NEL Panel Hearing

1971 Public Transport Map
Contents

1. Background
2. Understanding the problem
3. Helping to solve the problem
4. Reducing congestion earlier
5. Reducing construction impacts
6. Ensuring NEL delivers long-term benefits
7. Summary
La Trobe University requested my statement of expert evidence

Instructions

La Trobe University have asked me to consider the following questions:

• What transport problem is North East Link aiming to solve?
• What can be done to mitigate the transport problem in advance of NEL being constructed?
• What needs to be done to maintain efficient movement around La Trobe NEIC during and post construction of NEL?
• What best practice approaches to the analysis and modelling need to be improved to ensure the optimum outcomes for the region are understood and achieved?

Qualifications

• Bach. Urban & Regional Planning
• Master of Transport
• Chair of the Box Hill Transit Interchange Steering Committee
• Member: US Transportation Research Board’s (TRB) Transportation and Land Development Committee
• Secretary: US TRB’s Public Transportation Planning and Development Committee
• 25 years in government and consulting
• 15 years as a transport consultant
• Completed numerous projects in the region including for the Project Proponent
• Lecturer at Monash University in:
  – Traffic Systems
  – Transport Planning
  – Transport & Traffic Engineering
• Lecturer at La Trobe University in:
  – Mobilities & Transport Planning
I have reviewed the Transport & Traffic Impact Assessment (TTIA) and the NEL Project plans.
The IAC is tasked with assessing NEL’s environmental outcomes with regard to best practice, and ecological sustainability

To achieve Paragraph 31(b) of the Terms of Reference, the IAC needs to understand the:

– best practice approaches to transport project development; and
– environmental outcomes that arise from various project decisions.

Paragraph 31(d) requests recommendations and specific measures that would be appropriate to prevent, mitigate or offset adverse environmental effects having regard to legislation, policy, best practice, and the principles and objectives of ecologically sustainable development.
Put simply I’ve been asked

What are the best Value for Money ways to alleviate congestion from the corridor?
NEL includes a significant new busway to replace the existing bus lanes.

Figure 9-36  Doncaster Busway layout
...and a range of walking and bicycle riding path improvements
The IAC should recommend five core improvements to the NEL Project

1. NELA should establish new bus routes from February 2020
   a) Regional Routes
      Box Hill – LTU Express
      Swinburne University – LTU Express
   a) Local Routes
      The Pines – LTU via Templestowe
      Greensborough – LTU via Yallambie & Viewbank
      Hurstbridge – LTU via St Helena

2. NELA should duplicate Kingsbury Drive to provide a relief route during Project construction
The IAC should recommend five core improvements to the NEL Project

3. The Project design should ensure buses can travel directly between the Busway and:
   a) Eastern Freeway south of Doncaster Road; and
   b) North East Link tunnels

4. NELA should provide Road Replacement Bus Services to mitigate the construction impacts on traffic congestion

5. NELA should construct shared trails between the corridor and LTU in advance of large scale construction activities to mitigate the impact of these activities on traffic congestion
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Congestion is a symptom which is a function of network capacity and demand.
Demand is influenced greatly by the choices and options available.
Transit network design & transit service levels are generating traffic congestion in Heidelberg

Transit =
Public Transport
(just for brevity)
Confusion regarding Route 513 branches directly impacts on patronage – and traffic congestion.
DOT’s Banyule-Nillumbik Bus Service Review discussed the poor network design in 2008

Quotes:

The best option for Route 513 is to split the route into three discrete routes (including):...

- Route C: Eltham – Northland via Greensborough and La Trobe University

There are many other network issues that affect mode share in the north east.
Balanced mode share is required to achieve transport network and project efficiency

Mode Share

= The percentage of travellers using specific mode (walk, car, bus etc)

Mode Share is influenced by comfort, convenience and cost of other modes.

Car Mode Share relates to bus network & service levels
The TTIA finds that mode share is reliant on public transport journey times.
The general preference for car over public transport reflects its superior travel times for most destinations.

(TTIA, p89)
...for trips originating from Box Hill. Private vehicle travel is typically 30 to 40 minutes faster than public transport for most destinations apart from the CBD (TTIA, p89)
The TTIA finds that public transport journey times from La Trobe are worse than Box Hill.

Figure 6-20 – Comparison of AM peak car and public transport travel times from La Trobe, 2016 model

Source: TTIA, Page 89
The TTIA finds that mode share is reliant on public transport journey times.
...from La Trobe... Private vehicle travel is significantly faster than public transport for most destinations across Melbourne, often by over an hour.

