



# appendices

# appendix a

## List of submissions and consultations

### Submissions

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In March 2006, interested persons and groups were invited to make a submission to the EWLNA. The following submissions were received and are available at the EWLNA website.

1. Western Transport Alliance 2/01/2007
2. Paul Mees
3. Elwin Davies
4. Ron Brons 10/03/2007
5. Rueben van Bemmelen
6. Ron Brons 16/03/2007
7. Bruce Light
8. Andrew Trotter
9. Eriks Velins
10. Ron Brons 22/03/2007
11. Ron Brons 24/03/2007
12. Paul Anglin
13. Ron Brons 31/03/2007
14. Carlo Carli MP and Christopher Anderson
15. Craig Scott
16. Ron Brons 12/04/2007
17. Simon Conisbee
18. Philip Worssam
19. Stan Chang
20. Kelvin Thomson MP
21. Committee for Melbourne
22. Kaye Oddie
23. Carlton Residents Association
24. Ron Brons 2/05/2007
25. Lindsay Tanner MP
26. Bruce Light 3/05/2007
27. Ramesh Mackenzie
28. People for Ecologically Sustainable Transport
29. Ron Brons 7/05/2007
30. Peter Stafford
31. Diana Neville
32. Ron Brons 9/05/2007
33. Ron Brons 11/05/2007
34. Rod Oaten
35. Maribyrnong Bicycle Users Group
36. Satellic Traffic Management
37. Michael Ryan
38. Jon Stanger
39. Nick Pastalatzis
40. Frank Burden
41. Lynette Cremona
42. City of Greater Geelong
43. Citizens for a Liveable Melbourne
44. Hugh Rundle
45. Victorian Employers' Chamber of Commerce and Industry (VECCI)
46. Malcolm Pryor
47. Ron Brons 28/05/2007
48. Laurie P
49. City of Hobsons Bay
50. ABN AMRO Australia
51. Australian Greens – Victoria
52. TTF Australia (Tourism and Transport Forum)
53. David Lyons
54. City of Darebin
55. Greg Hosking
56. Institute of Logistics & Supply Chain Management
57. Nillumbik Shire Council
58. Paul Prentice
59. City of Melbourne
60. Moreland City Council
61. Janet Taylor
62. Habitat Trust 30/05/2007
63. Mark Schier
64. Habitat Trust 31/05/2007
65. Yarra Climate Action Now!
66. Geoff Peverell
67. Balance Research
68. The 3068 Group

69. Eastern Transport Coalition
  70. Jenny Mikakos MP
  71. Lowen Clarke
  72. Collingwood and Abbotsford Residents Association
  73. Municipal Association of Victoria
  74. Greater Dandenong City Council
  75. Institute of Public Works Engineering Australia, Victoria Division
  76. Engineers Australia, Victoria Division
  77. Ron Brons 5/06/2007
  78. Town and Country Planning Association
  79. Daniel Csikos
  80. Habitat Trust 6/06/2007
  81. Institute for Sensible Transport
  82. Western Transport Alliance 31/05/2007
  83. Macquarie Bank
  84. South Eastern Integrated Transport Group
  85. City of Whittlesea
  86. North and West Melbourne Association Inc
  87. Maribyrnong Truck Action Group
  88. Habitat Trust 13/06/2007
  89. Ross Thomson
  90. Metropolitan Transport Forum
  91. Australian Workers' Union
  92. Maribyrnong City Council
  93. Brimbank City Council
  94. Bicycle Victoria
  95. Moonee Valley City Council
  96. ConnectEast
  97. Metlink
  98. Mary Wooldridge MP
  99. Victorian Freight and Logistics Council
  100. Wyndham City Council
  101. Royal Park Protection Group
  102. Committee for Werribee
  103. Thiess
  104. Leighton Contactors
  105. Nick Wakeling MP
  106. City of Boroondara
  107. Chris Lewis
  108. Jarryd Rasti
  109. Infrastructure Partnerships Australia
  110. Victorian Council of Social Service
  111. Committee for Geelong
  112. Bruce Mildenhall
  113. Bus Association Victoria
  114. Public Transport Users Association
  115. Cardinia Shire
  116. Rod Watson
  117. David Droogleever
  118. Commissioner for Environmental Sustainability
  119. Peter Brohier
  120. RACV
  121. Victorian Transport Association
  122. City of Yarra
  123. Andre Haermeyer MP and George Seitz MP
  124. Eastern Sector Councils
  125. Manningham City Council
  126. Transurban
  127. Adem Somyurek MP
  128. Jackie Fristacky and Brian Buckley
  129. Avalon Airport Australia
  130. John Welsh
- Several late submissions were received. These were not placed on the EWLNA website, but were considered by the Study Team.
131. Yarra Bend Trust
  132. Shaun McGilton
  133. John Wallace
  134. Gippsland Local Government Network
  135. Robert Pelly
  136. Institute of Transportation Engineers, Australia and New Zealand Section Inc
  137. Dr John Love
  138. Mr A Mack

## Consultations

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The Study Team also met and consulted with a range of individuals and organisations. These consultations took a variety of forms, including presentations by and to Sir Rod Eddington and/or the Study Team, small group discussions, community forums, public meetings and visits to groups, companies and sites of interest. Organisations consulted by the Team are listed below.

AbiGroup

ABN Amro

Asciano

AusTrack

Australian Air Express

Australian Constructors Association

Australian Industry Group

Babcock and Brown

Boulderstone Hornibrook

Bicycle Victoria

Bouygues

C40 Cities Climate Leadership Group (Clinton Climate Initiative)

ConnectEast

Commissioner for Environmental Sustainability

Committee for Werribee

Committee for Geelong

Committee for Melbourne

CRT Group

Department for Transport (UK)

Grupo ACS

Grupo Ferrovial

Infrastructure Partnerships Australia

Institute of Logistics and Supply Chain Management

International Project Finance Association

John Holland Group

Leighton Contractors

Leighton Holdings

Linfox

Macquarie Bank

Maribyrnong Truck Action Group

Metlink

Metropolitan Transport Forum

Municipal Association of Victoria

Murray Goulburn Cooperative

NSW Office of the Coordinator General

Plenary Group

Port of Geelong

Port of Melbourne Corporation

Qantas Air Freight

RACV

Salta

Southern and Eastern Integrated Transport Authority (SEITA)

Theiss John Holland JV

Toll Holdings

Tourism and Transport Forum

Toyota Australia

Transfield Services

Transport Infrastructure Development Corporation (NSW)

Transport for London

Transurban

Treasury Corporation of Victoria

University of Melbourne

VECCI

VicRoads

Victorian Freight and Logistics Council

Victorian Funds Management Corporation

Victorian Transport Association

VicUrban

Western Transport Alliance

West Gate Freeway Alliance

This list does not include consultations with and presentations to internal units within Victorian Government departments and Members of Parliament.

Local government

Banyule City Council

Boroondara City Council

Brimbank City Council

Darebin City Council

Greater Dandenong City Council

Hobsons Bay City Council

Manningham City Council

Maribyrnong City Council

Maroondah City Council

Melbourne City Council

Melton Shire Council

Moreland City Council

Nillimbik Shire Council

South Gippsland Shire Council

Wyndham City Council

Yarra City Council

# appendix b

## Issues raised by submissions and consultations

The Study Group received 130 submissions from individuals, local councils and business and community organisations. Sir Rod Eddington and members of the Study Group also met with a range of key stakeholders. Individuals and groups making submissions to the EWLNA canvassed a wide range of issues and expressed different views on the study's terms of reference.

## Support for a major new east-west road link

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A number of submissions strongly supported the construction of a major new east-west road link, seeing such a link as filling a critical gap in Melbourne's road network. While proposing a range of options, these submissions argued that the growing demand for travel across the city and to the north of the CBD cannot be met by the existing road network and that a new east-west link is essential to managing and supporting Melbourne's population and industry growth over the next 30 years.

These submissions argued that the benefits of a new link would be substantial, including:

- improved amenity in Melbourne's inner north and inner west by removing traffic from these suburbs;
- relieving congestion in the inner city and on northern Melbourne arterial routes;
- meeting the growing transport demands of people and businesses in Melbourne's rapidly growing western suburbs;
- improved travel times for road-based public transport and better public transport access to the Parkville university/hospital precinct; and
- reduced reliance on the Monash – CityLink – West Gate corridor as the city's only major east-west road link.

Most of these submissions expressed the view that, even with a significant increase in rail freight and public transport patronage, the majority of freight and passenger traffic will travel by road for the foreseeable future. However, many submissions argued that any new road link should be part of a long term integrated transport plan that includes significant public transport improvements.

Generally, supporters of a new road link believe that it should be in the form of a tunnel and provide a major northern bypass of Melbourne's CBD with a further link to the Tullamarine Freeway, Western Ring Road and/or the Western Highway. A small number of submissions supported an upgraded link across the Yarra River, such as another deck on the West Gate Bridge or a new tunnel under the Yarra. Different views were expressed about the viability of the private sector fully funding these options.

## Opposition to a major new east-west road link

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A number of submissions expressed strong opposition to any new road-based east-west link. Generally, these submissions argued that there is no substantial demand for travel across Melbourne; that constructing an east-west link will not relieve congestion in inner Melbourne; and that Victoria should be investing in public transport and traffic management solutions rather than in new roads.

A strong focus of these submissions was giving priority to reducing the reliance on motor vehicle transport in Melbourne and increasing the speed, frequency and reliability of public transport services.

