

Environment  
Effects Statement

# Chapter 9

## Traffic and transport



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## Traffic and transport

This chapter provides an assessment of the traffic and transport impacts associated with the construction and operation of North East Link. This chapter is based on the impact assessment presented in Technical report A – Traffic and transport.

North East Link would complete the ‘missing link’ in Melbourne’s orbital freeway network. It has the potential to redistribute traffic and change travel patterns in Melbourne’s north-east and across the broader metropolitan area. Benefits and impacts associated with the construction and operation of North East Link could be experienced by all types of road users, including cars, trucks, buses, on-road trams, pedestrians and cyclists.

The EES scoping requirements set out the following draft evaluation objective:

- To increase transport capacity and improve connectivity to, from and through the north-east of Melbourne, particularly freight movement via the freeway network instead of local and arterial roads, while managing the effects of the project on the broader and local road, public transport, cycling and pedestrian transport networks.

To assess the potential effects of North East Link on traffic, freight, public transport, cyclists and pedestrians, a traffic and transport impact assessment was undertaken. The assessment included analysis of strategic transport modelling outputs to understand potential effects across metropolitan Melbourne, as well as additional modelling to understand local impacts within the north-east and along the project corridor.



## 9.1 Method

Informed by the risk assessment described in Chapter 4 – EES assessment framework, the traffic and transport assessment entailed the following key tasks:

- A review of relevant national, state and local legislation and policy.
- The establishment of a study area for traffic and transport as shown in Figure 9-1. The study area broadly encompasses metropolitan Melbourne's north-eastern suburbs ('the north-east'), from the Merri Creek in the west to Melbourne's metropolitan boundary in the east. The extent of the study area was informed by strategic transport modelling and represents the area where traffic volumes may materially change due to North East Link.
- A desktop assessment and baseline data review, which included a review of information from traffic surveys conducted in 2017 and 2018 across the north-eastern road network, and analysis of traffic volumes, public transport patronage and travel times across the whole of Melbourne. Where observed data was not available, the desktop assessment was based on outputs from the 2016 strategic transport model prepared by Veitch Lister Consulting.
- Consultation with the Banyule, Boroondara, Manningham, Whitehorse and Yarra councils and with other relevant government agencies including Transport for Victoria and VicRoads.
- The characterisation of existing conditions, including current travel demand, key challenges for the road network, travel time and accessibility, freight movements, public transport coverage and walking and cycling connections. An existing conditions crash assessment was also undertaken using 2012 to 2016 data from the VicRoads CrashStats database, which contains historical information about road incidents reported to Victoria Police.
- Modelling of 'no project' and 'with project' scenarios for the year 2036, which is approximately 10 years after North East Link would open. Three models were used:
  - Strategic transport model – the strategic transport model predicts traffic conditions resulting from future land use, population, employment and/or changes to transport infrastructure. It forecasts travel demand for a particular future year, the origins and destinations of travel, the choice of transport mode used and the route taken. This model was used to assess changes to traffic distribution and conditions across the Melbourne metropolitan network.
  - Spreadsheet model – during peak periods, the strategic model can sometimes forecast roads to carry high traffic volumes that can exceed the theoretical road capacity. The spreadsheet model uses observed traffic volumes from traffic surveys and estimated traffic volumes from the strategic transport model to predict capacity-constrained peak traffic volumes.

### What are the risk categories?

Risk levels were categorised as very low, low, medium, high or very high. The results of the initial risk assessment were used to prioritise the focus of the impact assessments.

- Microsimulation model – the microsimulation model simulates interaction between vehicles and driver behaviour within a defined area. It takes into account the potential for congestion, intersection delays, traffic queuing and merging and weaving movements on freeways. This model was used to predict how well North East Link and its key intersections would function.
- An assessment of the potential traffic and transport impacts during construction of North East Link, which considered the quantity of trucks required (particularly those carrying spoil), traffic management associated with the construction of site compounds, new lanes, ramps and tunnels, and the combined impact of multiple construction sites operating at the same time.
- An assessment of the potential traffic and transport impacts during operation of North East Link, which included consideration of changes in traffic patterns and local access, and analysis of intersection performance, traffic volumes, travel times, vehicle speeds and accessibility. A crash assessment was also undertaken using the modelled vehicle kilometres travelled and VicRoads CrashStats to project the incidence of crashes.

Comparisons of the 'no project' and 'with project' scenarios were undertaken at three levels:

- Across metropolitan Melbourne, defined as the Greater Melbourne Region by the Australian Bureau of Statistics' (ABS) Greater Capital City Statistical Areas – the assessment of potential impacts across Metropolitan Melbourne was informed by the strategic transport model.
- Within the north-east, defined above as the study area – the assessment of potential impacts within the north-east was informed by the strategic transport model as well as the spreadsheet modelling.
- Along the project corridor, which includes North East Link and roads which would connect directly to North East Link – the assessment of potential impacts along the project corridor was informed by the microsimulation modelling.
- Sensitivity testing to understand potential variations in modelling outcomes was conducted, including testing varied traffic impacts associated with population and employment changes, increased and decreased tolls, the extension of truck curfews, the construction of a new freeway link between the M80 Ring Road (otherwise known as the Metropolitan Ring Road) and the Hume Freeway (known as the E6 project), and an alternative design for the Manningham Road interchange.
- Environmental Performance Requirements (EPRs) were developed in response to impact assessment. The residual risk ratings and the assessment of impacts presented in this chapter assume implementation of the EPRs. For the full list of EPRs refer to Chapter 27 – Environmental management framework.



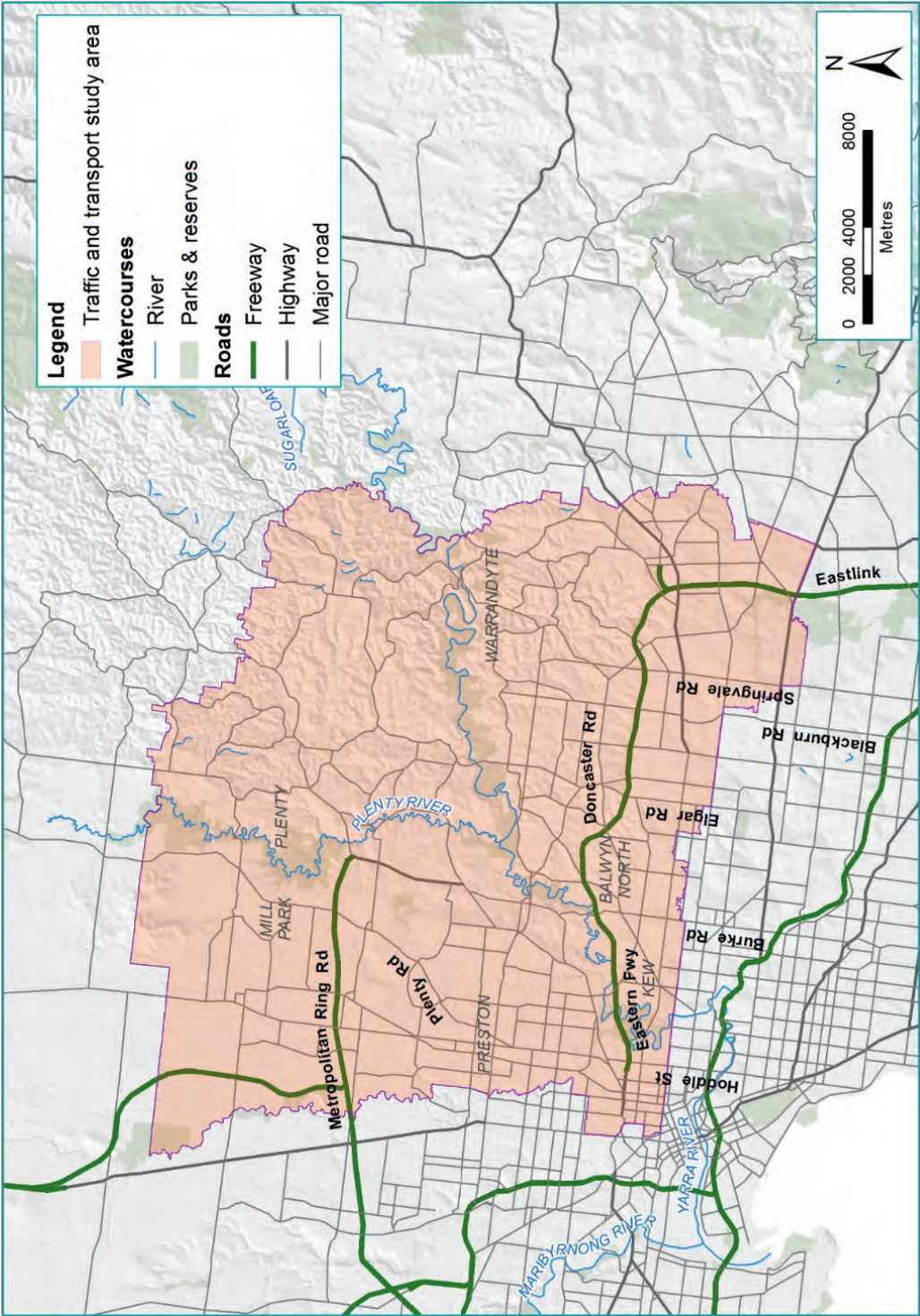


Figure 9-1 Traffic and transport study area

## 9.2 Key transport outcomes

This section provides an overview of the key transport outcomes that North East Link is expected to achieve.

The strategic context for Melbourne’s key transport challenges is provided in Chapter 2 – Project rationale. The chapter explains how North East Link is expected to address a number of these challenges by improving the cross-city network, and outlines the potential benefits of the project for businesses, communities, commuters and the wider Victorian economy.

This chapter examines the existing conditions within Melbourne’s north-east and identifies potential impacts from the construction and operation of North East Link at a more local level.

The key transport outcomes anticipated from North East Link are summarised in Table 9-1. Table 9-1 also identifies where more information is provided in this chapter about the existing transport challenges the project is aiming to address, and the potential positive and negative impacts during operation of North East Link.

Table 9-1 North East Link – key transport outcomes

Key transport outcomes	Existing conditions and project impacts	Chapter section
Redistribution of traffic away from local and arterial roads and onto North East Link and the freeway network	<p>The road network within the north-east is on average more congested than the rest of metropolitan Melbourne. Average traffic speeds in the north-east are typically 16 per cent slower than the average across metropolitan Melbourne.</p> <p>The project is anticipated to see a significant redistribution of medium and longer cross-city trips away from local and arterial roads and onto the freeway network and North East Link. The biggest reductions in traffic are anticipated on Rosanna Road (reduction of approximately 12,000 vehicles per day by 2036 compared with the ‘no project’ scenario) and Greensborough Road (reduction of approximately 19,000 vehicles per day).</p> <p>Traffic is anticipated to increase on a number of feeder routes to the project, including the M80 Ring Road and Eastern Freeway, as well as some arterial roads south of the Eastern Freeway and near the Greensborough Bypass and Grimshaw Street interchange. No net increase in traffic is anticipated for roads in the CBD as a result of the project.</p>	<p>Section 9.3.2 ‘Current key challenges’</p> <p>Section 9.5.1 ‘Changes to traffic patterns’ and ‘Changes to traffic volumes’</p>

Key transport outcomes	Existing conditions and project impacts	Chapter section
Less congestion at existing bottlenecks	<p>Travel within, outside and through Melbourne's north-east is presently constrained by congestion on Yarra River crossings at Chandler Highway, Burke Road, Manningham Road, Fitzsimons Lane and Kangaroo Ground-Warrandyte Road (Warrandyte Bridge). Trips within the north-east are also heavily reliant on a limited number of arterial roads, such as Bell Street for east-west movements and Rosanna Road and Fitzsimons Lane for north-south movements.</p> <p>Traffic volumes along the five existing Yarra River crossings are anticipated to reduce by 16 per cent across the day in the 2036 'with project' scenario.</p> <p>The number of vehicles travelling on the freeway network would increase with North East Link. This increase would be accommodated by providing additional traffic lanes on the M80 Ring Road and Eastern Freeway. A small number of local and arterial roads would also experience increased volumes with North East Link: Watsonia Road, Erskine Road in Macleod, and some arterial roads south of the Eastern Freeway (Bulleen Road, Elgar Road, Surrey Road and Springvale Road).</p>	<p>Section 9.3.2 'Current key challenges' and 'Existing traffic volumes'</p> <p>Section 9.5.1 'Changes to traffic volumes'</p>
Improved travel times across the north-east	<p>Travel times along key routes in Melbourne's north-east are variable and significantly affected by congestion during peak times. The most heavily congested and least reliable route is from the M80 Ring Road to the Eastern Freeway via Greensborough Road, Rosanna Road and Bulleen Road. The median travel time southbound along this route during the AM peak is 44 minutes, although this trip can be as short as 30 minutes or as long as one hour.</p> <p>By 2036, users of North East Link are forecast to save up to 35 minutes between the M80 Ring Road and the Eastern Freeway compared with the 'no project' scenario. Forecast travel times along the Greensborough Road/Rosanna Road/Bulleen Road corridor and along key routes crossing the Yarra River are also anticipated to be faster with North East Link by 2036 compared with the 'no project' scenario, and in some cases are predicted to be faster than current travel times.</p>	<p>Section 9.3.2 'Travel times and accessibility'</p> <p>Section 9.5.1 'Changes to travel times'</p>

Key transport outcomes	Existing conditions and project impacts	Chapter section
Reduced truck volumes on local and arterial roads	<p>Analysis of data from the strategic transport model indicates that a greater proportion of heavy vehicles within the north-east travel on the arterial network rather than the freeway network compared with the metropolitan Melbourne average.</p> <p>Truck volumes are generally forecast to decrease across the north-eastern arterial road network. Large decreases are predicted along Greensborough Road (7,400 less trucks per day), Bulleen Road (2,400 less trucks per day), Manningham Road (3,000 less trucks per day) and Rosanna Road (2,800 less trucks per day). North East Link would reduce the number of trucks using Rosanna Road for cross-city trips. The predicted decrease in the volume of trucks travelling along Rosanna Road represents a reduction of up to approximately 75 per cent with North East Link compared with the 2036 'no project' scenario.</p>	<p>Section 9.3.3 'Freight movement and volumes'</p> <p>Section 9.5.2</p>
Improved Doncaster Area Rapid Transit (DART) travel times	<p>DART buses operate at capacity during the peak periods, with extensive over-crowding of services leading to long queues at the Doncaster Park and Ride facility. Currently, these buses travel along the freeway shoulders on a part-time basis during the morning and at a reduced speed, and are required to merge and diverge with general traffic at every freeway interchange due to the freeway entry and exit ramps.</p> <p>The Doncaster Busway would improve travel times for DART users by up to 30 per cent along the Eastern Freeway by 2036 (compared with the 'no project' scenario). Travel times for DART services along non-freeway route segments in the inner city and eastern suburbs are forecast to improve by up to 15 per cent by 2036 compared with the 'no project' scenario, as North East Link would reduce congestion on the arterial road network.</p>	<p>Section 9.3.4</p> <p>Section 9.5.3</p>
New and upgraded shared use paths	<p>Melbourne's north-east has an existing network of shared use paths. This network consists primarily of creek and river trails, which can be indirect and unsuitable as commuting corridors. There are few on-road cycling paths and limited connectivity between activity centres and the existing cycling network.</p> <p>Extensive shared use path upgrades are expected to improve accessibility and travel times for pedestrians and cyclists across the north-east. These include: a new shared use path that would be constructed parallel to the above-ground sections of North East Link, completing the missing link in the Greensborough Road corridor; a new north-south shared use path that would be constructed along Bulleen Road; and construction of a new shared use path between the Merri Creek and Chandler Highway, known as the North East Bicycle Corridor.</p>	<p>Section 9.3.5</p> <p>Section 9.5.4</p>



Construction of North East Link would change road conditions, traffic flows and travel times. Additional truck trips would be required for the delivery of construction materials and the removal of excavated soil.

These impacts would be carefully managed to minimise traffic and transport disruptions. Transport Management Plans would be developed and implemented to minimise disruption to affected local land uses, traffic, car parking, public transport (rail, tram and bus), pedestrian and bicycle movements and existing public facilities during all stages of construction (EPR T2).

The potential traffic impacts during construction are discussed in Section 9.4.

## 9.3 Existing conditions

This section outlines the existing conditions of the North East Link study area that relate to traffic and transport.

An overview of the transport network in Melbourne's north-eastern suburbs is shown in Figure 9-2, including:

- Freeways and arterial roads (shown in white)
- The metropolitan bus network (shown in orange)
- Metropolitan train and tram networks (shown in blue and green).

Existing conditions are discussed in the next subsections:

- Travel demand in Melbourne's north-east – assessment of current travel preferences and behaviour based on mode share statistics
- Road network – current key challenges and road network performance issues, existing traffic volumes, and travel times and accessibility
- Freight network – identification of key routes within the north-eastern freight network and the proportion and volumes of heavy vehicle traffic along these routes
- Public transport network – overview of trains, tram and bus services, including DART and Doncaster Park and Ride facility
- Walking and cycling network – overview of existing shared use paths, analysis of cyclist and pedestrian volumes and current planned upgrades.

