North East Link Project Inquiry and Advisory Committee

Expert Witness Statement of Andrew O'Brien (Traffic and Geometric Design)

15 July 2019

Client:
Maddocks (on behalf of Boroondara, Banyule and Whitehorse City Councils)
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ANNEXURE A – O’BRIEN TRAFFIC ALTERNATIVE DESIGN – EASTERN FREeway PLAN SET

ANNEXURE B – O’BRIEN TRAFFIC ALTERNATIVE DESIGN – WATSONIA TO PLENTY ROAD PLAN SET
1. INTRODUCTION

1.1 This report

THIS IS A WITNESS STATEMENT TO THE INQUIRY AND ADVISORY COMMITTEE - in relation to the Environment Effects Statement (EES) prepared by the North East Link Project (NELP) for the proposed North East Link (NEL). I have been engaged by Maddocks on behalf of Boroondara City Council (BoCC), Whitehorse City Council (WCC), and Banyule City Council (BCC) to undertake a transport assessment, provide traffic planning advice, undertake an Alternative Design, and prepare expert evidence for presentation at the Committee hearing.

The North East Link (NEL) is a major transport infrastructure project proposed by the Victorian Government to link the M80 and Greensborough Bypass to the Eastern Freeway at Bulleen. It is proposed as a 13 km freeway standard connection.

The EES and ‘Reference Design’ for the NEL were completed in April 2019.

My report concentrates on the design and transport impacts of the proposed NEL within those municipalities, whether the EES provides an accurate assessment of the likely impact of the proposed scheme, and what additional mitigation measures may be necessary.

In the course of preparing this report I have:

- inspected the general area;
- reviewed the relationship between the proposed NEL and relevant strategic planning documents;
- reviewed comments and submissions by and on behalf of the three Councils;
- reviewed the alignment Concept Plans for the project prepared by the NELP;
- assessed some of the wider transport impacts on the Councils’ transport network;
- considered the impact on some arterial corridors and some local streets if the project proceeds in its current form;
- prepared an Alternative Design for the Eastern Freeway and the NEL north of Yallambie Road; and
- proposed mitigation measures to reduce the impact on the three cities.

1.2 Code of Conduct

I confirm that I have read and that I understand the Planning Panels Victoria’s ‘Guide to Expert Evidence’, and that I comply with the provisions of that guide. I also declare that I have made all the enquiries I believe desirable and appropriate to deal with the matters on which I have expressed an opinion in this report, and that no matters of significance which I believe to be relevant have (to my knowledge) been withheld.

15 July 2019

Ref: 19593 EES Response Report_AOB.Docx
Opinions expressed in this report are concluded opinions, unless there is any qualification expressed.

1.3 **Expert Witness Statement**

With respect to provision of Expert Evidence, the following statement is provided:

**Name & Address:** Andrew Philip O'Brien, P.T.O.E  
Suite 2.03, 789 Toorak Road, Hawthorn East, Victoria 3123

**Qualifications:**  
B.E. (Civil), University of Melbourne  
B.A. (Economics & Politics), University of Melbourne  
C.T.P.&C., University of New South Wales  
P.T.O.E. Certified Professional Traffic Operations Engineer (No. 300)) USA

**Professional Memberships:**  
Honorary Member – Institute of Transportation Engineers,  
Fellow - A.I.T.P.M.

**Experience:**  
14 years Country Roads Board, Road Traffic Authority;  
2 years at TTM Consulting  
32 years at Andrew O’Brien & Associates Pty Ltd/ O’Brien Traffic

**Additional Activities:**  
- Board member of ITE (Institute of Transportation Engineers) Australian Section, including Secretary, Vice-president, and President - (1982 to 2017);  
- Director – International Board of Direction ITE, Washington (1996-1998);  
- Sessional lecturing and seminars in traffic and transport engineering at Footscray IT, Warrnambool IAE, Monash University, Melbourne University, University of Maryland;  
- Presenter at International Road Safety Audit training courses and Traffic Calming courses in Australia, New Zealand, USA, Canada, and Europe;  
- Author of numerous refereed papers, articles and conference presentations;  
- Author in Ogden & Bennett (& Taylor) Traffic Engineering Practice (several editions), and ITE Traffic Engineering Handbook 1999.

**Particular Experience:**  
I have had continuous experience in all aspects of traffic engineering, traffic planning, transport planning and road safety engineering since 1971. I have substantial experience and expertise in traffic and safety aspects of road design, **functional freeway design**, road safety investigations and
auditing, traffic engineering operations, ramp metering design, traffic research, transport network planning, traffic management of both arterial roads and local areas, travel demand management, and traffic impact assessment of developments including traffic generation and parking.

This qualifies me to make my report on the issues as instructed.

**Facts upon which the Report Proceeds:**

- Ministerial Guidelines for assessment of environmental effects under the *Environment Effects Act 1978* (2006);
- North East Link EES documents;
- Councils submission on the EES;
- IAC report on Preliminary Matters and Further Information Request;
- Business Case documents prepared for the NEL;

**Reference Materials:**

- VicRoads Road Design Manual Part 2 – Horizontal and Vertical Geometry (2002);
- Transportation Research Board USA’s Highway Capacity Manual (HCM) (2000);
- VicRoads Managed Motorway Guidelines (various);
- Austroads - Road Safety Audit guidelines (various);

**Assistance in Preparation of Report:**

Chirag Safi, Senior Traffic Engineer, and several Traffic Engineers and Designers, have assisted me with the preparation of this report, plan sets, and other relevant materials.

**Instructions:**

I have been asked by Maddocks to prepare advice and to provide expert evidence on transport matters relevant to the Environment Effects Statement for the NEL.
1.4 Engagement

O’Brien Traffic has been engaged by Maddocks to:

- Extract traffic data from the NEL traffic models so that the data could be more readily understood;
- undertake a transport assessment;
- provide traffic planning advice;
- provide design advice, and prepare alternative design options;
- review relevant documents including:
  - Ministerial Guidelines for assessment of environmental effects under the Environment Effects Act 1978 (2006);
  - North East Link EES documents;
  - Councils’ submission on the EES,
  - IAC report on Preliminary Matters and Further Information Request;
  - any other submissions or documents we subsequently refer to you.
- and prepare expert evidence for me to present at the Committee hearing.

With respect to the expert evidence, I was tasked with preparing “an expert witness report that contains your opinion on the following matters, as relevant to your area of expertise:

a) does the EES adequately document and assess the nature and extent of the environmental effects of the Project? In addressing this question please explain where you are satisfied with the content of the EES and why, and if not, what if any deficiencies exist in the documentation and/or assessment of the nature and extent of environmental impacts contained in the EES;

b) can the Project as described in the EES achieve a level of environmental performance which is consistent with relevant legislation, documented and endorsed policy or acknowledged best practice?

c) if the Project, as described in the EES cannot achieve a level of environmental performance which is consistent with relevant legislation, documented and endorsed policy or acknowledged best practice, are there any recommendations that you would make as to specific measures which you consider necessary and/or appropriate to prevent, mitigate and/or offset adverse environmental effects? If so, please explain your reasoning in detail. To the extent that it is within your expertise to comment upon the feasibility of any of your recommendations, please state whether or not any recommendations are feasible, explaining your reasoning.

d) how does the Project as described in the EES respond to the principles and objectives of “ecologically sustainable development” as defined in the Ministerial Guidelines for assessment of environmental effects under the Environmental Effects Act 1978 (2006);

e) are there any recommendations that you would make as to specific measures which you consider necessary and/or appropriate to improve the response of the Project to the principles and objectives of “ecologically sustainable development”? If so, please explain...
Further follow-up tasks were to:

- in due course, review and comment on other parties’ expert evidence in relation to your area of expertise.
- participate in any expert conclave requested by the IAC;
- present your evidence at the IAC Hearing. You should anticipate preparing a short (no more than 30 minutes) presentation to facilitate the delivery of your evidence. The presentation is to be drawn from your expert witness report and may respond to other expert reports (as relevant).

My letter of instruction form Maddocks is appended.

1.5 Background

NELP released a suite of documents for public consultation relating to the NEL in April 2019. These documents formed the EES.

O’Brien Traffic initially carried out work for BCC and BoCC to assist them to provide alternative design options, then provided advice to Maddocks to assist in their preparation of Councils’ submissions on the EES.

O’Brien Traffic has been engaged by Maddocks to provide comment on the EES, to undertake necessary investigations to assess the likely impacts of the proposed NEL, to examine potential mitigation measures, and to prepare and present expert evidence to the Committee.

1.6 Report methodology

Prior to commencing this report, I had access to the EES suite of documents. Hence this report does not include exhaustive statements about existing conditions and justification for the proposed project, but concentrates on the assumptions made, adequacy of the reference design, likely problems, and opportunities for mitigation of impacts. I have not limited my analysis to the ‘Project Boundary’ defined by the NEL, as I believe this does not allow for consideration of the considerable impacts on the three municipalities. For example, I have considered the connections to other roads at the ends of the project, and some critical intersections adjacent to and impacted upon by the project.
I have not been provided with critical information (e.g. the micro-simulation model, ramp gradelines and geometric details) needed to properly assess this project. If this information becomes available, I may need to prepare a supplementary report to address the issues that arise.

1.7 The evidence report

This report summarises our investigation into aspects of the traffic and road design matters in the North East Link EES.

In the course of preparing this report:

- Previous plans and relevant documentation have been reviewed;
- The subject site and surrounding area have been inspected;
- Most recent traffic volume estimates and land use changes have been understood;
- Various options have been investigated and discussed with Council officers and Maddocks;
- Concept alignments and layouts of three options have been developed; and
- Implications of the three options have been assessed.

The following critical matters are addressed:

- Modelling outputs and reporting
- Significant local modelling outcome issues
- Reference Design
- Geometric designs of the proposed works
- Geometric designs of interchanges
- Matching traffic demands to designs
- Is the design north of Grimshaw Street excessive?
- Is the design of the widening of the Eastern Freeway excessive?
2. REPORT SUMMARY

Process:
This report has concentrated on:

- Understanding the Reference Design and traffic information;
- Discussing the EES and the limitations it has with respect to the extents of impacts that are assessed;
- Assessing the likelihood of the modelled traffic flows being able to actually occur;
- Examining and reviewing aspects of the TIA;
- Assessing the Reference Design in some detail and identifying aspects of ‘over-design’, the reasons for the over-design, and identifying the impacts so created;
- Providing a desk top road safety audit of the Reference Design;
- Developing an Alternative Design for the Eastern Freeway component, and for the NEL from Watsonia South to Plenty Road interchange on M80;
- Listing some benefits of the Alternative Design compared to the Reference Design.

Constraints
The task of preparing this report has been made extremely difficult due to the lack of comprehendible material supplied by NELP prior to and including the EES materials. For example, the Reference Design was in a PDF format that did not allow the drawings to be placed directly into a CAD program, and the traffic data was limited so that not all movement counts were available, and many assumptions had to be made to attempt to create usable data. All requests for additional (useable) information were refused.

Findings:
The findings of the O'Brien Traffic work can be summarised as:

(i) The EES information was extraordinarily difficult to analyse and use;
(ii) The micro-simulation modelling is flawed in that it does not extend beyond the project boundaries and reflect the current or future congestion at its major interfaces – Hoddle Street M80 west of Plenty Road, Greensborough Bypass, and the Melba tunnels;
(iii) The TIA does not test the impact on many adjacent critical intersections – e.g. Springfield Road with Middleborough Road, with Surrey Road, or with Springvale Road – our SIDRA analyses of these intersections show that they would be severely congested, with PM peak queues extending back onto the Eastern Freeway;
(iv) The modelling is unreliable. For example, at Middleborough Road the projected traffic volumes in the 2036 No Project Case reduce substantially (in order of 20%) when compared to existing volumes (see Figure 13 in the body of this report);

(v) The use of the “C-D” design is not warranted;

(vi) The decision to run a busway from the Hoddle Street ramps along segregated shoulders until near Chandler Highway then crossing over to a new facility along the northern side of the Eastern Freeway to Bulleen Road, is in my opinion, unjustified when it could be located in the median – one provided for a future railway. This is an extremely expensive decision.

(vii) I conducted a road safety audit of the designs for Eastern Freeway and north of Watsonia South and discovered numerous safety issues that, to address properly, would result in an increase in ‘footprint’;

(viii) I was instructed to prepare Alternative Designs for the Eastern Freeway and for the northern end of NEL. Some preliminary work on alternative designs options had previously been commissioned by BoCC and BCC. The aims of the Alternative Design are:

- To maintain the capacity of the Reference Design;
- To reduce the footprint of the Reference Design;
- To avoid the Bulleen Tennis Centre if possible;
- To avoid the golf course if possible;
- To provide a relocated Greensborough Highway on the eastern side of the NEL;
- To provide a new link road from Greensborough Highway across the rail to Watsonia Road containing a bus interchange on the link road;
- To simplify the major interchanges.

