises an approach based on four different zones, each with different noise levels and impacts, as summarised below:

- **Zone 1**: Noise levels above 110dBA, which are likely to cause permanent hearing damage to birds
- **Zone 2**: Noise levels above 93dBA, which are likely to cause a temporary (recoverable) shift in a bird’s hearing threshold and mask important communication signals
- **Zone 3**: Noise levels sufficiently elevated above background noise, which may cause some masking of communication signals. A threshold traffic noise figure of 60dBA is indicated, above which masking may occur
- **Zone 4**: Traffic noise levels are at or below natural background levels, which will have no effect on birds.

Predictions of traffic noise shown in Section 3 above indicate there are no risks of Zone 1 (hearing damage) or Zone 2 (temporary threshold shift) occurrence. Some of the wetland areas are predicted to be exposed to traffic noise levels above the indicated Zone 3 masking threshold of 60dBA. The impact of these noise levels will depend on the specific bird species and the importance of the affected habitat to the relevant species, which is a matter beyond my area of expertise.

As recommended by the Biodiversity expert and nominated in Environmental Performance Requirement (EPR) Biodiversity B1 – Fauna habitat, a multi-function fauna barrier has been recommended to protect fauna, which also has the benefit of mitigating traffic noise. The traffic noise modelling has been conducted taking into account the multi-function fauna barrier referenced in EPR B1 and included in the reference design (refer to Attachment A below for height and extent).

With regard to construction noise, it is noted that even from particularly intense construction activity such as rock breaking or pile driving, predictions indicate there are no risks of Zone 1 (hearing damage) or Zone 2 (temporary threshold shift) occurrence, provided that birds are at least 20m away from the construction site. Some masking may occur due to construction noise, which is predicted to be above 60dBA in some wetland areas, noting that the Caltrans Study indicates that birds are less sensitive to construction noise than to traffic noise. Again, the impact of these noise levels will depend on the specific bird species and the importance of the affected habitat to the relevant species.

Mitigation strategies to reduce the impact of construction noise on birds have been recommended by the Biodiversity expert and nominated in EPR B4 – Fauna (construction) and NV2 – Construction Noise and Vibration Management Plan.

4.3.3 Noise to parklands

The noise assessment for the Project was conducted in accordance with the VicRoads TNRP, under which parkland is not considered a sensitive receiver and is therefore not covered for traffic noise mitigation treatment under the Policy. This is consistent with precedents long-established in Victoria, where recreational open space is typically not provided with traffic noise control measures.
Information on existing and future noise levels at receivers in Braeside Park is provided in Section 3 above and in Attachment A below.

Whilst not a requirement under the VicRoads TNRP, it is noted that 30 of the 34 additional receivers in Braeside Park are predicted to experience traffic noise levels of 63dBA \(L_{10,18hr}\) or below, which is the VicRoads TNRP requirement for residential receivers. Note that the multifunction fauna barrier discussed in Section 4.3.2 has been included in the noise model for Braeside Park, to the extent shown in Attachment A below.

4.3.4 Noise to industrial/commercial properties

As highlighted above, the noise assessment for the Project was conducted in accordance with the VicRoads TNRP, under which industrial and commercial properties are not considered sensitive receivers and are therefore not covered for traffic noise mitigation treatment under the Policy. This is consistent with precedents long-established in Victoria, where industrial and commercial properties are not provided with traffic noise control measures.

4.3.5 Concerns relating to effectiveness of traffic noise barriers

Regarding questions of effectiveness, the traffic noise barriers for the Project would be designed and constructed by the successful tenderer and would be required to conform to the requirements of the VicRoads TNRP and achieve the required PONLs nominated in EPR NV1 – Noise and vibration (design), which will provide traffic noise mitigation to residential receivers affected by the Project.

4.3.6 PONLs compared to the WHO Guidelines

In 2018, the World Health Organization (WHO) Regional Office for Europe published the *Environmental Noise Guidelines for the European Region* (WHO Guidelines), which recommends noise criteria for a range of environmental noise sources, including traffic noise.

The WHO Guidelines are not applicable to this project, which is being assessed in accordance with current policy applicable in Victoria, i.e. the VicRoads TNRP, which came into effect in 2005 and has been used extensively for the assessment of traffic noise from road projects. I am not aware of any proposal for the 2018 WHO Guidelines to be incorporated into any noise legislation or guidelines in Victoria.