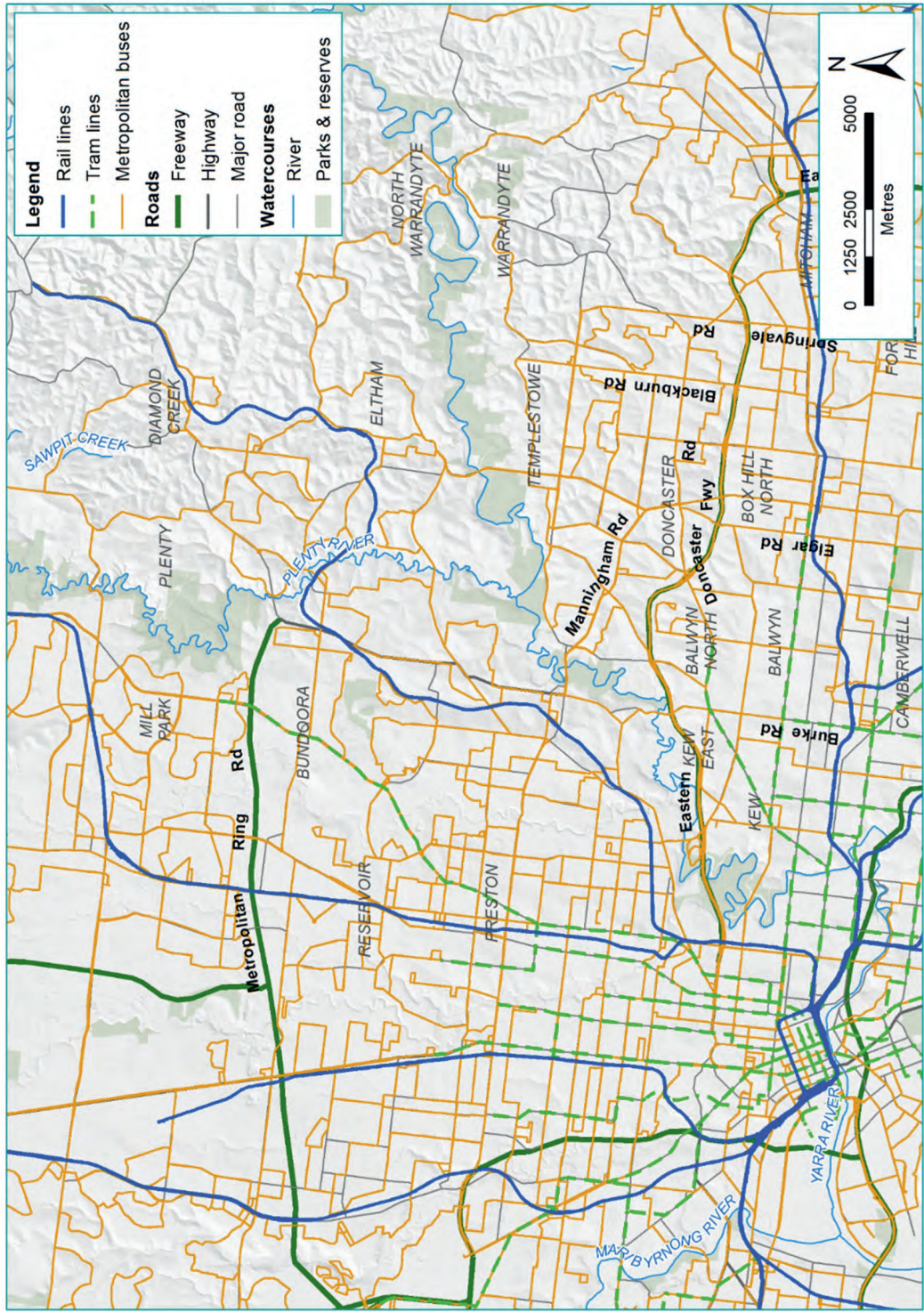
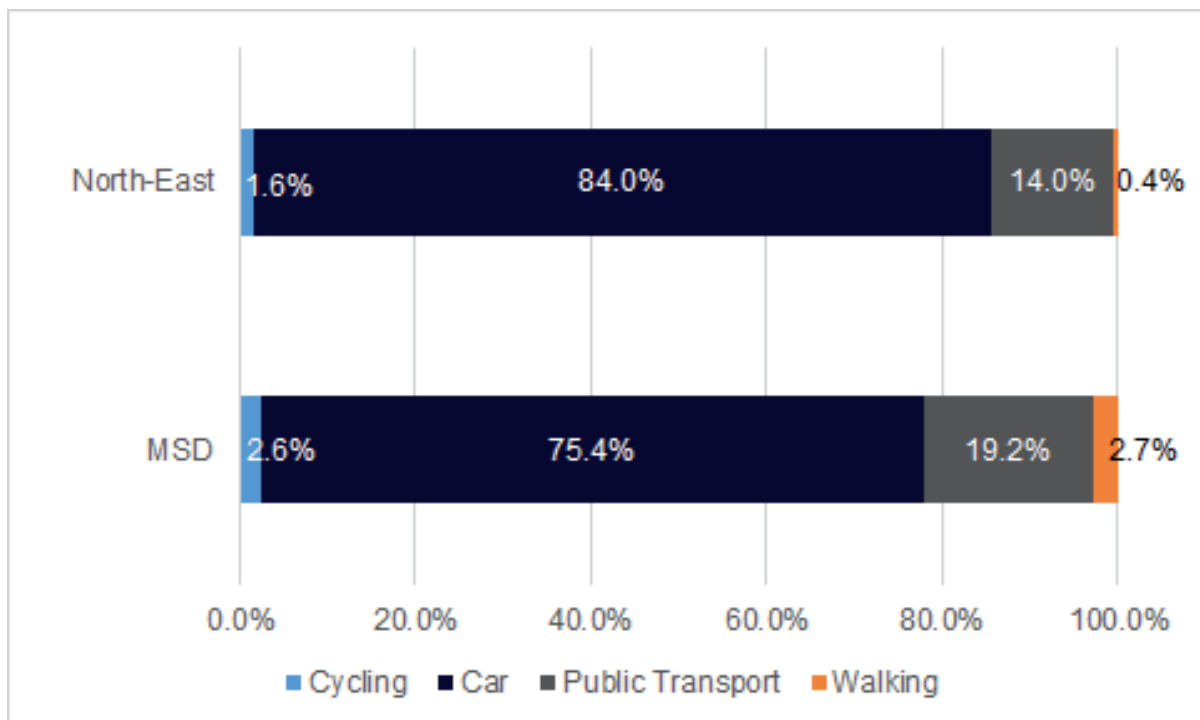


Figure 9-2 Melbourne's north-eastern transport network

### 9.3.1 Travel demand in Melbourne's north-east

There is a high reliance on car travel in Melbourne's north-east compared with broader metropolitan Melbourne. Illustrated in Figure 9-3, this is based on household travel surveys in 2012-13 for the Victorian Integrated Survey of Travel and Activity (VISTA), which indicated that private vehicles are used for 84 per cent of all trips within Melbourne's north-east.



**Figure 9-3** Transport mode share in the north-east vs. metropolitan Melbourne (defined as the former Metropolitan Statistical Division, MSD)

Source: Victorian Integrated Survey of Travel and Activity 2012-13

The preference for car travel corresponds to superior travel times for most destinations. Data from the strategic transport model indicates that cars travelling from the north-east would reach most destinations across Melbourne faster than would be possible if the same trips were taken on public transport. For example, private vehicle travel from Box Hill during the AM peak is typically 30 to 40 minutes faster than public transport for most destinations apart from the CBD, which can be accessed by express rail services.

As a result, Melbourne's north-east is heavily reliant on its road network for travel, particularly as traffic volumes in the north-east have grown significantly over the past decade.



## 9.3.2 Road network

This section covers:

- Current key challenges for the existing road network, including – Congestion on the five Yarra River crossings and on the sparse arterial network; over-reliance on the Rosanna Road north-south corridor; flow breakdown along the Eastern Freeway; and conflicts between pedestrians, cyclists and other traffic.
- Existing traffic volumes – Findings from the analysis of existing average weekday traffic volumes along the freeways and key arterial roads within the north-east, based on traffic surveys conducted in 2017 and 2018.
- Travel times and accessibility – Assessment of the duration and variability of peak-time trips along six key routes in Melbourne's north-east.

### Key roads servicing north-eastern Melbourne

- The **Eastern Freeway** is a high-capacity freeway linking the eastern suburbs from EastLink to the inner suburbs and CBD. The existing freeway has a 100 kilometres per hour speed limit and ranges between six and 10 lanes, with priority 'T2' lanes for vehicles carrying at least two people.
- The **M80 Ring Road** is a high-capacity orbital freeway spanning from Greensborough in the north-east to Laverton in the south-west. It facilitates high volumes of traffic between the northern and western suburbs and is currently undergoing a program of upgrades and widening works to meet the needs of population growth in these areas. The M80 Ring Road comprises the Metropolitan and Western Ring Roads, and connects the Hume, Tullamarine, Calder, Princes and West Gate freeways. The majority of the freeway has a 100 kilometres per hour speed limit, with the exception of the segment between Plenty Road and Greensborough Bypass which is 80 kilometres per hour.
- **Plenty Road** is a key route connecting central Melbourne, the inner northern suburbs and the La Trobe National Employment and Innovation Cluster (NEIC), and serves as the primary access route to the M80 Ring Road from the north. The northern section of Plenty Road beyond Kingsbury Drive is generally sign-posted at 80 kilometres per hour, which drops to 60 kilometres per hour further south.
- **Greensborough Road/Rosanna Road/Bulleen Road** is the preferred route for vehicles travelling between the M80 Ring Road and Eastern Freeway. It serves multiple functions as a north-south traffic route, a freight route and Principle Bicycle Network route, connecting population and employment centres in the north and east, providing access to local neighbourhoods and enabling freight journeys between the M80 Ring Road and the Eastern Freeway. Speed limits along the corridor range from 80 kilometres per hour along Greensborough Bypass at the northern end, to 60 kilometres per hour further south along Greensborough Road and Rosanna Road and 70 kilometres per hour along Bulleen Road.
- The **Fitzsimons Lane/Main Road/Para Road** route provides an alternative for traffic between the M80 Ring Road and the Eastern Freeway. Fitzsimons Lane, Main Road and Para Road have 80 kilometres per hour, 70 kilometres per hour and 60 kilometres per hour speed limits respectively.

## Current key challenges

The strategic transport modelling indicates the road network within the north-east is on average more congested than the rest of metropolitan Melbourne. While the north-east accounts for approximately 18 per cent of all vehicle kilometres travelled, it accounts for 25 per cent of congested vehicle hours travelled. Average traffic speeds in the north-east are also typically 16 per cent slower than the average across metropolitan Melbourne.

The traffic and transport assessment identified the following key challenges for the existing road network:

**Congested Yarra River crossings** – The Yarra River cuts diagonally through the north-east and its presence is a barrier to north-south movements throughout Melbourne's north-east. There are five river crossings within the north-east (as shown in Figure 9-2) at Chandler Highway, Burke Road, Manningham Road, Fitzsimons Lane and Kangaroo Ground-Warrandyte Road.

People use these river crossings to travel within, outside and through the north-east. These competing demands for limited road space cause congestion during peak periods.

**A sparse and congested arterial road network** – Melbourne's north-eastern suburbs form the foothills of the Yarra Ranges. The geographic features of this area were historically unfavourable to urban development, and contributed to the establishment of a relatively sparse arterial road network. Trips are heavily reliant on a limited number of arterial roads, such as Bell Street for east-west movements and Rosanna Road and Fitzsimons Lane for north-south movements.

A comparison of the VicRoads declared road networks for the north-eastern and eastern suburbs is presented in Figure 9-4. There are eight north-south arterial roads in the north-east, represented by the green dots. The same span in the eastern suburbs (represented by the blue dots) is supported by 17 routes, providing greater choice and network resilience for residents in the east.

**Over-reliance on the Rosanna Road north-south corridor** – Rosanna Road is one of the busiest north-south arterial roads in the north-east, carrying up to 50,000 vehicles per day. It is a four-lane, two-way undivided road, with low density residential dwellings along its length.

The Rosanna Road traffic corridor includes Greensborough Road to the north and Bulleen Road to the south. Due to limited alternative routes in the region, this north-south corridor is heavily relied upon for high-volume, cross-city traffic and freight movements, while also servicing local trips and areas such as the Heidelberg Activity Centre.

It is the preferred route for freight traffic in Melbourne's north-east (refer to Section 9.3.3) and also has a significant role in feeding Yarra River crossing movements via Manningham Road and Bulleen Road.

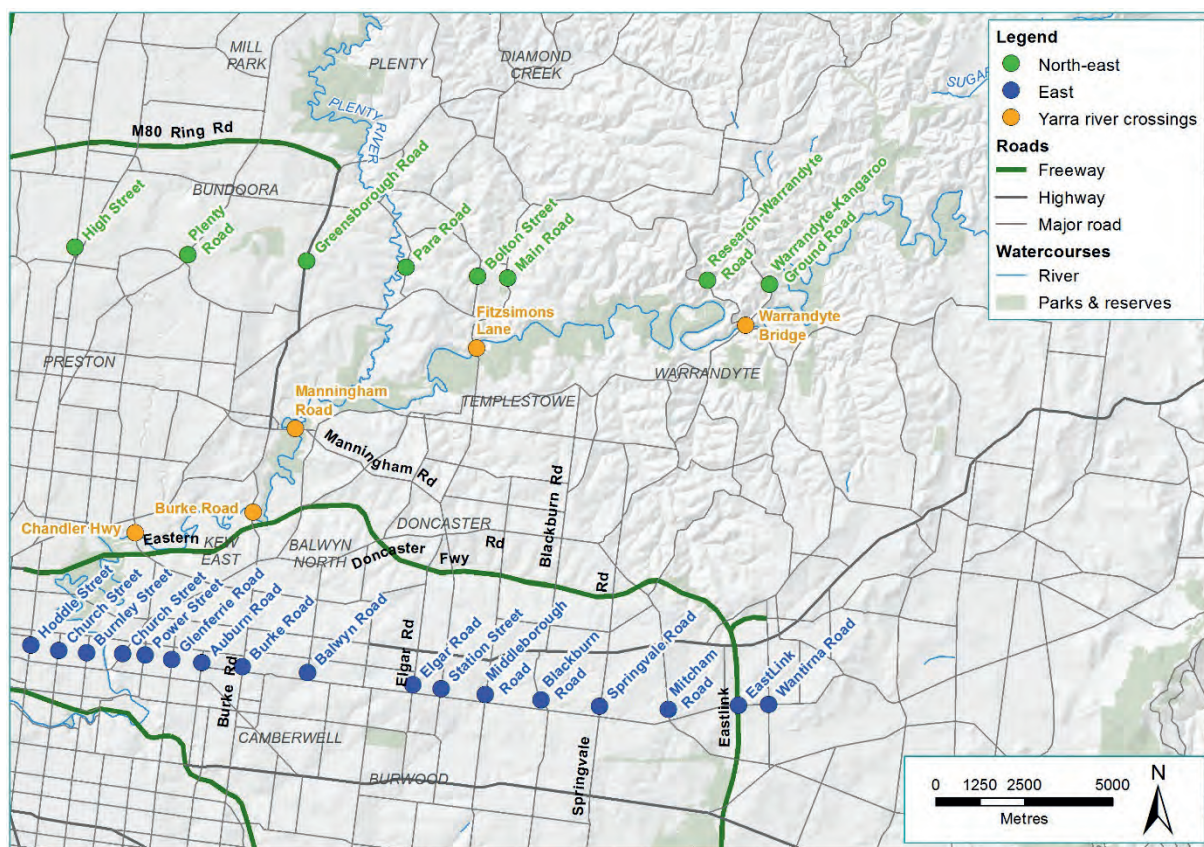


Figure 9-4 VicRoads declared road network east and north-east

**Flow breakdown along the Eastern Freeway** – The Eastern Freeway is a highly-utilised corridor with peak hour congestion affecting many sections, especially at its western terminus at the Alexandra Parade/Hoddle Street freeway exit. Due to the freeway abruptly terminating at an arterial road at its western end, the section of the Eastern Freeway between Chandler Highway and Hoddle Street has the lowest average vehicle speed of all freeways in Melbourne. Several factors contribute to flow breakdown along the Eastern Freeway, including:

- Merging and weaving at the freeway interchanges – flow breakdown can occur when traffic on the freeway is forced to slow down to accommodate large volumes of merging traffic. This typically occurs at the Springvale Road interchange in the westbound direction (1,800 vehicles per hour) and at Thompsons Road in the eastbound direction (1,500 vehicles per hour).
- A lack of ramp metering along the freeway – the majority of the Eastern Freeway is not ramp-metered. Ramp metering regulates the rate and spacing of traffic entering onto the freeway using traffic lights and is demonstrated to improve the overall performance (vehicle speeds and capacity) of a freeway network. Ramp meter gantries have been implemented on the West Gate Freeway and M80 Ring Road and are currently being installed on the Tullamarine Freeway and CityLink as part of the CityLink-Tulla Widening Works.

- Closely-spaced interchanges – there are five interchanges on the Eastern Freeway within a 5.5-kilometre length of road between Elgar Road and Springvale Road. The short distances between these interchanges leads to an intensity of lane changing activity across a relatively short section of road. As a result, there is a high degree of pressure placed on the left-most lanes of the freeway, as vehicles position themselves to exit the freeway in advance of their exits and, at the same time, traffic is merging onto the freeway.
- Lack of capacity – the number of traffic lanes on some sections of the Eastern Freeway also constrain the overall capacity, with some sections of only three lanes. The sections of the freeway typically operating over theoretical capacity are all three-lane sections of the freeway: Station Street to Elgar Road, Elgar Road to Doncaster Road, and Doncaster Road to Bulleen Road in the PM peak and Springvale Road to Blackburn Road in the AM peak.
- The EastLink tunnels – traffic flow near the EastLink tunnels often breaks down in peak periods. This is not due to a lack of capacity in the tunnels but rather upstream and downstream bottlenecks. In the AM peak, the westbound Springvale Road on-ramp carries high traffic volumes which enter the freeway without the control of ramp signals. This uncontrolled entry causes flow breakdown on the Eastern Freeway, which then sends a congestion 'shockwave' back through the EastLink tunnels. This is exacerbated by unmetered traffic entering from the Ringwood Bypass onto EastLink before the tunnel. This high-volume movement is very close to the tunnel portal and when combined with the congestion caused by the Springvale Road entry ramp, average speeds in the tunnel drop significantly.

**Conflicts between pedestrians and cyclists and other traffic** – As private vehicles are the predominant travel mode throughout the north-east, pedestrians and cyclists often encounter barriers to movement along roads that are congested and have been planned to prioritise traffic movements. Roads in the north-east often operate at high volumes with a large proportion of heavy vehicles, high sign-posted speeds, and reduced footpath quality and bicycle lane coverage.

## Existing traffic volumes

Traffic surveys were conducted within the north-east in 2017 to obtain traffic volumes for the assessment of road network performance. The total average weekday two-way traffic volumes for 2017 are shown in Figure 9-5, Figure 9-6 and Figure 9-7, and key findings are summarised as follows:

- The Eastern Freeway is the busiest thoroughfare in the study area and is heavily relied upon for road trips in the north-east. The busiest section of the Eastern Freeway is between Tram Road and Middleborough Road, carrying up to almost 180,000 vehicles per day. The western end of the freeway at Hoddle Street recorded the lowest volumes, ranging from approximately 120,000 to 140,000 vehicles per day. This reflects the capacity constraints of this end of the freeway, which is directly connected to the arterial road network.
- The M80 Ring Road carries approximately 140,000 to 160,000 vehicles per day west of the Hume Freeway. Traffic volumes generally decrease as the freeway approaches the Greensborough Bypass, with approximately 80,000 to 90,000 vehicles per day recorded east of Plenty Road.