These submissions argued that any major road link will:

- lead to increased road travel (than would otherwise occur);
- have adverse effects on the health and amenity of residents of Melbourne's inner north;
- encourage urban sprawl and reduce the city's capacity to contain growth within defined boundaries and around public transport nodes; and
- increase Melbourne's already heavy dependency on cars at the expense of other, more sustainable transport modes.

## Support for new transport options in the inner west

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A number of submissions viewed the study as also offering an opportunity to ameliorate the impact of heavy trucks moving through residential areas in Melbourne's inner west. Several submissions urged the study to consider options to improve truck access to the Port of Melbourne and bypass residential areas in Melbourne's inner west with the aim of improving residential amenity in suburbs such as Footscray, Yarraville and Seddon, opening up new investment opportunities in the Footscray Transit City area and supporting the expansion of activities at the Port of Melbourne.

### Public transport options

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Most submissions to the study pointed to the growing pressure on Melbourne's public transport network and noted that public transport patronage is likely to increase significantly over the coming decade. A range of public transport infrastructure and non-infrastructure options were proposed by submissions supportive of and opposed to a major new east-west link, including:

- major public transport upgrades to Doncaster (including extending rail services and improving bus services);
- extending rail services to Caroline Springs;
- the duplication and electrification of the Sunshine to Melton line;
- a major new underground rail link centred around Parkville;
- resolving the problems caused by the rail bottleneck at North Melbourne;
- upgrading train stations (including more Park & Ride facilities);
- increasing rail capacity on congested routes through signalling and operational improvements; and
- more flexible and convenient bus services and priority lanes for buses.

## Freight issues

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A significant number of submissions urged the study to recommend that a much greater effort be directed towards increasing the share of freight carried by rail. In particular, submissions supported:

- more efficient rail links to and from the Port of Melbourne;
- greater investment and commitment to developing intermodal freight hubs (within Melbourne and across regional Victoria);
- a mix of incentives and disincentives to shift freight in the direction of rail;
- initiatives to facilitate development of the Port of Hastings; and
- the development of a comprehensive Victorian Freight Strategy.

Submissions from people and organisations in the inner west and inner north were especially concerned about the impact of freight traffic on residential amenity.

## Congestion

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Many submissions discussed the economic, social and environmental costs of congestion, while noting that it is not possible to eliminate congestion altogether. Submissions from industry groups expressed the strong view that 'doing nothing' was not an option in relation to congestion, with the problem likely to get worse and lead to higher costs for business. However, submissions from some community and environmental groups argued that congestion should be viewed in a more positive light: as a sign of economic success and an effective disincentive to car use.

A significant number of submissions strongly favoured non-infrastructure options as a solution to congestion. These submissions urged the study to consider options such as:

- congestion pricing, including central city cordon pricing or congestion levies;
- Electronic Road Pricing, such as time-of-day pricing, to achieve traffic objectives;
- High Occupancy Vehicle lanes and other demand management mechanisms to ration road space more efficiently between different modes of transport;
- a greater investment in and use of intelligent transport systems (ITS) to manage travel demand and traffic flow;
- the removal of taxation and other financial incentives that favour car use; and
- public awareness campaigns about the environmental and other impacts of travel decisions.

## Urban growth and planning

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A number of submissions argued that transport planning in Melbourne should be much more closely aligned with urban development objectives and land use decisions. These submissions argued that any options considered by the study should take into account the need to curtail urban sprawl, increase population density in the city's inner suburbs and facilitate growth and high density housing around public transport nodes.

A number of submissions noted that growth in Melbourne's west was likely to be far stronger than current projections and that any options recommended by the study should take into account the future mobility needs of this rapidly growing area.



## Sustainability

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There was a strong focus on environmental issues across the range of submissions. Many submissions argued that the 'peak oil' scenario will occur within the timeframe covered by the study. These submissions urged the study to give careful consideration to the impact of continually rising petrol prices over the next decade on Melbourne's transport patterns. Some submissions argued that this scenario will place significant negative pressure on road-based transport, leading to reduced motor vehicle traffic on the city's roads and an increasing demand for public transport. However, other submissions argued that, with road transport becoming more carbon efficient, levels of car use are likely to remain relatively stable over the next 30 years.

Many submissions also urged the study to recognise that the fastest growth of greenhouse gas (GHG) emissions is occurring in the transport sector and to give serious consideration to the climate change implications of any options. These – and other – submissions argued that the study should look towards options that reduce travel by the largest emitter of GHG in the transport sector: the single occupancy passenger vehicle. Other submissions argued that road transport was becoming more carbon efficient and that this trend will pick up pace over the next decade, leading to a significant reduction in the contribution motor vehicles make to GHG.

## Social equity and healthy transport options

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Several submissions argued that greater effort should be directed towards improving cycling and walking options for short trips (less than five kilometres), including:

- improving pedestrian and cycling connections with train stations;
- completing the Principle Bike Network; and
- upgrading cycling links in Melbourne's inner west and between the inner west and the CBD.

A relatively small number of submissions urged the study to consider the social costs and equity implications of any recommendations and to ensure that any proposed options actively tackle transport disadvantage.

# appendix c

## Doncaster corridor options

As noted in Chapter 7, the EWLNA Study Team reviewed a range of public transport options for the Doncaster/ Manningham corridor. In order of cost and carrying capacity, these options are:

- Heavy rail
- Light rail
- DART with additional service enhancements).

It should be noted that any heavy or light rail option to the Manningham corridor would require a reassessment of freeway bus services.

## Heavy rail

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A heavy rail link to Doncaster – an idea that was first put forward in the 1920s and again in the late 1960s – continues to be discussed, although it has been rejected by successive state governments over the last 40 years.

The Study Team examined the option of heavy rail in the Doncaster corridor, including alternative routes and different ways of connecting the line to the existing rail system at the city end.

### The Doncaster end

The route would provide a service linking Doncaster Shoppingtown with Victoria Park station, then continuing to Flinders Street/Parliament along the existing Clifton Hill Group rail line.

Frequencies would be four services per hour, three new stations would be provided, and Victoria Park and the new stations would be Premium Stations. The route would follow a direct underground path from the Doncaster (Westfield) Shoppingtown (due to the grade differential of Doncaster Hill to the Eastern Freeway) from the west to Bulleen Road/Eastern Freeway. The alignment would gradually descend from a tunnel as it approaches the Bulleen Road overpass and continue along the existing median strip within the Eastern Freeway. Between that point and Victoria Park station, the freeway median would be used.

The total length of the link would be approx 12.6 km including 5 km of tunnel.

### Options at the City end

Alternatives were considered for linking a heavy rail service from Doncaster to the existing rail network.

#### *To the CBD changing trains at a major Victoria Park interchange station*

While it is possible to provide a major modal interchange at Victoria Park onto the Clifton Hill group which serves the Epping and Hurstbridge lines it was not considered viable by the Study Team due to:

- The need to transfer from the Doncaster trains (as they would terminate at Victoria Park) to the Clifton Hill Rail Group trains would inconvenience passengers travelling to the CBD, making it less likely that the Doncaster rail service would be used.
- Fully loaded trains on the Clifton Hill Rail Group may not have spare capacity for a major influx of interchanging passengers at Victoria Park, requiring an increase in service levels on the Clifton Hill group that would only be fully utilised between Victoria Park and the CBD (despite the substantial additional infrastructure required between Clifton Hill and the CBD to create this option).

### *To the CBD via the Clifton Hill rail line*

Connecting a new Doncaster rail line directly to the existing Clifton Hill Rail Group is currently technically feasible, as this line has some spare capacity (subject to changes and infrastructure works such as the Clifton Hill-Westgarth duplication). While the best option for making this connection is via the Clifton Hill rail line, additional capacity would be required in the future at this connection point, requiring new tracks above, adjacent or below the existing tracks between Clifton Hill and the CBD.<sup>1</sup>

Building tracks above would significantly increase noise and visual intrusion for nearby residents in Collingwood, East Richmond and Jolimont. Constructing new tracks adjacent to the existing tracks would require acquisition of around 100 to 200 properties and may also require some parkland in Collingwood and Jolimont. Tunnelling below the existing tracks would be very expensive, but would avoid most surface impacts.

It is likely that these expansion works between Clifton Hill and the CBD will be needed in the longer term, regardless of whether a Doncaster rail link is built (although a Doncaster link would bring the need for such work forward). Accordingly, these works have not been included in the options analysis for Doncaster.

### **Indicative costs**

For the purposes of comparison to other public transport options within the corridor, the heavy rail option connecting the Doncaster line to the CBD via the Clifton Hill line has been adopted. The estimated costs of this option are around \$1.7 billion - \$2 billion.

## **Light rail**

In considering light rail options, the Study Team examined extensions to existing routes, as well as a new light rail service along the Eastern Freeway.

### **Tram network extensions**

Two possible extensions of the tram network to Doncaster Hill were suggested by submissions to the EWLNA:

- Extending Route 109 north along Tram Road
- Extending Route 48 along Doncaster Road.

While a Route 109 extension would provide a tram service from Box Hill station to Doncaster Hill, the route would not be viable for tram travel to the central city, as the travel time would be around 70 minutes (roughly double the current time taken by bus route 307). The extension would be likely to attract only a very small number of additional CBD-destined patrons.

In addition, National Bus operates several bus routes along this alignment, with around fourteen buses travelling from Doncaster Hill and Box Hill between 7am and 8am each weekday. While growth on the route would come from patrons destined for Doncaster Shoppingtown, most of these passengers would simply be transferring from existing bus routes in the area (particularly Route 207).