(ix) The Alternative Design has been prepared, and is discussed in Section 9 of this report, with the plan sets for Eastern Freeway and NEL (north) provided under separate cover.

(x) The Alternative Design generates considerable benefits in terms of maintaining community infrastructure, reducing the impact on open space along Eastern Freeway by at least 13 Ha, reducing the constructed footprint, and significantly reducing costs.

(xi) The report recommends adoption of the Alternative Design.
3. THE NORTH EAST LINK

3.1 North East Link

The North East Link (NEL) project is a major freeway and tunnel project designed to connect Melbourne’s northeast and southeast.

The project consists of three components: The Eastern Freeway upgrades would include widening works between the Springvale Road interchange and the Chandler Highway interchange. The tunnels component would include one northbound and one southbound tunnel between just north of the Eastern Freeway and to the north of Lower Plenty Road. The tunnel component would cater for three lanes of traffic in each direction. The northern component comprises a tollway and a replacement arterial for Greensborough Highway extending to the M80/Greensborough Bypass and Plenty Road.

The overall project is shown in Figure 1.

![Figure 1: The NEL (Source: EES Chapter 6)](image)

In April 2019, the Environment Effects Statement (EES) for the NEL Project was released to the public.

A ‘Reference Design’ for the project was included as part of the EES. This is a concept design, which indicates the form the project may take. However, as the final design would be determined by the appointed contractor, it may take a somewhat different form.
4. ENVIRONMENT EFFECTS STATEMENT

4.1 Purpose

In April 2019 NELP released the EES for the ‘North East Link Project’ to the public. The EES is a suite of documents that purports to ‘assess the anticipated impacts of the project and examine options for avoiding, managing and mitigating any negative impacts.’ It also describes the Reference Design and presents the findings of the NELP’s consultants’ impact assessments. Through these assessments it attempts to identify performance requirements and obligations that would be placed on the contractors delivering the project.

The EES includes a main document which is supported by numerous technical appendices. The review of the transport impacts of this project is focussed on the analysis contained in ‘Technical Report A – Traffic and Transport Impact Assessment’. That document will be referred to in this report as the TIA.

The stated objective of the TIA is to:

- Understand the operation, constraints and opportunities of the existing transport network in the vicinity of the project
- Understand the relationship between the current and planned transportation network and the current and planned land use in the area surrounding the project
- Assess the transport risks (including for traffic, freight, public transport, bicycles, pedestrian and constructability) and potential impacts associated with the project
- Satisfy regulatory requirements under the Road Management Act 2004
- Satisfy the objectives and decision-making principles of the Transport Integration Act 2010
- Develop mitigation and management measures and a succinct set of performance requirements and indicators for transport that specify the limits and processes that must be followed to achieve an acceptable outcome during construction and operation.

The stated purpose of this TIA is essentially to examine the risks and impact of the proposed project and identify suitable mitigation measures. VicRoads does not have a formal guide for TIAs, but DIER Tasmania has, and they state: “The purpose of a Traffic Impact Assessment (TIA) is to assess the impacts of development on the transport network and identify reasonable solutions, applicable to the Tasmanian experience, to address these impacts. . . . A full and detailed assessment of how vehicle and person movements to and from a (project) might affect existing road and pedestrian networks is required.” That guide is typical in its requirements.

However, I consider that this TIA, does not meet its stated objective. This is most clearly apparent in relation to limiting the coverage of the study area by excluding the Eastern Freeway at Hoddle Street, the M80 Ring Road west of Plenty Road, the Greensborough Bypass connection to Diamond Creek Road, the Melba tunnels, and local arterial road network adjacent to the NEL and Eastern Freeway in the TIA – areas which are clearly impacted. The second major failing of the TIA is the lack of
available detail to make a proper assessment. I have only once seen a TIA (WGT project) that does not provide before and after analyses of critical intersections – e.g. all of the interchanges along the Eastern Freeway, NEL, Greensborough Bypass, and the eastern end of M80.

### 4.2 The Reference Design

The Reference Design is a design for the NEL that shows how the project could connect the Eastern Freeway, M80 and Greensborough Bypass. However, the Reference Project is only a concept design, which shows a potentially feasible way to achieve the Victorian Government’s aim for providing such a connection. There is no guarantee that the winning consortium chosen to build the link would utilise a similar design. This introduces a significant challenge in assessing the transport risks and impacts of the project, as the impacts of variations could alter traffic flows significantly.

Even if the winning consortium intend to utilise the Reference Design as a basis of their design, it is likely that major changes would be needed to address non-transport impacts, which may thus have cumulative impact on the traffic impacts. Also, the Reference Design for the Project, as designed, may not be acceptable. For example, the acceptability of not providing suitable emergency stopping lanes, potential issues regarding the safety of merges and exits, and vertical alignment are likely to be issues. The removal of emergency stopping shoulders on the M1 has been a disaster in operational-reliability and safety terms, and this will likely be an issue with Reference Design. My report, and my Alternative Design, suggest that “it can be done much better”.
5. **EES - ISSUES WITH ADEQUACY OF EES MATERIALS**

5.1 **Reference Design**

The Reference Design is presented in the EES in order to assist in the understanding of extent of the works and to demonstrate how the Project could be designed to operate in a way that enables the modelled demands to be accommodated.

The Reference Design, in the form provided, is extremely difficult for anyone wishing to test the design. The ‘Horizontal Plans: Operation’ plans are provided at a non-standard scale of about 1:3200, which means that information/distances cannot be readily measured. There are no chainages provided on the plans. On separate plans, the longitudinal gradelines are provided, but only for the mainline movements. There is no geometric or gradeline information provided for the multitude of ramps, the collector-distributor (C-D) roads, or intersecting arterial roads.

The drawings are ‘secured’ PDFs such that they cannot be electronically copied for incorporation into a design assessment.

The Reference Design, as provided, prevents any reasonable level of design scrutiny.

5.2 **Micro-simulation modelling extents**

The micro-simulation modelling does not assess downstream effects on Greensborough Bypass, downstream congestion west of Plenty Road on M80, queuing from Hoddle Street and Alexandra Parade on the Eastern Freeway, and congestion approaching the EastLink tunnel. The micro-simulation modelling that extends to just short of Hoddle Street makes no allowance for the congestion that currently occurs on the Eastern Freeway in the AM peak (often back to Bulleen Road), and that is only likely to get worse over time.

On the arterial roads, some of the nearest critical intersections are not modelled despite the fact that many cannot accommodate the modelled traffic flow increases above current flows.

5.3 **Micro-simulation modelling outputs and reporting**

The modelling reports, as constructed, prevent any reasonably easy examination of the outputs. There is missing data at each interchange – so that it is not possible to accurately assess the micro-simulation model outputs. The missing data could have been extracted from the model as readily as the data which has been made available.

My firm has spent a couple of weeks of consultant time getting the data extracted and put into a form that can be used – some of the outcomes have needed to be estimated due to the lack of suitable output data.

5.4 **Existing operating conditions (to allow for comparison)**

The Technical Report A did not include operational results for existing conditions and therefore, does not allow for comparisons between existing and future cases. It is important to facilitate a side-by-side comparison among the three scenarios analysed.
While it is acknowledged that Technical Report A assesses the impact of the future scenarios, it is important to understand how future performance would change relative to existing with the background growth in traffic alone and then with the NEL project. This assessment requires an existing conditions baseline.
6. **REVIEW OF TRAFFIC IMPACT ASSESSMENT**

6.1 **Context of comments**

The review of the TIA has been done to identify areas or issues where I consider that the TIA is internally inconsistent, where the predicted outcomes are unlikely to occur, or where there are significant issues that have not been considered (often because they are considered to be ‘outside the Project boundaries).

6.2 **Project corridor operational performance**

6.2.1 **Eastern Freeway**

A major concern with the TIA is the discrepancies between the current levels of peak period congestion and those showing up in the micro-simulation modelling. These are discussed below.

Technical Report A states on page 114 that:

“The largest delays were observed in the AM peak westbound surveys, particularly at the approach to Hoddle Street. Observed travel times ranged from 20 minutes to 38 minutes across the morning peak period. The approach to Hoddle Street was also the most unreliable section, recording the largest spread of travel times of any segment”.

**Comment:**

Consistent with the above description, Figure 2 depicts the sudden rise in travel times just west of Chandler Highway, illustrating the extent and magnitude of congestion approaching Hoddle Street.

![Figure 2: Eastern Freeway Travel Times – Westbound AM Peak (Source: Figure 6-35 of Technical Report A, comment added)](image-url)
By way of contrast Figure 3 indicates free-flow speed in the westbound direction between Chandler Highway and Hoddle Street. As such, queue-backs resulting from Hoddle Street are not incorporated in the Base microsimulation model.

**Figure 3: Eastern Freeway Observed Speeds – AM Peak Hour (Source: Figure 6-52 of Technical Report A)**

Simulated travel speeds under the 2036 No Project and Project Case are indicated in Figure 4. A small section of Eastern Freeway west of Chandler Highway is shown to operate with no congestion, i.e. free-flow speeds even though the peak hour traffic volumes are projected to increase substantially on the Eastern Freeway.

**Figure 4: Eastern Freeway Simulated Traffic Speeds – AM Peak Hour (Source: Figure 9-65 of Technical Report A)**
It is plausible that queue-backs from Hoddle Street reduce in 2036 No Project Case due to the upstream congestion which ‘meter’ traffic from reaching Hoddle Street. However, the provision of additional capacity the NEL east of Bulleen Road would relieve the upstream congestion and in turn release more traffic from Bulleen Road to Hoddle Street. Without significant intervention these volumes would extend the Hoddle Street queue-backs much further east.

As shown in Figure 5, the microsimulation is terminated just short of Hoddle Street which ignores impacts of Hoddle Street queue-backs on the performance of the NEL and distorts its benefits.

Figure 5: Microsimulation Model Study Area Peak (Source: Figure 4-6 of Technical Report A, comment added)

This has severe consequences. In reality, the Hoddle Street queue-backs will continue to worsen due to increased demand along Eastern Freeway and from NEL, without any major intervention. A high-level assessment indicates that the queue-backs in the 2036 Project Case could extend as far back as Doncaster Road on the Eastern Freeway, and if that happens, it is also likely to queue back along the north to west NEL ramp back into the tunnel – which would be a major safety issue. The queueing on the Eastern Freeway appears to be the primary reason for designing a split carriageway in the westbound direction between Bulleen Road and Tram Road. The Reference Design is prepared to protect the NEL movements from the potential Hoddle Street queue-backs.

One of the underlying assumptions not stated in the EES documentation is that the Hoddle Street queues are mitigated by another major infrastructure project (i.e. East-West Link). This position has significant pitfalls. Without the East-West Link, the
NEL would not be able to achieve the slated benefits and inclusion of the East-West Link will significantly change costs and benefits (ignoring politics).

6.2.2  **M80**

**Figure 6** indicates travel time profile between M80 and Wattle Glen via Greensborough Bypass, illustrating the existing congestion approaching the Diamond Creek/Civic Drive roundabout in the PM peak period.

![Graph of travel time profile between M80 and Wattle Glen via Greensborough Bypass](image)

**Figure 6: Greensborough Bypass Travel Time – Eastbound PM Peak Hour (Source: NELP Travel Time Runs provided by BCC)**

Appendix D of Technical Report A indicates that the PM peak hour volumes (estimated as half of the upper range two-hour volume) on the eastbound Greensborough Bypass between M80 and Diamond Creek Road would increase from 3,000 vph in existing to 3,550 vph in 2036 No Project (+550 vph) to 4,450 vph in 2036 with Project.

**Comment:**

With the NEL Project boundary at the Plenty River Drive bridge, the above increases in the PM peak hour volumes which would exacerbate the existing bottleneck at the Diamond Creek Road/Civic Drive roundabout or Diamond Creek Road east of Civic Drive, are not taken into account. The resultant congestion and queues can now extend back to the M80 interchange. It is also likely that this congestion on Greensborough Bypass approaching the Civic Drive roundabout would encourage traffic to travel through Greensborough as the southern approach movements have right of way over the western approach at this roundabout.

The EES documentation does not address any potential environment impact of Greensborough Bypass congestion, nor suggest any improvement at this intersection to address the issue.
6.2.3  **M80 to Eastern Freeway**

**Figure 7** and **Figure 8** indicate travel time profile between M80 at Plenty Road and Eastern Freeway at Doncaster Road. This is Route F identified at page 106 of Technical Report A.

![Figure 7: Travel time between M80 at Plenty Road to Eastern Freeway at Doncaster Road southbound – AM Peak (Source: Figure 6-31 of Technical Report A)](image)

![Figure 8: Travel time between Eastern Freeway at Doncaster Road and M80 at Plenty Road to northbound– PM Peak (Source: Figure 6-33 of Technical Report A)](image)
Forecast travel time comparisons for the various routes are presented in Figure 9 and Figure 10.