- Greensborough Bypass carries up to 80,000 vehicles per day just south of the M80 Ring Road and is a major arterial servicing north-south traffic within the study area. Traffic volumes further south near Simpson Barracks were recorded as closer to 68,000 vehicles, indicating that many local trips are being undertaken along this corridor.
- Rosanna Road carries up to 50,000 vehicles per day and is a continuation of the north-south corridor from Greensborough Road, allowing access to the Heidelberg shopping area as well as the Eastern Freeway via Manningham Road and Bulleen Road.
- Manningham Road carries 64,000 to 83,000 vehicles per day across the Yarra River. It is a major arterial providing east-west connectivity via Bell Street and north-south connectivity via Rosanna Road and Bulleen Road.
- Bulleen Road also carries up to 50,000 vehicles per day, facilitating traffic movements between Manningham Road and the Eastern Freeway interchange. It continues the north-south corridor from the M80 Ring Road via Greensborough Road and Rosanna Road.
- Plenty Road is another major north-south corridor through the study area. It carries up to 64,000 vehicles per day north of the M80 Ring Road, which reduces to 23,000 per day further south at Murray Road. The route provides direct connectivity to La Trobe University and the proposed La Trobe NEIC.
- Chandler Highway carries 38,000 to 50,000 vehicles per day across the Yarra River. The route connects Grange Road from the north (19,000 to 26,000 vehicles per day) to Princess Street (28,000 to 35,000 vehicles per day) and Earl Street (13,000 to 16,000 vehicles per day) in the east.
- The Burke Road bridge is the next river crossing to the east of Chandler Highway, carrying 35,000 to 45,000 vehicles per day. South of the Yarra River, traffic demand disperses onto the arterial road network and traffic volumes on Burke Road reduce to 26,000 to 33,000 per day.
- Further east, Fitzsimons Lane carries up to 68,000 vehicles per day across the Yarra River. It provides connectivity between arterial roads in the east such as Williamsons Road (23,000 to 30,000 vehicles per day), Reynolds Road (26,000 to 34,000 vehicles per day) and Main Road to the north (up to 32,000 vehicles per day).
- The final river crossing in the north-east at Kangaroo Ground-Warrandyte Road carries up to 21,000 vehicles per day. The bridge is located almost eight kilometres away from the nearest crossing at Fitzsimons Lane, meaning that residents are heavily dependent on this route for north-south accessibility.
- Templestowe Rd near Birrarung Park carries 8,000 to 11,000 vehicles eastbound per day and westbound carries 7,000 to 10,000 vehicles per day.
- Arterial roads south of the Eastern Freeway also carry significant traffic volumes, such as Elgar Road (26,000 to 34,000 vehicles per day), Station Street (22,000 to 30,000 vehicles per day), Middleborough Road (28,000 to 37,000 vehicles per day) and Springvale Road (50,000 to 66,000 vehicles per day).

- North of the Eastern Freeway, Blackburn Road carries 20,000 to 27,000 vehicles per day south of Doncaster Road, and 27,000 to 35,000 vehicles per day between Doncaster Road and Reynolds Road.
- The section of Springvale Road north of the Eastern Freeway carries 19,000 to 24,000 vehicles per day between Doncaster Road and Reynolds Road.
- Traffic volumes along Doncaster Road are variable. It carries up to 21,000 vehicles per day near Bulleen Road, up to 32,000 vehicles per day south of the Eastern Freeway, up to 25,000 vehicles per day north of the Eastern Freeway and up to 31,000 vehicles per day approaching Blackburn Road.

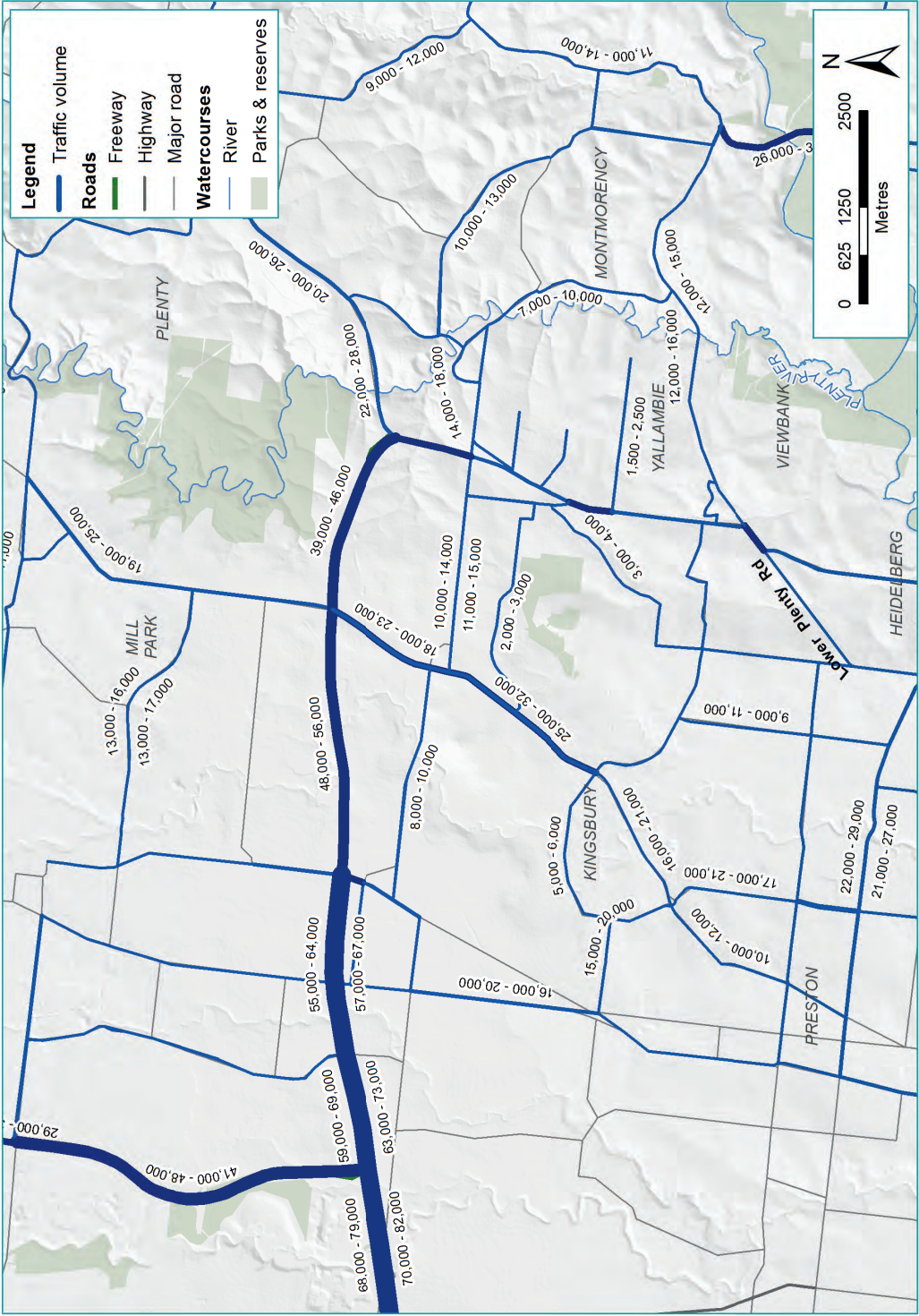


Figure 9-5 Total average weekday traffic volumes, 2017 – study area north



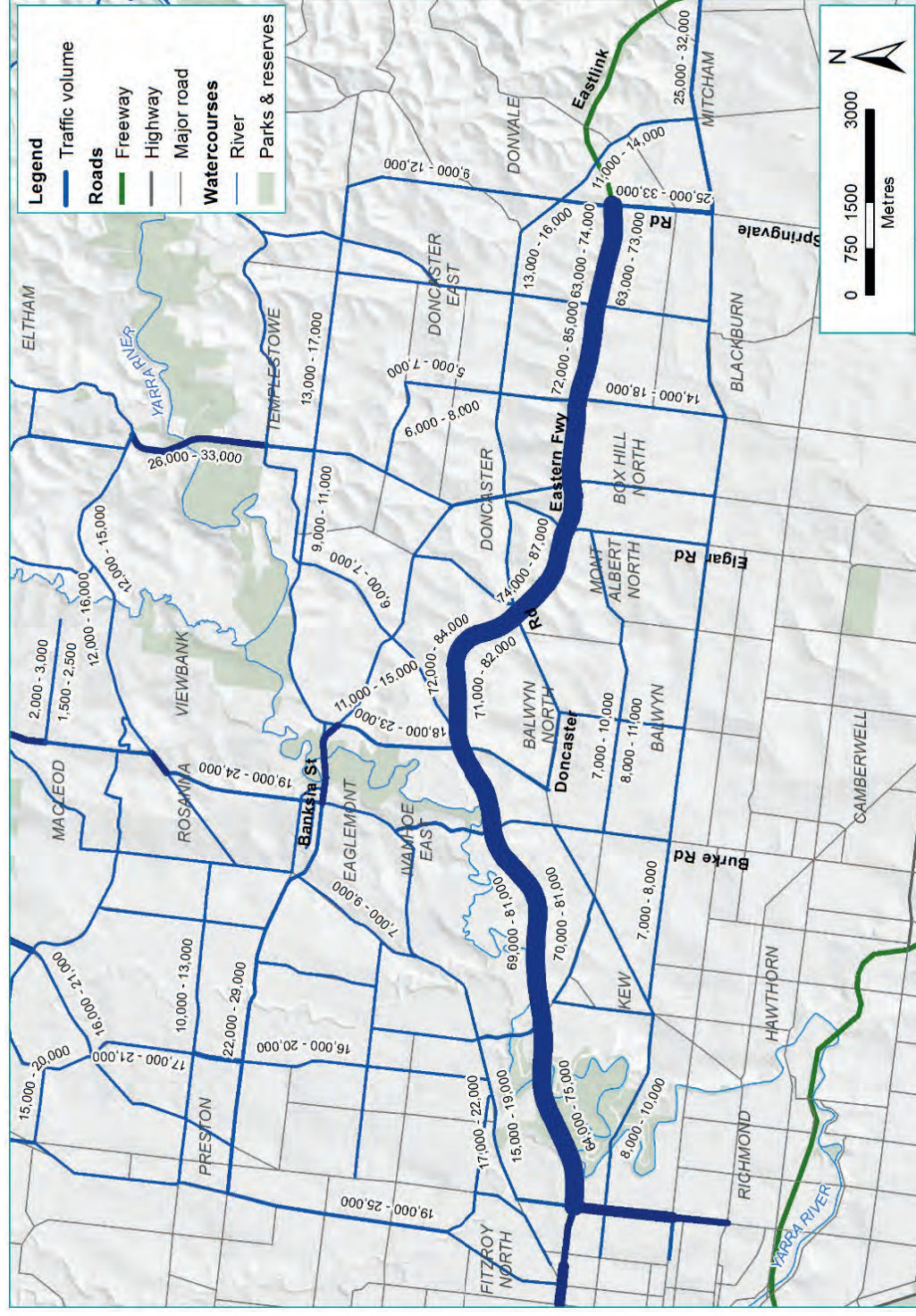


Figure 9-6 Total average weekday traffic volumes, 2017 – study area south



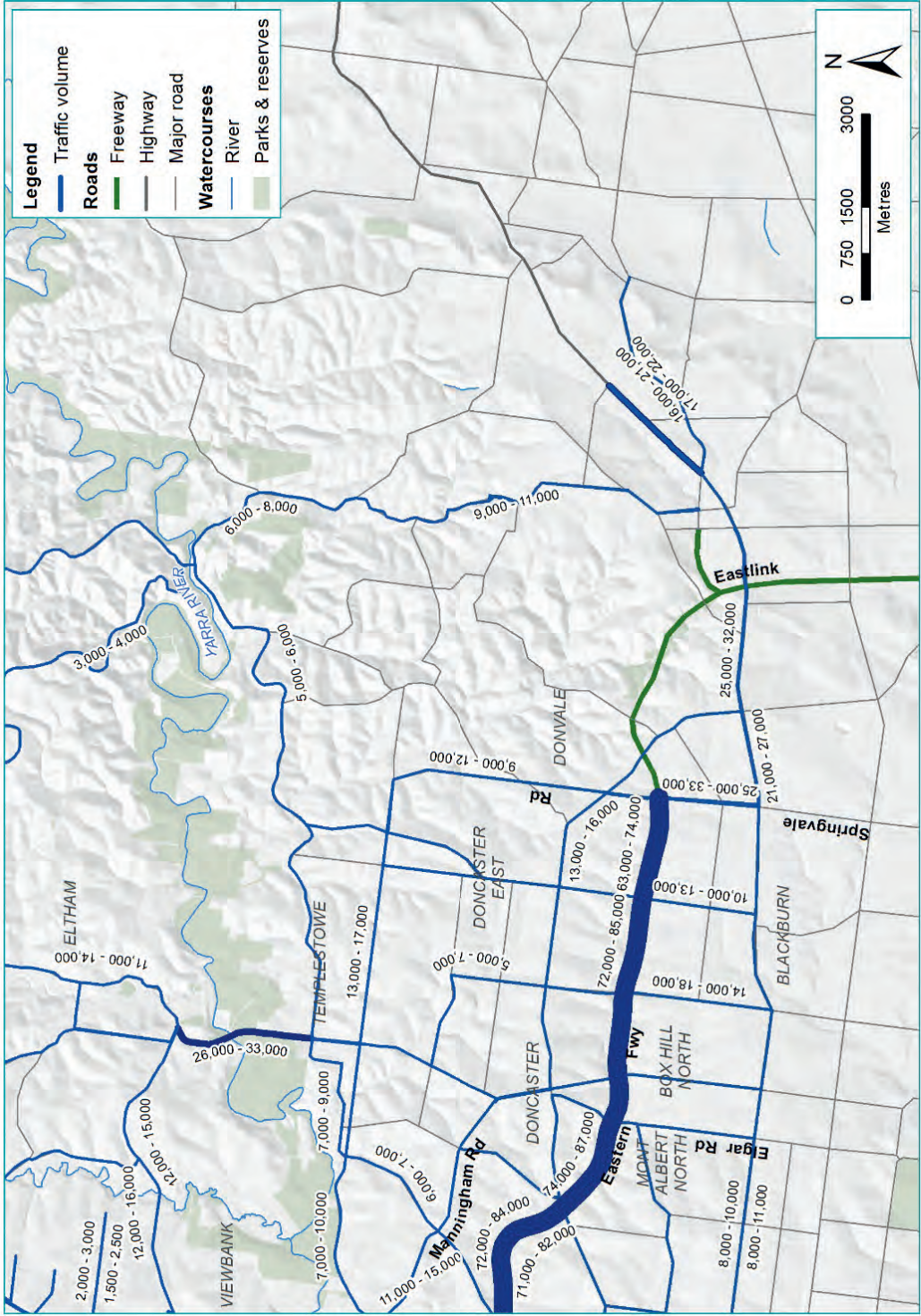


Figure 9-7 Total average weekday traffic volumes, 2017 – study area east

## Travel times and accessibility

Travel time data from the strategic transport model was analysed to determine the duration and variability of peak-time trips along six key routes in Melbourne's north-east:

- M80 Ring Road interchange to Wattle Glen
- Kangaroo Ground to Warrandyte Bridge
- Warrandyte Bridge to Ringwood
- Lower Plenty Road to Manningham Road via Fitzsimons Lane
- Eastern Freeway between Hoddle Street and Springvale Road
- M80 Ring Road to Eastern Freeway.

These routes are shown in Figure 9-8.

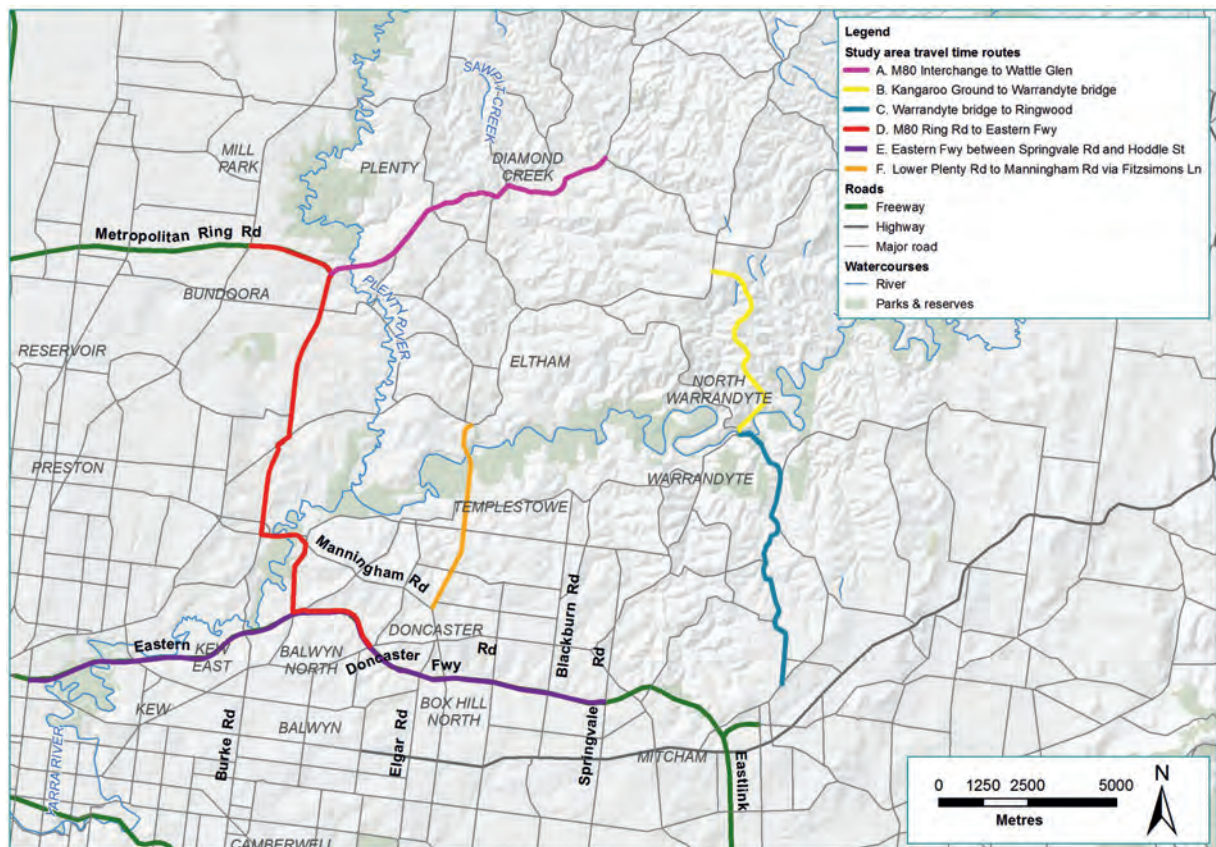


Figure 9-8 North-east travel time routes



The analysis found that travel times along these key routes are variable and significantly affected by congestion during peak times. Travel times are typically highest in the peak 'direction' such as the AM peak westbound or southbound and PM peak eastbound and northbound. Travel times in the 'counter-peak direction' (AM peak eastbound and northbound and PM peak westbound and southbound) are typically faster and are more like off-peak conditions.