The extension of Route 48 to Doncaster Hill would require around 4 km of dual tram tracks along Doncaster Road, the first 1.6 km shared with traffic and the remainder in a new median to be constructed by converting the two central traffic lanes. Steep grades along this section appear likely to exceed the maximum design grade for trams and would also exceed grade limitations for DDA compliant stops. This issue would require further consideration to determine if it could be overcome.

While the extension of Route 48 would connect Doncaster Hill to the tram network, the very long travel time (around 60 minutes in off-peak periods) means that this is highly unlikely to attract significant CBD-bound patronage. This option does not materially improve travel to the CBD and offers virtually no benefit for commuters in the Doncaster/Manningham region.

The Study Team does not consider Route 109 or 48 extensions to offer sufficient travel benefits to be a priority for public transport investment.

1. See SKM Maunsell et al (2008a)

### Light rail via the Eastern Freeway

A number of submissions suggested providing a new light rail service running along the Eastern Freeway to Doncaster Road and then to Doncaster Hill. The key issues for such a service include:

- Fleet requirements
- Connections to existing tram services in inner Melbourne
- Getting the service into and out of the Eastern Freeway median at each end of the route
- How far to extend the route into Doncaster
- Requirements for depot(s) and power supply.

#### *Fleet requirements*

As a minimum, modern low-floor light rail vehicles compatible with the existing Melbourne tram system (such as the current Combino or Citadis trams) would be required to allow the route to run into the CBD. However, these trams have an effective operating maximum speed of around 70 to 80 km/h.

Since extensive unconstrained running in the Eastern Freeway median is available, vehicles with a higher operating speed could be considered to minimise travel time. However, it is not clear that appropriate vehicles would be compatible with the existing system (for example, they may require larger wheel flanges to increase stability). If these vehicles were not compatible, a separate route into the CBD may be required (such as via Rathdowne Street-Exhibition Street or Hoddle Street-Albert Street-Lonsdale Street). Alternatively, passengers could be required to interchange to existing services, negating the benefits of the faster freeway travel time.

Given the difficulties and uncertainty around non-compliant vehicles, it is assumed that optimised but compliant vehicles would be used with a running speed up to 80 km/h along the freeway.

### *Melbourne connection*

At the Melbourne end of the route, two options exist for connecting the route to the tram network.

- Nicholson Street could provide a segregated route into the CBD via Bourke Street.
- A connection could be provided at Melbourne University in Swanston Street, connecting with one or more of several routes from the south that terminate at Melbourne University. An extension would run east along Johnston Street to Victoria Park station, connecting to the Eastern Freeway service.

The Melbourne University option has merit as it would:

- directly service Melbourne University as well as the CBD;
- make better use of spare capacity on trams running between Melbourne University and the CBD rail stations; and
- allow through running to destinations along St Kilda Road without interchange.

### *Eastern freeway connection – western end*

Leaving the Eastern Freeway at the western end would be difficult irrespective of any decision to build an east-west road link. With a tunnel road link, it will almost certainly be necessary to elevate the tram within the Eastern Freeway median due to the need for additional road space to provide a tunnel portal. Without a tunnel, the limited road space under Hoddle Street would require considerable works, including land acquisition and retaining walls to provide space for a tram.

Two routes are possible: via Alexandra Parade or swinging south via an overpass and via Victoria Park Station and then west via Johnson Street, possibly using a 'Strasbourg style' treatment (that provides tram priority, but retains a measure of car access and parking for abutting development).

If a road tunnel option at the western end of the Eastern Freeway is adopted, the 'Strasbourg style' option becomes viable due to the emergence of opportunities to reallocate road space.

The option via Victoria Park and Johnston Street would:

- provide an interchange opportunity for commuters on the Clifton Hill Rail Group at Victoria Park station (especially for people travelling to Melbourne University);
- better serve employment and retail activity along Johnston Street;
- preferably require reallocation of road space in Johnston Street to give trams priority; and
- provide an opportunity (from reallocated road space in Johnston Street) to create a major east-west bicycle link from Melbourne University to Victoria Park Station and then along Turner Street, linking into the Capital City Trail along the Yarra River.

The Study Team considers that the Melbourne University/ Johnston Street option offers the best east-west light rail option.

#### ***Eastern Freeway connection – eastern end***

The light rail could be constructed within the Eastern Freeway median until Bulleen Road (with some challenges), but at that point the freeway median disappears. Two basic options appear available to address this problem:

- continuing along the Eastern Freeway and then up Doncaster Road; or
- running via Thompson Road and Manningham Road.

To provide space for the tram to continue along the Eastern Freeway median, the freeway would need to be widened, which appears to be mostly possible within the existing reservation, but would also be costly. Alternatively, the light rail line could cross to the north side of the freeway and run along the north side to meet Doncaster Road. While the reservation appears to be mostly adequate, significant earthworks and retaining structure would be required.

From the freeway, the route would turn east past the Doncaster Park & Ride towards Doncaster Hill. As Doncaster Road is six lanes through this section, the tram could be located within a widened median formed by converting a traffic lane in each direction.

A route via Thompson and Manningham Roads may be feasible, but this would mainly serve lower-density residential development and access to Doncaster Hill is more circuitous. Taking a lane from Manningham Road may also be more difficult than from Doncaster Road, as a high-capacity alternative is not available.

#### ***Doncaster terminus***

Any light rail should extend at least to Doncaster Hill to support its high-density residential development and major commercial and retail activities.

#### **Indicative costs**

To estimate the costs of a light rail service, the Study Team has adopted the following project scope:

- A light rail system that is compatible with the existing Melbourne tram network
- A route that:
  - extends an existing route (that terminates at Melbourne University), along Elgin Street-Johnston Street to Victoria Park station, before passing over the Eastern Freeway to run along the freeway median; or alternatively
  - accesses the CBD via Alexandra Parade and Nicholson Street.
- Runs along the Eastern freeway in the median to Bulleen Road, crosses to the north side of the freeway (accessing a new Park & Ride site near Bulleen Road), and runs alongside the freeway to Doncaster Road. Turning within a widened median along Doncaster Road to Blackburn Road, accessing key activity centres and new Park & Ride sites.
- Stop spacing within Doncaster is longer than normal and tram priority is provided at traffic signals.

The estimated cost of this option is \$600 million - \$710 million. In addition to these indicative costs, additional Park & Ride facilities would cost a further \$12 million to \$15 million each (for 400 space multi-storey car parks). The purchase of 15 additional trams would cost approximately \$75 million.

## DART with further service enhancements

While the MOTC DART upgrade will provide substantially increased bus services along the corridor from 2009, a further step-up in service is possible and desirable. Implementing a range of Bus Rapid Transit (BRT) measures will deliver this step-up by providing dedicated road space and priority to buses, greater frequency of services and the visibility and permanency usually associated with fixed rail options. This step-up will leverage further enhancements from the planned DART upgrade.

### Scope

A successful rapid bus system along the Doncaster/Manningham corridor would require:

- Bus-only road space in the form of bus lanes and/or signal priority
- Tram-like service levels and hours of operation (7 day operation to midnight, 15 minute or better peak and daytime service);
- High quality 'super-stops' with fully accessible platforms and real time travel information
- Higher-capacity, low carbon, state-of-the-art buses
- Additional parking in the form of Park & Ride stations and possible replacements for kerb-side parking substituted for bus lanes.

The DART enhancements involve full-length bus-only lanes on a dedicated route with signal priority between the Eastern Freeway and the CBD to minimise the interference from traffic congestion, supported by similar treatments – at least during peak periods – in Doncaster.

The preferred route to the CBD would remain the existing route along Hoddle Street/Victoria Parade. Additionally, the option of running some services along Johnston Street or Alexandra Parade and then along Rathdowne, Lygon or Nicholson Streets should be considered. If a road tunnel option at the western end of the Eastern Freeway is adopted, this option becomes possible due to road space reallocation opportunities.

The enhanced DART service would also include a major interchange facility at Victoria Park, giving passengers a choice to travel directly into the central city or to Carlton/Melbourne University and Parkville, or further west. This option would:

- provide an interchange opportunity for commuters on the Clifton Hill Rail Group at Victoria Park station, especially for Melbourne University/ Carlton, Parkville travellers and further west;
- Provide a direct link to Parkville underground railway station, giving direct rail connections to the west and south-east;
- better serve employment and retail activity along Johnston Street/ Alexandra Parade;
- if the road tunnel proceeds, preferably require reallocation of road space to give buses priority; and
- provide the opportunity (from reallocated road space) to create a major east-west bicycle link from Melbourne University to Victoria Park Station and then along Turner Street, linking into the Capital City Trail along the Yarra River.