Figure 9: Travel time comparisons – westbound/southbound AM Peak (Source: Figure 9-88 of Technical Report A)

Figure 10: Travel time comparisons – eastbound/northbound PM Peak (Source: Figure 9-89 of Technical Report A)

Comment:
There appears to be inconsistencies in the route limits of travel time runs for Route F (i.e. M80 at Plenty Road – Eastern Freeway at Doncaster Road) vs. the limits of travel time results (M80 - Eastern Freeway) presented in Technical Report A. It was also not clear where the results included represent an average, minimum, maximum or median travel times. Note that Springvale Road to Hoddle Street in the AM peak is 6 minutes longer than in the PM peak - despite the micro-simulation showing no delays in the AM peak (see Figure 4).
In order to better understand where would the reported travel time savings occur along Route F, the average travel times between successive stations from M80 at Plenty Road to Eastern Freeway at Doncaster Road in AM peak and from Eastern Freeway from Doncaster Road and M80 at Plenty Road in PM peak are re-produced in Figure 11 and Figure 12 respectively. It is noted that these O’Brien Traffic plots are based on the same data used in the EES.
The above plots clearly indicate that the travel times at both ends (i.e. M80 between Plenty Road and Greensborough Bypass intersection and Eastern Freeway between Bulleen Road and Doncaster Road) of Route F were significantly higher, particularly in PM peak when compared to those between other stations increasing the average travel times for the entire route.

Route F referenced in Section 9.4 of Technical Report A, the 2036 Project Case results (M80 to Bulleen Road) appears to have reduced from the original Route F (Plenty Road to Doncaster Road). Both ends which generated longer travel times (i.e. higher delays) in the original travel time runs appear to have been removed.

The above assessment indicates that the travel time savings presented in the EES documentation may be exaggerated given existing and 2036 No Project Case travel times appear to include a longer section for Route F, while the analysed section in the 2036 Project Case is shortened.

The average travel time from the M80/Greensborough Bypass intersection to Thompson Road on-ramp in AM was 00:36:49, 00:08:46 less than the average of the entire Route F. The average travel time in PM peak from Bulleen Road to the M80/Greensborough Bypass intersection was 00:34:59, 00:09:13 less than the average of Route F. The results presented in Section 9.4 of Technical Report A (refer to Figure 9 and Figure 10) for Existing and 2036 No Project Case should be updated based on these numbers to reflect an apples-to-apples comparison.

6.3 Nature and extent of impacts

My assessment of the NEL and its implications on the road network was constrained by the limited amount of useful information and data supplied and the relatively restricted study area. Therefore, additional investigations have been undertaken as discussed below to potentially identify environmental issues that could affect local residents or the safe operation of the connecting arterial road network.

6.3.1 Middleborough Road

Given specific turning movement volumes at intersections were not provided within the EES documentation, for the purposes of my analysis existing volume data on Middleborough Road at the Eastern Freeway interchange and Springfield Road collected over a 24-hour period on Thursday the 21st March 2019 was obtained through the VicRoads SCATS system.

The existing peak hour traffic volumes on Middleborough Road were compared to peak hour approach volumes included in Appendix E Microsimulation Results of Technical Report A. The higher volume of the two hours in the AM and PM peaks was adopted for the purposes my review.

Figure 13 indicates O’Brien Traffic’s traffic volume comparisons between existing, 2036 No Project Case and 2036 Project Case at two locations on Middleborough Road: at Eastern Freeway interchange (total entering volumes to the interchange) and midblock (two-way) south of this interchange.
As shown in the figure above, projected traffic volumes in the 2036 No Project Case reduced substantially (in order of 20%) when compared to existing. With over 15 access points between the Eastern Freeway and Springfield Road, traffic reductions in the 2036 No Project Case would significantly improve local access and enhance safety along Middleborough Road. However, there is no reason for traffic volumes in the 2036 Project Case to increase by in order of 30% from the 2036 No Project Case. With limited information supplied in the EES documents, reasons for such increases cannot be determined, but it is highly likely that these increases are primarily caused by the provision of higher capacity on the Eastern Freeway and the assumed capacity constraints in the EastLink tunnels (stated on page 51 of the Technical Report A). Most of these increases can constitute ‘pass through’ traffic, not accessing local streets.

Middleborough Road provides one lane in each direction between the Eastern Freeway and Springfield Road. Over this length it is typically about 10.5 m between kerbs. Existing traffic volumes are close to the roadway capacity. Additional traffic volumes on Middleborough Road would significantly degrade operational efficiency (i.e. ability for local traffic to turn in and out of the local streets) and safety at local street intersections (15 of them).

Technical Report A fails to address traffic volume increases on Middleborough Road from the 2036 No Project Case to 2036 Project Case during the peak hours and subsequently identify potential operational and safety impacts, and mitigations.

6.3.2 Surrey Road

Given specific turning movement volumes at intersections were not provided within the EES documentation, for the purposes of my analysis existing volume data on Surrey Road at the Eastern Freeway interchange and Springfield Road collected over a 24-hour period on Thursday the 21st March 2019 was obtained through the VicRoads SCATS system.
The existing peak hour traffic volumes on Springvale Road were compared to peak hour approach volumes included in Appendix E Microsimulation Results of Technical Report A. The higher volume of the two hours in the AM and PM was adopted for the purposes of my review.

Figure 14 indicates traffic volume comparisons between existing, 2036 No Project Case and 2036 Project Case at two locations on Surrey Road: at Eastern Freeway interchange (total entering volumes to the interchange) and midblock south of this interchange.

![Figure 14: Comparison of Peak Hour Traffic Volumes – Surrey Road](image)

The PM peak hour traffic volumes in the 2036 No Project Case at the Surrey Road interchange are projected to increase in order of 17% from the existing. A further 15% increase would occur from the 2036 No Project Case to 2036 Project Case during the PM peak.

Technical Report A analyses an unsignalised intersection of Surrey Road and Grosvenor Road south of Eastern Freeway. A more logical choice would be to analyse the first signalised intersection to the south, i.e. Springfield Road. It is noted that the first intersection analysed to the north is fairly major intersection, but not to the south. The intersection of Surrey Road and Springfield Road intersection was assessed for existing and 2036 Project Case volumes during the AM and PM peak hours.

Existing volume data at this intersection collected over a 24-hour period on Thursday the 21st March 2019 was obtained through the VicRoads SCATS system. The existing left turn traffic volumes were estimated based on the reverse movement in the counter peak period. For the purposes of this analysis the EES peak hour volumes in the 2036 Project Case south of the interchange have been assigned to the north-south through movements on Surrey Road at the Springfield Road intersection. The remaining turn movements have not been factored up from existing (i.e. kept the same as existing).
SIDRA, a computer program developed to aid in the design and analysis of intersections was used to determine operational performance of the Surrey Road/Springfield Road intersection during the AM and PM peak hours. The SIDRA results summarised in Table 1 and Table 2 indicates that this intersection would operate with Degree of Saturation 1.296 in the 2036 Project Case during the PM peak hour. The 95th percentile queues on the northern approach would extend back almost 1.5km (i.e. beyond the Eastern Freeway interchange). This queue-back would generate ‘knock-on’ effects on the Eastern Freeway interchange (and also on east-west local streets) and could potentially affect off-ramp and motorway operations.

<table>
<thead>
<tr>
<th>AM Peak Hour</th>
<th>Existing</th>
<th>2036 Project Case</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surrey Road S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arrived Volume</td>
<td>Degree of Saturation</td>
<td>Average Delay (sec)</td>
</tr>
<tr>
<td>450</td>
<td>0.434</td>
<td>33.9</td>
</tr>
<tr>
<td>Springfield Road E</td>
<td></td>
<td></td>
</tr>
<tr>
<td>780</td>
<td>1.004</td>
<td>52</td>
</tr>
<tr>
<td>Surrey Road N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>980</td>
<td>1.056</td>
<td>114.4</td>
</tr>
<tr>
<td>Springfield Road W</td>
<td></td>
<td></td>
</tr>
<tr>
<td>380</td>
<td>0.423</td>
<td>41.7</td>
</tr>
<tr>
<td>Intersection</td>
<td>2,590</td>
<td>1.056</td>
</tr>
</tbody>
</table>

Table 1: Surrey Road/Springfield Road SIDRA Results – AM Peak Hour

<table>
<thead>
<tr>
<th>PM Peak Hour</th>
<th>Existing</th>
<th>2036 Project Case</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surrey Road S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arrived Volume</td>
<td>Degree of Saturation</td>
<td>Average Delay (sec)</td>
</tr>
<tr>
<td>720</td>
<td>0.931</td>
<td>44</td>
</tr>
<tr>
<td>Springfield Road E</td>
<td></td>
<td></td>
</tr>
<tr>
<td>510</td>
<td>0.837</td>
<td>43.9</td>
</tr>
<tr>
<td>Surrey Road N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>720</td>
<td>0.915</td>
<td>40.9</td>
</tr>
<tr>
<td>Springfield Road W</td>
<td></td>
<td></td>
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<tr>
<td>760</td>
<td>0.949</td>
<td>46.5</td>
</tr>
<tr>
<td>Intersection</td>
<td>2,710</td>
<td>0.949</td>
</tr>
</tbody>
</table>

Table 2: Surrey Road/Springfield Road SIDRA Results – PM Peak Hour

6.3.3 Springvale Road

Given specific turning movement volumes at intersections were not provided within the EES documentation, for the purposes of my analysis existing volume data on Springvale Road at the Eastern Freeway interchange and Springfield Road collected over a 24-hour period on Thursday the 21st March 2019 was obtained through the VicRoads SCATS system.

The existing peak hour traffic volumes on Springvale Road were compared to peak hour approach volumes included in Appendix E Microsimulation Results of Technical Report A. The higher volume of the two hours in the AM and PM was adopted for the purposes my review.

Figure 15 indicates traffic volume comparisons between existing, 2036 No Project Case, and 2036 Project Case at two locations on Springvale Road: at the Eastern Freeway interchange (total entering volumes to the interchange) and midblock south of this interchange.
As shown in the figure above, the AM and PM peak hour traffic volumes in the 2036 No Project Case are projected to only increase by less than 5% when compared to existing. This small increase can very well be expressed as day-to-day variation in existing traffic volumes. On this basis, it is concluded that the performance of Springvale Road between the Eastern Freeway and Springfield Road in the 2036 No Project Case would not be very different than the existing.

However the AM and PM peak hour traffic volumes in the 2036 Project Case are projected to increase in the order of 30% when compared to existing.

In order to better understand the source of the above increases in the 2036 Project Case, a further assessment has been undertaken as explained below:

Given the EES does not provide on-ramp volumes on the Eastern Freeway, for the purposes of my analysis the on-ramp volumes have been estimated using the Eastern Freeway midblock volumes upstream and downstream of each on-ramp. These on-ramp volumes also represent the departure volumes from the ramp intersections. The supplied approach volumes and estimated departure volumes at the Springvale Road interchange have been distributed through the ramp intersections using the existing turn movement data obtained through the SCATS system and the likely catchment area. **Figure 16** indicates the AM and PM turn movement data at the Springvale Road interchange in existing, 2036 No Project and 2036 Project Case.
The above figure indicates that the most of these increases on Springvale Road come from the west facing ramps at the Eastern Freeway interchange while the through movements would reduce. The peak hour traffic volumes in the 2036 Project Case on the west facing ramps at Springvale Road are projected to increase by approximately 55% from existing conditions. Due to capacity constraints in the EastLink tunnels, a significant proportion of traffic would enter/exit the Eastern Freeway via Springvale Road and travel to/from the south.

Technical Report A analyses an unsignalised intersection with Springvale Road and Ashwood Drive south of Eastern Freeway. That intersection is totally irrelevant. A more appropriate choice to show critical impacts would be to analyse the first signalised intersection to the south, i.e. Springfield Road. The first intersection analysed to the north is fairly major intersection, but not to the south.

The Technical Report A does not analyse the impacts arising from additional traffic on Springvale Road. In order to demonstrate the extent and magnitude of impacts, the intersection of Springvale Road and Springfield Road intersection was assessed for existing and 2036 Project Case volumes during the AM and PM peak hours. Existing volume data at this intersection collected over a 24-hour period on Thursday the 21st March 2019 was obtained through the VicRoads SCATS system. The existing left turn traffic volumes were estimated based on reverse movement in counter peak period. For the purposes of this analysis the EES peak hour volumes in the 2036 Project Case south of the interchange have been distributed through the intersection of Springvale Road and Springfield Road based on existing turn movement.
distributions. The remaining turn movements have not been factored up from existing (i.e. kept the same as existing).

SIDRA results summarised in Table 3 and Table 4 indicate that this intersection would operate with Degree of Saturation 1.37 in the 2036 Project Case during the PM peak hour. The 95th percentile queues on the northern approach would extend back almost 1.5km (i.e. beyond the Eastern Freeway interchange) and present significant impact to the operational capacity of the interchange. This queue-back could generate ‘knock-on’ effects on the operation of the outbound off-ramp and the motorway.