The most heavily congested and least reliable route is from the **M80 Ring Road to the Eastern Freeway via Greensborough Road, Rosanna Road and Bulleen Road**. The median travel time southbound along this route during the AM peak is 44 minutes, but this trip can be as short as 30 minutes or as long as one hour.

Travel times are most variable on Bulleen Road near the Eastern Freeway, whereas travel times along M80 Ring Road and Greensborough Road are generally faster and more consistent than for other sections of this route. Heavy delays are experienced in both directions near the intersection of Rosanna Road and Manningham Road; during the PM peak it takes an average of 10 minutes to complete the turn onto Rosanna Road from Dora Street.

Travel times recorded along the **Eastern Freeway between Springvale Road and Hoddle Street** are also highly variable during the AM peak, ranging from 20 to 38 minutes for vehicles travelling westbound in the peak direction. The longest delays and greatest amount of variability are at the approach to Hoddle Street.



The PM peak direction eastbound travel times are less variable, recording an average travel time of 23 minutes. Delays were spread across the entirety of the Eastern Freeway east of Chandler Highway. Travel times along this route are typically around 11 to 13 minutes for traffic that is not travelling in the peak direction.

The median southbound trip from **Kangaroo Ground to Warrandyte Bridge** during the AM peak is approximately nine minutes, although the longest trip recorded was approximately 21 minutes. Similarly, the median trip duration for southbound travel between **Lower Plenty Road and Manningham Road via Fitzsimons Lane** during the AM peak is approximately 11 minutes, while the longest trip recorded along this route was 19 minutes. Travel times northbound along this route are also highly variable during the PM peak, with the maximum trip duration almost double the minimum trip duration.

Travel times from the M80 Ring Road interchange to Wattle Glen and from Warrandyte Bridge to Ringwood are generally less variable. Trips in the peak direction westbound from **Wattle Glen to the M80 Ring Road** interchange take on average 17 minutes westbound during the AM peak and 15 minutes eastbound during the PM peak, with average travel time reducing to 12 minutes eastbound in the AM peak and 13 minutes westbound in the PM peak. Trips in the peak direction from **Warrandyte Bridge to Ringwood** take on average 10 minutes southbound during the AM peak and 14 minutes northbound during the PM peak, with travel time averaging 10 minutes in the AM peak travelling northbound and PM peak travelling southbound.

### 9.3.3 Freight network

#### The north-east freight network

Freight moves through the north-east as it is carried to and from industrial and employment precincts in Melbourne's north (Tullamarine, Somerton, the Melbourne Wholesale Fruit, Vegetable and Flower Market at Epping, Thomastown, Northland and Heidelberg West) and south-east (Bayswater, Scoresby and Dandenong). These major industrial and employment precincts are shown in Figure 9-9. Freight demand is also generated within the north-east by local retail and shopping centres, business parks and industrial activities.



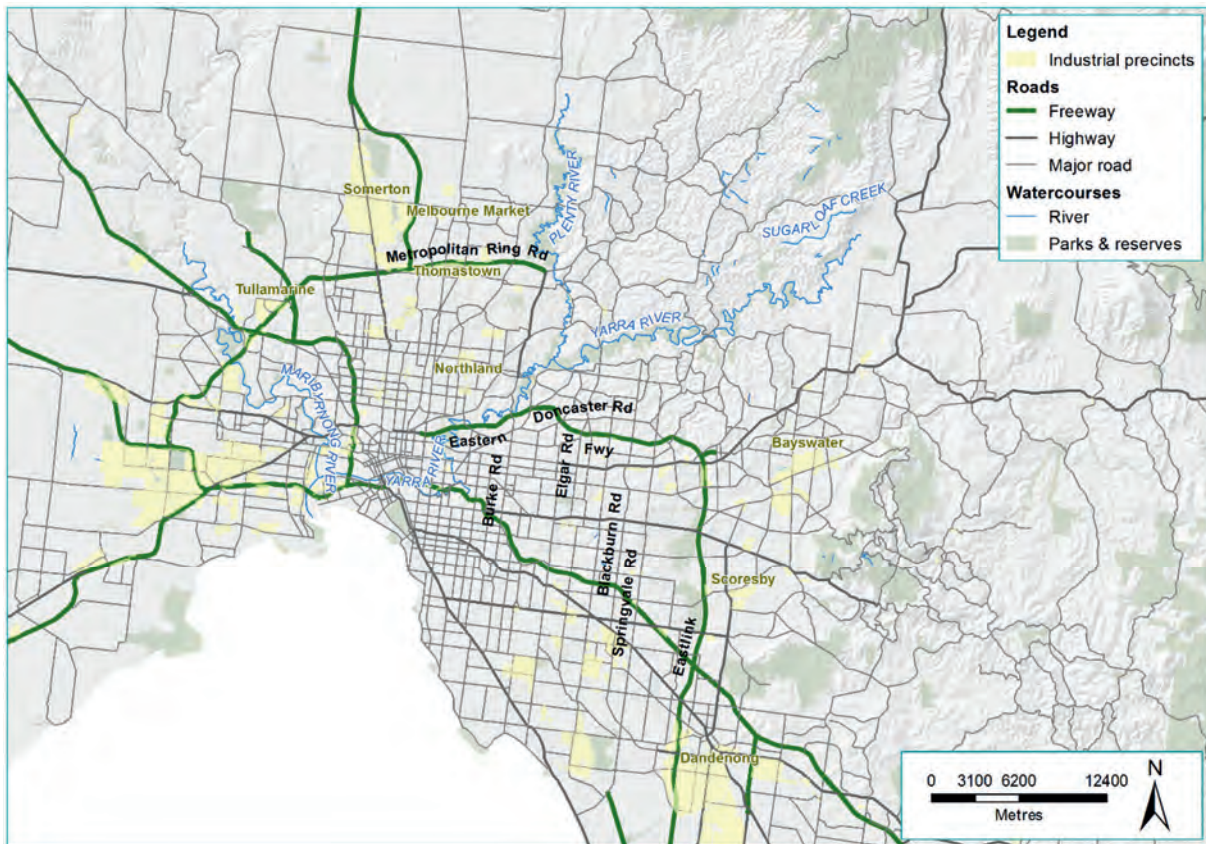


Figure 9-9 Major industrial and employment precincts

Within the north-east, freight is primarily distributed using the arterial road network. Some of these freight vehicles require specific networks that are capable of handling their size and weight. VicRoads has approved certain road routes for use by these vehicles, as described below. General heavy vehicle traffic is permitted to use any road within the network, unless a specific restriction is in place.

The **B-Double network**: The VicRoads B-Double network shown in Figure 9-10 is approved for use by Class 2 B-Doubles and Class 3 B-Doubles. Some roads are subject to time of day restrictions. B-Doubles are not permitted on the Yarra River crossing at Burke Road. Other restricted arterial roads in the north-east include Rosanna Road, Greensborough Road and Lower Plenty Road.

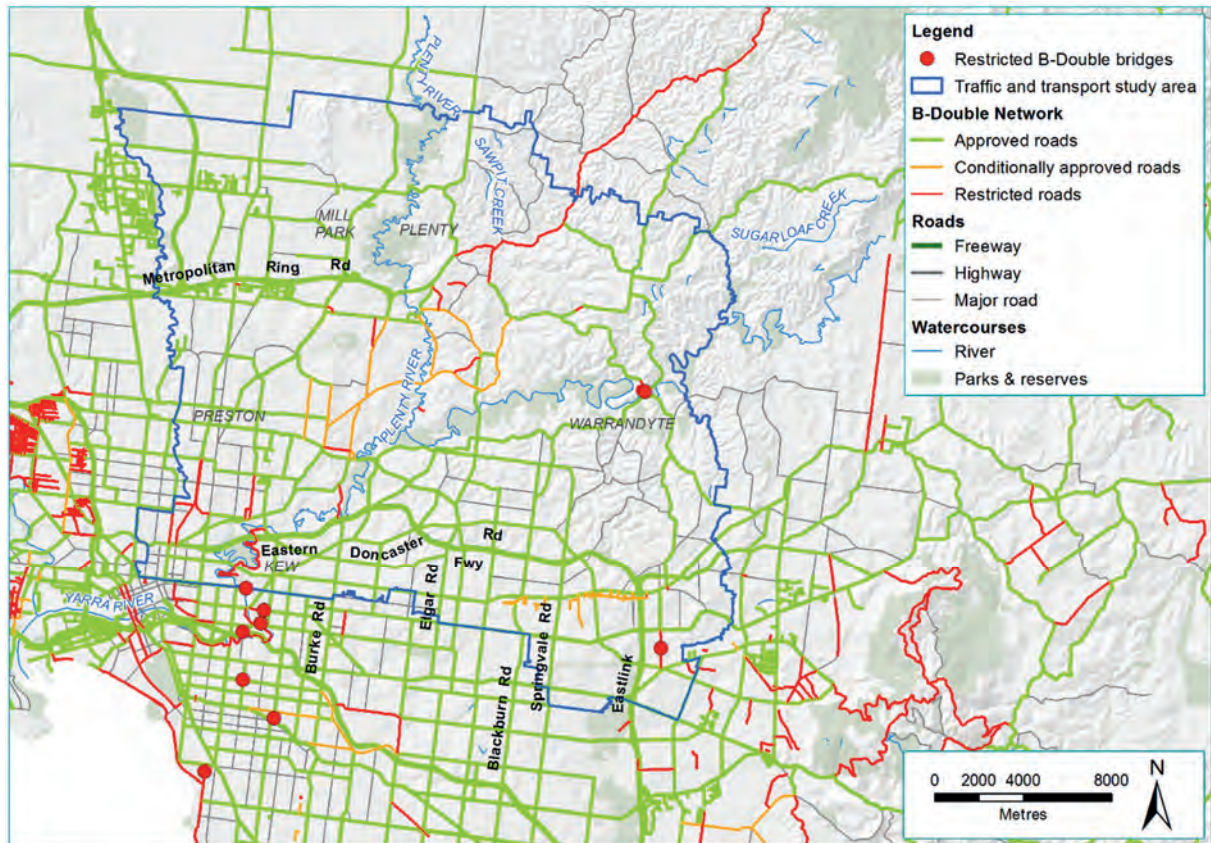


Figure 9-10 Victoria's B-Double network



**The Higher Mass Limits (HML) network** – VicRoads also specifies a HML network for Class 2 and 3 heavy vehicles over certain weight limits. A similar level of restriction applies across the north-east as for the B-Double network, as shown in Figure 9-11.

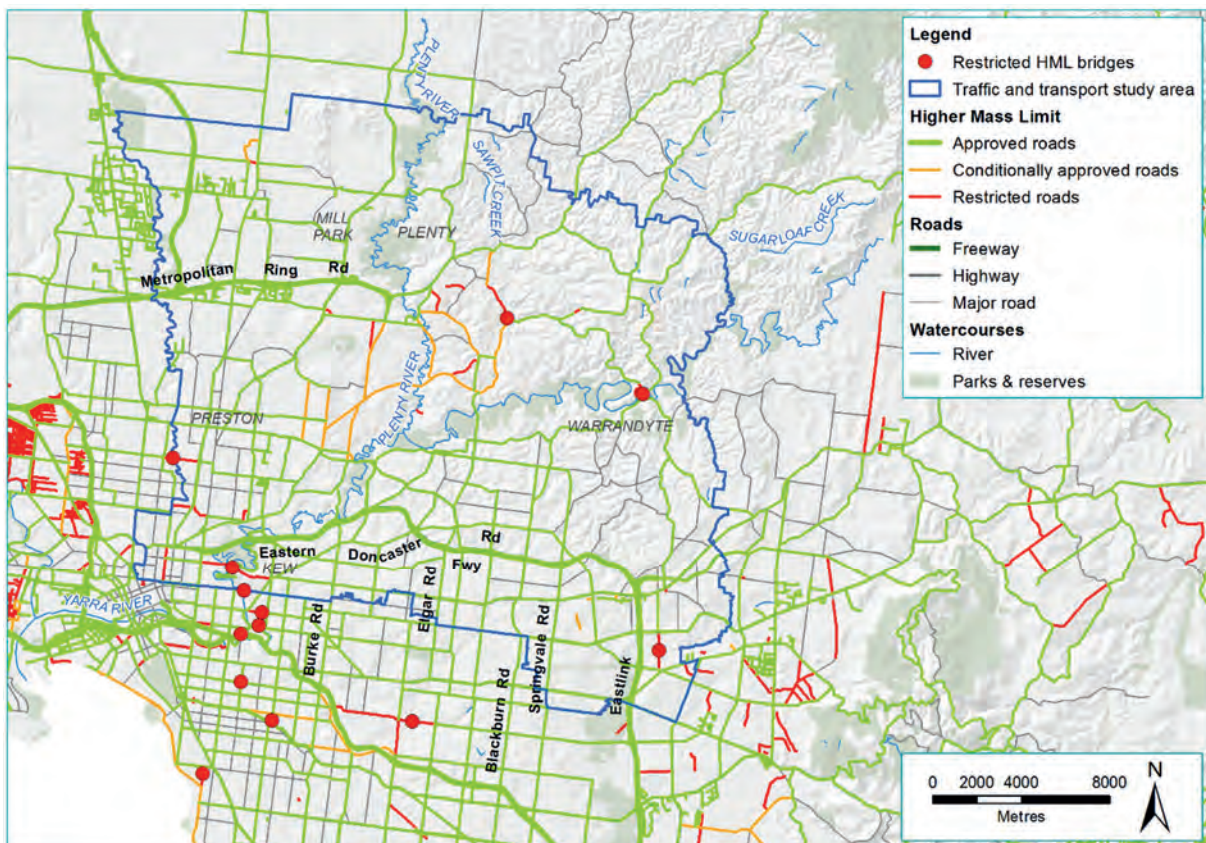


Figure 9-11 Melbourne Higher Mass Limits network

**The Over-size and Over-mass (OSOM) network** – VicRoads has designated OSOM routes based on a network of arterial and municipal roads that can cater for vehicle combinations that operate up to five metres high or wide, 30 metres long or 100 tonnes gross mass. The section of the OSOM network within the north-east is shown in Figure 9-12. Roads on this network are either approved for travel by over-size and over-mass vehicles (in green), approved with conditions (in orange), or require road manager approval for access with a separate permit.

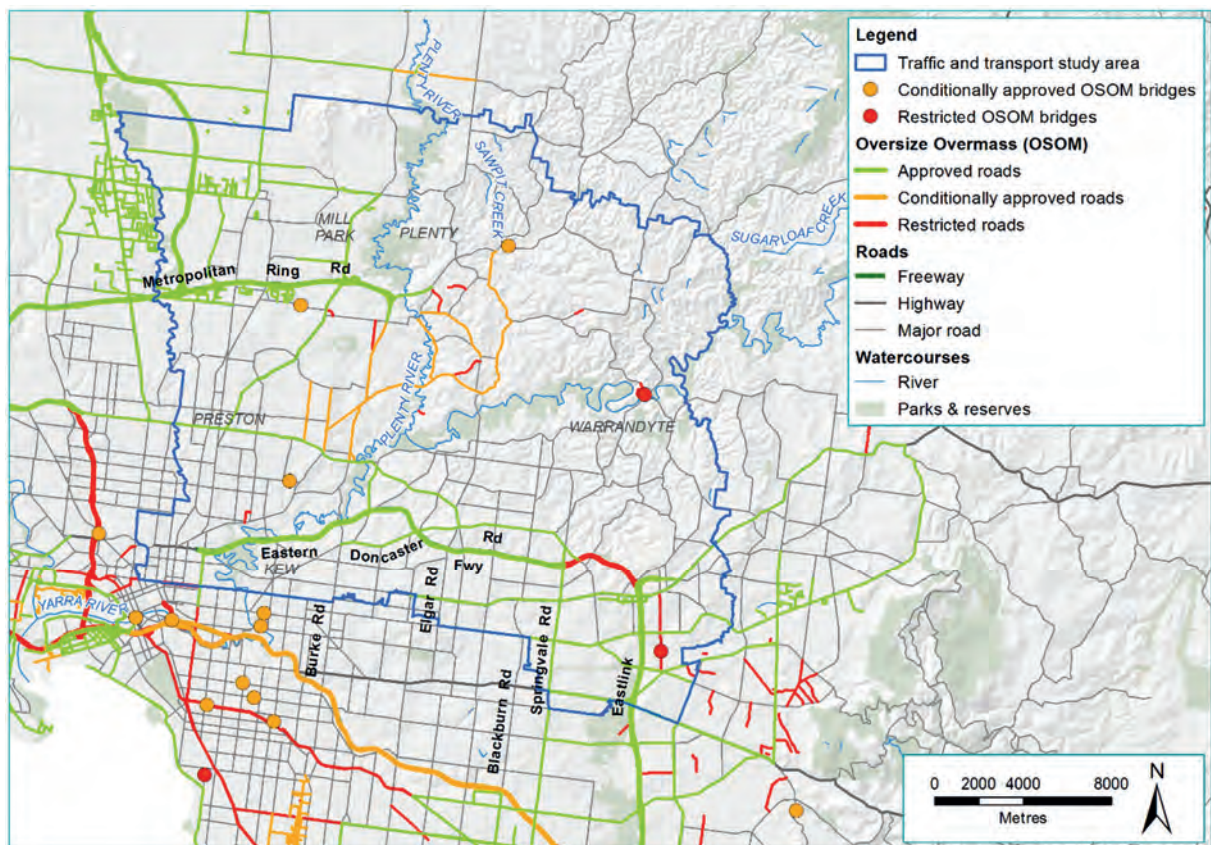


Figure 9-12 VicRoads Over-size and Over-mass network



The **Over Dimensional (OD) network** – VicRoads has designated OD routes based on a network of arterial and municipal roads that can cater for vehicle combinations that exceed five metres high or wide, 30 metres long or 100 tonnes gross mass. As shown in Figure 9-13, the Greensborough Road/Rosanna Road/Bulleen Road corridor is the only approved OD route through north-east Melbourne, allowing access to the south-east via the Eastern Freeway, Springvale Road and EastLink.