(TTIA, p89)
As a result, the TTIA finds mode share for public transport is lower in the north east region...
...5.2% lower than the metropolitan average
The TTIA then takes a leap...

*It is therefore anticipated that private vehicles would continue to be dominant mode of travel in the north-east.*

(TTIA, p89)
...while the State is planning a significant public transport investment.

Understanding how SRL will change travel patterns is important.

Source: DOT, 2019
The TTIA identifies trips across the Yarra River on Manningham Road

Figure 6-42 – Origins and destinations of southbound traffic using Manningham Road bridge in the AM peak
...and on Chandler Highway

Figure 6-40 – Origin and destinations of southbound traffic using Chandler Highway in the AM peak

Legend
- Origins
- Destinations
- Select Link Location

Kew Schools
Swinburne University
Route 609 is the only route that crosses from Kew over the Chandler Hwy bridge
The current public transport network is not designed to meet these needs.
The TTIA implies that this problem is intractable...

growth in public transport usage is also lower in the north-east (85 per cent) when compared with metropolitan Melbourne (112 per cent).

(TIA, p191)
...while clearly identifying the solution

This is primarily due to a lower accessibility to public transport services in the north-east...

(TIA, p191)
As a result, traffic congestion is exacerbated.
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Frequency and directness of routes has a significant impact on mode share.

**Barriers to Public Transport Use**

La Trobe Transport Survey 2010

6 main barriers relate to journey time

The TTIA notes that in some locations traffic volumes are decreasing.

Reduced traffic volumes in the inner city...could be related to increases in operating costs of private vehicles...

...or greater access to public transport

(TTIA, p92)
Perhaps mode shift helps explain it.

The City of Melbourne attracts 900,000 people a day.

Source: City of Melbourne Draft Transport Strategy
In Melbourne greater access to public transport is defined by the PPTN

PPTN = Principal Public Transport Network

(Clause 72.04 of the Victorian Planning Provisions)
The PPTN and bus network serve other areas richly, while there are big gaps in the north & north-east.
Effective networks provide for many different journeys

Transfer Penalty: The pain endured when forced to change seats

Typically = 10 mins
A chronic lack of investment weakens connections between the East and North-East

5km stretch of Yarra River

Eastern Fwy to MacRobertson Bridge (inclusive) has:
- 7 road bridges
- 2 railway bridges catering for 4 train lines
- 4 tram routes
- 12 long distance bus routes

12km stretch of Yarra River

Chandler Hwy to Fitzsimons Ln (inclusive) has:
- 4 road bridges (not including the Eastern Freeway)
- Zero railway bridges
- Zero tram routes
- 4 long distance bus routes
- 2 short distance bus routes

Note: Minor typo
Paragraph 4.27.4 of my evidence should read “4 long distance bus routes”
Only 1 route crosses the Yarra to La Trobe University
Public transport services per capita in Banyule & Nillumbik have reduced

Change in public transport service provision per capita by local government area in Melbourne, 2015 to 2016 (Monash University 2017)
In 1971 there was one bus route on Manningham Road Bridge and none on Bulleen Road Bridge.

Source: Melbourne Metropolitan Tramways Board, 1971
...just as there is in 2019

Source: Department of Transport, 2019
12 buses/hr along Station St and 8/hr along Manningham Rd in 1984

<table>
<thead>
<tr>
<th>Time</th>
<th>Route</th>
<th>Buses/hr</th>
</tr>
</thead>
<tbody>
<tr>
<td>AM</td>
<td>Bulleen-Box Hill</td>
<td>12</td>
</tr>
<tr>
<td>AM</td>
<td>Doncaster-Box Hill</td>
<td>12</td>
</tr>
<tr>
<td>Inter-Peak</td>
<td>Doncaster Junction</td>
<td>4</td>
</tr>
</tbody>
</table>

8 buses in AM Peak Hour (Bulleen-Box Hill)
12 buses in AM Peak Hour (Doncaster-Box Hill)
The 2018 timetable has similar service levels to in 1984.
Routes in the north east tend to be more insular than elsewhere.
By comparison, Monash University is served by a web of routes.
Resulting in much higher car mode share at LTU than Monash University.