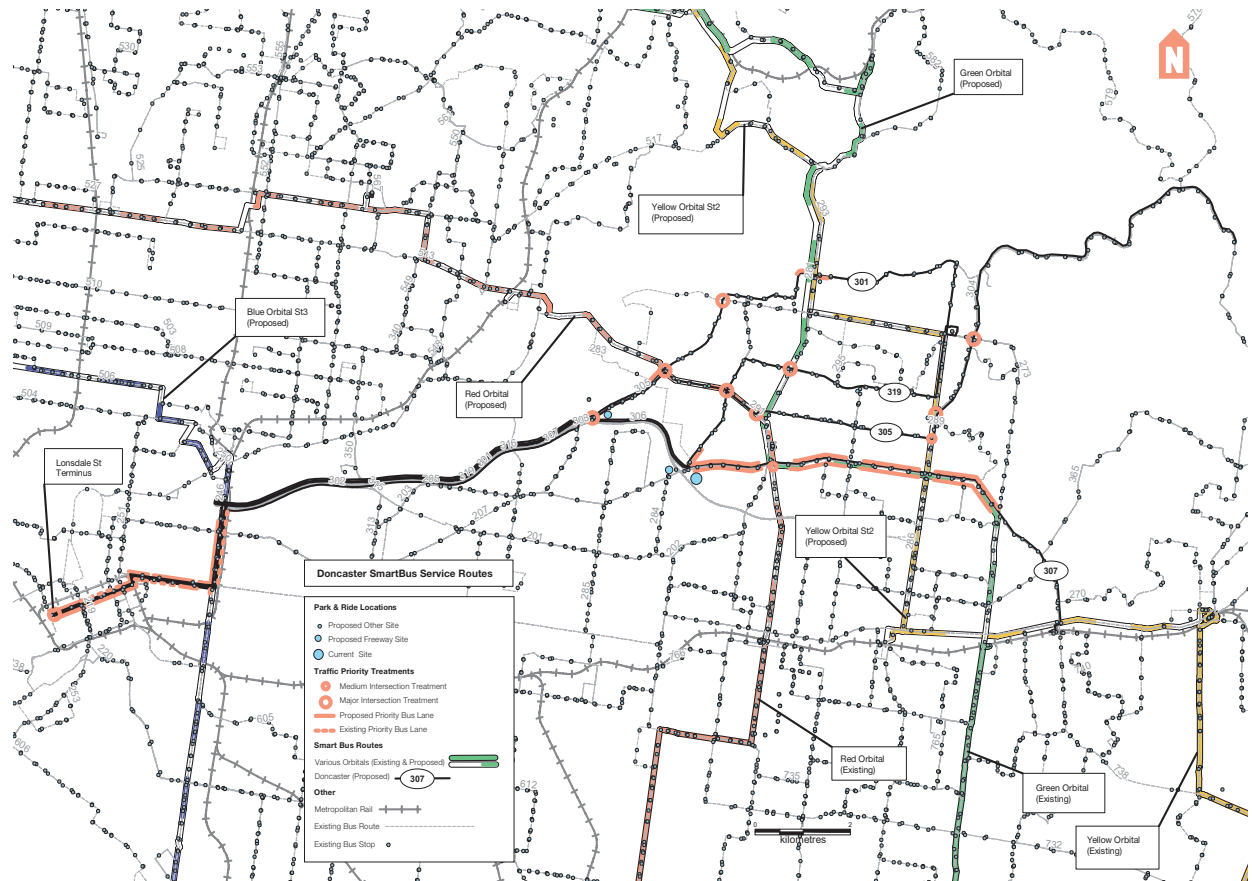
Modelling suggests that an alternative bus route into the central city (one that complements the existing Hoddle Street/Victoria Parade route) connecting Victoria Park Station with Melbourne University with a dedicated bus way would be a popular alternative to travelling through the CBD, with significant numbers of patrons switching between options at this interchange.

The interchange at Victoria Park could complement an urban redevelopment of the area.

### Indicative costs

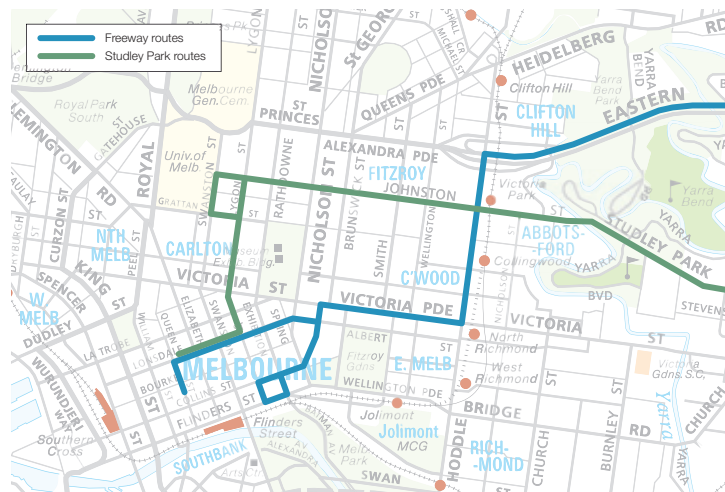
The estimated capital costs of the enhanced DART option are around \$250 million - \$300 million (this includes the \$80 million already estimated for the planned DART upgrade). These costs indicate that this option would be a highly cost-effective means of delivering much better public transport services – and substantially higher levels of public transport patronage – to the Doncaster area.

Figure 113 – Possible enhanced DART service area – Doncaster/Manningham corridor



Source: EWLNA (Public Transport Division, DOI)

Figure 114 – Bus services in the Doncaster corridor – links to the central city



Source: Public Transport Division (DOI)



## Comparing the options

Some supporters of a fixed rail link to Doncaster assume that if a rail service were provided, patronage will automatically follow. The Study Team does not share this view and the available evidence and traffic modelling does not support such a view.

### Heavy rail

#### *Patronage*

Some submissions to the EWLNA argued that a train along the Doncaster corridor would carry more than 3,000 seated passengers per hour (or the equivalent of around 2,600 cars or one and a half lanes of heavy traffic, based on typical occupancies). While this is an accurate reflection of a rail line's capacity, the evidence strongly indicates that such capacity would not be taken up and that the vast majority of potential train users from the region are already using the public transport system. Even if these numbers of people did use the train during the morning peak, a heavy rail line is a costly way of meeting a demand that can be met more effectively by bus services – which have the capacity to carry just as many passengers per hour<sup>2</sup>, can run at more regular intervals than a heavy rail service and can be readily increased or decreased as demand dictates.

In addition, as noted earlier, a substantial proportion of the traffic on the last section of the Eastern Freeway comes from east of the Doncaster/Manningham catchment, particularly Springvale Road and beyond. Only a small amount of traffic (8 per cent) enters the freeway at Doncaster Road, with a further 12 per cent entering at Thompsons Road. In addition, a significant proportion of Eastern Freeway traffic entering from the north and further east already have access to rail lines. This means that any shift to public transport by Manningham/Doncaster residents, will not significantly reduce traffic build-up at the city end of the freeway.

#### *Journey times*

Travel time between Doncaster Hill and Melbourne Central along the proposed heavy rail line would vary from around 25 to 30 minutes, depending upon the number of stations and the route taken to access the central city.

### Light rail via Eastern Freeway

#### *Patronage*

While a small number of additional CBD-destined patrons would be attracted to the route, some growth would come from patrons destined for Doncaster Shoppingtown. Most of these passengers would be captured from the existing bus routes in the area, including planned SmartBus services.

While a light rail would offer a higher level of access to the CBD compared with existing bus services, this is almost solely due to offering higher levels of priority – something that which could also be achieved by bus services at a much lower cost. The catchment and access issues regarding patronage on the heavy rail line also apply to the freeway-aligned light rail option.

#### *Journey times*

Running time would be about 35 to 40 minutes to the CBD, slower than the DART option.

### DART with service enhancements

#### *Patronage*

An enhanced DART bus service would have the greatest capacity to respond to changes in patronage coming from any reduced road use. The flexibility of a priority road based public transport option, and the local nature of bus services has the potential to service a greater catchment area than a fixed rail option.

#### *Journey times*

Bus travel along the Eastern Freeway is already as fast, or faster, than car travel (due to the emergency lane doubling as a bus-only lane) and only minor improvements in peak inbound travel time are possible. Improvements on the Eastern Freeway must concentrate on providing priority for safer and faster bus travel.

Time penalties exist mainly on Hoddle Street and Victoria Parade, where bus priority measures are affected by issues of compliance, enforcement and local parking.

With the right measures in place, the DART service could cut the travel time between Doncaster Hill and Melbourne Central to around 25 to 35 minutes – approaching the travel time that could be achieved by a dedicated rail line but at a considerably lower cost.

2. See for example: Federal Transit Authority and United States Department of Transportation, (August 2004), *Characteristics of Bus Rapid Transit for Decision Making*, pp. 3-76



# appendix d

## Policy context

The East West Link Needs Assessment carefully considered Commonwealth, Victorian and Local Government policies with an impact on the development and implementation of transport improvements in Melbourne's east-west corridor.

## Whole-of-government strategies and objectives

Several Commonwealth and Victorian government policies set high-level whole-of-government objectives that are relevant to transport planning in Melbourne. These policies include:

### Victorian Government

- *Growing Victoria Together (2002 and 2005)* is the Victorian Government's ten-year vision for making Victoria a stronger, more caring and innovative State. Growing Victoria Together (GVT) includes a commitment to balancing social, economic and environmental considerations in making budget and policy decisions (the 'triple bottom line' concept). One of GVT's goals is 'growing and linking all of Victoria', including building faster, better and more accessible transport links. GVT sets two transport targets that are relevant to the EWLNA:
  - The proportion of freight transported to ports by rail will increase from 10 per cent to 30 per cent by 2010
  - Travel in Melbourne taken on public transport will increase from 9 per cent to 20 per cent by the year 2020.