The WHO Guidelines recommend the use of \(L_{den}\) (\(L_{eq}\) over the day, evening and night periods, with penalties applied for evening and night period noise levels). The WHO Guidelines recommend a 24-hour period road traffic noise limit of \(L_{den}\) 53dBA and for the night period a limit of \(L_{night}\) 45dBA. Technical acoustic papers and a selection of WSP’s traffic noise measurement data have been referenced to derive the approximate difference between the \(L_{den}\) metric used in the WHO Guidelines and the \(L_{10,18hr}\) metric used in the VicRoads TNRP. This analysis indicated that the \(L_{den}\) is likely to be of the order of 3dBA higher than the \(L_{10,18hr}\) for the same traffic noise measurement (this is an approximation only and would be subject to significant variation, but is considered an appropriate estimation for the purposes of this comparison exercise).

The analysis outlined above indicates that the traffic noise limits recommended in the WHO Guidelines are much more stringent than the VicRoads TNRP, with traffic noise limits approximately 13dBA lower, i.e. instead of the VicRoads TNRP \(L_{10,18hr}\) 63dBA limit for residential properties affected by new roads, the WHO Guidelines may require a limit of the order of \(L_{10,18hr}\) 50dBA. This would effectively mean that for all the residential receivers, the future traffic noise level would need to be similar to, or quieter than, the existing noise levels. It is relevant to note that the existing noise levels throughout much of Braeside Park are higher than the WHO recommended traffic noise level.
The WHO Guidelines are very recent and it seems that relevant policy-makers have not yet had the opportunity to seriously consider the very stringent traffic noise limits proposed or the ramifications of adopting such objectives, including practicality and cost, or the benefit of applying such low noise limits for freeways when local roads without noise mitigation treatment could often generate much higher noise levels. The WHO targets should be considered aspirational and are not considered practical, given the extremely high levels of noise control that would be required in order to achieve them, e.g. enclosing freeways and arterial roads in tunnels. Many suburban streets would not comply with the proposed targets.

4.3.7  Additional issues raised in specific submissions

Additional issues raised in specific submissions are discussed in Table 2 below.

<table>
<thead>
<tr>
<th>Submission</th>
<th>Concern raised</th>
<th>Response</th>
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<tr>
<td>40</td>
<td>Concern regarding noise to the Parks Victoria office in Braeside Park</td>
<td>The reference design includes a multi-function fauna barrier from Governor Road to north of the Parks Victoria office, with a height in the range 2-3m, which can be seen in Attachment A below. The multi-function fauna barrier will be of solid construction that will attenuate traffic noise to the Parks Victoria office and immediate surroundings. Traffic noise predictions as shown in Table 1 above show that the predicted traffic noise level at the Parks Victoria office location (P15) is 63dBA L_{10, 18hr}, which is consistent with the PONLs nominated in the VicRoads TNRP applicable to residential receivers</td>
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<tr>
<td>47, 53, 88</td>
<td>Requests that dilapidation surveys being carried out prior to construction</td>
<td>The need for dilapidation surveys would be assessed by the contractor as part of compliance with EPR NV2 (Construction Noise and Vibration Management Plan)</td>
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<td>59</td>
<td>Concern regarding noise from Governor Road to the Waterways Estate</td>
<td>The VicRoads TNRP applies only to traffic noise from the freeway and ramps, not to noise from local roads</td>
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<td>Concerns about cumulative noise impacts of the project and increased aircraft traffic at Moorabbin Airport</td>
<td>Existing levels of noise including aircraft noise from Moorabbin Airport have been measured to assess existing conditions. It is not appropriate for the project to assess future aircraft noise from Moorabbin Airport, which is a separate issue covered under the Moorabbin Airport Master Plan.</td>
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<tr>
<td>70</td>
<td>Concerns about whether noise walls will mitigate noise from on and off ramps, including the southern off-ramp to Lower Dandenong Road</td>
<td>The reference design of the traffic noise barriers on the freeway and ramps has been conducted based on indicated traffic volumes on the various sections of the project for the design year 2031 as required to comply with the PONLs nominated in the VicRoads TNRP</td>
</tr>
<tr>
<td>70</td>
<td>Concerns about the use of engine exhaust brakes on off-ramps</td>
<td>The traffic noise model takes into account the percentage of heavy vehicles in the traffic flow and the road gradient, so is predicted to adequately consider the effect of engine exhaust brakes on off-ramps, bearing in mind that traffic noise is assessed using a statistical measure over an 18-hour time period, and does not consider individual noise events</td>
</tr>
<tr>
<td>74</td>
<td>Request that noise attenuation be included for properties in Patterson Lakes due to the increased traffic on that section of the freeway as a result of the project</td>
<td>This submission concerns an existing section of the MPF, which is currently highly trafficked, and there are no project works within the vicinity of Patterson Lakes. Since the receiver location is outside the project boundary, a noise assessment has not been conducted for this location.</td>
</tr>
<tr>
<td>88</td>
<td>Concerns that noise impacts have not been assessed for future additional lanes</td>
<td>The reference design is for a four-lane freeway. If the freeway were to be upgraded to six lanes in the future, the traffic noise associated with that change would need to be considered and evaluated at that time</td>
</tr>
<tr>
<td>Submission</td>
<td>Concern raised</td>
<td>Response</td>
</tr>
<tr>
<td>------------</td>
<td>---------------</td>
<td>----------</td>
</tr>
<tr>
<td>88, 112</td>
<td>Requests that double glazing be provided for affected dwellings</td>
<td>Traffic noise mitigation measures can include noise control treatments at the source (such as low-noise Open Graded Asphalt), in the noise path (such as noise barriers) or at the receiver (acoustically treating a building, e.g. double glazing). For urban road projects, it is generally most efficient to utilise noise control treatment to the noise source and the noise path, both of which have been included in the reference design as required to achieve compliance with the PONLs nominated in the VicRoads TNRP, without the need for including at-receiver measures such as double glazing. Note that double glazing does not provide any mitigation for outdoor noise levels at receiver locations</td>
</tr>
</tbody>
</table>