Table 3: Springvale Road/Springfield Road SIDRA Results – AM Peak Hour

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Existing</th>
<th>2036 Project Case</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Arrived Volume</td>
<td>Degree of Saturation</td>
</tr>
<tr>
<td>Springvale Road S</td>
<td>1,700</td>
<td>0.713</td>
</tr>
<tr>
<td>Springvale Road E</td>
<td>360</td>
<td>0.583</td>
</tr>
<tr>
<td>Springvale Road N</td>
<td>2,160</td>
<td>0.901</td>
</tr>
<tr>
<td>Springfield Road W</td>
<td>430</td>
<td>0.979</td>
</tr>
<tr>
<td>Intersection</td>
<td>4,650</td>
<td>0.979</td>
</tr>
</tbody>
</table>

Table 4: Springvale Road/Springfield Road SIDRA Results – PM Peak Hour

Signal timing adjustments would not reinstate the performance of this intersection back to existing (or even to 2036 No Project Case). If signal timings are adjusted to significantly favour north-south movements along Springvale Road (as VicRoads does at many arterial and collector road intersections), significant impacts would be triggered on Springfield Road which would further impact local access and movements.

This significant impact is a direct consequence of additional traffic being directed to Springvale Road because they cannot use the EastLink tunnels. Technical Report A is completely silent on any impacts the NEL could have on the wider road network which would not only diminish the claimed benefits of the NEL but also generate the need to build additional infrastructure. In this case, The NEL project would fail to provide the claimed benefit without duplication of the EastLink tunnels.

6.3.4 Watsonia Road

Appendix D of Technical Report A indicates that the daily traffic volumes on Watsonia Road would increase from 16,000 vpd in existing to 19,000 vpd (+3,000 vpd
or +19%) in 2036 No Project Case and to 23,000 vpd (+7,000 vpd, or +44%) in 2036 Project Case.

**Comment:**

There are significant concerns regarding the impacts on local roads in Watsonia due to projected traffic increases on Watsonia Road. Rat running is already an issue in roads such as Kenmare Street and Lambourne Road. The projected increases on Watsonia Road would exacerbate existing conditions.

The Y-shaped intersection layout typically creates a perception that one main road splits into two main roads. This is what would happen at the Watsonia Road/Greensborough intersection. Due to its unusual design, motorists may be encouraged to use Watsonia Road as a cut-through route.

Due to capacity and speed reductions on Greensborough Road, Watsonia Road would become equally attractive route for vehicles travelling north-south between Grimshaw Street and south of Watsonia Road. An increase in traffic in Watsonia Road is not supported as it will significantly impact on the economic role of the Watsonia commercial centre.

It has been evident in many studies that increased pass-through traffic within the neighbourhood activity centre has detrimental effects on road safety and pedestrian and cycle movements. Such an outcome of the NEL is not acceptable and better designs should be investigated that not only limit cut-through traffic but optimise local access and connections in and around Watsonia.

### 6.3.5 Local roads

None of the local roads, not even those that can be critical are analysed. For the purposes of demonstrating the likely impacts on local roads, I have analysed the Erskine Road/Chapman Street intersection east of the Macleod railway station.

Appendix D of Technical Report A indicates that the daily traffic volumes on Erskine Road would increase from 9,000 vpd in existing to 11,000 vpd (+2,000 vpd or +22%) in 2036 No Project Case and to 13,000 vpd (+4,000 vpd, or +44%) in 2036 Project Case.

Appendix D of Technical Report A indicates that the daily traffic volumes on Chapman Street would increase from 17,000 vpd in existing to 21,000 vpd (+4,000 vpd or +24%) in 2036 No Project Case and to 23,000 vpd (+6,000 vpd, or +35%) in 2036 Project Case.

My assessment and a review of local traffic flows indicate that while the traffic volume increases in the 2036 No Project Case volumes would be due to the land use growth at the La Trobe NEIC, those in the 2036 Project Case would be due to two reasons: 1) the unusual interchange arrangement at Lower Plenty Road, and 2) the removal of connections for local roads to Greensborough Road.

The southbound NEL ramp at the Lower Plenty interchange is located north of the Erskine Road/ Greensborough Road intersection (opposite Strathallan Road). This would attract additional traffic from the La Trobe NEIC via Erskine Road. For example, vehicles wishing to access La Trobe NEIC from the south are likely to use the Erskine Road-Chapman Street route, rather than travelling south to use Lower
Plenty Road. Such increased traffic volumes on both Erskine Road and Chapman Street would impact safety of vulnerable road users and deteriorate access to Macleod Station for local residents.

The traffic movement redistributions resulted from the removal of local roads connections to Greensborough Road in the vicinity of the Lower Plenty Road interchange would put extra pressure on Erskine Road.

Local road access to Greensborough Road would be significantly altered in Macleod, particularly for Oban Way, Edward Street, Strathallan Road and Sydney Street. No assessment has been provided as to how peak period traffic would be redistributed and what the impacts on local streets and intersections would be. It appears that the redistributed traffic would be loaded onto Erskine Road and Torbay Street. This is likely to impact safety and operations in the local street network and the remaining local street intersections with Greensborough Road.

The likely combined implications of the above can be substantial for the local community.
7. REFERENCE DESIGN DEVELOPMENT

7.1 Context of comments

I have reviewed the NELP’s stated approach to the Reference Design, tested some of its assumptions to the approach, reviewed some rejected options, and discusses some of the more questionable aspects of the Reference Design, including the busway design.

7.2 Assumed design elements

In ESS Report Chapter 6 Section 6.4 Project Development it is stated: “. . . North East Link was envisaged to include the following design elements:

- A tunnelled section, with a minimum length from Blamey Road to Manningham Road (described in Section 6.4.1)
- A section of the road in cutting, extending from Blamey Road to Watsonia railway station, running alongside Simpson Barracks (described in Section 6.4.1)
- Interchanges at M80 Ring Road/Greensborough Bypass, Grimshaw Street, Lower Plenty Road, Manningham Road and the Eastern Freeway (described in Section 6.4.2)
- Upgrades to the Eastern Freeway to increase its capacity in both directions, with dedicated carriageways between Middleborough Road and Burke Road to separate through traffic from traffic entering and exiting the freeway (described in Section 6.4.3)
- A new Doncaster Busway system along the Eastern Freeway from Doncaster Park and Ride to Hoddle Street (described in Section 6.4.4).

The options associated with the different design elements followed a set of criteria which reflect the transport system objectives and decision-making principles informed by the Transport Integration Act 2010 (Vic). . . . Key aspects of the criteria are described in Table 6-4 below and referenced throughout Section 6.4.

These are discussed in following sub-sections – generally by quoting a statement, then providing my comment on it.

7.3 Design approach and assumptions

7.3.1 Assessment criteria

Key aspects of the assessment of the Reference project were set out in Table 6.4. The two criteria most relevant to this report are the first two, as listed in the following EES extract.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Key aspects of criteria</th>
<th>Transport system objectives</th>
</tr>
</thead>
</table>
| Traffic and transport | • Functionality of layout  
| | • Accessibility of layout | Integration of transport and land use |
| Design          | • Compliance with standards and best practice including  
| | gradient and configuration of road geometry,  
| | maintenance access, OH&S and clearances | Efficiency, coordination and reliability |
The second dot point in column 2 makes no sense. What does “accessibility of layout” mean? The more important criterion is: "Compliance with standards and best practice including gradient and configuration of road geometry, maintenance access, OH&S and clearances". I will make numerous comments in this report about “Compliance with standards and best practice”. An important project assessment criterion omitted is ‘minimising the footprint of the project works and impacts on important community facilities/open space etc’. It is apparent that this criterion has not been considered, and is thus a major failing in the Project’s design.

7.3.2 Unconstrained or constrained designs

The following is an extract from Section 6.4.3 of Chapter 6 (Project Development):

“Eastern Freeway widening

Two key road design options were available for the layout of the Eastern Freeway widening:

- Option A – An unconstrained road design
- Option B (reference project) – A collector distributor design.

Option A: An unconstrained road

The current layout of the Eastern Freeway is an unconstrained road where cars in any lane can merge and weave across the corridor in both directions. When high volumes of traffic enter and exit the freeway, the merging and weaving tangles traffic, slows it down and causes congestion. Short distances between entries and exits on the Eastern Freeway intensify the problem, as drivers are trying to move into the left lane to exit, at the same time as traffic is trying to merge on to the freeway.

This road layout, together with insufficient road width, has resulted in parts of the Eastern Freeway, particularly around Bulleen Road, operating close to capacity. During peak periods of the day, some sections are significantly over capacity: Station Street to Elgar Road, Elgar Road to Doncaster Road, and Doncaster Road to Bulleen Road in the PM peak and Springvale Road to Blackburn Road in the AM peak.

As a result of the existing traffic conditions, and the compounding impact of the construction of North East Link, widening using an unconstrained road design was not investigated further”.

Comment:

This is the first time in about 48 years of working in this field that I have even heard the expression “an unconstrained road”, and it got no results in a Google search.

Currently the Eastern Freeway could best be described as a ‘mis-managed motorway’, and this is the cause of the operational problems described above. Statements such as “some sections are significantly over capacity . . .” show ignorance of traffic flow theory and conventions. Capacity is the maximum achievable throughput under given conditions – so a freeway segment can never be ‘over capacity’. Congestion occurs when demands exceed capacity.
The concerns stated in the second paragraph are typically related to the lack of the appropriate numbers of lanes.

The decision that “. . widening using an unconstrained road design was not investigated further” is remarkable. If this was the actual reason for the decision, then it shows, in my opinion, a lack of understanding of freeway operations and design.

7.3.3 Designing to level of service (LOS) D

In Technical Report A Traffic and Transport by Smedtech, Table 5-2 (Community consultation feedback addressed by traffic and transport – transport network planning), the second ‘Community and Stakeholder feedback item states: “Concerns the new link between the M80 Ring Road and the Eastern Freeway will be at or above capacity by the time it opens”.

The ‘Consideration in EES assessment’ response was “The EES assesses the performance of the project 10 years after opening. The project will be required to meet its design target of a Level of Service of D. A Level of Service of D means that traffic flow along the freeway is stable, but incidents may cause delays”. The response continues “The analysis in Section 9.3 shows the project would be operating at Level of Service D or better in both peak periods in 2036, 10 years after opening”.

Comment:

A target of LOS of D is not appropriate. It would be impossible to achieve in a large metropolitan area unless the project is substantially over-designed, and also that it was not possible for the actual travel demand to access the facility. If the facility has adequate accessibility, then the peak demands will increase beyond those modelled, and there will be a shorter peak period – i.e. the reverse of ‘peak spreading’. One does not get ‘peak spreading’ on a facility operating at LOS D.

Figure 17 is extracted from the TRB Highway Capacity Manual (HCM), and provides a diagrammatic representation of the various levels of service. The red solid line shows the speed and flow rate (volume) that could be expected at LOS D on a Melbourne freeway. The dashed line shows the capacity for the same maximum operating speed (55 mph) to be about 400 vph more than at LOS D. At LOS D, cars would be spaced about 45 m apart.

The facility has constrained peak period accessibility. At the western end, the Eastern Freeway terminates at Hoddle Street, and in the AM peak, queues often extend back to Burke Road. At M80, congestion also seems to evaporate despite a significant increase in peak demand arriving at a congested facility. The modelling has constrained the use of the Melba tunnels - but in practice this will only happen if there is congestion at/in the tunnels – which is LOS F, not LOS D.
So the major approaches to the Project will operate at LOS F, but the Project will operate at LOS D. This can only be interpreted as the Project being over-designed.

The arterial road network connecting to the Project also has constrained peak period accessibility. As discussed later in the report, the intersections of Surrey Road and Springvale Road with Springfield Road do not have the capacity to enable the modelled traffic flows to occur at the relevant interchanges. If the peak period modelled traffic flows cannot access the Project, the flow predictions will not be met, and the facility, as designed, is more likely to operate at LOS C than LOS D.

7.4 Design options – Bullen Road interchange

An option to build the NEL over the top of Bulleen Road was considered but rejected on visual and amenity impact grounds. Two tunnel options were then considered:

“A tunnel concept was considered as two options:

• Option B.1: TBM tunnel – this option would use a TBM to construct the tunnels connecting North East Link to the Eastern Freeway. This is presented in Figure 6-10.
Option B.2, a ‘cut and cover’ option was also developed as per their Figure 6-11.

Figure 6-10  Option B.1: TBM tunnels to Eastern Freeway

Figure 6-11  Option B.2: Cut and cover tunnels to Eastern Freeway
The Project Development report comments: “Despite the advantages of a tunnelled option associated with visual impacts, this was removed from further consideration due to a number of issues:

- **Traffic and transport**

  The design layout for this option would not provide an acceptable level of traffic functionality. This is due to the tight radius curve of the east-facing tunnel (on the eastern side of Bulleen Road) which would not provide sufficient stopping sight distance.