<table>
<thead>
<tr>
<th>Mode of Access</th>
<th>La Trobe University</th>
<th>Monash University</th>
</tr>
</thead>
<tbody>
<tr>
<td>Car</td>
<td>67%</td>
<td>35%</td>
</tr>
<tr>
<td>Transit</td>
<td>24%</td>
<td>42%</td>
</tr>
<tr>
<td>Active</td>
<td>9%</td>
<td>23%</td>
</tr>
</tbody>
</table>
Every dot on this map is the residential location of a staff member, researcher or student at La Trobe University.

Darker areas are where multiple dots are overlapping.
La Trobe University alone has 5,000 staff & students living south of the Yarra River.
LTU travel occupies four hour’s worth of lane space on the average day

From south of Yarra River
- Roughly 3,000 travelling to campus from south of the Yarra each day
- = 2,250 people arriving in cars
- Requires 1,875 vehicles to complete the task
- Lane capacity is 900 vehicles/hour
- Throughout the day, LTU students from the south occupy 2 lane hours in each direction

Other critical populations
- People from north of the Yarra & east of Macleod
  - Must cross Greensborough Hwy
  - Competing for signal time
  - Every bus could remove 20-50 cars of congestion
- 8,500 staff at Austin Health
- Total of 56,000 researchers, staff & students in La Trobe NEIC
Most use cars because comparative travel times are so different.

Transfer penalties add 10 minutes to the perceived trip cost for each transfer that is required, therefore:

Total perceived trip cost will be 80-90 minutes.
Cars take around a third of the time for many trips (even those where public transport options are close by).

Travel time variability is a significant issue with car travel in the corridor.

People do not like waking up early on the off-chance there will be congestion.
Even from under 7km away indirect routes lead to effective transit travel speeds of just 11km/h.
While a car can get you there in 10 minutes
This LTU car mode share impacts on the Greensborough Hwy corridor in two ways:

- Traffic in the corridor
- Traffic crossing the corridor
Monash University shows that a different outcome is possible

15 buses/hr All Day
Achieving 42% mode share by public transport

<table>
<thead>
<tr>
<th>Route 601 Route 900</th>
<th>Stud Park SC (Rowville) via Chadstone SC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service operates from 26.08.2018 until further notice</td>
<td></td>
</tr>
</tbody>
</table>

**Wheelchair Accessible Service**

<table>
<thead>
<tr>
<th>Time</th>
<th>Monday to Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td>5:05</td>
<td>5:36</td>
</tr>
<tr>
<td>6:00</td>
<td>6:32</td>
</tr>
<tr>
<td>6:42</td>
<td>6:52</td>
</tr>
<tr>
<td>7:02</td>
<td>7:12</td>
</tr>
<tr>
<td>7:23</td>
<td>7:33</td>
</tr>
<tr>
<td>7:43</td>
<td>7:53</td>
</tr>
<tr>
<td>8:03</td>
<td>8:13</td>
</tr>
<tr>
<td>8:23</td>
<td>8:33</td>
</tr>
<tr>
<td>8:43</td>
<td></td>
</tr>
</tbody>
</table>

15 buses/hr All Day

6 buses/hr in Peak Hour
Through high frequencies

In 2015 service improvements

Cost: $5m

Benefit: average waiting time reduced from 2:40s to 2:20s

Total = 27 buses/hr

15 buses/hr All Day

6 buses/hr in Peak Hour

6 buses/hr in Peak Hour
And direct routes that eliminate transfer penalties

Special Note: Route 703 includes express services that cut travel time by 20%
Such that the Monash University 1 hour catchment extends over much of south east Melbourne
While the 1hr catchment for La Trobe University struggles to reach all of Templestowe
Despite Monash University being 30% further from the CBD, frequent services bring it closer.

Congestion will reduce when the public transport service levels provided to other parts of Melbourne are applied in the north east.
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The North East Link will help to reduce congestion when it is finished in 2027

What can we do before then?
1. Bus route to Box Hill
2. Bus route to Swinburne
3. Local bus routes
4. Improve shared trail connections to LTU

Let's prepare for construction
1. Duplicate Kingsbury Drive
2. Use data to develop Road Replacement Bus Routes
3. Early works on shared trail links
New regional public transport connections

Express bus: Box Hill – LTU

Bus: Swinburne – LTU
New regional public transport connections

Express bus: Box Hill – LTU
- Every 5 min
- Cost: $6m p.a.
- 60 FTE

Heidelberg
Bulleen
Doncaster

Express Bus: Swinburne – LTU
- Every 5 min
- Cost: $8m p.a.
- 80 FTE

Swinburne University
Kew Schools
Fairfield
Swinburne University
Kew
Heidelberg West
Rosanna
Heidelberg
Heide Museum of Modern Art
Doncaster
Kew
Heidelberg
Heidelberg
Heidelberg
Kew East
Balwyn
Balwyn North