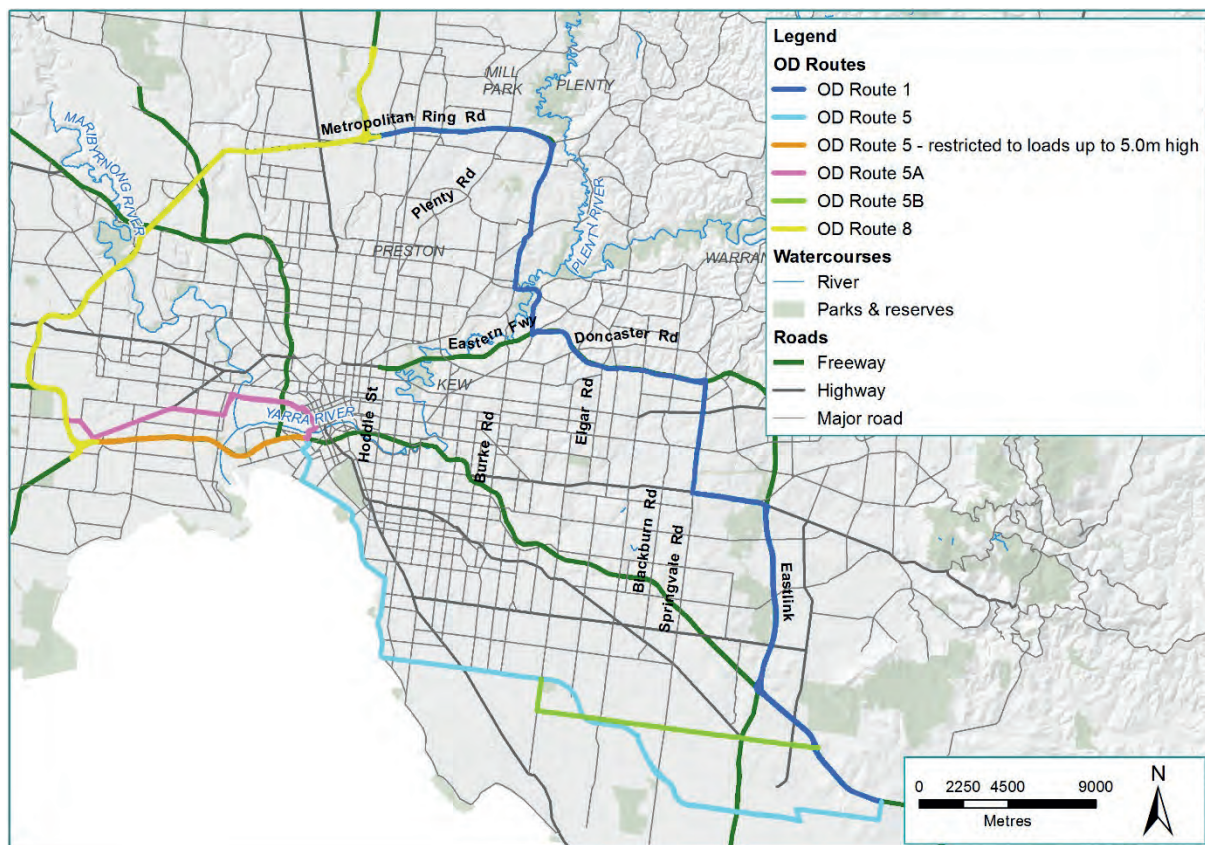


Figure 9-13 VicRoads Over Dimensional network

VicRoads also has an approved High Productivity Freight Vehicle (HPFV) network. HPFVs are very large or long truck and trailer combinations that require permits from the National Heavy Vehicle Regulator. HPFVs allow operators to distribute higher volume and mass loads using larger, safer and more productive trucks on specified routes. In general, the road network within the north-east cannot accommodate HPFVs, with weight limits along the Eastern Freeway and truck curfews along arterial roads.

Truck curfews are enforced to reduce truck traffic throughout much of the north-east at night, as shown in Figure 9-14. Trucks in excess of 16.5 tonnes are not allowed to travel on these roads between the hours of 10 pm and 6 am, unless they are making local deliveries within the curfew area. The curfews prevent the use of the Fitzsimons Lane access across the Yarra River and require a longer route to access river crossings at Banksia Street and Burke Road.

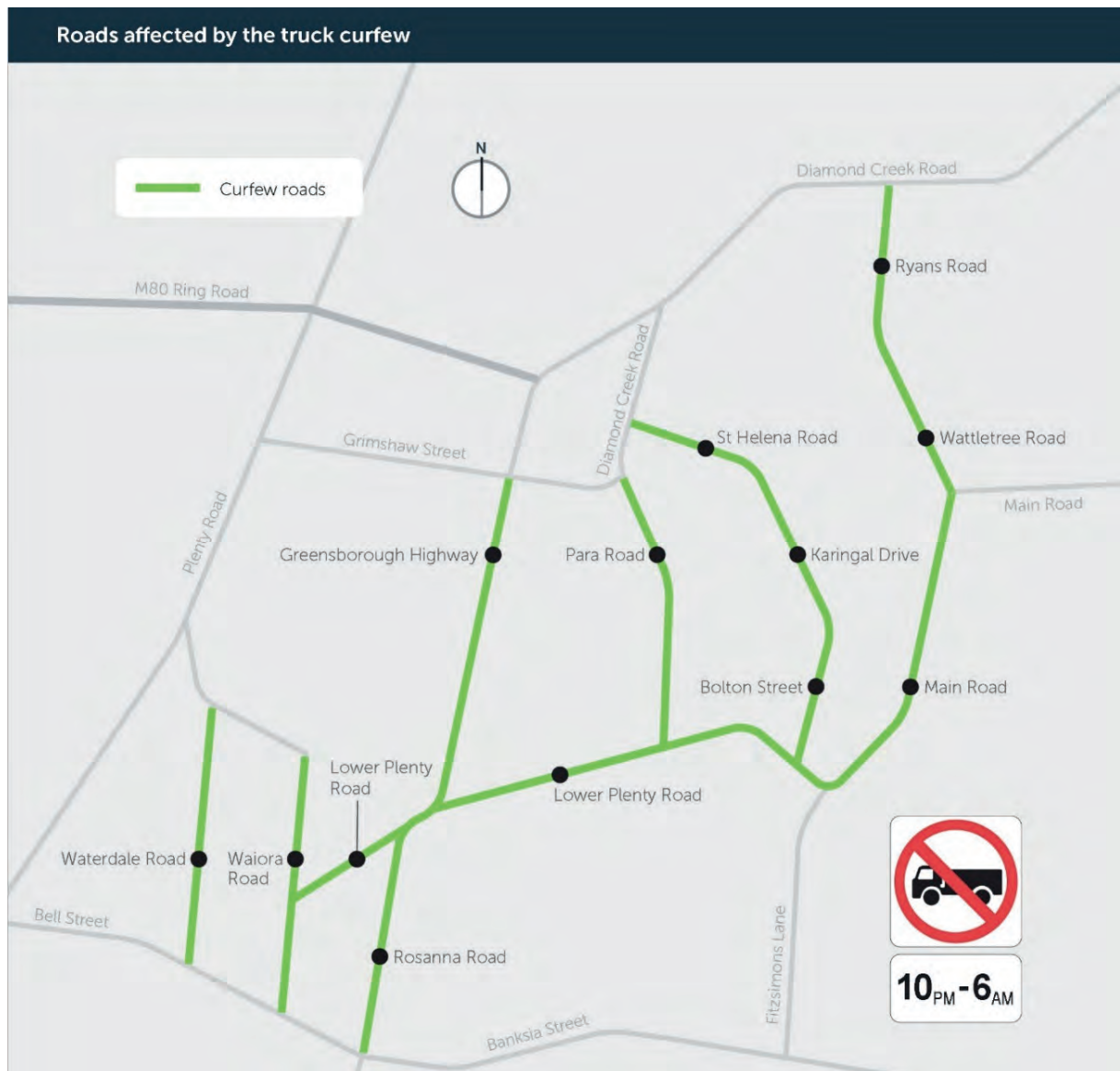


Figure 9-14 North-eastern suburban truck curfew locations

Source: VicRoads.vic.gov.au

## Freight movement and volumes

Analysis of data from the strategic transport model indicates that travel by heavy vehicles accounts for 7 per cent of total vehicle kilometres travelled within the north-east. This is similar to the proportion of heavy vehicle kilometres travelled within metropolitan Melbourne, at 8 per cent. However, a greater proportion of the heavy vehicles within the north-east (70 per cent) travel on the arterial network rather than on the freeway network, compared with the metropolitan Melbourne average (57 per cent).

Truck traffic through the north-east primarily uses the Eastern Freeway and the Greensborough Road/Rosanna Road/Bulleen Road corridor, as well as Fitzsimons Lane. This truck demand occurs despite the primarily residential land uses along the arterial roads and extensive curfews operating throughout the region. These routes are described below.

- The Eastern Freeway – this is the primary route for freight travelling between the northern, eastern and south-eastern suburbs. Trucks access the freeway from the north via the north-eastern arterial road network, and from the east via the freeway connection to EastLink. Most heavy vehicles travelling westbound on the Eastern Freeway exit at Bulleen Road, with many also exiting at Chandler Highway. Some trucks also exit the freeway at Station Street and travel north via Manningham Road.
- The Greensborough Road/Rosanna Road/Bulleen Road corridor – this is the preferred route for trucks crossing the Yarra River, and carries approximately 3,000 to 8,000 trucks per day (total average weekday traffic volume) along its length. Truck origin-destination surveys undertaken over a 24-hour period found that trucks were three times as likely to use Bulleen Road rather than Fitzsimons Lane to travel between the Yarra River and the M80 Ring Road.
- Fitzsimons Lane – this is the Yarra River crossing with the next largest truck volume, at 3,400 to 4,400 trucks per day. This is generated by several feeder routes including Williamsons Road, Reynolds Road, Foote Street, Main Road and Bolton Street.
- Springvale Road (5,500 to 7,000 trucks per day) and High Street (2,900 to 3,800 trucks per day) also carry significant truck volumes.

Existing truck volumes are illustrated in Figure 9-15, Figure 9-16 and Figure 9-17.



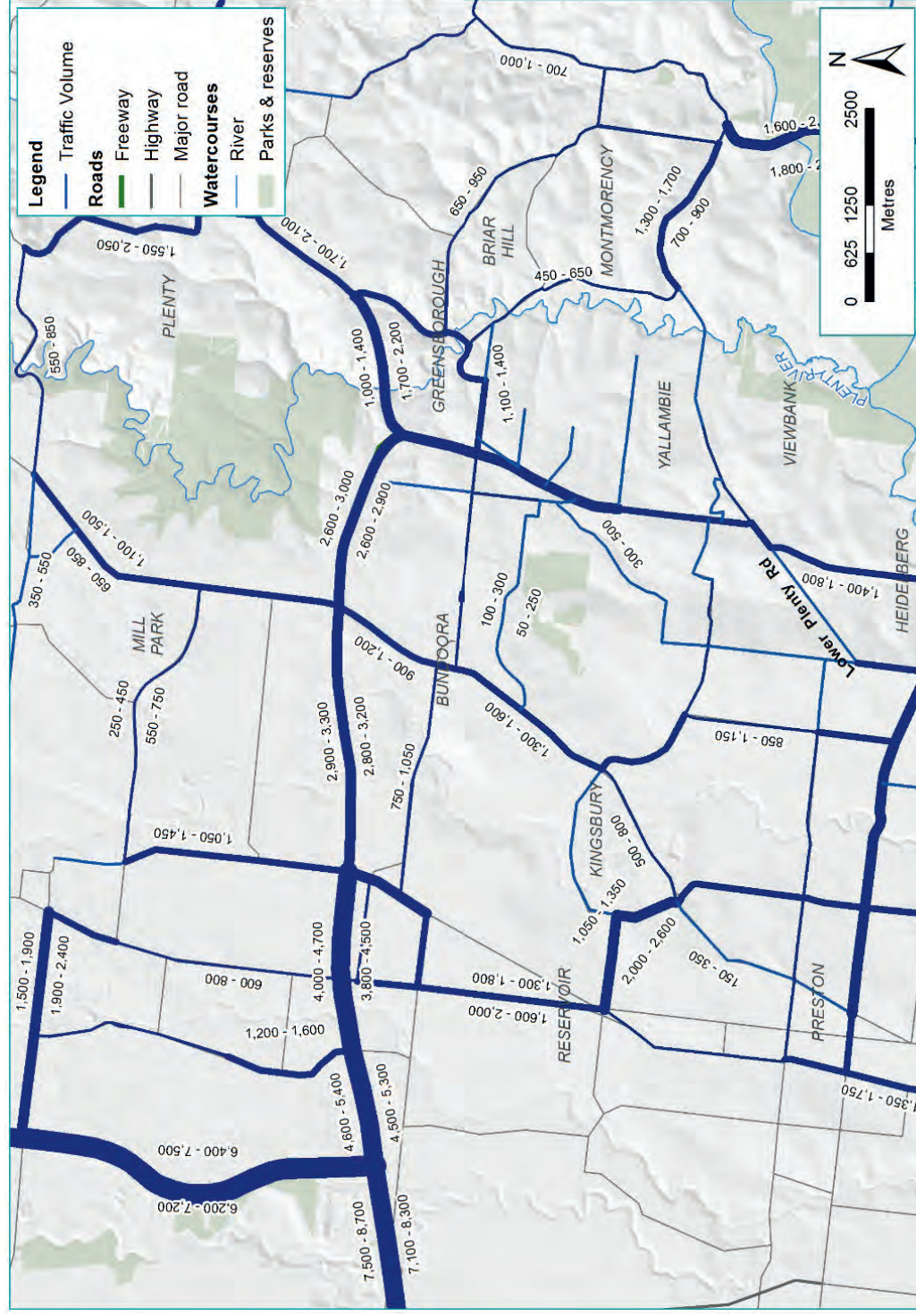
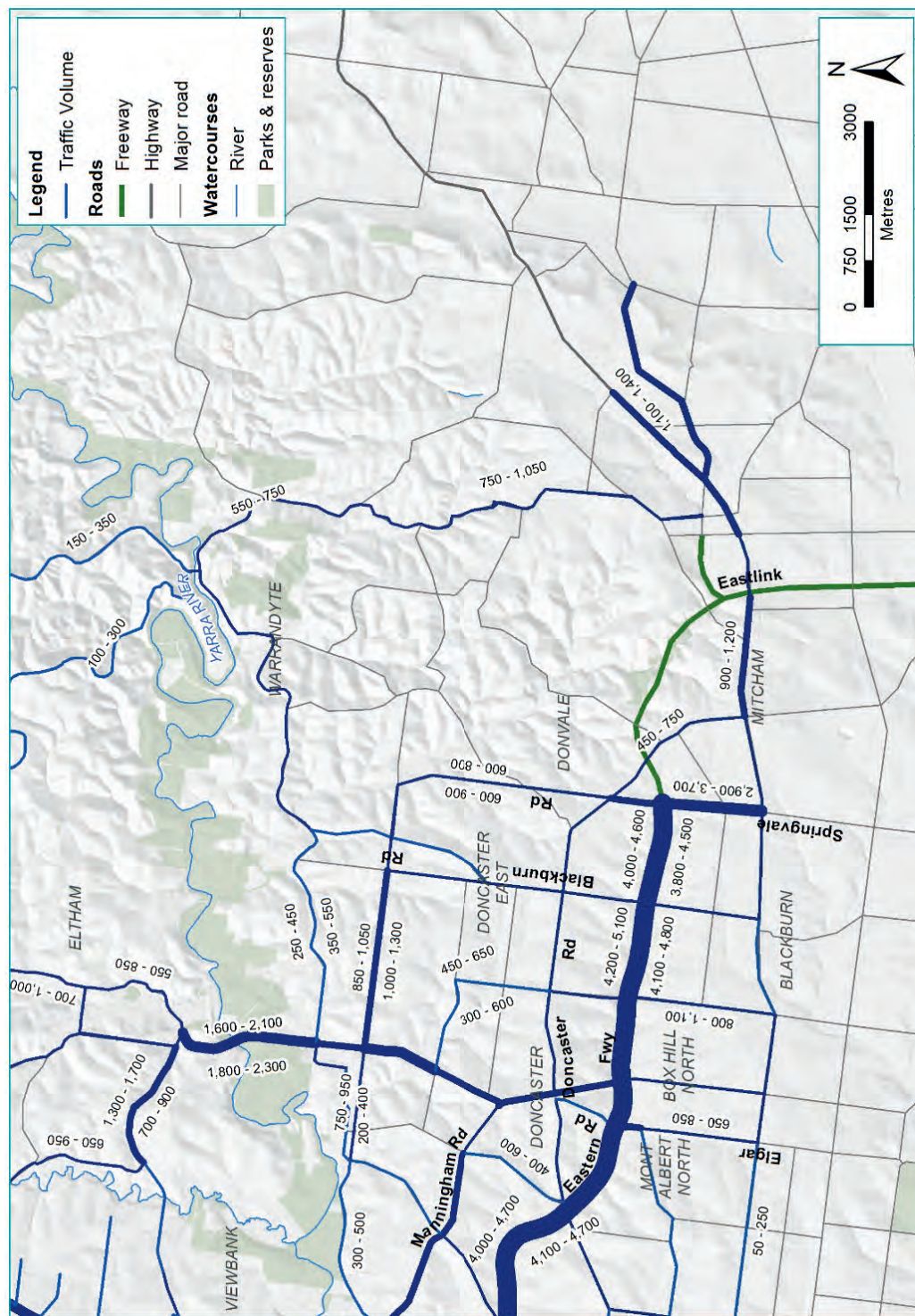


Figure 9-15 Total average weekday truck volumes, 2017 – study area north









### Trucks on Rosanna Road

**The Greensborough Road/Rosanna Road/Bulleen Road** is the preferred route for freight traffic in Melbourne's north-east. This corridor is the only permitted over-dimensional vehicle route through the north-eastern suburbs due to heavy vehicle restrictions and curfews on other arterial roads within the study area. Each day, the Greensborough Road/Rosanna Road/Bulleen Road corridor carries 3,000 to 8,000 trucks per day across its length.

**It is typically large trucks that travel along Rosanna Road.** Rosanna Road has less trucks per day than Fitzsimons Lane but it carries significantly more articulated or B-Double trucks due to its connectivity to the freeway network and more suitable grades for larger vehicles. Rosanna Road typically carries three times as many articulated trucks compared with other key north-south roads within Melbourne's north-east.

**Most of the trucks on Rosanna Road are travelling directly between the Eastern Freeway and the M80 Ring Road.** Truck origin and destination surveys have revealed that once freight reaches Rosanna Road, the overwhelming majority (89 per cent) travels northbound and onwards to the M80 Ring Road. This means the majority of freight on Rosanna Road is 'through' traffic – trucks that are travelling between the Eastern Freeway and M80 Ring Road and have no local origin or destination.