5 Woodlands Drive alternative arrangement

An alternative freeway interchange configuration has been considered to avoid the need to truncate Woodlands Drive. From an acoustic perspective, at this section of the study area, the industrial properties on the west side of the Freeway are considered non-sensitive receivers in accordance with the VicRoads TNRP, so are not provided with traffic noise mitigation measures. That said, it appears that the ramp entry/exit through Woodlands Drive could be expected to reduce traffic and trucks within the industrial area and would therefore be expected to improve the acoustic environment when compared to the current option.

It is noted that the Woodlands Drive alternative arrangement would not require any change to the EPRs related to Noise and Vibration.

6 Environmental Performance Requirements

Proposed Environmental Performance Requirements (EPRs) for the Project have been included in the Environmental Management Framework (EMF). With regards to noise and vibration, the following EPRs have been proposed:

- **NV1 – Noise and vibration (design):** Requires compliance with the PONLs, i.e. 63dBA $L_{10,18hr}$ for the new bypass, and 68dBA $L_{10,18hr}$ for the Mornington Peninsula Freeway works, for noise-sensitive receivers as defined in the VicRoads Traffic Noise Reduction Policy.

- **NV2 – Construction Noise and Vibration Management Plan:** Requires preparation of a CNVMP in consultation with EPA Victoria

- **NV3 – Traffic noise verification:** Requires measurement and reporting of traffic noise levels after opening of the Project

Also of relevance to noise and vibration are the Biodiversity EPRs B1 (Fauna habitat) and B4 (Fauna (construction)), because they will have the additional benefit of mitigating noise impact.

I consider the EPRs relating to noise and vibration to be consistent with other similar projects and appropriate and adequate for the Project, although I recommend that EPR NV1 (Noise and vibration (design)) should be modified to reflect that the design year 2031 shall be utilised for the purposes of conducting traffic noise modelling for the Project.
Declaration

I have made all the inquiries that I believe are desirable and appropriate and no matters of significance which I regard as relevant have to my knowledge been withheld from the Inquiry and Advisory Committee.

Signed

Date: 14/02/19
Appendix A  Matters Raised by PPV’s Guide to Expert Evidence

(a) The name and address of the expert

Michael Dowsett: Level 15, 28 Freshwater Place Southbank Vic 3006

(b) The expert's qualifications and experience

Michael's qualification is a Bachelor of Applied Science in Applied Physics and he has 29 years of experience working in acoustics. Further information is provided in the CV attached in Appendix B.

(c) A statement identifying the expert's area of expertise to make the report

Michael has 29 years of experience working in acoustics across a range of sectors including transport noise and is a Technical Director at WSP. Further information is provided in the CV attached in Appendix B.