- **Land planning and environment**

  This option would also require a larger project footprint at the Eastern Freeway in order to accommodate the tunnel portals and the ventilation structures, which would have permanent impacts on parkland, community facilities and would impact residential properties (as a result of the cut and cover methodology).

  *Through an assessment of the advantages and disadvantages associated with Options A and B, Option C was developed*.

**Comment:**

The two tunnel options were ‘all or nothing’ ones. The obvious option for consideration would be a hybrid option that overcame any perceived issues.

The first dot point above as not a reason for eliminating tunnel options: “the tight radius curve of the east-facing tunnel (on the eastern side of Bulleen Road) which would not provide sufficient stopping sight distance”. As the Reference Design has done, one just needs to widen the shoulder marginally on the inside of the curve.

I have developed an alternative option that places the connections to and from the east in a trench from the proposed tunnel section. This is referred to throughout at the Alternative Design, and is discussed in detail later.

### 7.5 Design options – M80 Ring Road interchange

The adopted design is referred to as “**Option B (reference project): A road at-grade**” in the Project Development report. The design in Figure 6 – 16 of the report is the exact opposite to “*a road at-grade*”. It is described as “*a free flowing interchange with multiple carriageways, providing connectivity from M80 Ring Road to the west, Greensborough Bypass to the east and North East Link to the south. This at-grade configuration provides a number of advantages including: . . “.

**Comment:**

The normal use of the term “at-grade” means that all roadways and connections occur at the same level and are via ‘at-grade’ intersections. The following paragraph mentions ‘pedestrian overpasses’ which are ‘grade-separation’ treatments – an at-grade treatment is a pedestrian crossing.
7.6 **Grimshaw Street interchange**

The reference design has so little information/detail that no constructive comment can be made at this stage. If, in the near future, ramp and roadway grade lines and alignment details are provided, further comment may be possible.

7.7 **Lower Plenty Road interchange**

As per the previous item, the reference design has so little information/detail that no constructive comment can be made at this stage. If in the near future, ramp and roadway grade lines and alignment details are provided, further comment may be possible.

7.8 **Eastern Freeway widening**

The adopted Eastern Freeway widening proposal is shown below – Figure 6-26 in the EES report Chapter 6.

![Figure 6-26](image-url)

**Figure 6-26** Option B (reference project) – Schematic lane diagram of Eastern Freeway upgrades

The justification or rationale for this overly-complex and over-designed scheme is set out on page 48 of the report. “Traffic entering the freeway from the city and Chandler Highway would be able to access express lanes straight through to Middleborough Road, Blackburn Road, Springvale Road and the EastLink tunnel. This would accommodate weaving away from the express carriageway, and minimise the number of entry and exit points, while still providing additional capacity. To facilitate this capacity, new lanes would be added between Bulleen Road and Springvale Road, and between Chandler Highway and Bulleen Road to separate traffic staying on the freeway from traffic getting on and off North East Link and Bulleen Road.

By minimising weaving, this design solution would improve the efficiency of the freeway and the safety of drivers. Additional lanes would provide an acceptable level of capacity to support the existing levels of traffic as well as the additional traffic as a result of North East Link”.

The ‘rationale’ is further reinforced by the comments on ‘short trips’: “This option provides a design solution which would retain short trips without impacting freeway functionality. This would be facilitated by providing dedicated lanes along braided ramps
between Tram Road and Middleborough Road, which weave over and under each other to avoid merging and weaving on and off the freeway (as shown in Figure 6-27).

This design option would untangle these traffic movements on the freeway, keep traffic off local roads, maintain traffic flow along the Eastern Freeway and keep drivers safe”.

**Comment:**

**Weaving and ‘express lanes’**

Does this complex arrangement actually reduce weaving? Several example movements are assessed as follows:

- **Outbound express lanes to Blackburn Road** – the Reference Design has a minimum of a 2-lane weave over just 1250 m. The Alternative Option (see Section 9 and Plan Set) requires a lane change into the adjacent auxiliary lane.

- **Outbound Middleborough Road to Blackburn Road then right turn** – the Reference Design has a merge, then an exit diverge, then a weave on the ramp to right turn. The on-ramp ‘nose’ to the 2-lane off-ramp ‘nose’ is about 870 m. The Alternative Option requires entry into, then exit from an auxiliary lane, and no weave on the off-ramp. The on-ramp ‘nose’ to the single lane off-ramp ‘nose’ is about 990 m.

- **Outbound crossing Yarra River in the middle of 5 lanes to Elgar Road** – the Reference Design requires a 1-lane weave to the C-D Road just before Bulleen Road, 2 lanes to 1 lane merge before the Bulleen Road on-ramp, 1-lane weave to the right to bypass the Doncaster Road exit, then a 1-lane weave into the auxiliary lane. The Alternative Option requires a 1-lane change/weave to the left anywhere along the route, then a 1-lane change/weave to the left after the NEL joins, then a 1-lane change into the auxiliary lane to exit. The Alternative Design is safer.

- **Inbound Middleborough Road to Yarra River** – the Reference Design requires a driver to merge from the on-ramp, then weave across 2 lanes within 1.1 km to access the ‘express lanes’ towards the city. The Alternative Option does not require any weaving other than moving out of the auxiliary lane (equivalent to the merge entry in the Reference Design – but easier and safer). By way of comparison, traffic heading for NEL only merges onto the freeway with the Reference Design, but needs to make 3 lane changes over 2 km after merging, or using the crossing to NEL just east of Bulleen Road, with the Alternative Option. There is likely to be considerably less traffic heading to NEL than to Eastern Freeway.

While not exhaustive, the above examples indicate that there is unlikely to be a reduction in required lane changes/weaves with the Reference Design by comparison with the Alternative Option. In my opinion, the Reference Design for Eastern Freeway is likely to be less safe that the Alternative Option.

**Short trips**

If a user gets on at an on-ramp and off at the next off-ramp, this usually involves a merge then a diverge. With the Reference Design, to travel west to east from Tram
Road to Middleborough Road one enters the ‘on-ramp’, diverges about 100 m further along the ramp, passes along a ramp that is too narrow (4 - 4.5 m between barriers/walls), merges with C-D Road traffic about 350 m further on, joins a ramp which to the right as an ‘added lane’, then proceeds ahead for a left turn or weaves across one or two lanes to right turn at Middleborough Road. Since most traffic enters the on-ramp from the north, most of that traffic will exit as a right turner at Middleborough Road – i.e. makes a diverge, a merge, then a weave. In the opposite direction, a user will make a diverge just after the start of the ramp, the passes along a section of ramp that is too narrow (4 - 4.5 m between barriers/walls), joins the exit ramp to Tram Road as an added lane, and, if a right turner (most traffic), weaves across the exit ramp traffic.

In the Alternative Design discussed later, these two movements occur by entering the freeway into an auxiliary lane, then exiting at the following off-ramp directly from that auxiliary lane. There is no merging with other traffic or weaving. Traffic exiting at the off-ramp, but that has been on the freeway prior to the on-ramp (i.e. travelled further along the freeway), has to make a one lane diverge into the auxiliary lane. There is a 3 m wide safety shoulder beside the auxiliary lane.

7.9 Busway

As a part of NEL, a new busway is provided between east of Hoddle Street to a modified Doncaster Road ‘Park & Ride’.

The design features:

- Bus ‘shoulder running’ between Hoddle Street and just west of Chandler Highway where it transitions into an exclusive busway on the northern side of the Eastern Freeway up to Bulleen Road.
- Access to the outbound facility from Hoddle Street is only provided from the north (a ramp on which there are no scheduled bus routes).
- A bus interchange and new large Park & Ride facility at the Bulleen Tennis Centre, with the Tennis Centre to be relocated.
- An at-grade crossing of Thompsons Road prior to becoming an exclusive busway on the northern side of the freeway until reaching the Doncaster Road Park & Ride, where it terminates.
- Access to the busway is provided at Chandler Highway for movements to/from the west, at Thompsons Road for access to/from the northeast, and at Doncaster Road. No access is available to/from Bulleen Road, either to the north or to the south.
- The busway requires significant structures at Chandler Highway (under the eastbound off-ramp and across the two mainline carriageways), under the Burke Road off-ramp, under the NEL west to north and north to west ramps, under Bulleen Road, and under Doncaster Road.

Comment:
The Eastern Freeway was designed to have a railway operate in its median between Hoddle Street and Bulleen Road. The Reference Design ignores this, and creates an inefficient/costly facility between Hoddle Street and Thompsons Road.

In response, O’Brien Traffic has prepared a design that has the busway in the median from just west of Bulleen Road to Hoddle Street. It has no at-grade crossing of Thompsons Road, and is grade-separated all the way from Hoddle Street to the Doncaster Road bus interchange. It has right hand side shoulder running across the major river crossings close to Hoddle Street.

The Reference Design’s decision to operate the outbound bus-lane on the north to east Hoddle Street on-ramp is not supported. All scheduled bus movements onto the outbound freeway come from the south. It would not be practical, after the recent changes made to the Hoddle Street interchange, to provide for buses from south to east via this ramp.

One has to question the logic behind shifting the outbound carriageway into the median, then building a separate busway on the northern side, rather than simply widening the freeway (the fifth lane in each direction between Chandler Highway and Bulleen Road) into the median, and placing the busway in the residual median. The costs of the Reference Design in this regard are excessive.
8. REFERENCE DESIGN ROAD SAFETY AND OPERATIONS AUDIT

8.1 Purpose

The purpose of carrying out a ‘desk top audit’ is to highlight safety deficiencies that, to overcome them, would involve increasing the footprint of the Reference Design, and adding significantly to costs or increasing footprint impacts.

8.2 Safety Issues – Eastern Freeway

There are numerous safety issues with the proposed designs for the Eastern Freeway. Many of these relate to the lack of adequate safety shoulders on the major carriageways.

VicRoads and Austroads have long held that for a 3-lane or wider carriageway, safety shoulders should be at least 3 m on both left and right sides of the carriageway. Such shoulders cater for emergency stopping and also make incident management more efficient and safer for responders. Many years back now, VicRoads vowed to never allow 2.5 m shoulders between the mainline and a barrier due to the adverse safety outcomes where the narrower shoulders were installed on the Ring Road. The list of road safety audit issues, and likely treatments, is provided in Table 5.