The Victorian Government has specifically requested Sir Rod Eddington to consider the contribution of improved east-west transport links to meeting these targets.<sup>3</sup>

- *A Fairer Victoria (2005)* outlines a range of actions to address disadvantage across Victoria, improve access to vital services and reduce barriers to opportunity. The update of A Fairer Victoria (released in 2007) notes that "an efficient and affordable public transport system is an important way of delivering fairness and equity to all Victorians" and includes commitments to increasing transport options for disadvantaged groups.

- *Victoria – Leading the Way (2004)* is a major economic statement that aims to position Victoria as a competitive force in the global marketplace. The statement focuses on increasing the competitiveness and export performance of Victorian businesses, including new investment in infrastructure for moving goods to market. Key actions include improving access to the Port of Melbourne and transforming the Port of Melbourne and Dynon rail precincts into a single intermodal terminal of world class standard.
- *Environmental objectives.* The Victorian Government has set whole-of-government environmental objectives through several strategies and initiatives. These include the Victorian Greenhouse Strategy (2002), which aims to reduce Victoria's greenhouse gas emissions across a range of sectors (including transport), and the Our Environment – Our Future Sustainability Action Statement (2006), which identifies priority actions aimed at securing a sustainable future for the state. Our Environment – Our Future identifies the development of efficient and sustainable transport systems as a key objective and includes actions to provide more transport choice, invest in alternative fuels and more fuel-efficient vehicles, and trial hybrid buses in Melbourne.

### Commonwealth Government

- *Environmental objectives.* The Commonwealth Government sets broad environmental objectives through a number of national strategies, including the National Strategy for Ecologically Sustainable Development (1992) and the National Greenhouse Strategy (1998). Compliance with these strategies requires transport planners to address issues such as integrated land use and transport planning, travel demand and traffic management, improved vehicle fuel efficiency and fuel technologies, and greater use of public transport, walking and cycling.
- Under the Integrated National Strategy for Lowering Emissions from Urban Traffic (2000), developed by the Australian Transport Council, all Australian governments have agreed to work towards achieving six key outcomes designed to reduce greenhouse gas emissions from passenger transport in urban areas.

3. See EWLNA Study Scope, page XX

## Transport system strategies and objectives

The Commonwealth and Victorian governments have also used a range of strategies and policies to set broad objectives for the transport system. Key strategies include:

### Victorian Government

- *Linking Melbourne: Metropolitan Transport Plan (2004)*. Linking Melbourne identifies four major transport challenges facing Melbourne (improving safety, managing congestion, managing metropolitan growth and supporting economic growth) and sets out a comprehensive plan to address these challenges. The Plan maintains a triple bottom line approach and aims to ensure that improvements to the Principal Public Transport Network (PPTN) deliver integration between modes, with a focus on improving overall mobility and access, rather than on providing individual train, tram or bus services.
- *Meeting Our Transport Challenges (2006)*. The Victorian Government is investing more than \$10 billion through *Meeting Our Transport Challenges* (MOTC) to ensure that Victoria's transport system keeps pace with future travel demand. MOTC aims to deliver significant community benefits, including improving transport connections between communities to give Victorians better access to jobs and services; creating a safer and more secure transport system; cutting congestion; growing the whole state; and enhancing Victoria's liveability.
- *Melbourne 2030: Planning for Sustainable Growth (2002)* is the Government's long-term plan for managing Melbourne's growth in ways that are economically, socially and environmentally sustainable. Melbourne 2030 focuses development in areas that can be well-served by road and public transport infrastructure. The plan identifies 'better transport links' as a key direction, including improving the existing public transport network, better managing the road system, giving more priority to cycling and walking and promoting the use of sustainable personal transport options.
- *arrive alive!* is the Victorian Government's strategy to reduce deaths and injuries on Victoria's roads. The strategy identifies and addresses a number of road safety issues, including road design, speeding, drink driving, fatigue and vehicle safety.
- *Accessible Public Transport in Victoria – Action Plan 2006-2012 (2006)* provides a framework for achieving accessible public transport in Victoria for people with disabilities. It covers mainstream public transport for which the Victorian Government has direct responsibility and aims to ensure that access is provided in line with the requirements of the Federal Disability Discrimination Act 1992.

### Commonwealth Government

- *AusLink*. AusLink sets out the Commonwealth Government's approach to planning and funding transport projects of national significance. AusLink aims to promote national and regional economic growth, development and connectivity by building an integrated National Network of significant road and rail infrastructure links. AusLink also aims to generate greater cooperation in transport planning and funding between Commonwealth, State and Territory governments.

Future AusLink funding will be determined by a series of 'corridor strategies', to be developed jointly by the Commonwealth and State/Territory governments. Corridor strategies identify priority needs along major freight and travel routes and are designed to assist governments and the private sector to make the best investment decisions along these routes over the next 20 to 25 years.

- *Transport Policy Framework– A New Beginning*: this recently released document from the National Transport Commission acknowledges that the 'massive forecast increase' in passenger and freight growth requires a new national policy framework to ensure that Australia's road, rail, air and sea transport systems are planned and operated as an integrated network. The document also aims to develop the framework through cooperation between all levels of government. The document nominates Melbourne's east-west corridor as a possible priority national infrastructure project for consideration by Infrastructure Australia.
- *National Road Safety Strategy 2001-2010*. Coordinated by the Australian Transport Council (which comprises all Commonwealth, State and Territory Ministers with transport responsibilities), the strategy establishes a national framework for reducing deaths and injuries on Australia's roads. All Australian governments have agreed to pursue the strategy's eight objectives, which include improving the safety of roads, improving equity among road users and encouraging alternatives to motor vehicle use.
- *Australian National Cycling Strategy 2005-2010*. The strategy aims to coordinate the activities of all Australian governments to encourage cycling and improve safety for cyclists. The strategy's priorities include creating infrastructure and facilities that support increased cycling, enabling and encouraging safe cycling, and providing leadership and developing partnerships to support and promote cycling in Australia.

## Strategies and objectives specific to the east-west corridor

The EWLNA has also taken into account more specific transport objectives that relate directly to Melbourne's east-west corridor, including:

### Victorian Government

- *Meeting Our Transport Challenges (2006)*. MOTC identifies the Monash-West Gate corridor as one of Victoria's most important road connections and notes that the corridor is experiencing congestion during peak periods, is vulnerable to short term interruptions and is rapidly approaching capacity. MOTC includes a \$1 billion improvement package for the corridor to relieve congestion, reduce accidents and improve capacity and travel times. MOTC also includes a commitment to explore and assess options for the development of another east-west link.
- *Transit cities and growth areas*. Alongside Melbourne 2030, the Government is developing a number of Transit Cities as locations for new activities and development, centred around railway stations. Two Transit Cities – Sydenham and Footscray – lie within the EWLNA Study Area. the Government has also appointed a Growth Areas Authority to oversee planning and development in Melbourne's five growth areas. Growth in three of these areas (Melton-Caroline Springs, Whittlesea and Wyndham) is highly likely to significantly affect demand in the east-west corridor.
- *Outer Western Suburbs Transport Strategy (2001)*. Developed by the Department of Infrastructure, this strategy provides a plan for transport improvements within Melbourne's western region. The strategy's objectives include enhancements to public transport (especially in relation to commuter traffic from the west to the CBD) and improved road links (especially those providing for inter-regional travel, more efficient freight links and better connections to activity centres).
- *Draft transport strategies*: The Government has released several draft strategies that are relevant to the EWLNA, including: Draft Northern Central City Corridor Strategy (2003), North East Integrated Transport Study – Draft Strategy Report (2006) and Melbourne 2030 – Planning for Sustainable Growth – Implementation Plan No 6 – Integrated Transport (2002). While these strategies have no formal status, they provide an indication of the Government's views on particular issues.

- *Port of Melbourne strategies*: A number of strategies are in place to manage and support growth in trade through the port of Melbourne. The Victorian Ports Strategic Framework (2004) identifies strategies to assist Victoria's commercial trading ports to manage international trends in shipping and logistics, strong growth in trade and social and environmental risks. The Framework recognises that continuous improvements in road, rail and intermodal connections are needed to sustain the competitiveness and efficiency of the Port of Melbourne.

The Port of Melbourne Development Plan (Consultation Draft, 2006) sets out Port of Melbourne Corporation's 30-year plan for the Port of Melbourne, including plans to increase the percentage of freight movements by rail.

Melbourne Port@L (Consultation Draft, 2006) is a comprehensive scheme to ensure that the Port of Melbourne manages growth in container trade over the next 30 years. Melbourne Port@L aims to fully integrate the Port with landside transport infrastructure to deliver an efficient and sustainable intermodal freight system. The draft strategy notes the need to decentralise non-core container handling activities, progressively implement an efficient metropolitan rail freight system and balance freight infrastructure and operating requirements with community, social and environmental goals. The strategy specifically notes the need to manage amenity impacts, particularly truck traffic impacts, in the inner west and states that this aspect will be considered by the EWLNA.

### Commonwealth Government

- *Melbourne Urban Corridor Strategy*. Developed as part of the national AusLink program, the Melbourne Urban Corridor Strategy covers designated urban road links and key segments of the five interstate and inter-regional corridors that traverse Melbourne's growth areas. The strategy identifies a number of short-term priorities with particular relevance to the EWLNA, including:
  - Improving east-west traffic flows in the inner city
  - Improving connectivity at the city end of the Eastern corridor
  - Improving capacity and accessibility of public transport services
  - Improving road and rail links to Port of Melbourne
  - Reducing community impacts of freight transport through Melbourne's Inner West
  - Enhancing the capacity of the Monash-West Gate freeway.