(d) A statement identifying any other significant contributors to the report and where necessary outlining their expertise

Other significant contributors to the report include:

- Nicole Lanzer, an Acoustic Engineer with two years of acoustic experience
- Arvind Deivasigamani, a senior Acoustic Engineer with seven years of experience working in acoustics and a Doctor of Philosophy (PhD) in the field of vibrations
- Adrian White, with nine years of experience working in acoustics

(e) All instructions that define the scope of the report (original and supplementary and whether in writing or oral)

All instructions that defined the scope of the report are detailed in the project scoping requirements relevant to noise, as follows:

The EES should assess the environmental effects arising from all components and stages of the project. The assessment should include:

- The potential effects on individual environmental assets – magnitude, extent and duration of change in the values of each environmental asset – having regard to intended avoidance and mitigation measures
- The likelihood of adverse effects and associated uncertainty of available predictions or estimates or scientific modelling
- Further management measures that are proposed where avoidance and mitigation measures do not adequately address effects on environmental assets, including specific details of how management measures address relevant policies
- The likely residual effects, including on relevant Matters of National Environmental Significance (MNES), that are likely to occur after all proposed measures to avoid and mitigate environmental effects are implemented
- Potential cumulative impacts (including but not limited to concurrent construction of level crossing removals in the area)
An analysis on the acceptability of effects on all MNES.

(f) The identity of the person who carried out any tests or experiments upon which the expert has relied on and the qualifications of that person

Tests or experiments upon which the expert has relied were conducted by:
- Nicole Lanzer, an Acoustic Engineer with two years of acoustic experience
- Arvind Delvasigamani, a senior Acoustic Engineer with seven years of experience working in acoustics and a Doctor of Philosophy (PhD) in the field of vibrations
- Philip Setton, a senior Acoustic Engineer with seven years of experience working in acoustics
- Darcy Wall, a Graduate Environmental Consultant with one year of experience in environmental consulting, including training in noise monitoring
- Nifarul Islam, Graduate Acoustic Engineer with one year of experience working in acoustics.

(g) A statement setting out any questions falling outside the expert’s expertise

No matters other than noise have been covered by the Expert

(h) A statement setting out any key assumptions made in preparing the report

Key assumptions made in preparing the report include the following:
- As per guidance provided in the EES Scoping Requirements and the Inquiry & Advisory Committee’s Terms of Reference, i.e. the use of relevant standards, objectives and guidelines, traffic noise criteria nominated in the VicRoads Traffic Noise Reduction Policy (TNRP) have been used to conduct the assessment of traffic noise associated with the Project. Consistent with precedents long-established in Victoria on road projects of a similar nature, it is assumed that the VicRoads TNRP represents a suitable methodology for assessing traffic noise impact
- Open Graded Asphalt (OGA) provides beneficial reductions of traffic noise. A correction of -3dBA has been applied in the modelling of traffic noise for the project. However, studies have shown that the traffic noise reduction provided by OGA typically reduces over time due to progressive degradation of the road surface. It has been assumed that the road surfaces throughout the project will be regularly maintained to a level sufficient to sustain the acoustic benefit provided by the OGA
- Noise modelling conducted for noise-sensitive receivers assumes a conservative approach of 100% hard ground for all noise modelling, i.e. no acoustic correction for ground absorption

(i) A statement indicating whether the report is incomplete or inaccurate in any respect

I am not aware of any areas in which the acoustic report is incomplete or inaccurate.
MIKE DOWSETT
Technical Director, Acoustics

PROFILE
Mike has a long history in the acoustic consulting field, with a depth and breadth of experience across a range of industry sectors and geographies. Mike has consulted on projects in Australia, New Zealand, Malaysia, Singapore, Hong Kong, China, Indonesia, Thailand, Vietnam, Dubai and Bahrain. His project experience ranges from domestic noise issues all the way up to major developments with project values in the billions of dollars.

Mike also has 20 years of management experience, 9 years as a board director and 4 years running an international office. Coordinating and leading large project teams has been a significant part of his work history, along with working on large and complex projects.

EDUCATION
Bachelor of Applied Science in Applied Physics, RMIT 1989

PROFESSIONAL ASSOCIATIONS
Member, Australian Acoustical Society MAAS
Member, Australian Institute of Company Directors MAICD

SAMPLE PROJECTS
— Mordialloc Freeway EES, Melbourne VIC
  Technical Reviewer. New $375 million project to build the new 9km long, four lane Mordialloc Freeway to link the Mornington Peninsula Freeway to the Dingley Bypass, creating a continuous connection from Frankston. Client: Major Roads Project Authority, Victoria