<table>
<thead>
<tr>
<th>Location</th>
<th>Safety Issue</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collingwood rail bridge to E of Bulleen Road</td>
<td>No right hand side 3 m shoulders</td>
<td>Provide 3 m shoulders except on major structures over water</td>
</tr>
<tr>
<td>Collingwood rail bridge to 350 m E of Merri Ck</td>
<td>No left hand side 3 m shoulders</td>
<td>Provide 3 m shoulders except on major structures</td>
</tr>
<tr>
<td>Yarra River crossing</td>
<td>500 m with no left hand side 3 m shoulders. Minimal, if any shoulders on the busway facilities.</td>
<td>Provide 3 m shoulders by using bus shoulder running. Remove barriers between busway and mainline.</td>
</tr>
<tr>
<td>Westbound busway between overpass and Chandler Highway on-ramp</td>
<td>The total width between outer barriers for the 120 m or so east of the merge is about 10 m with two central barriers. This is insufficient on each roadway to have a bus pass a disabled bus. For the mainline busway, there is no escape route west of Bulleen Road.</td>
<td>Shift the westbound mainline carriageway into the median to allow suitable shoulders to be in place.</td>
</tr>
<tr>
<td>Chandler Highway eastbound exit</td>
<td>The exit design has an 80 m taper rather than the required 160 m taper. This occurs due to the complex busway exit design.</td>
<td>Shift the eastbound mainline alignment into the median to allow a standard exit to be designed</td>
</tr>
<tr>
<td>Bulleen Road eastbound off-ramp</td>
<td>This ramp diverges as a right hand exit from the NEL system (freeway to freeway) ramp. This defies all ‘best practice’ recommendations to ALWAYS have local ramps exiting to the left – a significant ‘human factors’ safety issue.</td>
<td>Redesign the ramp so that it exits to the left from either the NEL west to north ramp, or from the Eastern Freeway mainline (this may be extremely difficult to achieve give the current</td>
</tr>
<tr>
<td>Location/Interchange</td>
<td>Shoulder Design Suggestions</td>
<td></td>
</tr>
<tr>
<td>----------------------</td>
<td>----------------------------</td>
<td></td>
</tr>
<tr>
<td>NEL to city ramp</td>
<td>Minimal shoulders for last 300 m</td>
<td>Provide 2 m left shoulder (may need to relocate ramp entry to the east)</td>
</tr>
<tr>
<td>EF under Bulleen Road inbound</td>
<td>3-lane roadway has merge from C-D road and is a likely major bottleneck</td>
<td>Add the C-D lane as an ‘added lane’ rather than as a merge.</td>
</tr>
<tr>
<td>C-D Road at Bulleen Road</td>
<td>This has a 2-lane exit, followed by a lane-drop merge prior to the Bulleen Road on-ramp joining as an ‘added lane’</td>
<td>Make the exit from the mainline a single-lane exit.</td>
</tr>
<tr>
<td>From Park Ave reserve to Doncaster Rd</td>
<td>No right hand side 3 m shoulders on any of the 4 roadways, except for curve widening on the inside of sharp curves.</td>
<td>Provide 3 m shoulders on the right hand side of all carriageways.</td>
</tr>
<tr>
<td>Exit from NEL connector to Bulleen Road and mainline (Ch:13,700)</td>
<td>The exit commences on the inside of a sharp radius (600 m R) curve. The sight distance requirement from the left lane to the exit nose is 300 m. Only about 200 m is provided. Providing the 300 m will widen the footprint into Koonung Reserve by about 10 m at the centre of the chord – see Figure 18. This exit may also be congested in the AM peak when queues back from Hoddle Street can be expected. This is a significant weakness in the design approach.</td>
<td>Move exit point about 100 m to the west, and make consequential downstream changes. Provide the full 300 m sight distance to the exit.</td>
</tr>
<tr>
<td>Doncaster Rd to Tram Road</td>
<td>No right hand side 3 m shoulders on any of the 4 roadways</td>
<td>Provide 3 m shoulders on the right hand side of each carriageway.</td>
</tr>
<tr>
<td>Tram Rd to Middleborough Rd</td>
<td>5-lanes inbound no right hand side 3m shoulder. 2 x 3-lane outbound roadways have no 3 m right hand side shoulder.</td>
<td>Provide 3 m shoulders on the right hand side of each carriageway.</td>
</tr>
<tr>
<td>Middleborough Rd to Surrey Rd</td>
<td>5-lanes inbound no hand side 3m shoulder. 6-lanes outbound no right hand side 3m shoulder</td>
<td>Provide 3 m shoulders on the right hand side of all carriageways.</td>
</tr>
<tr>
<td>Surrey Rd to Springvale Rd</td>
<td>4-lanes inbound no right hand side 3m shoulder. 5-lanes outbound no right hand side 3m shoulder. It is noted that provision of full shoulders under Surrey Road bridge will be impractical without replacing the bridge.</td>
<td>Provide 3 m shoulders on the right hand side of all carriageways, except under the Surrey Road bridge.</td>
</tr>
<tr>
<td>Inbound carriageway separation E of Elgar Rd occurs on 900 m radius curve</td>
<td>This is unsafe. The ‘gore’ of the split should be relocated to the tangent section about opposite the nose of the Elgar Rd entry ramp.</td>
<td>Relocate split</td>
</tr>
<tr>
<td>Middleborough Rd - Surrey Rd interconnecting ramps</td>
<td>The interconnections appear to have only minimal shoulders over about 350 m</td>
<td>Widen to a minimum of 5.5 m between barriers.</td>
</tr>
</tbody>
</table>
m (outbound) and 250 m (inbound).

<table>
<thead>
<tr>
<th>Location</th>
<th>Safety Issue</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>BlackBurn Road underpass</td>
<td>Minimal shoulders are provided under this bridge. It is accepted that it is impractical to lengthen the bridge span without demolishing the bridge.</td>
<td>Accept this aspect of the design</td>
</tr>
<tr>
<td>At Middleborough Rd there are successive inbound exits about 300 m apart.</td>
<td>This is too close for an urban freeway and against driver expectations when away from a system interchange.</td>
<td>Separate the exits by at least 600 m</td>
</tr>
</tbody>
</table>

Table 5: Road safety audit issues and recommended treatments (Eastern Freeway)

Figure 18 shows the required sight distance to the exit area (red dashed line).

![Figure 18: Required line-of sight at the off-ramp to Bulleen Road](image)

8.3 Safety Issues – M80 to Watsonia

Many of the identified safety and operational issues in this sector also relate to lack of suitable safety shoulders, lack of required sight distance to exits, but also to weaving lengths.

<table>
<thead>
<tr>
<th>Location</th>
<th>Safety Issue</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>M80 eastbound exit to Greensborough Bypass and Greensborough Highway (Ch: 38,400)</td>
<td>This is the exit of a major system ramp and needs to comply with the best standards. The mainline enters a sharp curve (600 R) about half way along the exit. There is only about 200 m vertical sight distance to the exit pavement at the nose due to the vertical curve.</td>
<td>Move exit back to prior to the sharp curve. Regrade the mainline to achieve the required sight distance vertically.</td>
</tr>
<tr>
<td>NEL northbound exit to Plenty Road (Ch: 39,050)</td>
<td>This split takes place partially on a curve as about 600 m radius, commencing mid-exit, which causes the horizontal sight distance to be restricted to well below that required. The exit gore is at the start of the bridge over the Greensborough Bypass ramp. A bridge barrier extending to the gore cannot be treated safely.</td>
<td>The exit needs to be shifted about 80 m southwards to occur on the preceding straight.</td>
</tr>
<tr>
<td>Location Description</td>
<td>Description</td>
<td>Recommendation</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>NEL northbound exit to Greensborough Bypass (Ch: 39,350)</td>
<td>This is a system ramp and needs to be located further from the Plenty Road ramp exit to the north. The spacing should be at least 400 m to allow for adequately safe signage.</td>
<td>In combination with the previous recommendation, this pushes the exit back into an area that would be likely to require acquisition on the western side.</td>
</tr>
<tr>
<td>Greensborough Bypass westbound split (just west of Plenty River)</td>
<td>This split takes place partially on a curve as about 480 m radius, commencing mid-exit, which causes the horizontal sight distance to be restricted to below that required. It is also on a sharp vertical curve (K (^1) = 60) which provides only 120 m pavement sight distance (300 m required), and which compounds the sight distance problem.</td>
<td>Substantially increase the curve radius (from 480 m), and regrade to provide vertical sight distance.</td>
</tr>
<tr>
<td>Greensborough Bypass southbound split to NEL and Grimshaw Street/ Greensborough Highway</td>
<td>This split diverge commences at the start of a 280 m radius horizontal curve left, and on the same sharp vertical curve. The sight distance to the exit pavement beside the nose is extremely sub-standard. The required minimum sight line distance is shown in Figure 19.</td>
<td>Increase the radius of the horizontal alignment of the ramp to NEL, and provide adequate vertical and horizontal sight distance to the exit pavement.</td>
</tr>
<tr>
<td>NEL northbound exit to Greensborough Bypass</td>
<td>This exit is only about 300 m south of the Greensborough Bypass – which is too close. If the Greensborough Bypass is relocated to the south (as per the previous issue’s recommendation), then this exit will need to be relocated about 200 m further south.</td>
<td>Relocate the exit about 200 m further south, and expand the resulting right-of-way into the housing on the eastern side of Sellars Street.</td>
</tr>
<tr>
<td>C-D weave northbound (Ch: 39,500)</td>
<td>In the PM peak, about 1000 vph from Greensborough Highway weaves across about 950 vph from the Grimshaw Street on-ramp. This has to occur over only about 220 m, which is highly unlikely to occur without severe flow breakdown.</td>
<td>Extend the weave length, or consider an alternative design.</td>
</tr>
<tr>
<td>C-D weave southbound (Ch: 39,500)</td>
<td>In the AM peak, about 850 vph from M80 weaves across about 750 vph from the Greensborough Bypass heading for Grimshaw Street. This has to occur over only about 150 m, which is highly unlikely to occur without severe flow breakdown.</td>
<td>Extend the weave length, or consider an alternative design.</td>
</tr>
<tr>
<td>Greensborough Highway northbound and southbound connectors south of Kempston Street</td>
<td>Both connectors appear to be too narrow (less than 5.5 m).</td>
<td>Needs checking and widen if needed.</td>
</tr>
<tr>
<td>NEL northbound exit at rail overpass</td>
<td>There is insufficient sight distance to the exit nose are due to the sharp (K = 28)</td>
<td>Relocate the exit about 100 m to the north.</td>
</tr>
</tbody>
</table>

\(^1\) ‘K value’ is the distance over which a grade change of 1% occurs. It is routinely used in assessing vertical alignments
vertical alignment that precedes the exit. This is unsafe.

| Greensborough Highway/Watsonia Road complex intersection | The intersection layout (Figure 20) defies most principles of safe intersection design. A separated right turn lane is not provided on the southern approach. Local access to/from the local streets to the west require complex movements. | Re-design this intersection (and nearby streets) to provide a more rational intersection. |
| M80-NEL mainline (Plenty Road to Grimshaw Street) | The is a narrow shoulder on the median side of both mainline carriageways – except for a widened shoulder to provide forward sight distance around the inside of the sharp bend between M80 and NEL | Provide 3 m median side safety shoulders along this section o the mainline |

Table 6: Road safety audit issues and recommended treatments (Watsonia to Plenty Road)

**Figure 19** shows the 250 m and 300 m sight lines at the ramp split to Grimshaw Street.

![Figure 19: Sight distance issue at the off-ramp to Grimshaw Street](image)

**Figure 20** shows the overly complex intersection at Watsonia Road. A major safety issue is the lack of a northbound right turn lane on Greensborough Highway.

![Figure 20: Overly complex intersection at Watsonia Road](image)
8.4 Responses to road safety audits

Typically, the response from both designer and the road controlling authority is to accept the auditor’s recommendations unless it can be demonstrated that the audit comments are not relevant (or incorrect), or that any changes are impractical due to ‘costs’ – which may be non-monetary ones.

The road safety audit demonstrates that there are major safety deficiencies in the design – both along the Eastern Freeway and north of Watsonia. To address the deficiencies may require substantial changes to the designs.

The current designs are unacceptable in terms of road safety.
9. ALTERNATIVE DESIGNS

9.1 Background

In September 2017 O’Brien Traffic was engaged by the City of Boroondara to develop an alternative design for the NEL/Eastern Freeway interchange. The aim of the design was to try to keep both the Freeway Golf facility and the Boroondara Tennis Centre intact.

Following formal engagement by Maddocks to act on behalf of the three Councils, O’Brien Traffic was further instructed to prepare alternative designs for the Eastern Freeway and for NEL from south of Watsonia northwards to M80 at Plenty Road.

9.2 Design approach

The O’Brien Traffic approach to the development of an Alternative Design for the NEL is based on:

- Despite the issues regarding designing to LOS D, ensuring that the capacities of the Reference Design are maintained in the Alternative Design;
- Addressing the safety issues identified in the NEL Reference Design;
- Providing a simplified and more effective design for the proposed busway;
- Recognising the legitimate need to minimise the adverse environmental impacts of the Reference Design;
- Addressing the unjustified complexity of the designs on the Eastern Freeway and of the M80 interchange;
- Providing simplified, but more effective and safer, alternatives to many of the components of the Reference Design;
- Complying with widely accepted design standards – such as provision of safety shoulders.

9.3 Dealing with ‘weaves’

A traffic ‘weave’ is created where the route for one traffic movement must cross over the route for another traffic movement without grade-separating the two movements. ‘Old school’ analysis of weaving areas is provided in the USA’s Highway Capacity Manual (HCM). Where the length available for a weave is greater than 750 m, HCM requires that it not analysed as a weave, but as separate merges and diverges.

9.3.1 Reference Design

The Reference Design deals with weaves mostly by grade-separation – most cases of which are not needed as they could be addressed just by ramp metering the on-ramp. The Reference Design shows ramp meters at most on-ramps – with two possibly critical exceptions, the entry to Eastern Freeway from the outer lanes just east of
Bulleen Road, and the on-ramp (carrying about 2,000 vph in the PM peak) from Grimshaw Street into the weaving area to the north.

The ramp meters appear to be used solely to prevent flow breakdown in merge areas. Little understanding of ramp metering is displayed in either the text or the designs.

### 9.3.2 The Auckland experience using ramp metering

The biggest challenge I faced in developing and designing the Auckland ramp signalling system in 2005-7 was dealing with the weave between the Gillies Avenue on-ramp and the Khyber Pass Road off-ramp, and the matching weave in the opposite direction. The Gillies Avenue ramps carried about 1900 - 2000 vph and the Khyber Pass Road ramps about 1200 - 1300 vph. Both directions suffered flow breakdown for up to 10 hours per weekday. We produced a performance report on the safety and operation of the system - SCATS Ramp Signalling, Safety & Operational Outcomes, Auckland NZ (2013). The Gillies Avenue ramp was discussed:

“The ramp signals on the Gillies Avenue on-ramp handled peak flow rates of up to 1950 vph with 2-lane storage at the signals merging to a single lane entry to an “added lane” on the mainline”.