## Local Government

- *Local council transport strategies.* Many Melbourne councils have developed transport strategies that identify the key issues affecting their municipalities. Local councils that have developed – or are developing – strategies relevant to the EWLNA include Boroondara, Brimbank, Darebin, Hobsons Bay, Manningham, Maribyrnong, Moonee Valley, Moreland and Wyndham.
- *Moving People and Freight: the City of Melbourne's Transport Strategy (2006 – 2020).* Moving People and Freight outlines a strategy for transport within Melbourne over the next two decades and identifies short-term actions that can be taken over the next five years in three areas: getting to the city, getting around the city, and freight and commercial travel. The strategy also identifies the importance of removing barriers to freight movement in an east-west direction; the need for stronger linkages between the western suburbs, the Port of Melbourne, CityLink and the eastern suburbs; and the need to plan for the construction of new rail tunnels to increase the capacity of the City Loop and to serve a wider central city area.
- *Inner Melbourne Action Plan (IMAP).* A collaboration between the Cities of Melbourne, Port Phillip, Yarra and Stonnington and VicUrban (Docklands), IMAP identifies a series of actions that can be taken over the next five to 10 years to improve the liveability of Melbourne's inner region. These actions include: linking and improving transport routes; minimising traffic congestion and increasing public transport use; and developing the inner city's distinctive activity centres.

# appendix e

## Induced travel – a complex story

The term ‘induced travel’ is often used in debates about whether investments in major urban transport projects are ‘good’ or ‘bad’ for the community. The term is over-arching, in the sense that it attempts to describe in two words the complex travel outcomes of changed accessibility within a city (usually resulting from a major road infrastructure project). Unfortunately the term means many things to many people, is rarely defined with any clarity, and – consequently – does little to inform debate.

A number of submissions to the EWLNA referred to ‘induced travel’ or ‘induced demand’ in advancing the argument that ‘Melbourne cannot build its way out of congestion’ by creating more road space – because any increase in road capacity will be filled up with additional traffic.

Many factors combine to influence travel patterns in a complex transport network, including growth in population, demographic changes to the workforce (and to the driving population), changes in economic activity, changes in business practices, changes in the cost of travel and cars, and changes in land-use. It is difficult to attribute longer-term change or growth in travel patterns to a single factor.

Generally, the majority of trips on a new road facility were already being made prior to the increase in road space delivered by the new facility. These trips are often referred to as ‘redistributed travel’ or ‘diverted traffic’: people switch from other routes to the new road because they will derive a benefit in terms of reduced travel time or costs.

The possible impacts of the provision of new road infrastructure on travel behaviour are:

- Time of day shift – where people change the time of their trip to a previously congested time of day. *Time of day shift does not result in a change to the total number or length of journeys undertaken on the road network.*
- Route shift – where people change the route of their journey to the new road. *Route shift does not result in changes to the total number of journeys on the network, but may result in minor changes to the length of journeys.*
- Transport mode shift – where people change their mode of trip and travel on the new road. *Transport mode shift will result in a change to the total number and length of journeys undertaken on the road network.*
- Change in destination choice – where people change their destination location to an alternative, but preferred, destination. *Change of destination will not result in changes to the total number of journeys on the network, but may result in changes to the length of journeys.*

- Newly generated trips –
  - a) where people decide to undertake a trip that may not have been considered worthwhile before the provision of the new road.
  - b) where changes to land use patterns and increased economic activity result in additional trips in areas accessed by the new road.

*Newly generated trips will result in a change to the total number and length of journeys undertaken on the road network.*

While some of these responses represent new trips, the majority of the observed increase in traffic comes from trips that were already being made prior to the change in road network capacity. The net effect of these changes is that the amount of traffic using the new or improved road will be largely offset by reductions in traffic on other parts of the road network. The re-routing of traffic, and people changing their time of travel, will have a minimal impact on the total vehicle-kilometres of travel undertaken across the road network.

Numerous studies have been undertaken on induced traffic. One of the most widely referenced studies is the UK Standing Advisory Committee on Trunk Road Assessment (SACTRA) study of 1994. This study found that the elasticity of traffic demand in relation to roadway expansion is between 0 and 1 per cent.<sup>4</sup>

Most travel behaviour changes occur soon after the opening of a new or improved road. However, in the longer term population growth, land development and social and economic changes also occur. As noted in Chapter 1, improved accessibility influences residential and commercial decisions, which may have a significant impact on travel demand and patterns. The travel associated with these factors is often mistakenly identified as ‘induced travel’, when it is really the consequence of changing patterns of residential, business and jobs growth.

There are a number of ways to ‘lock in’ the benefits of providing a more efficient link in a road network and mitigating the less positive aspects of travel behaviour changes, such as allocating ‘freed-up’ road space to other uses, such as bicycles, public transport or high occupancy vehicles.

4. SACTRA: UK Standing Advisory Committee on Trunk Road Assessment (1994), *Trunk Roads and the Generation of Traffic and Government Response*, Department of Environment, Transport and the Regions, London

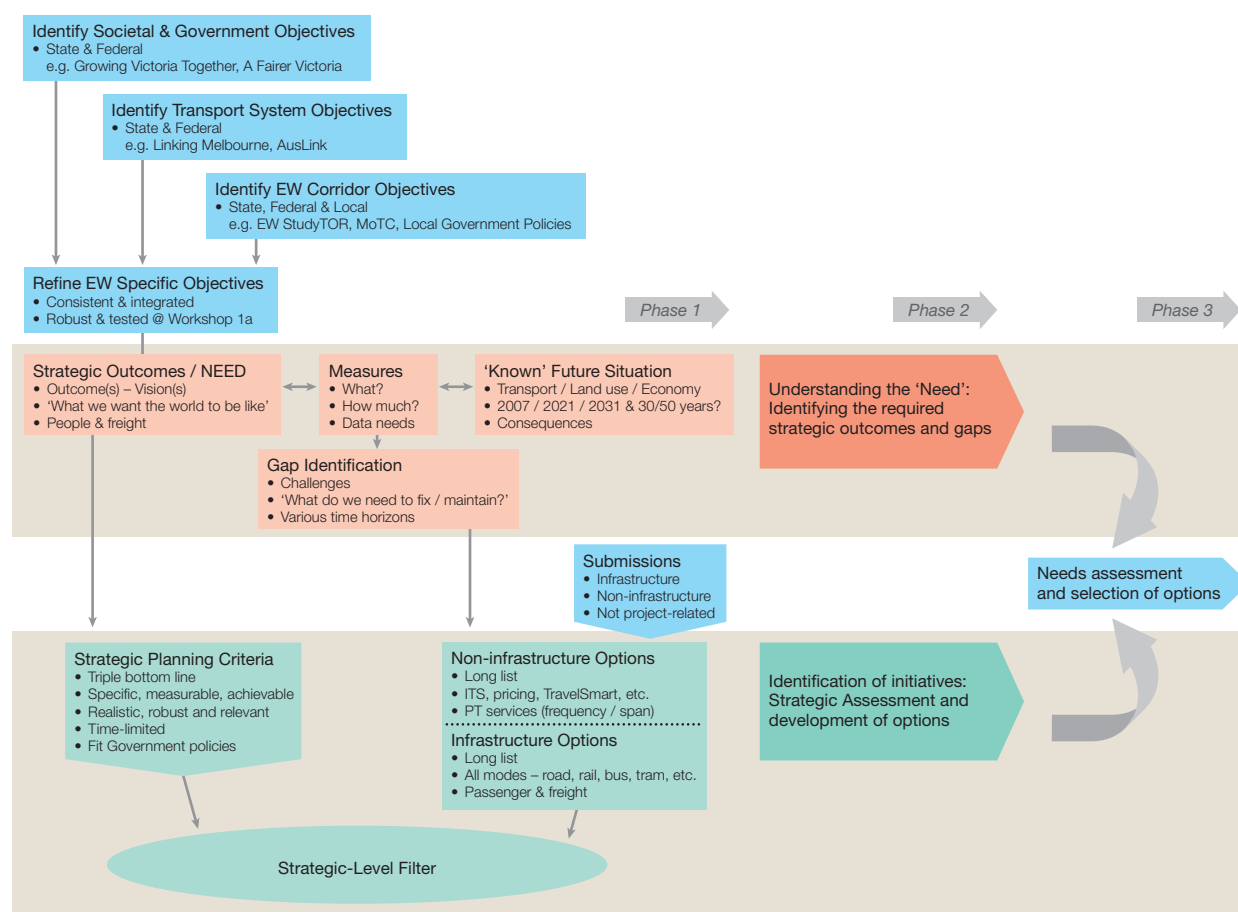
# appendix f

## EWLNA process

### The overall process

The overarching assessment and analysis process adopted by the Study Team is based on the *National Guidelines for Transport System Management in Australia*<sup>5</sup>.

Figure 115 – Outline of overarching EWLNA process



Source: EWLNA

5. Australian Transport Council (2006), *National Guidelines for Transport System Management in Australia*, Commonwealth of Australia, Canberra



## Canvassing the options

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The Study Team conducted its investigation in three phases, based on the three step process outlined by the National Guidelines for Transport System Management in Australia: Strategic Merit Test, Rapid Appraisal and Detailed Appraisal.

### Phase 1 – Develop objectives, assessment criteria and initial options

Phase 1 examined the current situation in the Study Area, explored existing and future drivers of transport demand and identified gaps and problems in meeting demand along the east-west corridor. Phase 1 drew together nearly 100 potential options sourced from public submissions and work undertaken by the Study Team and specialist consultants.