— West Gate Tunnel Project, Melbourne VIC
  Acoustic Lead for the Independent Reviewer and Environmental Auditor (IREA). New $6.7 billion major infrastructure project providing a travel alternative to the West Gate Bridge. The project comprises twin tunnels, additional lanes on the West Gate Freeway, a new bridge over the Maribyrnong River and an elevated road above Footscray Road. Client: Western Distributor Authority / Transurban

— Suburban Roads Upgrade (SRU) Project, Melbourne VIC
  Technical Reviewer. Set to improve 22 priority roads across Melbourne, the $4 billion Suburban Roads Upgrade project is Victoria’s biggest investment in suburban roads. Client: Major Roads Project Authority, Victoria

— Level Crossing Removal Project, Southern Program Alliance, Melbourne VIC
  Technical Reviewer. $590 million project to remove level crossings along the Melbourne – Frankston rail line utilizing both rail-over and rail-under solutions. Client: Level Crossing Removal Authority and Metro Trains Melbourne

— Western Highway Beaufort Bypass EES, Beaufort VIC
  Technical Reviewer. As part of the planned $941 million investment to improve more than 1,500km of Victoria’s country road network managed by Regional Roads Victoria, the Western Highway will bypass the town of Beaufort, improving road safety, freight efficiency and amenity in the town centre. Client: VicRoads

— Melbourne Metro Rail Project, Melbourne VIC
  Technical Reviewer. The $11 billion Metro Tunnel involves the construction of twin 9km rail tunnels and five new underground stations to create a new rail line from Sunbury to Cranbourne / Pakenham. Client: Rail Projects Victoria & Metro Trains Melbourne

Revision date: 15/11/2018
— **Woolgoolga to Ballina Pacific Highway Upgrade, NSW**
Technical Reviewer. One of the largest road infrastructure projects in NSW, the Pacific Highway Upgrade between Woolgoolga and Ballina comprises approximately 155km of dual carriageways. Client: NSW Road and Maritime Services

— **Footscray Central Activities District, Melbourne VIC**
Lead Engineer. Train noise and vibration study for the Footscray Central Activities District, the most regionally significant activity centre of Melbourne’s west, abutting the Footscray rail corridor and Footscray Railway Station. Client: Plus Architecture

— **Goulburn Valley Highway Residential Development, VIC**
Lead Engineer. Traffic noise impact assessment and planning review for a major residential subdivision adjacent the Goulburn Valley Highway. Client: Haynes

— **Waverley Park Residential Development (Monash Freeway), Melbourne VIC**
Technical Reviewer. Traffic noise impact assessment and noise barrier design for the redevelopment of the old Waverley Park AFL football stadium and surrounds into a 1,500-lot residential development adjacent Melbourne’s Monash Freeway. Client: Mirvac

— **Cedar Woods Triangle Site Epping (Hume Freeway), Melbourne VIC**
Technical Reviewer: Traffic noise impact and noise barrier design of a major residential subdivision in Epping affected by traffic noise from the Hume Freeway. Client: Jarrah Property

— **Yarra’s Edge Masterplan, Melbourne VIC**
Lead Engineer. Traffic noise impact assessment and tower building envelope designs for Mirvac’s masterplan of the prestigious Yarra’s Edge precinct on the banks of the Yarra River, to assess noise impact from the West Gate Freeway. Client: Mirvac

— **Yarra’s Edge Bolte Precinct, Melbourne VIC**
Lead Engineer. Traffic noise impact assessment and building envelope design of the Bolte Precinct residential development located at the western end of Mirvac’s premium Yarra River development, which is impacted by noise from the Bolte Bridge and the West Gate Freeway. Client: Mirvac

— **Hampton Station Precinct, Melbourne VIC**
Lead Engineer. Feasibility study and masterplan assessment of train and bus noise for a proposed mixed use development at Hampton Railway Station. Client: Mirvac

— **Central South Yarra Apartments Rail Noise, Melbourne VIC**
Lead Engineer. Train noise impact assessment and building envelope design for an apartment tower in Melbourne’s trendy South Yarra, located on Yarra Street directly adjacent the South Yarra train station and busy rail line. Client: Little Projects