## 9.3.4 Public transport network

There are multiple public transport options available in Melbourne's north-east, including trains and trams for radial movements to and from the CBD, and bus services for orbital, radial and cross-city movements across the suburbs. The key public transport services within the north-east are shown in Figure 9-18 and described in this section.



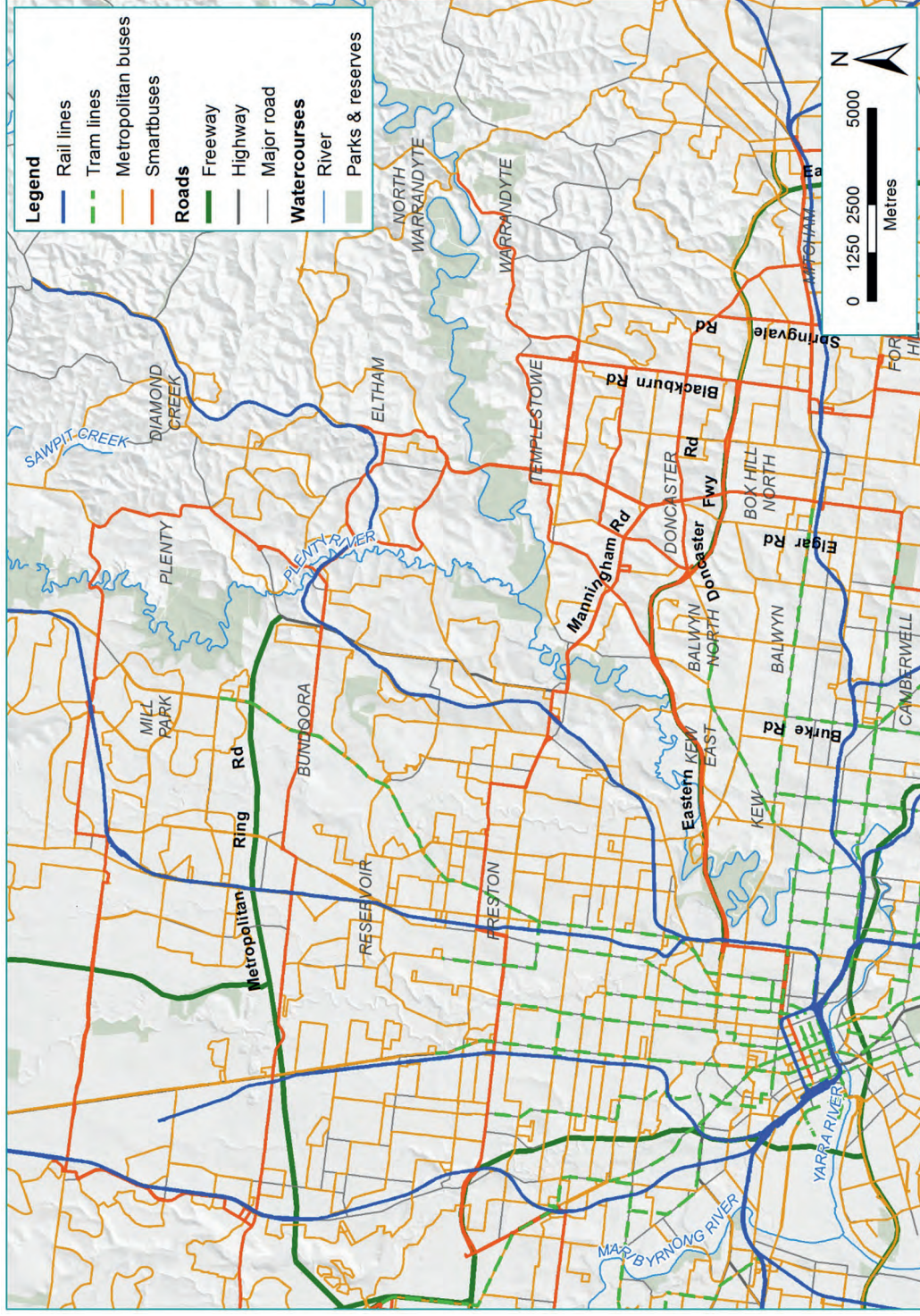


Figure 9-18 Existing public transport routes



**Train services:** The Hurstbridge rail line services suburbs to the north-east of the Yarra River, while the Mernda line provides accessibility to northern suburbs such as Preston and the Epping Activity Centre. The Lilydale and Belgrave lines service the eastern suburbs, including Metropolitan Activity Centres at Box Hill and Ringwood. Trains on these lines run every 5 to 20 minutes in peak periods, and generally every 10 to 20 minutes in off-peak periods. Patronage data provided for 2016 by Public Transport Victoria (prior to the completion of the Mernda Rail Extension in 2018) indicated the Hurstbridge and South Morang rail lines both carried just under 30,000 passengers per day. The Lilydale and Belgrave lines were recorded as taking approximately 80,000 passengers each day, which reflects the higher population density in the eastern suburbs.

**Tram services:** Tram lines radiate from the CBD and are clustered in the western edge of the study area. Tram route 86 to Bundoora RMIT, route 48 to North Balwyn and 109 to Box Hill are the key routes that operate within the north-east. These services generally run every 6 to 10 minutes in peak periods, and every 10 to 20 minutes in off-peak periods.

**Bus services:** There is an extensive network of bus routes across the north-east serviced by SmartBuses, DART and other metropolitan buses:

- SmartBus is a high frequency service providing a cross-city, radial and orbital services around Melbourne. Key aspects of this service include extended hours of operation (including late evening and Sunday services), improved timetable information at bus stops and priority at some traffic lights.
- DART bus routes are part of the SmartBus network. The DART bus routes have priority use of the Eastern Freeway's emergency lanes to operate at a high frequency between the eastern suburbs and the CBD, servicing the area between the Hurstbridge and Lilydale rail lines.
- Metropolitan bus (non-SmartBus) routes have the largest coverage in the north-east and consist of radial, orbital and cross-town services. Over 100 routes operate across the north-east and services along these routes cater for approximately 97,000 boardings on an average weekday.

The Doncaster Park and Ride facility located on the corner of Doncaster Road and the Eastern Freeway provides 400 car parking spaces and is serviced by 10 different bus routes including the 907 and 908 DART services.

## Doncaster Area Rapid Transit

The DART bus routes are of particular significance to the traffic and transport assessment for North East Link. These routes are shown in Figure 9-19.

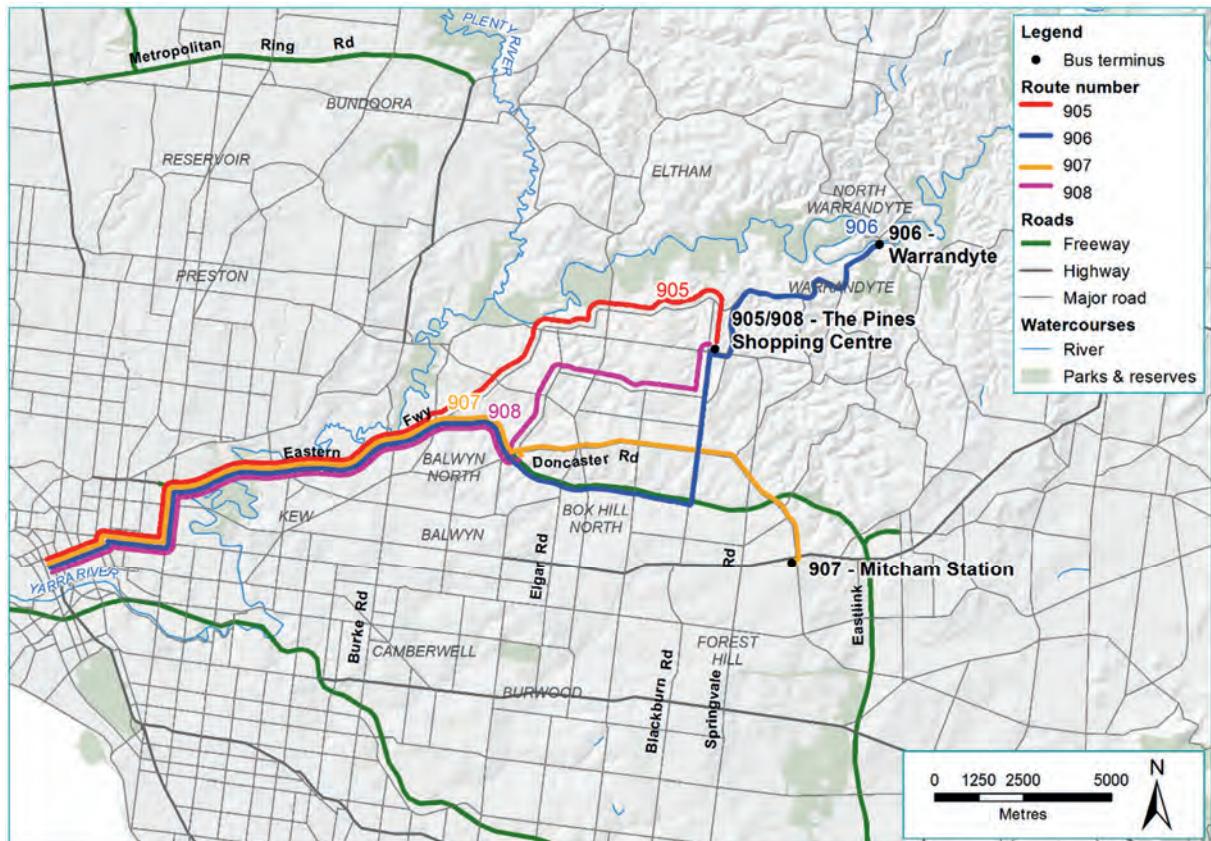


Figure 9-19 DART bus routes

The suburbs of Doncaster, Templestowe and Warrandyte heavily rely on these services. The DART buses have higher patronage compared with other metropolitan buses, with approximately 18,000 daily boardings across the four routes. Despite their popularity, the DART services experience several issues which affect their patronage and quality of service:

- Doncaster Park and Ride – this facility is often at capacity by 7:00 am on weekdays, with passengers parking in adjacent streets, sometimes up to one kilometre away.
- Service frequency and capacity – DART buses operate at capacity during the peak periods, with extensive over-crowding of services leading to long queues at the Doncaster Park and Ride. This is despite the fact that peak service frequencies are generally high. In peak periods the services operate approximately every six minutes, and approximately every 15 to 30 minutes in off-peak periods.

- On-road congestion – the 12-kilometre trip from the Doncaster Park and Ride to Hoddle Street takes approximately 12 minutes in peak periods. However, the 4.6-kilometre trip from Hoddle Street to the terminus at King Street takes 22 minutes. This highlights the delays that are experienced due to congestion along Hoddle Street and Victoria Parade. The 907 westbound service is approximately 60 per cent slower in the AM peak compared with off-peak periods while the eastbound service is 75 per cent slower. PM peak travel times are slower than the AM peak travel times.

### 9.3.5 Walking and cycling network

Melbourne's north-east has an existing network of shared use paths that run parallel to creeks, rivers and freeways as well as some on-road cycling lanes, as shown in Figure 9-20.

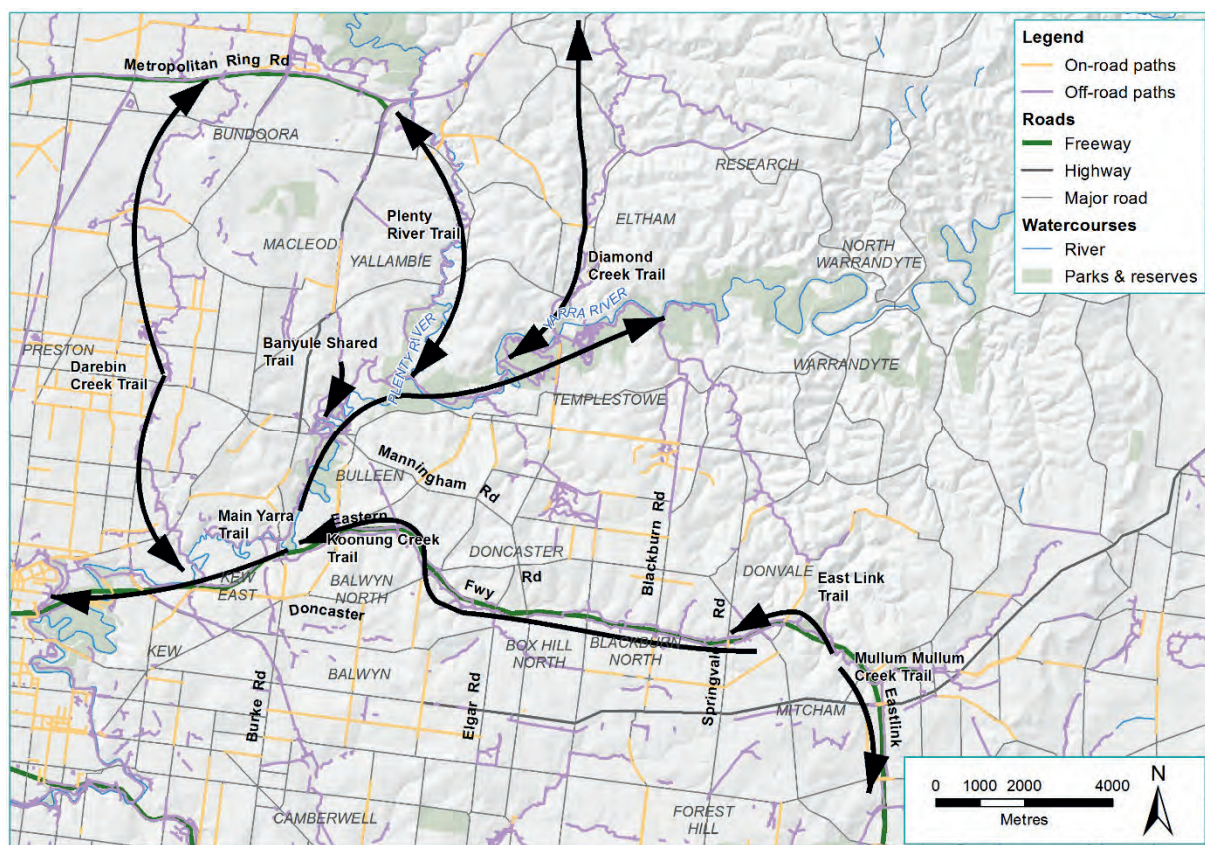


Figure 9-20 North-east walking and cycling trails and on-road paths



### Key off-road shared use paths servicing north-eastern Melbourne

- The Main Yarra Trail which starts in Templestowe at the Mullum Mullum Creek and follows the Yarra River through the north-eastern suburbs. It connects to many other feeder trails in the study area and provides connectivity to the inner suburbs and CBD via a network of on-road cycling paths
- The Plenty River Trail which follows the Plenty River through Greensborough and Lower Plenty. It provides a connection from Greensborough Bypass to the Main Yarra Trail
- Banyule Shared Trail/River Gum Walk, a north-south, shared use path connecting Lower Plenty Road to the Main Yarra Trail in Heidelberg
- The Diamond Creek Trail, a 12-kilometre shared use path linking Diamond Creek with the Main Yarra Trail that starts at Nillumbik Park and joins the Main Yarra Trail at Candlebark Park in Templestowe
- The Darebin Creek Trail which runs from the M80 Ring Road in Bundoora to the Main Yarra Trail near Alphington
- The Koonung Creek Trail which runs along the Eastern Freeway from Springvale Road to Burke Road, providing a link from the EastLink trail to the Main Yarra Trail
- The EastLink Trail, a 28-kilometre shared use path that follows the EastLink tollway from Ringwood to Dandenong
- The Mullum Mullum Creek Trail, an 18.5-kilometre trail from the Yarra River in Templestowe that connects to the EastLink Trail in Donvale. A separate section of the trail also spans from Donvale to Croydon.

Cyclist and pedestrian counts were undertaken along the North East Link project corridor in 2018 to understand how the existing shared use path network is used. Based on the collected data, the busiest site for pedestrians was the Watsonia railway station overpass which provides access from the station platforms to Watsonia Road. Over 1,000 pedestrians were recorded using this overpass across the AM and PM peaks. The crossing at Elder Street and Greensborough Bypass recorded the second highest pedestrian count of over 600 people across the peak periods. Pedestrians recorded at this site were likely to be accessing Watsonia railway station and could have therefore been recorded in the pedestrian count at the Watsonia railway station overpass as well.

Cyclist volumes were generally higher at inner-city locations such as along the Main Yarra Trail between Chandler Highway and Burke Road and at the Fairfield Park pipe bridge. The Elder Street/Greensborough Bypass intersection recorded a higher number of cyclists across peak periods than other nearby sites.

Data from the Australian Bureau of Statistics 2011 Census of Population and Housing indicates the proportion of people within the north-east who use the existing shared use path network to commute to work is relatively low. Just 1.6 per cent of residents within the north-east cycle to work and only 0.4 per cent walk to work. This is likely to be due to the low population and employment density in north-east Melbourne and a low proportion of mixed land uses, as well as limited walking and cycling accessibility and conflicts on roads where other traffic is prioritised (see Section 9.3.2 'Current key challenges').

The core elements of the existing cycling network are the creek and river trails, which can be indirect and unsuitable as commuting corridors. Other factors that currently limit walking and cycling accessibility are:

- The limited connectivity between activity centres and the existing cycling network
- Limited bicycle infrastructure, especially cycling paths providing east-west connectivity
- Sparse patterns of development in the northern and eastern reaches of the study area and a wider dispersal of neighbourhood centres
- The undulating topography in the northern and eastern reaches of the study area, which increases the difficulty of walking and cycling for a large proportion of the population.

A further challenge within the north-east is the discontinuous nature of safe active transport corridors. While access within residential neighbourhoods is generally safe for students, many walking or cycling trips to school in the north-east require travelling along or traversing high-volume or high-speed traffic thoroughfares.

Many schools are not directly served by the existing cycling network. The degree to which the gaps in the existing cycling network fall within residential areas would affect the relative degree of safety for student cyclists.

Melbourne's metropolitan planning framework, Plan Melbourne, identifies the need to improve walking and cycling links to support the 20-minute neighbourhood concept. This concept is based on the practice of 'living locally' whereby people can meet most of their daily needs within a 20-minute walk, bicycle ride or public transport trip. At present, the 20-minute neighbourhood concept is more readily matched to the southern and western portions of the study area than to the outer north-east. As described above, neighbourhoods in the northern and eastern reaches of the study area are challenged by more sparse development patterns, a wider dispersal of neighbourhood centres and undulating topography. Few major activity centres that are located north of the Eastern Freeway are connected via commuter-quality cycling facilities.