Phase 1 used the National Guidelines Strategic Merit Test to review these options and identify those with little chance of meeting the identified strategic requirements or the EWLNA Terms of Reference.

The Strategic Merit Test is largely a qualitative assessment of 'strategic fit', testing how well an option would play a part in achieving transport system objectives or need; whether there are any obvious 'fatal flaws' or key risks; and how an option is broadly likely to measure up under a Triple Bottom Line (TBL) assessment.

The Study Team used this process to 'park' less suitable options, rather than to select a preferred option. The remaining options were further developed to a level of detail that allowed more quantitative assessment to be undertaken. From this process, nine main options were taken through to Phase 2.

### Phase 2 – Initial option assessment

Phase 2 involved a Rapid Appraisal of the nine main options brought forward from Phase 1. Rapid Appraisal is intended to be a cost effective way of gauging whether an initiative is likely to pass a detailed appraisal. The methodology used for rapid appraisal is similar to a detailed appraisal; however the estimates and detail for a rapid appraisal are less precise.

During Phase 2, options were developed to a level of detail allowing a quantification of as many benefits and costs as possible to establish whether the option was worth developing further. As part of this exercise, options were developed to engineering feasibility stage, giving consideration to physical and geometrical constraints and construction requirements. Preliminary modelling was also undertaken to ascertain the impacts of each option. The appraisal incorporated an indicative assessment of the main benefits and costs, as well as establishing a 'confidence level' to identify areas where information may not be as robust as required for a detailed appraisal.

## Phase 3 – Final option assessment

Following the Rapid Appraisal, Phase 3 further developed options and subjected them to a Detailed Appraisal. The framework used for this appraisal was the same as those used for the Strategic Merit Test; however, further development of the options meant that more detailed analysis was possible using transport model outputs, high level costing information and further detailed analysis of the impacts of the options.

Options for financing, delivery and governance were explored during this phase. Phase 3 also reviewed options that had been rejected in Phase 1 in the light of the more detailed knowledge gained by the EWLNA about the selected options.

## Transport modelling

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To assist in the understanding of transport demands, the EWLNA Study Team engaged the firm of Veitch Lister Consulting (VLC) to provide transport modelling services.

The Study Team believes that it is important to correct the widespread misconception that transport models provide a view of the future that can be uncritically accepted as 'fact'. As models become more sophisticated – especially micro-simulation models – and outputs are presented more and more attractively and stylishly, viewers can be forgiven for thinking that they are watching a virtual representation of the transport network as it will be operating 20 or more years into the future.

Transport planners would find it very reassuring if the transport behaviour in a big city such as Melbourne could be replicated so realistically by a model. With such a tool, changes to the network could be tested with confidence and the future could be predicted with such accuracy that transport investments would be unerringly well targeted. Unfortunately, the reality is that such models do not (and fundamentally cannot) exist.

Nevertheless, transport models are available that provide reasonably good correlation with the transport network as it currently operates (particularly for the arterial corridors), as well as an insight into the way people may access Melbourne's road and rail systems in the future. However, it is important to treat the information provided from these models with judgement and balance, with the information being considered alongside a range of other assessments to inform recommendations about future transport investments.

To predict future travel behaviour, transport models use data previously provided by the community and captured by surveys such as the Victorian Activity and Travel Survey (VATS). They also rely upon estimates about the future characteristics of Melbourne: how many people will live in the city, where they will live, where jobs will be located, what the level of economic activity will be, and so on. These factors are difficult to predict with precision, especially the further into the future planners try to look. This means that, by their nature, transport models are heavily influenced – and limited – by past behaviour.

The last VATS (which are a series of ‘snapshots’ of travel behaviour by a group of respondents on particular days) were undertaken between 1994 and 2002. A new survey (the Victorian Integrated Survey of Travel and Activity – VISTA) was commenced in 2007, but the collation and analysis of the results of this survey are not yet available to update transport models. Because travel behaviour is not static, VISTA is expected to reveal changes in travel behaviour since VATS. Some of these changes are evident (such as the substantial increase in rail patronage), can reasonably be expected to continue into the future and can be incorporated into current models; others may be less obvious.

Demographic and employment data is also constantly changing. For example, the growth of jobs in central Melbourne is significantly higher than predicted only a few years ago. Melbourne’s population is presently growing strongly and is expected to increase by at least one million over the next 25 to 30 years. Recent analysis undertaken by the Victorian Government suggests that Melbourne’s growth is running ahead of these projections. Models allocate trips on the transport network based on statistics such as these that try to reflect the likely future state of the city; however, the reality may be quite different. To test the impact of ‘different’ futures on transport demand in Melbourne, high growth, low growth and carbon constrained scenarios have been considered as part of the EWLNA.

Overlaying these many variables is the sheer complexity of the transport network, which covers all modes of transport for moving people and goods, and which is constantly undergoing change as roads, trams, buses or trains are added or altered. It is worth noting that the impact of such changes can alter the dynamics of land use in a way that is well outside the parameters of the transport modelling used to support the change in the first place. For example, traffic on the Western Ring Road dramatically exceeded modelled predictions, because the improved accessibility it offered triggered a rapid acceleration of land development in the western region of Melbourne.

Accordingly, information provided from the models should be treated with careful judgement, particularly modelling for future volumes on *specific* roads or rail lines. Broader outputs such as screenline information (which describes future demand for travel across a cordon intersecting a number of roads and rail lines) can be used with greater confidence. In other words, the broader the interpretation of model outputs, the more likely it is to provide a reasonable guide to the future. Particular conclusions should not be drawn without considering broader trends and evidence.

In summary, transport modelling should be seen as a tool to assist strategic transport planning by providing a guide to how further pressures on the network will develop and how options to respond to these pressures might perform.

## Veitch Lister modelling work

The firm of Veitch Lister Consulting (VLC) was engaged to provide transport modelling services. VLC utilises a multi-modal model (the Zenith model) that encompasses the wider Melbourne metropolitan area, along with major provincial centres, and includes both the road and public transport networks. This model has been used extensively for analyses of major public and private transport infrastructure projects in Melbourne, and is regarded as a state-of-the-art model for transport planning purposes in Melbourne.

The key background reports that describe VLC’s modelling are:<sup>6</sup>

- Background Modelling Assumptions for the East-West Link Needs Assessment Study
- Zenith Model Establishment and Validation Report.

The Zenith model was calibrated for the EWLNA Study Area and adjusted to provide a ‘reference’ network that included all committed and expected projects that will be undertaken over the assessment period. For example, as a result of *Meeting Our Transport Challenges*, there will be numerous changes to the form and operation of the transport network, with one of the most obvious and relevant being the upgrade to the Monash-City Link-West Gate corridor. Other changes will also impact on the study area. (such as the expenditure of around \$6 billion on public transport enhancements over the next ten years). These changes were included to test how well the modified network would cope with the predicted travel demands, whether further action is required and whether proposed actions were well targeted.

The model was also tested to ensure that recent work by the Department of Infrastructure on road freight distribution was appropriately reflected in the model outputs.

6. These papers are available from the EWLNA website



### Key characteristics of the Zenith model

A detailed overview of the Zenith model can be found in the background reports listed above; however, an extract from the reports provides a useful summary:

“The Zenith travel forecasting model simulates people’s travel behaviour based on observed travel behaviour. The model incorporates the following components in generating travel matrices:-

- a trip production model (a model of how often households of various types decide to make trips for various purposes);
- a trip attraction model (which produces a measure of how attractive a destination will be in satisfying travel desires);
- a trip distribution model (which uses the outputs of the trip production and attraction models to produce estimates of zone-to-zone travel for each travel market segment);
- a mode choice model (which estimates whether people will choose to travel by car, transit or non-motorised modes);
- a vehicle occupancy model (which converts person trips made by car into vehicle trips); and
- a time period model (which allocates trips to parts of the day).”

The model calculates travel between 2519 zones across Victoria, providing forecasts for transport of people and goods using all transport modes.

A summary of modelling results is available at the EWLNA website.

### Reference modelling with MITM

The alternative model for transport planning purposes is the Melbourne Integrated Transport Model (MITM). The Department of Infrastructure maintains and is developing this model for a range of transport infrastructure analyses and the Study Team sought some ‘parallel’ model runs with this model to provide a comparative view about the transport characteristics of the study area.

The outputs from MITM confirm the substantial growth expected in rail and road traffic in the Study Area. As with Zenith, MITM provides travel estimates for 2031: while the quantum and distribution of the predicted growth differs from Zenith in the parallel runs, both models show that the demand for rail and road access will significantly outstrip the capacity of the ‘reference’ network and that infrastructure intervention is required.

## Future scenarios

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The Study Team developed a number of future scenarios to test the sensitivity and robustness of options being considered as part of the EWLNA.

The scenarios represented the future transport task for Melbourne under different conditions and aimed to ensure that the Study Team considered a reasonable range of different outcomes, having regard to relevant forces and variables. While consideration was given to the risk generated by more extreme scenarios, the Study Team focused on more likely outcomes.

It is important to note that the scenarios have no purpose other than to test the performance of various options under widely different conditions – and to indicate how these options support (or affect) existing government policies, strategies and programs.

A series of workshops conducted by the Study Team suggested the following scenarios. The scenarios are described at 2031, which is the test year adopted for all EWLNA transport modelling.