Maps showing the routes and connections between Box Hill, LTU, Heidelberg, Bulleen, Doncaster, and Swinburne University with respective details on frequency, cost, and FTE.
Better bus routes can get car mode share to LTU (and the NEIC) closer to 35%

<table>
<thead>
<tr>
<th>Daily LTU based car movements in the NEL corridor</th>
<th>2019</th>
<th>2022 (with bus improvements)</th>
<th>Reduction in LTU traffic (cars/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>To/From south of the Yarra River</td>
<td>~3,700</td>
<td>~2,100</td>
<td>~1,600</td>
</tr>
<tr>
<td>To/From south of the north of Watsonia</td>
<td>~1,800</td>
<td>~800</td>
<td>~1,000</td>
</tr>
<tr>
<td>Across the NEL corridor from Viewbank &amp; Greensborough</td>
<td>~1,200</td>
<td>~600</td>
<td>~600</td>
</tr>
</tbody>
</table>
Better local connections
Bus: Hurstbridge – LTU

Every 40min
Cost: ($0.2m) p.a.
-1 FTE

Join Routes 343 & 513Gr
New local connections

Bus: Greensborough – LTU

Every 24min
Cost: NIL p.a.
+0 FTE
New local connections
Bus: The Pines – LTU

- Every 40min
- Cost: $1.1m p.a.
- 9 FTE
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Expanding transport choices early will reduce frustration during construction.

Provide more travel options & choices for people wanting to avoid construction chaos.
Duplicating Kingsbury Drive will provide a congestion relief valve

Duplicate the Kingsbury Drive carriageway

Use the extra lanes to relieve Greensborough Highway prior to 2027

After 2027, convert the left lanes to bus lanes
Lane closures should be “replaced” with real alternatives – just train replacements

Road Replacement Buses should be ordered

- It is routine for buses to help when other modes are affected
- Car drivers are not less important and should be treated equally
- Road Replacement buses could significantly reduce congestion
- Melbourne is very good at planning them

Most successful if they are:

- Data driven
- Coordinated holistically
- Established & normalised in advance

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**Buses replace trains**

**From 8.20pm Friday 30 August to last train Sunday 1 September**

**Monday 2 September to Wednesday 4 September, 8.20pm to last train each night**

**Buses replace trains between Flagstaff and Upfield**

<table>
<thead>
<tr>
<th>From Flagstaff to Upfield</th>
</tr>
</thead>
<tbody>
<tr>
<td>12:30pm to 1:30pm, 3:30pm, 5:30pm, 7:30pm, 9:30pm, 11:30pm</td>
</tr>
</tbody>
</table>

**Buses replace trains between North Melbourne and Upfield**

<table>
<thead>
<tr>
<th>From North Melbourne to Upfield</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:45am to 11:45am, 11:45am to 11:54pm</td>
</tr>
</tbody>
</table>
The TTIA has considered where people are likely to walk & ride bicycles to work.
Early works on shared trails can help to ease construction congestion and frustration.

Figure 9-116 – North East Link walking and cycling scope with existing PBN and SCCs

- **Key users identified by the Proponent**
  - 3 small additional links can improve the Project

- **2 longer links can improve the Project**
  - Complete north-south cycling corridor along Greensborough Bypass/Road
The North East Link will help to reduce congestion when it is finished in eight years’ time.

We need long lasting benefits:

1. Direct connection to Busway from NEL
2. Direct connection to Busway from Chandler Highway
3. Direct connection from Busway to Eastern Freeway south of Doncaster Road
4. Bus lanes through Heidelberg
The busway needs to connect Eastern Freeway & NEL

Figure 9-36 Doncaster Busway layout
Southbound Eastern Fwy connection is required to maintain Routes 303, 318, 684 & 906

Routes 303, 318, 684 & 906 need to directly access the busway
Travellers passing Heidelberg on Rosanna Road would benefit from NEL-Busway Link

New Route in 2050?

Busway Catchment
Manningham Road has bus lanes that cease where congestion gets really bad.

This bus holds as many people as there are cars in this photo.
Bus lane infrastructure needs to be expanded prior to construction commencing.

- Peak hour bus lane required
- Full time bus lane required
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