— **Federation Square Over-Station Development, Melbourne VIC**
Lead Engineer: An iconic development in Melbourne’s CBD to mark the Centenary of Federation in 2001, Federation Square includes cultural and commercial buildings and an open amphitheatre for up to 15,000 people. Built above the city’s major transport hub of Jolimont Railway Yards and accessing the historic Flinders Street Station, the $450 million project has been embraced by Melburnians and is also a major tourist attraction, with more than 10 million visits every year. Train noise and vibration impact was a major concern across the project, requiring innovative building vibration isolation control measures to be implemented across the entire deck structure. Client: Major Projects Victoria
— **Epping Melbourne Wholesale Fruit, Vegetable & Flower Market, Melbourne VIC**
  Lead Engineer. Environmental noise assessment for Melbourne’s Wholesale Market, which presented major challenges to control noise from the hundreds of forklifts and heavy vehicles operating throughout the sensitive night period impacting major residential subdivisions located close to the site. Client: Major Projects Victoria

— **699 Bourke Street Offices Over-Station Development, Melbourne VIC**
  Lead Engineer: Located directly over Melbourne’s busy Southern Cross Station, the 699 Bourke Street office development is premium office space in one of Melbourne’s most accessible locations on the border of the CBD and Docklands. Airborne noise from trains accessing the station and vehicles on the adjacent Wurundjeri Way was a significant design challenge, as was structure borne noise and vibration from the trains running directly beneath the building. Client: Mirvac

— **664 Collins Street Offices Over-Station Development, Melbourne VIC**
  Lead Engineer: Stage two of Mirvac’s development over Southern Cross Station at the southern end of the site, the 664 Collins Street building required assessment of train and tram noise and vibration impact to achieve appropriate amenity levels in the premium office development. Client: Mirvac

— **Expert Evidence experience**
  Preparation and presentation of expert evidence on a number of environmental and building projects at VCAT and Planning hearings.

— **300 High Street Prahran acoustics VCAT, Melbourne VIC**
— **Tooriel Vale Kennels & Cattery noise impact VCAT, Melbourne VIC**
— **Main Road Eltham Carwash noise impact VCAT, Melbourne VIC**
— **21-23 Monomeath Avenue acoustics VCAT, Melbourne VIC**
— **205 Gipps Street Abbotsford plant noise VCAT, Melbourne VIC**
— **Somerton Power Station noise impact VCAT, Melbourne VIC**
— **East Trentham Dog Kennel noise impact VCAT, Melbourne VIC**
— **Margaret Court Arena music noise impact, Melbourne VIC**
— **Chevron Apartments helicopter noise impact, Melbourne VIC**
— **Project Oxygen Masters Hardware noise impact, Melbourne VIC**
— **Prince of Wales Band Room music noise impact, Melbourne VIC**
— **Spanish Club music noise impact, Melbourne VIC**
— **Kew RSL townhouses environmental noise impact, Melbourne VIC**
— **Eastbourne Apartments Epworth Hospital noise impact, Melbourne VIC**
— **350 William Street Jazz Club music noise impact, Melbourne VIC**
— **St John’s Catholic Leadership Centre noise impact, Melbourne VIC**
— **Vincent Care Victoria Ozanam House noise impact, Melbourne VIC**
— **Wilson Transformers Glen Waverley noise impact, Melbourne VIC**
— **Flinders Gate redevelopment construction noise impact, Melbourne VIC**
— **31 Leamington Crescent Caulfield train noise impact, Melbourne VIC**
— **Craigieburn Town Centre noise impact, Melbourne VIC**
— **Point Cook Town Centre noise impact, Melbourne VIC**
ATTACHMENT A  NOISE CONTOUR PLOTS IN THE PARKLAND AND WETLAND ZONES DUE TO THE PROPOSED FREEWAY ALONE
2135645A - Mordialloc Bypass
Predicted free-field (no facade reflections) noise levels (2031)
Braeside Park - Section 3

CONTOURS
dBA, L10,18Hr

SCALE

LEGEND
- Category A building
- Category B building
- Industrial building
- Proposed noise wall (height varies)
- Road
- Multipurpose barrier (2m height)

Date: 30/01/2019
Prediction Algorithm: CoRTN
Prediction Height: 1.5m
Map Number: 003
Coordinate System: UTM Zone 55 WGS84
Client: NL

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Predicted free-field (no facade reflections) noise levels (2031)

Waterways - Section 4
Legends:
- Category A building
- Category B building
- Industrial building
- Proposed noise wall (height varies)
- Road

Map details:
- Date: 30/01/2019
- Prediction Algorithm: CoRTN
- Prediction Height: 1.5m
- Map Number: 005
- Coordinate System: UTM Zone 55 WGS84
- Client:

 SoundPLAN 7.4 - Future Waterways without facade reflection

2135645A - Mordialloc Bypass

Predicted free-field (no facade reflections) noise levels (2031)

Waterways - Section 5