- **The Reference Case**

The Reference Case was used for the major part of the development and assessment of the options being considered by the Study Team. The Reference Case is a well-developed and understood scenario as it is based on extensive detailed land use, employment and economic forecasts developed by Victorian Government agencies.

However, the Reference Case is not necessarily the most likely outcome for Melbourne and Victoria. For example, if high levels of population growth continue to 2031, the High Population Growth Scenario is more likely.

The Reference Case assumes Melbourne's population will reach 4.54 million by 2031.

- **Carbon Constrained Scenario**

The Carbon Constrained Scenario tests the implications of a world where the free availability of carbon-based fuels is constrained by high prices and/or limited supply. This could mean high market prices for carbon-based raw materials (especially oil and gas) due to supply limitations (such as 'peak oil') or it could mean the imposition of high end carbon pricing.

The scenario assumes the same population growth as the Reference Case and marginally lower economic growth. The scenario assumes there will be an orderly increase in carbon prices and that the economy can adjust to this increase while maintaining economic growth. From a transport perspective, such an orderly progression could be encouraged by early government action designed to reduce the impact of carbon constraints on individuals and the economy – such as introducing road pricing, offering incentives for the development of alternative fuels, providing more public transport and educating people about travel choices. Recent studies – and the recognition of the need for action at the state, federal and international levels – suggest that an orderly approach is feasible and becoming more likely.

The headline assumption behind this scenario is a doubling in the cost of road transport relative to other household expenditure items. The scenario also assumes a 25 per cent reduction in the cost of public transport and increased urban density.

- **High Population Growth Scenario**

The High Population Growth Scenario was developed to provide an upper limit of demand for transport. This scenario enabled an assessment to be made about whether the proposed options can cater for travel demands in a high population growth situation.

The scenario assumes higher employment and population growth, based on the headline assumption of Melbourne's population reaching around 5 million people by 2031.

While higher population growth may increase the need for some additional transport infrastructure in fringe areas, any impact within the Study Area will be negligible, so the Reference Case Transport network assumptions are also used.

- **Low Population Growth Scenario**

This scenario was developed to provide a lower boundary of demand. The scenario provided a view about whether the recommended options would be needed even in a low population growth environment or if improvements to the transport network could be deferred under a low-growth scenario.

The headline assumption behind this scenario is a Melbourne population of around 4.3 million people by 2031. The Reference Case Transport network is assumed.

While it is almost certain that the future will not match precisely any of the scenarios outlined above, the range of possibilities covered by the scenarios provided the Study Team with a tool for measuring the robustness of options under different circumstances.

# appendix g

## Specialist consultant teams

The EWLNA Study Team commissioned seven specialist teams to provide expert advice to Sir Rod Eddington. The teams provided an overview of the current situation in relation to a range of issues, impacts and indicators within the study area, generated options to meet future transport needs in Melbourne's east-west corridor, formulated criteria to assess these options and tested the projected impact of options.

### Environment and heritage

*Sinclair Knight Merz – Maunsell*

SKM – Maunsell identified and evaluated the physical and natural environmental and heritage constraints and opportunities for the east-west transport options. Issues identified and investigated by SKM – Maunsell included: environmental sustainability and GHG emissions, air quality, noise, flora and fauna, cultural heritage, hydrology, water quality and aquatic ecology, land contamination and hydrogeological issues.

### Transport and the economy

*Meyrick and Associates - Econsearch - Steer Davies Gleave*

This team examined the importance of transport to Melbourne's economy, including the relationship between freight and the economy, the impact on transport of the shift to a services economy, and the implications and likely costs of failing to improve transport connections.

Meyrick also quantified the economic benefits of various transport initiatives considered by the study.

### Transport planning and costing

*Sinclair Knight Merz – Maunsell – Evans and Peck*

This specialist team provided analysis of current and future transport demand and supply issues in the EWLNA Study Area, and identified future drivers of travel demand and mode share. The team tested proposed options against likely future scenarios, and provided cost estimates for their implementation.

## Demographics, social and land use

*SGS Economics and Planning*

SGS assessed the demographic, social and land use impacts associated with options for an additional east-west link. Issues investigated by SGS covered Melbourne's geography and its impact on the city's transport network, urban growth and development, the demographic and community profile of the study area and transport accessibility and disadvantage.

### Commercial and financial

*Ernst & Young*

Ernst & Young provided advice about commercial and financial issues relevant to the EWLNA, including potential revenue sources and financing options, possible delivery models and general market issues.

### Transport modelling

*Veitch Lister Consulting*

This specialist team was responsible for developing, applying and documenting the results of transport models to test options and scenarios explored by the EWLNA. Veitch Lister also provided expert advice to the Study Team and other specialist consultants about current and future travel demands, patterns and costs across all transport modes.

## Legal

*Clayton Utz*

Clayton Utz assisted the Study Team to identify and assess legal issues arising from the various options under consideration, including providing advice about structuring and governance arrangements, relevant overseas developments within infrastructure markets and the implications of legal and regulatory impediments and opportunities.



# acronyms + references

# acronyms and abbreviations

AAA	Australian Automobile Association
ABS	Australian Bureau of Statistics
ADR	Australian Design Rules
ARTC	Australian Rail Track Corporation
ATC	Australian Transport Council
BCR	Benefit Cost Ratio
BITRE	Bureau of Infrastructure Transport and Regional Economics
CBD	Central Business District
CGI	Coordinator General of Infrastructure (Victoria)
CLUE	Census of Land Use and Employment (City of Melbourne)
CO / CO <sub>2</sub> / CO <sub>2</sub> e	Carbon monoxide / Carbon dioxide / Carbon dioxide equivalent
COAG	Council of Australian Governments
CSIRO	Commonwealth Scientific and Industrial Research Organisation
D&C	Design and Construct
DART	Doncaster Area Rapid Transport
DDA	Disability Discrimination Act
DIIRD	Department of Innovation, Industry and Regional Development (Victoria)
DOI	Department of Infrastructure (Victoria)
DSE	Department of Sustainability and Environment (Victoria)
DTF	Department of Treasury and Finance (Victoria)
DTRS	Department of Transport and Regional Services (Commonwealth)
EES	Environmental Effects Statement
EPAV	Environmental Protection Authority Victoria
ESC	Essential Services Commission
EU	European Union
EWLNA	East West Link Needs Assessment
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GSP	Gross State Product
GVT	Growing Victoria Together

HOT	High Occupancy Toll
ICT	Information and Communication Technology
IEA	International Energy Agency
IMAP	Inner Melbourne Action Plan
IMT	Intermodal Terminal
IPCC	Intergovernmental Panel on Climate Change
JtW	Journey to Work
LATM	Local Area Traffic Management
LCV	Light Commercial Vehicle
LGA	Local Government Area
M1	Monash-CityLink-West Gate Freeway Corridor
MCC	Melbourne City Council
MITM	Melbourne Integrated Transport Model
MMBW	Melbourne Metropolitan Board of Works
MOTC	Meeting Our Transport Challenges
MTAG	Maribyrnong Truck Action Group
NCCC	Northern Central City Corridor Study
NO <sub>x</sub>	Nitrous oxide
NSBT	North South Bypass Tunnel
O <sub>3</sub>	Ozone
OCC	Office of Climate Change
PBS	Performance Based Standards
PCB	Polychlorinated Biphenyl
POMC	Port of Melbourne Corporation
PPP	Public Private Partnerships
PPTN	Principal Public Transport Network
PT	Public Transport
PTD	Public Transport Division, Department of Infrastructure (Victoria)
R&D	Research and Development
SEIFA	Socio-Economic Indexes for Areas

SEITA	Southern and Eastern Integrated Transport Authority
SLA	Statistical Local Area
TBL	Triple Bottom Line
TDL	Transport, Distribution and Logistics
TOD	Transit (or Transport) Oriented Development
TOT	Truck Only Toll
TBM	Tunnel Boring Machine
UK	United Kingdom
US	United States
VATS	Victorian Activity and Travel Survey
VCEC	Victorian Competition and Efficiency Commission
VFLC	Victorian Freight and Logistics Council
VIF	Victoria In Future
VISTA	Victorian Integrated Survey of Travel and Activity
VKT	Vehicle Kilometres Travelled
VOC	Volatile Organic Compounds
VTA	Victorian Transport Association
WRR	Western Ring Road
WTA	Western Transport Alliance



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## What other cities are doing

Information in this report about initiatives in other cities is sourced from:

- The c40 Cities Group:  
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- The Victorian Transport Policy Institute's Transport Demand Management Encyclopedia: [www.vtpi.org/tm/tm59.htm](http://www.vtpi.org/tm/tm59.htm)
- London's Crossrail project: <http://www.crossrail.co.uk/>
- Kuala Lumpur's SMART project: [www.smarttunnel.com.my](http://www.smarttunnel.com.my)
- Associated Research Centers for the Urban Underground Space: [www.acuus.qc.ca](http://www.acuus.qc.ca)
- Better Air for Berlin: [http://www.berlin.de/sen/umwelt/luftqualitaet/de/luftreinhalteplan/download/Umweltzone\\_Broschuere\\_en.pdf](http://www.berlin.de/sen/umwelt/luftqualitaet/de/luftreinhalteplan/download/Umweltzone_Broschuere_en.pdf)
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Folio of Modelling Outputs

**These papers are available for viewing at the EWLNA website: [www.doi.vic.gov.au/eastwest](http://www.doi.vic.gov.au/eastwest)**

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