Bicycle infrastructure planning in Victoria is guided by Strategic Cycling Corridors (SCCs) (Action 42 of Plan Melbourne). SCCs are the cycling equivalent of arterial roads and their principal aim is to improve access to NEICs and Major Activity Centres. They have been developed as a subset of the broader Principal Bicycle Network (PBN) strategy, which focuses on cycling accessibility for local destinations. Transport for Victoria is currently reviewing and updating the SCC network in the north-east. The current extent of the SCCs and PBN, along with key activity centres in the north-east, is presented in Figure 9-21.

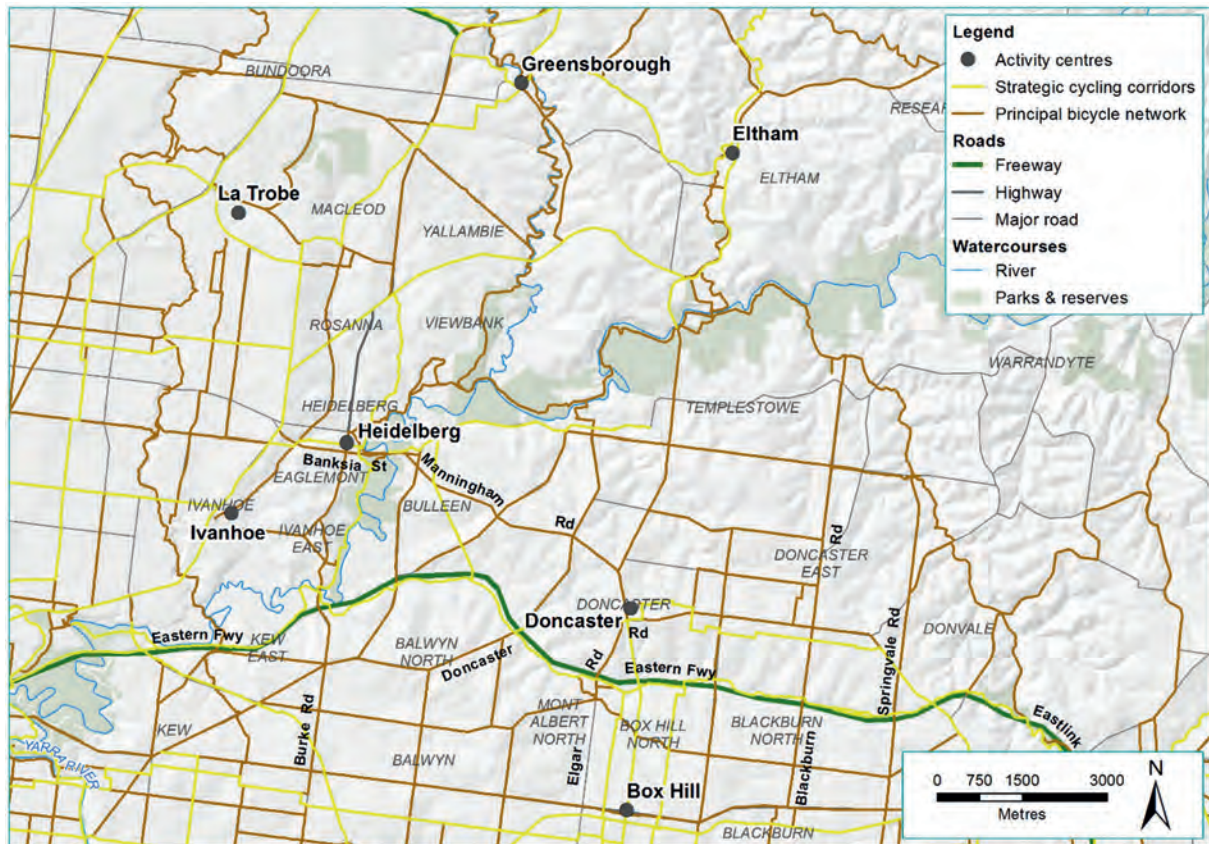


Figure 9-21 Existing cycling infrastructure in the north-east – (existing PBN and SCC routes only)



## 9.4 Construction impact assessment

This section discusses the construction impacts associated with North East Link that relate to traffic and transport.

Construction of North East Link would change road conditions, traffic flows and travel times. These changes would be temporary, with some occurring for short periods (days, weeks, or months) and others for the duration of the project's construction.

These changes could impact all transport modes, including cars and trucks, public transport and pedestrians and cyclists. Impacts would include increased traffic and congestion at some locations as well as temporary road, lane and ramp closures. There would be more heavy vehicles on the road as these would be required to haul spoil from construction sites and to transport construction materials.

### Communicating with communities, road users and stakeholders

The contractors appointed to build North East Link would be required to prepare and implement a Communications and Community Engagement Plan (CCEP) to keep the community and potentially affected stakeholders informed about the progress of construction activities (EPR SC2). The CCEP would outline the approach for communicating changes to transport conditions and relevant mitigation, such as road closures and detours.

Chapter 5 – Communications and engagement provides more detail on stakeholder and community engagement during the construction of North East Link.

The impacts identified for the construction of North East Link that relate to traffic and transport are discussed in the following subsections:

- Overview of construction-related traffic – including traffic generated by the construction workforce, the transport of spoil, delivery of materials, machinery and equipment, and over-size, over-mass and over-dimensional vehicles.
- Road and freight network – including predicted truck volumes during construction, site specific impacts (where there is likely to be increased congestion or changes in access arrangements) and proposed road closures and diversions.
- Public transport network – including potential impacts to bus and rail services and commuter car parking facilities.
- Walking and cycling network – including anticipated short and long-term closures of shared use paths and the potential effects of construction traffic movements on pedestrians and cyclists.

## 9.4.1 Overview of construction-related traffic

Construction of North East Link is predicted to take seven years, with different construction segments mobilising and demobilising during that time.

During construction, traffic would be generated by:

- Workers commuting to construction sites
- Transport of spoil (excavated soil) to landfill by trucks
- Delivery of construction materials, machinery and equipment to construction work sites and compounds by trucks.

This section provides an overview of the movement of this construction-related traffic. More information on the construction workforce, indicative construction schedule, quantities of construction materials and quantities and management of spoil is provided in Chapter 8 – Project description.

### Construction workforce

Construction working hours in most areas would typically be from 7:00 am to 5:30 pm. This means the construction workforce would arrive before the AM peak and leave during or after the PM peak.

In construction areas that would operate for 24 hours a day, the office-based staff would work from 7:00 am to 4:00 pm, although the on-site workers would typically work in two 12-hour shifts from 7:00 am to 7:00 pm and 7:00 pm to 7:00 am. This means the majority of the construction workforce in these areas would arrive before the AM peak and would leave during or after the PM peak.

These working hours would minimise the potential for impacts on the road network due to construction workforce traffic.

Construction staff car parking would be provided at key construction compounds to avoid impacting public and commuter parking (as required through the development of Transport Management Plan(s) in EPR T2).

### Transport of spoil

Spoil would be removed from construction sites along the project corridor and transported to landfills outside the project boundary. The proposed spoil haulage routes are identified in Chapter 8 – Project description. These routes have been identified to provide construction-related traffic with efficient access to the freeway and arterial road network and between construction sites, minimising the impact on local traffic and local roads wherever possible.

An overview of anticipated spoil movements is provided in Table 9-2. It is assumed that 5 per cent of all spoil material would be contaminated and would not be suitable for landfills located to the north. This contaminated spoil would need to be hauled south to the Dandenong area to be treated at a suitable facility. More detail on contaminated spoil management is provided in Chapter 23 – Contamination and soil.

It is not anticipated that spoil trucks would use the arterial or local road network south of the Eastern Freeway. However, material deliveries may use some of these roads if materials are sourced locally.

**Table 9-2** Anticipated spoil movements during construction

Location of construction site/s	Proposed spoil destination	Proposed haulage route
Construction sites north of Lower Plenty Road	Locations along the M80 Ring Road and the Hume Freeway	Trucks carrying spoil from these locations would use Greensborough Road and the Greensborough Bypass to access the M80 Ring Road.  Trucks hauling contaminated material from these sites are anticipated to use Rosanna Road to access Bulleen Road, the Eastern Freeway and EastLink to travel to Dandenong.
Construction sites at Manningham Road and Bulleen Road	Two-thirds of spoil generated would go north to locations along the M80 Ring Road and the Hume Freeway  One-third of spoil generated would go south to locations near Dandenong	Trucks carrying spoil from these locations would access Bell Street using Bulleen Road and (for sites along the Eastern Freeway) Chandler Highway.  From Bell Street, there are three potential routes available to access the M80 Ring Road: <ul style="list-style-type: none"> <li>• Sydney Road</li> <li>• High Street</li> <li>• Plenty Road/Albert Street.</li> </ul> These routes are currently used by trucks and are approved B-Double truck routes. The best solution for the management of this haulage task may be to spread the load across the three routes to distribute the impact of the construction activities across the road network.
Construction sites along the Eastern Freeway west of Doncaster Road	Locations along the M80 Ring Road and the Hume Freeway	Trucks carrying spoil from the construction sites at Manningham Road and Bulleen Road to locations near Dandenong are anticipated to use the Eastern Freeway and EastLink.  Note: <ul style="list-style-type: none"> <li>• Burke Road is not proposed to be used for haulage as it is a restricted B-Double route</li> <li>• Rosanna Road is not proposed to be used for the haulage of materials from these construction sites given existing high levels of congestion.</li> </ul>
Construction sites east of Doncaster Road on the Eastern Freeway	Locations near Dandenong	Trucks carrying spoil from these locations are anticipated to use the Eastern Freeway and EastLink to access locations near Dandenong.



## Delivery of materials, machinery and equipment

During construction, truck traffic would be generated by the delivery of materials, construction machinery and equipment to construction work sites and to construction compounds that would be established along the North East Link corridor and the Eastern Freeway, as identified and mapped in Chapter 8 – Project description.

It is expected that most of the construction compounds would be used for the storage of materials before they are required on-site. The potential locations of the construction compounds that would be used for storage of materials and proposed access arrangements are identified in Table 9-3.

The routes used to access these storage compounds would vary, as the construction materials, machinery and equipment would come from a range of locations across Melbourne. Haulage routes would be included in Transport Management Plans and discussed and agreed with the relevant road authorities (VicRoads or local councils) (EPR T2). The Transport Management Liaison Group would review proposed haulage routes for construction sites south of the northern tunnel portals to minimise reliance on a single haulage route between Bell Street and the M80 Ring Road and provide coordination between construction sites and haulage routes to minimise reliance on a single corridor (EPR T3).

**Table 9-3** Construction storage compounds – potential location and access arrangements

Site number	Site name	Proposed access
North East Link corridor		
1	AK Lines Reserve	Via the existing entry/exit on Grimshaw Street opposite Frye Street.
2	Simpson Barracks	Via a new access road from Drysdale Street.
13	Gabonia Avenue Reserve	Via Frensham Road and Manfred Street from Elder Street.
14	Winsor Reserve	Via Somers Avenue.
15	Coles Express petrol station	Via Yallambie Road.
19	North of the M80 Ring Road interchange	Via the M80 Ring Road, with an exit onto the Greensborough Bypass.
20/22	Bridge Street	Via Bridge Street.
Eastern Freeway corridor		
3	Chandler Highway interchange (south-west corner)	Via Chandler Highway, with an exit onto the Eastern Freeway entry ramp.
4	Chandler Highway interchange (north-west corner)	Via the Eastern Freeway exit ramp, with an exit onto Chandler Highway.
5	Chandler Highway interchange (north-east corner)	Via Chandler Highway, with an exit onto the Eastern Freeway entry ramp.

Site number	Site name	Proposed access
6	Burke Road interchange (north-east corner)	Via Burke Road.
7	Burke Road interchange (south-east corner)	Via Burke Road.
8	Eastern Freeway Linear Reserve	Via the Springvale Road entry ramp.
9	Koonung Creek Reserve	Via Larbert Avenue and Walnut Road, with connections to Doncaster Road.
10	Doncaster Road interchange (north-west corner)	Via Doncaster Road, with an exit onto the Eastern Freeway entry ramp.
11	Doncaster Park and Ride	Via the existing entry on Doncaster Road.
12	Kampman Street	Via Kampman Street.
18	Elgar Park (north-east oval)	Via the existing field access road, opposite Paul Avenue.
29	Katrina Street Reserve	Via Katrina Street, which connects to Elgar Road.

Over-size and over-mass vehicles (as described in Section 9.3.3) may be used to deliver some materials to the construction sites. These vehicles would be allowed to use certain routes to access the construction sites without a permit, as shown in Figure 9-12 in Section 9.3.3.

It is possible that vehicles exceeding the over-dimensional vehicle criteria (as described in Section 9.3.3) would also be required to deliver some material to site, such as the delivery of the tunnel boring machines (TBMs) or bridge beams. These vehicles would require a specific permit from VicRoads to travel anywhere on the road network. Given the size of these vehicles, it is likely they would travel on the road network overnight. The permit to use the road network would also allow these trucks to travel on roads with overnight curfews (as shown in Figure 9-14).

## 9.4.2 Road and freight network

Construction of North East Link would generate a large number of truck movements for the haulage of spoil and delivery of materials, machinery and equipment. At the same time, there would be a need for temporary road closures and diversions to allow construction activities to be undertaken safely. These changed traffic conditions would impact cars and trucks travelling on the existing road and freight network.

The risk pathways associated with changed conditions on the road and freight network as a result of construction activities are described in Table 9-4. The potential impacts associated with each of these risk pathways are discussed in this section.

**Table 9-4** Risk table – construction – road and freight

Risk ID	Risk pathway	Risk rating
TR01	Traffic movements associated with construction site clearance and establishment impedes the safe and efficient movement of local traffic, including public transport movements and cyclists and pedestrians	Medium
TR02	Traffic movements associated with construction activity impedes the safe and efficient movement of freeway traffic, including the disruption associated with the potential closure of traffic lanes	Medium
TR03	Normal traffic flows on the freeway are impeded by narrowing of traffic lanes to accommodate construction activity and by driver behaviour around construction activity within the freeway	Medium
TR06	Traffic movements associated with construction activity impede freight accessibility and increase travel times for freight traffic generally	Medium
TR07	Traffic movements associated with construction activity affect access and egress to industrial and commercial premises through increased congestion and temporary road closures	Low
TR08	Traffic movements associated with construction activity affect access and egress to recreational facilities and public open space through increased congestion and temporary road closures	Low
TR09	Traffic movements associated with construction activity on the freeways generate additional traffic and congestion of the surrounding road network through road users seeking diversions around the freeways	Medium
TR10	Traffic associated with the construction of the ramp connections to the Eastern Freeway impedes the safe and efficient movement of traffic, including public transport movements, on the Eastern Freeway through temporary lane closures	Medium
TR12	Construction traffic associated with the removal of spoil generated by tunnelling or trenching activities impedes the safe and efficient movement of traffic and public transport movements on arterial and local roads in the vicinity of the work zones	Medium



## Truck volumes

Estimates of the number of truck trips per day across the whole project for spoil haulage and material delivery were completed for each month during North East Link's construction. These estimates considered one option in which the TBM would be launched from the southern end of the tunnels at Manningham Road and an alternative option where the TBM would be launched from the northern end of the tunnels at Lower Plenty Road (as described in Chapter 8 – Project description). Key findings were:

- If the TBM was launched from the southern site option:
  - The highest daily number of truck trips produced by construction activities is predicted be approximately 3,500 daily trips in January 2023.
  - During this time, the haulage of spoil would be at its peak and the haulage of construction materials would be starting to rise.
  - Average daily spoil truck volumes (two-way) in January 2023 for the southern option for the TBM launch site are shown in Figure 9-22. It is expected there would be significantly more trucks travelling along Greensborough Road toward the M80 Ring Road if the TBM was launched from the southern site, with an estimated 1,465 truck trips per day during the peak month (compared with 730 truck trips per day during the peak month for the northern option for the TBM launch site). This is due to differences in scheduling of the construction program associated with the different TBM launch sites.
- If the TBM was launched from the northern site option:
  - The highest daily number of truck trips is predicted to be approximately 3,700 daily truck trips in November 2022. The TBM and construction works within the Kempston Street to northern portal area would be operating at the same time for longer, generating truck trips at the same time.
  - The haulage of spoil would also peak in November 2022. As shown in Figure 9-23, it is expected that there would be a significant increase in the number of trucks travelling along Bell Street if the TBM is launched from the north, with an estimated 930 truck trips a day during the peak month (compared with 265 truck trips per day during the peak month for the southern TBM launch site) during the peak month of activity on the project.
  - As described in Section 9.4.1 (Table 9-2), from Bell Street it is proposed to separate the haulage of spoil across three routes to the M80 Ring Road: Sydney Road (route 'S'), High Street (route 'H') and Plenty Road/Albert Street (route 'P'). This would reduce the likelihood of overloading any one of these routes with trucks, which would adversely impact the road network.