“In the PM peak, substantial improvements can be seen in Figure 13. This has occurred despite generally worse conditions downstream. In the before period, this location was a critical bottleneck with flow breakdown occurring due to the extremely high weaving flows – about 1900 vph entering, and 1300 vph exiting downstream – with a weaving distance of about 380 m. This weaving flow breakdown occurred often from mid-morning, so the benefits shown here are a significant underestimate. The flow breakdown that did occur in the PM peak was almost always associated with a standing queue extending back to Gillies Avenue from the system ramp to SH16W, followed later in the peak by a queue from Wellington Street on-ramp to the north”.

**Figure 21** shows the ramp with vehicles being metered onto the motorway at a rate of around 1,800 vph. Note that the gaps between the vehicles indicated by the red arrows are sufficient for a vehicle in the adjacent lane to accept.

The reason that the ramp metering ‘works’ with such high flows is that the entering vehicles are spaced sufficiently to allow weaving vehicles to accept the small physical gaps that are created. With heavy traffic on un-metered on-ramps long ‘platoons’ of vehicles with minimal gaps between each vehicle enter, then there is often a long time-gap before the next platoon arrives.

The other treatment used in high-flow weaves is to use an auxiliary lane to lower the traffic densities in the two left lanes.

The Auckland experience is that huge weaving flows can be managed with ramp metering.
9.3.3 **Alternative Design treatment of weaves**

The Alternative Design addresses weaving by the use of the on-ramp ramp meters. Based on my extensive experience in modelling, designing, and then setting up the operation of complex ramp metering systems, I am confident ramp metering can resolve any merging/weaving conditions that occur in the Alternative Design.

9.4 **Alternative Design and Reference Design Schematics**

Schematic diagrams showing the diagrammatic layouts of the Eastern Freeway and NEL north of Grimshaw Street are provided in the following Figures. They indicate the numbers of lanes and how ramps pass under or over other roadways.
Figure 22: Comparison schematics – Eastern Freeway, Chandler Highway to Doncaster Road

Figure 23: Comparison schematics – Eastern Freeway, to Doncaster Road to Springvale Road
9.5 Geometric design of the Alternative Design - Busway

The wide median on the Eastern Freeway was created originally for the Doncaster Railway, which was to run in the median between Collingwood and Bulleen Road before taking a route away from the freeway alignment.

The Alternative Design has the busway in the median from just west of Bulleen Road to Hoddle Street with a westerly connection from Chandler Highway. From just west of Bulleen Road it passes under the outbound carriageway, then through an existing span of the Bulleen Road bridge, into a proposed station opposite the Tennis Centre. Buses can access and egress the busway to Bulleen Road and Thompsons Road providing full route flexibility. The station can be accessed by pedestrians through a wide underpass under a slightly relocated Thompsons Road joining the station to a major car park replacing, or under, the tennis courts. The busway continues to Doncaster Road, passing under the Thompsons Road on-ramp and over the NEL trenches, then continuing along the NEL Reference Design route beyond those crossings.

At the two river crossings, the busway splits to use the right hand side safety shoulders. The inbound busway has an exit to Hoddle Street. A major benefit of this alternative is the ability to continue the busway along Alexandra Parade. Access from Hoddle Street for outbound buses would occur, in the short term, via a connection between Hoddle Street bridge and the rail bridge. If the busway were to continue westerly, then the ultimate design shown on the plans would provide for this connection while providing better and safer alignments for general traffic.
9.6 Geometric design of the Alternative Design – Eastern Freeway/NEL

The layout of the interchange was first conceived as part of advice to BoCC in the very early stages of the NEL development. O'Brien Traffic was asked to produce a minimum footprint interchange that saved the Tennis Centre and as much of the golf course as possible. In early 2019, we were asked for further advice after being provided with the North East Link – Bulleen Park land use plan Concept Design 1 plan which showed what appears to be the Reference Design. This was the first time that I was aware that a separate busway was being proposed.

O'Brien Traffic was then provided with the Reference Design and other materials. The horizontal plan sets are at a scale of about 1:3200 – and no manufacturer makes scales (rulers) with that scale on them. Requests for plans that could be placed in CAD programs were refused, as were requests for longitudinal vertical alignments for ramps and interchanges. To create the ‘foot print’ of the Reference Design onto an aerial photo base in CAD was a time-consuming task of manually measuring hundreds of points and plotting them onto the aerial base. This provided a starting point for the Alternative Design.

It was clear from a preliminary examination of traffic data that separate carriageways were not needed for outbound traffic as the extent of merges, diverges, or weaves did not justify them. It was also clear that a more efficient design could be created if the NEL inbound connection was the right hand carriageway rather than the left hand one. Late in the process I decided that the NEL tunnels would be better located on the eastern edge of Bulleen Road to minimise construction-related impacts.

The interchange design area features:

- The NEL to east connections in trenches staying north of Koonung Creek and passing under a slightly raised Thompsons Road;
- The east to north NEL connection passing under the outbound Eastern Freeway carriageway;
- The Thompsons Road on-ramp joining the Eastern Freeway mainline prior to the NEL carriageway joining;
- The NEL ramp towards the City as an elevated roadway from where it passes over the NEL north to east trench until it passes under the existing Bulleen Road bridge;
- The City to NEL ramp exiting about 370 m prior to the existing Bulleen Road outbound off-ramp, then following the western edge of Bulleen Road until dropping into a tunnel under Bulleen Road and merging with the east to north NEL ramp;
- A minor shift to the north in Thompsons Road to enable the busway and stations to be located between it and the Eastern Freeway mainline;
- Connection roadways to/from NEL have similar curve radii to the Reference Design – except that the NEL to City ramp has a much tighter one – about the same as the Bolte Bridge to West Gate Freeway ramp towards the City;
- The Eastern Freeway maintains a 3 m wide left side safety shoulder on each carriageway, has a 3 m right side shoulder from where the NEL outbound
roadway joins, and, inbound, has a 3 m right side shoulder except for about 400 m adjacent to where the NEL link drops down to pass under the outbound Eastern Freeway carriageway;

- The NEL connections to/from the east have similar shoulder widths as has the Reference Design;
- The NEL connections to/from the west have 1m or 2m shoulder widths.

It is considered that the ventilation building should be located immediately south of the access to the Reception Centre, with a ventilation stack located well west of Bulleen Road. The Alternative Design offers considerable benefits in terms of environmental impact and impacts during construction while still providing the capacities in the Reference Design.

9.7 Geometric design of the Alternative Design – Eastern Freeway to City

From Bulleen Road to Chandler Highway the freeway footprint would be widened, if needed, typically from the southern barriers. Scaling from NearMap aerials suggests that at most tested locations the desired cross-section of 3 m safety shoulders, 3.5 m traffic lanes and an 11 m busway would fit within existing outer barriers.

The central busway should result in considerable cost savings as all works would be carried out within the median-side edge lines of the mainline carriageways.

The Alternative Design for this section features:

- Providing the fifth lane in each direction by widening into the median;
- The centrally located busway;
- Moving the Burke Road ramp meter about 100 m further down the ramp to create more storage;
- Widening the northern approach into the Chandler Highway interchange into the median to allow provision of an exclusive left turn lane for the outbound on-ramp - to address the existing traffic problems created by the Chandler Highway bridge project;
- Relocating the entry to the outbound on-ramp about 15 m to the west, and lengthening the ramp storage by about 50 m;
- Joining the bus ramp onto the Chandler Highway bridges just east of the outbound on-ramp.

The Alternative Design offers considerable benefits in terms of function, congestion management, constructability, and most likely in reduced cost compared to the Reference Design.

9.8 Geometric design of the Alternative Design – Eastern Freeway, Bulleen Road to Blackburn Road

Following some traffic analysis that convinced me that the complex treatments between Middleborough Road and Tram Road were unnecessary, I set about
developing a concept design that would supply the same capacity as the Reference Design – but with far less impact.

A major issue to resolve was whether or not to have the split carriageways that are a feature of the Reference Design. In my opinion, there is no rationale for doing so for the outbound Eastern Freeway. An option for minimising unnecessary lane changing is that employed on the Monash Freeway (M1) between Toorak Road and High Street. A similar technique was used in Auckland during the reconstruction of the Newmarket Viaduct which a ‘before and after’ study showed a reduction in lane changing of around 70%. For inbound traffic there may be a good reason to separate the traffic – potential queuing back from Hoddle Street. If this is so, then the Reference Design protects the wrong movement – it should protect access to the NEL. The issue with the Reference Design is the connection from the outer lanes back to the Eastern Freeway mainline just east of Bulleen Road. If the Eastern Freeway queues back, then that queue could continue along that connection and congest the NEL connection.

The Alternative Design therefore has the NEL east to north connection to the right of the Eastern Freeway westbound through lanes. Access to the NEL connection is from a second on-ramp from Doncaster Road directly onto that connector, and via a crossover ramp from the right lane of the Eastern Freeway carriageway to become an ‘added lane’ on the Connector. This design considerably reduces lane changing/weaving on each roadway.

The busway east of Bulleen Road is in the same location as it is on the Reference Design, and it was used as the control for the freeway alignment.

Although unlikely to be needed, the Alternative Design shows auxiliary lanes between on-ramps and downstream off-ramps between Doncaster Road and Blackburn Road outbound. Inbound auxiliary lanes are provided between Middleborough Road and Doncaster Road, but they are also not likely to be needed. The need for the auxiliary lanes should be tested in micro-simulation that incorporates actuated ramp metering (not fixed time ramp metering).

The Alternative Design for this section features:

- The busway as per the Reference Design;
- Six lanes eastbound until a lane drop at the exit to Doncaster Road, followed by an auxiliary lane (6th lane) between Doncaster Road on-ramp and Elgar Road off-ramp, 5 lanes under Elgar Road, then an auxiliary lane from Tram Road to the Middleborough Road exit, 5 lanes under Middleborough Road, then an auxiliary lane between the Middleborough Road on-ramp and the Blackburn Road exit after which 5 lanes continue to Springvale Road as per the Reference Design;
- Westbound from Springvale Road to the Middleborough Road exit as per the Reference Design, then the Middleborough Road on-ramp entering as an ‘added lane’ (6th lane), the line marking for the split commencing just west of Tram Road continuing to Elgar Road, where the lanes separate into 2 lanes to NEL on the right, and 4 lanes continuing to Bulleen Road, with an auxiliary lane between the Elgar Road on-ramp and the Doncaster Road off-ramp;
• Safety shoulders of 3 m are provided along the Eastern Freeway mainline – except for outbound between the Doncaster Road on-ramp and Elgar Road, and inbound except between Elgar Road on ramp and Doncaster Road off-ramp. These narrower shoulders were as a result of a drafting oversight, and providing them would widen the footprint on the southern side by up to 3 m.

• Shoulders on the NEL link roadway are 3 m in total until the Doncaster Road on-ramp, where the left side shoulder widens to 3 m as the taper from the ramp forces vehicles into the left lane. This continues until the cross-over connection (which becomes the third NEL lane). To the west from the cross-over, there is a total shoulder width of 3 m – as per the Reference Design.

The auxiliary lanes in each direction between Doncaster Road and Blackburn Road are to cater for a ‘worst case’ scenario in terms of potential footprint. They are unlikely to be needed, but should be tested in future micro-simulation modelling.

9.9 Geometric design of the Alternative Design – NEL, Watsonia to Plenty Road

Traffic analysis of available data indicated that the complex interchange between M80 Greensborough Bypass and NEL was not necessary. Also, BCC had tried to engage NELP to consider alternative treatments of the NEL between Grimshaw Street and south of Watsonia, to little avail other than NELP produced a plan with a different intersection treatment at Watsonia Road. O’Brien Traffic was involved with BCC at an early stage and developed several different design options for Council. One of these was an option that did not split Greensborough Highway north of Watsonia to Grimshaw Street, but shifted it to the eastern side of NEL from south of Watsonia to Nell Street.

The plans that we developed for that section would supply the same capacity as the Reference Design – but with far less impact on local access.

In mid-June 2019, I was asked to carry out two further tasks – assess whether or not an extended tunnel option, prepared by BabEng could be interfaced with the Grimshaw Street interchange and could a Lower Plenty Road interchange be accommodated, and to provide an Alternative Design for the project north of Grimshaw Street.

9.9.1 Long tunnel option

The BabEng option for a long tunnel (extending the proposed tunnel from Lower Plenty Road to just south of Grimshaw Street), appears to be compatible with the Reference Design just south of Grimshaw Street – so long as the bored southbound tunnel can be ‘flared’ sufficiently, using other techniques, to accommodate an on-ramp merge.

I am assuming that a Lower Plenty Road interchange can be retained, but there is insufficient information about the Reference Design proposal to enable any rational discussion of the current design.
9.9.2 Simplified M80/Greensborough Bypass/NEL interchange

The simplified interchange is based on the following assumptions:

- If the Plenty Road eastbound on-ramp can join as two ‘added lanes’, with a 1,000 m spacing to the 2-lane exit (and lane drop) to Greensborough Highway/Grimshaw Street, then the Greensborough Bypass 2-lane metered on-ramp joining M80 1,200 m prior to the Plenty Road off-ramp will also operate satisfactorily;

- The Greensborough Highway connections that pass under Grimshaw Street can be joined to as ‘added lane(s) to NEL between Grimshaw Street and the ramps to/from Greensborough Bypass – northbound the entry to the 520 m long weaving area will be ramp-metered, and southbound, 2 lanes are proposed to be added (unmetered) to ensure low traffic densities in the 670 m long weaving area;

Importantly, the Alternative Design for this interchange and its approaches resolves each of the identified road safety audit issues – with a substantial reduction in costs. There is a reduction in the footprint of the Alternative Design compared to the Reference Design, as well as substantially reduced paved areas.

9.9.3 Grimshaw Street interchange

The plans currently show a clear area at Grimshaw Street. The design either side of Grimshaw Street has been done with a view to tying into the Reference Design interchange, and supplying the same functionality.

A quick assessment at the time of finalising this report indicates that a ‘diverging diamond’ interchange is likely to be feasible – offering substantial cost savings and reduced footprint.

9.9.4 Greensborough Highway – Grimshaw Street to Somers Avenue

The plans show Greensborough Highway just south of Grimshaw Street generally as per the Reference Design. From Grimshaw Street to Nell Street, Greensborough Highway is shifted to the eastern side of the NEL as per Council’s previous proposal provided to NELA. It allows a southbound connection of Greensborough Road to the new alignment of Greensborough Highway just north of Nell Street. Nell Street is proposed to be signalised offering improved access to Greensborough Secondary College and sports fields.

Further south access is provided at Temby Street and Elder Street. A new road link is proposed in the transmission lines reserve from Frensham Road (to the east), crossing Greensborough Highway at a signalised intersection, then to Watsonia Road, with a bus interchange over Watsonia Station. There would be a new shared path on the northern side of the route.

A new link from Greensborough Highway to Watsonia Road is proposed to replace the very complex intersection in the Reference Design. The link joins at the Richards Avenue intersection as a roundabout. This arrangement provides a ‘book end’ to the commercial centre, allows commercial development of the eastern side north of the
connection in front of the proposed multi-deck car park, and would allow a strip for a residential buffer development south of Richards Avenue – backing onto the ‘trench’.

A cycleway is proposed between the NEL and Greensborough Highway extending from a connection at Grimshaw Street and passing under the crossing over the trench by Greensborough Highway south of Watsonia. This provides a highly protected facility for cyclists.

The plans show the minimal road infrastructure to which land bridges can be added.

### 9.10 Land Requirement Reductions with Alternative Eastern Freeway Designs

Table 7 sets out the OBT estimates for the savings of open space along the Eastern Freeway corridor with the Alternative Design compared to the Reference Design. It is likely to be in excess of 13 ha.

<table>
<thead>
<tr>
<th>Location</th>
<th>Area saved</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Golf course</td>
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<td></td>
</tr>
<tr>
<td>Bulleen Park</td>
<td>(1 Ha)</td>
<td>Oval remains viable</td>
</tr>
<tr>
<td>Tennis Centre</td>
<td>retainable</td>
<td>Car park under</td>
</tr>
<tr>
<td>Koonung Creek Reserve (Bulleen Rd to Doncaster Rd)</td>
<td>3.6 Ha</td>
<td></td>
</tr>
<tr>
<td>Doncaster Rd to Elgar Rd (south side)</td>
<td>1.4 Ha</td>
<td></td>
</tr>
<tr>
<td>Elgar Rd to Tram Rd (south side)</td>
<td>0.6 Ha</td>
<td></td>
</tr>
<tr>
<td>Tram Rd to Wetherby Rd (north side)</td>
<td>3.5 Ha</td>
<td></td>
</tr>
<tr>
<td>Tram Rd to Wetherby Rd (south side)</td>
<td>1.3 Ha</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>12.7+ Ha</td>
<td></td>
</tr>
</tbody>
</table>

**Table 7: Land requirement reductions – Eastern Freeway**

### 9.11 Construction cost savings

O’Brien Traffic has undertaken some indicative relative cost savings between the Reference Design and the Alternative Design based solely on bridge area and pavement area estimates. They The bridges that were costed are those coloured pale blue on each of the Reference Design and the Alternative Design. The cost estimates are:

- Eastern Freeway bridges - $240 m;
- Eastern Freeway pavements - $ n.a.;
- M80 to south of Grimshaw Street bridges - $83 m
- M80 to south of Grimshaw Street pavements - $ n.a. yet
10. CONCLUSIONS & RECOMMENDATIONS

10.1 Conclusions

Based on my experience, the materials provided, site inspections, and a review and assessment of the available documentation, I reach the following conclusions in relation to the transport geometric design implications of the proposed project:

With respect to the adequacy of the TIA:

- The extents of the area subjected to the TIA did not include critical adjacent intersections such as those on Springfield Road, Blackburn, or interchanges at the ends of the Project within the micro-simulation extents, which, if included, would have demonstrated severe congestion;
- The micro-simulation is inadequate for testing impacts of the Project due to its limited extents;
- The TIA does not allow for a proper impact analysis to be undertaken as it does not provide turning movement estimates at interchanges and local intersections, and the intersections therefore cannot be analysed;
- In summary, in my opinion the TIA does not provide a realistic assessment of the likely traffic-related impacts of the Project.

With respect to the scope of the Project, its basis, and its alternatives:

- I do not accept that this facility, or any similar facility, can be designed to meet LOS D during peak periods in a city the size of Melbourne;
- I do not accept that the Eastern Freeway section from Bulleen Road to Springvale Road needs to use the wasteful ‘collector-distributor’ design;
- Similarly, at the northern end, the Reference Design appears to be far more complicated than necessary, and involves significantly higher costs and physical impacts than a simpler, yet just as functional, design as provided in the Alternative Design;
- The Reference Design does not respect the need to be able to retain many community facilities and as much open space as is readily possible;
- There does not appear to be a logical reason to locate the proposed busway to the north of the Eastern Freeway, when it would be far simpler to locate it in the existing median;
- There are numerous road safety issues with the Reference Design;
- The Alternative Design addresses the safety issues, retains the proposed capacity of the Reference Design, and has far lower costs and physical impacts;
- It would appear that the ‘long tunnel’ option (extending the tunnels to just south of Grimshaw Street) is technically viable.
10.2 Recommendations

Based on my conclusions I would recommend that the IAC:

- Require the TIA to be extended in its physical areas of interest to include all critical intersections impacted by the NELP
- Require the micro-simulation to include the ‘end conditions’ where it connects to Hoddle Street, M80 west of Plenty Road, the Greensborough Bypass roundabout at Civic Drive, the Melba tunnels, and the adjacent critical intersections discussed above;
- Require the TIA to be updated to provide turning movement estimates at interchanges and local intersections and undertake a proper analysis of local impacts - a fundamental consideration to be addressed in the TIA.
- Reject the simplistic basis for the “collector distributor design” of the Eastern Freeway from Bulleen Road to Blackburn Road;
- Reject the notion that this facility can be designed to meet LOS D during peak periods;
- Adopt the Alternative Design for road safety, traffic impact, environmental impact, and cost reasons – for the areas where the Alternative Design is relevant;
- Subject to some further work, consider the ‘long tunnel’ option as a preferred part of the Alternative Design.

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 Panel.

Andrew O’Brien P.T.O.E.(ret.),
B.E., B.A., C.T.P.&C.
Honorary Member. I.T.E.
F.A.I.T.P.M.
Chairman & Director, O’Brien Traffic, Melbourne
Email Letter

From
Terry Montebello
Direct
03 9253 3606

Date
25 June 2019
Email
terry.montebello@maddocks.com.au

To
Andrew O’Brien
Organisation
O’Brien Traffic
Email
andrew@obrientraffic.com

Our Ref TGM.7849160

North East Link Inquiry and Advisory Committee Hearing

Dear Mr O’Brien

We continue to act for Banyule City Council (Banyule), City of Borondara (Boroondara) and City of Whitehorse (Whitehorse) (collectively, the Councils) in relation to the Joint Inquiry and Advisory Committee (IAC) for the North East Link (Project).

We are instructed to provide expert evidence in the area of traffic operations and design.

The IAC has been appointed:

- to hold an inquiry into the environmental effects of the Project under section 9(1) of the Environmental Effects Act 1979, and
- to review the draft planning scheme amendment prepared to facilitate the Project under section 151 of the Planning and Environment Act 1987.

Further details regarding the role of the IAC is set out in paragraphs 1 and 2 of the Terms of Reference. The biography for each committee member of the IAC is available here.

The IAC will hold a public hearing commencing on 25 July 2019.

Scope of Instructions

You are instructed to:

1. review the Ministerial Guidelines for assessment of environmental effects under the Environmental Effects Act 1979 (2006);

2. review the exhibited North East Link Environment Effects Statement (EES) documents, relevant to your area of expertise;

3. review:

   (a) the Councils submission on the EES, dated 7 June 2019;

   (b) the IAC report on Preliminary Matters and Further Information Request; and

Ref: 19593 EES Response Report_AOB.Docx
(c) any other submissions or documents we subsequently refer to you;

4. prepare an expert witness report that contains your opinion on the following matters, as relevant to your area of expertise:

(a) does the EES adequately document and assess the nature and extent of the environmental effects of the Project? In addressing this question please explain where you are satisfied with the content of the EES and why, and if not, what if any deficiencies exist in the documentation and/or assessment of the nature and extent of environmental impacts contained in the EES,

(b) can the Project as described in the EES achieve a level of environmental performance which is consistent with relevant legislation, documented and endorsed policy or acknowledged best practice?

(c) if the Project, as described in the EES cannot achieve a level of environmental performance which is consistent with relevant legislation, documented and endorsed policy or acknowledged best practice, are there any recommendations that you would make as to specific measures which you consider necessary and/or appropriate to prevent, mitigate and/or offset adverse environmental effects? If so, please explain your reasoning in detail. To the extent that it is within your expertise to comment upon the feasibility of any of your recommendations, please state whether or not any recommendations are feasible, explaining your reasoning.

(d) how does the Project as described in the EES respond to the principles and objectives of “ecologically sustainable development” as defined in the Ministerial Guidelines for assessment of environmental effects under the Environmental Effects Act 1978 (2006);

(e) are there any recommendations that you would make as to specific measures which you consider necessary and/or appropriate to improve the response of the Project to the principles and objectives of “ecologically sustainable development”? If so, please explain your reasoning in detail. To the extent that it is within your expertise to comment upon the feasibility of any of your recommendations, please state whether or not any recommendations are feasible, explaining your reasoning; and

(f) to the extent that the content of the draft planning scheme amendment, works approval application or environmental performance requirements (EPRs) lies within your expertise, do you have any recommendations for changes that should be made to the draft planning scheme amendment, works approval or planning approval and/or EPRs in order to improve the environmental outcome of the Project.

5. in due course, review and comment on other parties’ expert evidence in relation to your area of expertise.

6. participate in any expert conclave requested by the IAC;

7. present your evidence at the IAC Hearing. You should anticipate preparing a short (no more than 30 minutes) presentation to facilitate the delivery of your evidence. The presentation is to be drawn from your expert witness report and may respond to other expert reports (as relevant).

Please ensure you are familiar with the requirements of the Planning Panels Guide to expert evidence (DOCX 618 KB, April 2019) and ensure that your evidence is prepared in accordance with the requirements set out in the Guide.

1 At page 5.
Relevant documents

The exhibited EES documents can be accessed at:

Please also consider any relevant “information updates” contained on the NELP website:

Please let us know if you require any of these documents in hard copy.

We also consider the background information contained in our letter requesting your fee proposal dated 15 April 2019.

Key Dates

We are currently waiting on written directions from the IAC to confirm the key dates for the hearing. We will provide these to you when they come to hand. In the meantime, please note the following anticipated key dates:

- Your expert witness statement will need to be circulated by 10:00am on Monday 15 July. We kindly ask that you provide us with a copy of the report no later than 5:00pm on Tuesday 9 July.
- A conclave of specified fields of experts is likely to be scheduled to occur on the week of 15 July. We will confirm this as soon as possible.
- Presentation of the proponent’s case is scheduled to commence on Thursday 25 July; and
- Presentation of the Councils’ case is likely to be scheduled to commence in mid-August. We will confirm this as soon as possible.

Key Contacts

Council’s representative for this engagement will be Terry Montebello, Partner, Maddocks Terry.Montebello@maddocks.com.au and Phone: 03 9258 3588.

Terry is being assisted by Sophie Jacobs, Senior Associate, Maddocks Phone: 03 9258 3546 Email: Sophie.Jacobs@maddocks.com.au

Please contact Sophie Jacobs on 03 9258 3546 if you have any queries or wish to discuss any aspect of these instructions with us.

Yours faithfully

Terry Montebello
Partner