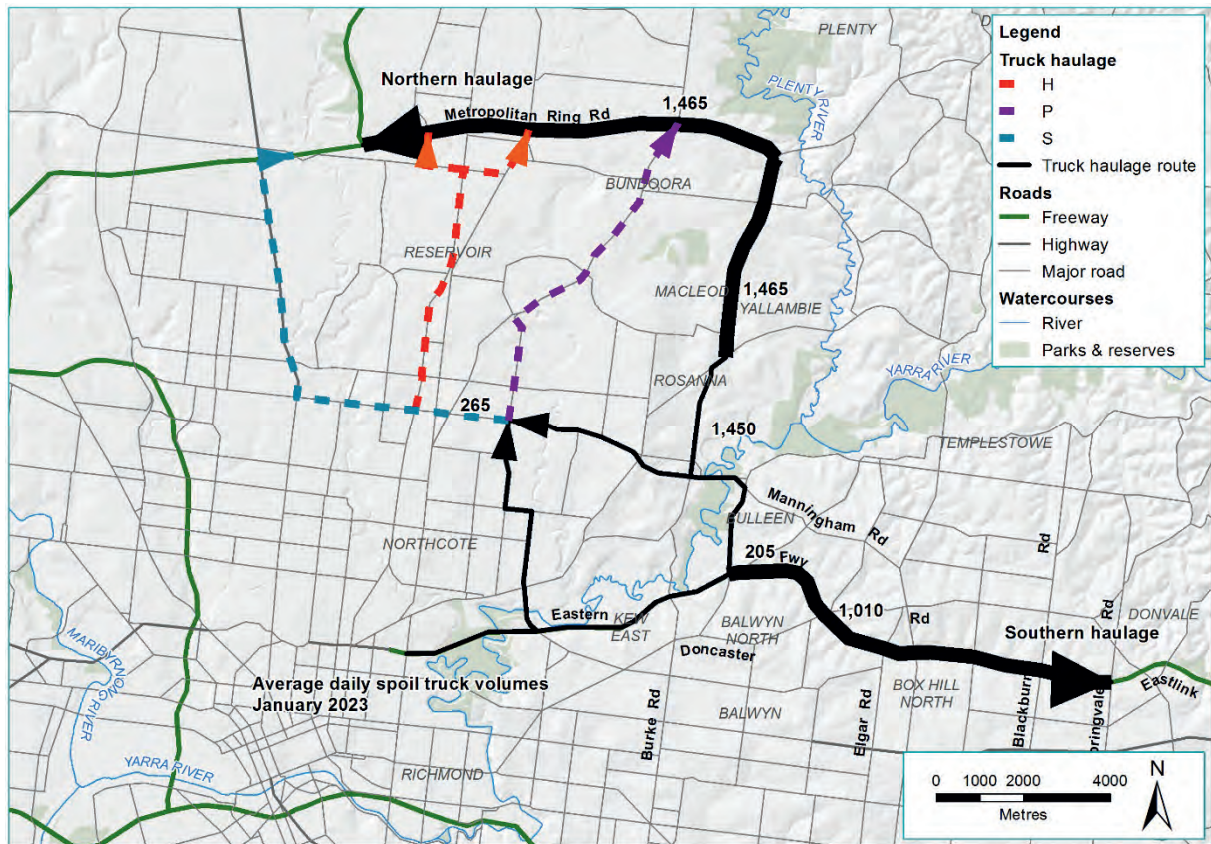


Figure 9-22 Average two-way daily spoil truck volumes for southern TBM launch (peak period, January 2023)

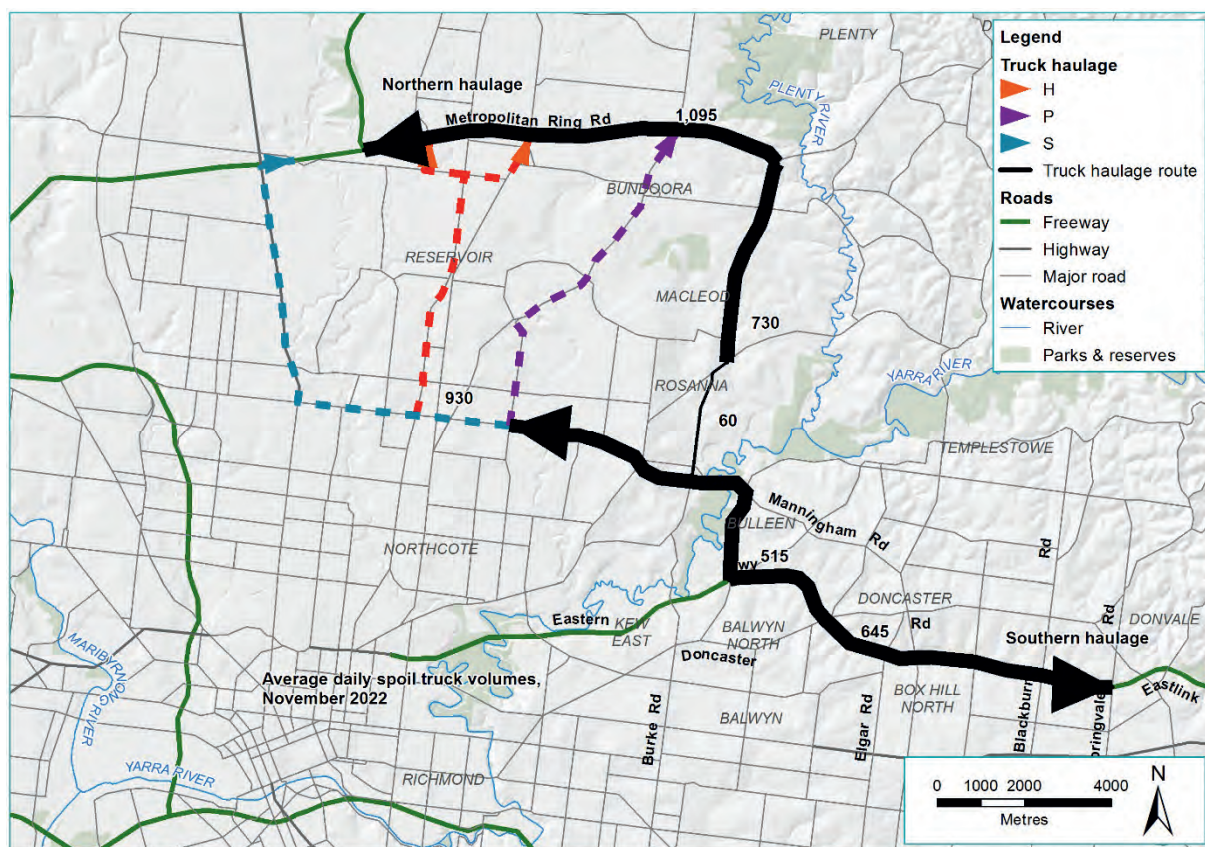


Figure 9-23 Average two-way daily spoil truck volumes for northern TBM launch (peak month, November 2022)

## Site-specific impacts

There are some locations where the forecast truck volumes during construction could increase congestion and create pressure on the road and freight network.

Effective management of these potential impacts would be crucial to the delivery of North East Link. The increased congestion and change in traffic movements associated with construction activity at these locations could be managed to maintain the safe and efficient movement of traffic (risks TR01, TR02, TR06, TR12) and to minimise impacts on existing access and egress arrangements (risks TR07 and TR08). The contractors would be required to:

- Prepare and implement a Transport Management Plan(s) before construction works started (EPR T2) – the Transport Management Plan(s) would be informed and supported by transport modelling and include the identification of appropriate construction traffic routes as well as measures to maintain transport capacity and limit construction haulage in peak periods, and also provide for consultation with relevant road authorities.
- Participate in independent road safety audits after each stage of detailed design and after construction (EPR T4).



- Develop a detailed monitoring program to monitor the impacts of construction activities and to inform local traffic management – monitoring would allow the contractors to provide real-time traffic information to drivers during the project's construction (EPR T5).

A Transport Management Liaison Group with representatives from the Victorian Government, VicRoads, emergency services, the contractors, relevant transportation authorities and relevant local councils would also be established to exchange information and discuss issues associated with the Transport Management Plan(s) (EPR T3). This would include review of proposed haulage routes for construction sites south of the northern tunnel portals to minimise reliance on a single haulage route between Bell Street and the M80 Ring Road, and to facilitate different sites using different haulage routes.

There would still be some site-specific impacts, given the large number of construction vehicles required throughout the project. Table 9-5 identifies areas where construction truck movements are predicted to impact on the surrounding road network and includes estimated truck volumes (representing both spoil and material haulage), proposed truck access points and predicted road network performance.

**Table 9-5** Site specific impacts associated with construction truck movements

Construction truck movements – site-specific impacts		
Kempston Street to northern tunnel portals near Blamey Road		
Description of works	<p>Works from Kempston Street to the northern tunnel portals at Lower Plenty Road would involve:</p> <ul style="list-style-type: none"> <li>• Construction of the North East Link main line</li> <li>• Reconstruction of the Greensborough Bypass</li> <li>• Construction of the Grimshaw Street interchange</li> <li>• Construction of the trenched section from Elder Street/Watsonia railway station to the northern tunnel portal.</li> </ul> <p>Construction works within this area could occur over a period of approximately 3.5 years.</p>	
Forecast two-way truck volumes	<p>This construction area is within the existing curfew zone, although it is possible that construction trucks could be issued with an exemption allowing them to travel during the curfew period. An assessment of trucks operating for 20 hours a day (travelling through the curfew period) and eight hours a day (not travelling within the curfew period) was performed. The forecast hourly two-way truck volumes below conservatively assume that trucks would not travel within the curfew period, which results in the highest estimated volumes.</p>	
	TBM launch from the south: Approximately 1,730 trucks per day (220 trucks per hour)	TBM launch from the north: Approximately 960 trucks per day (120 trucks per hour)
Truck access points	<p>The construction area between Watsonia Road and Kempston Street would be accessed from Greensborough Bypass. The existing intersection with Greensborough Road at Drysdale Street, and a new access point north of Erskine Road would be used to access the construction area between Watsonia Road and Lower Plenty Road.</p>	

Construction truck movements – site-specific impacts	
Road network performance and potential network upgrades	<p>The Greensborough Road/Greensborough Bypass corridor is expected to be able to accommodate the forecast truck volumes outside peak periods. However, the additional truck traffic could create congestion during the peak periods, particularly around the Greensborough Bypass/Grimshaw Street intersection.</p> <p>As such, the delivery of materials and spoil haulage should occur outside peak periods at times when the road network would have capacity to accommodate this. Consideration should also be given to allowing the haulage of spoil during the curfew period to minimise impacts on the road network.</p> <p>The intersection of Greensborough Road with Drysdale Street may also require temporary signals to assist trucks to access this construction area. Modelling of the proposed signals at Drysdale Street shows that during the peak period when traffic volumes on Greensborough Road are at their highest, travel times are expected to increase an average of 10 seconds in both directions.</p> <p>The access point to the north of Erskine Road may require turn lanes in the southbound direction to minimise the impact to through-traffic on Greensborough Road.</p>
Northern TBM launch site – north of Lower Plenty Road and east of Greensborough Road	
Description of works	This construction area is where the TBM would be launched from if tunnelling commences from the north.
Forecast two-way truck volumes	<p>As above, this construction area is within the existing curfew zone and the forecast hourly two-way truck volume below conservatively assumes that trucks would not travel within the curfew period.</p> <p>Approximately 960 trucks per day (120 trucks per hour)</p>
Truck access points	The northern TBM launch site would be accessed via Greensborough Road, between Erskine Road and Strathallan Road. It is expected that trucks transporting spoil or materials to and from this area would enter the site from near Strathallan Road and exit either near Strathallan Road or Erskine Road.
Road network performance and potential network upgrades	<p>It is anticipated that Greensborough Road would be able to accommodate the forecast truck volumes outside of peak periods.</p> <p>Trucks accessing the site from the north would be provided with a left turn slip lane to turn into this construction area from Greensborough Road.</p> <p>The construction of a dedicated right turn lane into the construction area from Greensborough Road may be required so that vehicles entering from the south (for the delivery of materials) do not impede through-traffic.</p> <p>If vehicles exit the site near Erskine Road, changes would be required to the existing traffic signals to allow for haulage vehicles. If an eight-hour haulage scenario was adopted, it would mean one vehicle per minute exiting the construction area, which is expected to have a minimal impact on the operation of Greensborough Road outside peak periods.</p> <p>Temporary signals may be required at Strathallan Road to assist trucks to exit the construction area.</p>

Construction truck movements – site-specific impacts	
Kempston Street to northern tunnel portals and northern TBM launch site – combined impacts	
Description of works	If the TBM was launched from the northern site, there would be a period when this site could be operating at the same time as the Kempston Street to northern portals construction area.
Forecast two-way truck volumes	<p>The forecast truck volumes conservatively assume the number of truck movements generated at both sites would peak at the same time.</p> <p>Approximately 1,920 trucks per day (240 trucks per hour)</p>
Truck access points	<p>The traffic accessing these two construction areas would likely use two to three access points from Greensborough Road near Drysdale Street, Erskine Road and potentially near Strathallan Road.</p> <p>It is likely the left in/left out arrangement at Erskine Road would be changed to left in/left out and a right turn out at the Erskine Road traffic signals.</p>
Road network performance and potential network upgrades	<p>The TBM site works would likely use the exit from the construction area near Erskine Road, while the trenching works would likely be spread across the exits near Drysdale Street and Erskine Road. As such, it is possible that approximately 90 trucks per hour could be leaving the construction area near Erskine Road and entering Greensborough Road. Approximately 30 trucks per hour could exit the construction area near Drysdale Street and enter Greensborough Road.</p> <p>In the context of existing hourly traffic volumes on Greensborough Road, these truck volumes are low. It is therefore expected that both exits would operate without significant impacts to the performance of Greensborough Road. An assessment of the hourly impacts of the combined truck movements along Greensborough Road indicates it would have spare capacity throughout the day outside of the peak periods to accommodate the forecast truck demands. The potential network upgrades described above for both construction areas is expected to be sufficient to accommodate their combined impacts.</p>
Southern TBM launch site – west of Bulleen Road and south of Manningham Road (existing Bulleen Industrial Precinct)	
Description of works	<p>This construction area is where the TBM would be launched from if tunnelling commences from the south. This area would also be used for the construction of the Manningham Road interchange.</p> <p>The TBM launch and the construction of the Manningham Road interchange would generally be occurring at different times.</p>
Forecast two-way truck volumes	<p>Approximately 620 truck movements per day would involve the removal of spoil to locations in the north via the M80 Ring Road. This haulage task would take place for up to 20 hours of the day.</p> <p>The remaining 340 truck movements would be for materials, which would typically occur during daylight hours (over an eight-hour period). The delivery of materials would represent a net increase of around 140 truck movements, as this precinct would be acquired for the project and there would no longer be truck traffic generated by existing industrial land uses (estimated to be approximately 200 truck movements per day).</p>



Construction truck movements – site-specific impacts		
Truck access points	Access to the site would be via two locations: <ul style="list-style-type: none"><li>• The existing intersection on Bulleen Road at Greenaway Street</li><li>• A left in/left out turning lane at the existing intersection on Manningham Road at Greenaway Street.</li></ul>	
Road network performance and potential network upgrades	<p>The intersection of Bulleen Road and Greenaway Street would require temporary signalisation to allow access from all directions. This signalised intersection would operate in the shadow of the Bulleen Road/Manningham Road intersection signals so there would be no adverse impacts on traffic performance along Bulleen Road. Southbound trucks would use this temporary signalised intersection to head towards Dandenong via the Eastern Freeway and EastLink.</p> <p>Trucks hauling spoil to head north toward the M80 Ring Road could use the exit point on Manningham Road, avoiding the traffic signals at the intersection of Bulleen Road/Manningham Road. However, trucks returning to this construction area from the north would need to travel through the Bulleen Road/Manningham Road intersection. This is anticipated to result in the addition of up to 30 trucks per hour to the intersection, which would have a minimal impact and would be within the typical hourly fluctuations of truck volumes.</p> <p>Workers would be on site in two shifts, typically commencing at 7:00 am and 7:00 pm. This means that workers would be accessing the site outside peak periods (arriving before 7:00am) when there is spare capacity on the road network.</p> <p>Analysis of the hourly traffic profile shows the highest hourly volume for two-way traffic would be approximately 5,400 vehicles per hour in the PM peak. Between the AM and PM peaks there is potentially spare capacity on Greensborough Road of 1,100 vehicles an hour. This increases to over 3,750 vehicles per hour after the PM peak until the AM peak.</p> <p>The maximum two-way traffic volume generated by this site is 75 vehicles per hour, which could be accommodated by Manningham Road.</p>	
Mined tunnel sections – Bulleen Road		
Description of works	The Bulleen Road mined construction area would extend from Bulleen Road to Rocklea Road. Works within this area could occur for approximately 30 months.	
Forecast two-way truck volumes	TBM launch from the south: Approximately 630 trucks per day (40 trucks per hour)	TBM launch from the north: Approximately 170 trucks per day (20 trucks per hour)
	Note: The bulk of hourly truck movements in this area would be related to the haulage of spoil material. The hourly truck volume associated with a TBM launch from the south assumes that spoil haulage would occur over a 20-hour period, as trucks carrying spoil could travel on routes that are not subject to curfews. The hourly truck volume associated with a northern TBM launch site conservatively assumes that spoil haulage would occur over an eight hour period, as routes in the north would be subject to curfew periods. It is assumed that materials delivery would occur over an eight hour period regardless of the location of the TBM launch.	
Truck access points	Trucks would access this site via the southern TBM construction site.	

#### Construction truck movements – site-specific impacts

Road network performance and potential network upgrades	The number of trucks generated at this work site is anticipated to be significantly lower than those generated by the southern TBM work site. As such, it is expected the road network would be able to accommodate the trucks generated by this work site and no additional network upgrades would be required.
Eastern Freeway	
Description of works	Construction of additional lanes between Springvale Road and Chandler Highway and construction of the Doncaster Busway. The works would also include upgrade structures along the Eastern Freeway to cater for heavy vehicles, and modernisation to a fully managed motorway.
Forecast two-way truck volumes	The multiple construction areas along the Eastern Freeway are anticipated to generate approximately 1,010 trucks per day travelling between Blackburn Road and Springvale Road in the peak month for the southern TBM launch site option.
Truck access points	Site access to all construction areas along the Eastern Freeway would be via the main freeway carriageway. Deceleration and acceleration lanes would be provided for trucks to access the construction areas and to minimise impacts to through-traffic on the freeway.
Road network performance and potential network upgrades	<p>During construction, trucks travelling along the Eastern Freeway are expected to come from multiple locations with different hours of operation, as follows:</p> <ul style="list-style-type: none"> <li>• 130 trucks from the southern TBM launch site – hauling for 20 hours a day</li> <li>• 800 trucks from construction areas along the Eastern Freeway – hauling for eight hours a day</li> <li>• 80 trucks from the northern construction areas hauling contaminated spoil – hauling for eight hours a day.</li> </ul> <p>These truck operating hours mean approximately 120 trucks per hour. This volume of trucks could be accommodated by the Eastern Freeway, especially if it occurred outside the peak traffic periods.</p>

## TBM retrieval

As described in section 8.7.5 of Chapter 8 – Project Description, there are two potential TBM retrieval locations, depending on the TBM launch site chosen:

- **TBM retrieval at Lower Plenty Road:** If the TBMs are launched from the south, they would be retrieved from the construction compound just north of Lower Plenty Road. The TBM retrieval would be undertaken within the trench created for the North East Link carriageway. There would be minimal additional spoil removed from this location to facilitate TBM retrieval. The TBMs would be removed in sections with the use of cranes, and loaded onto over-dimensional vehicles for transport to a suitable location. Although the TBM haulage route has not been confirmed, it would likely be to the north to make use of the M80 Ring Road, and transport would probably occur overnight to minimise the impacts on the surrounding road network.

- **TBM retrieval at Bridge Street:** If the TBMs are launched from the north, they would be retrieved from the construction compound just north of the Manningham Road interchange and Bridge Street, within Banksia Park. The worksite is likely to be operational for approximately eight months.

The retrieval works would require the construction of two shafts to reach the TBMs. Excavation of these shafts would generate additional spoil haulage and material deliveries to those outlined previously in this section (in Table 9-5). This would result in an additional 170 two-way truck movements per day in the vicinity of the Manningham Road interchange site. Analysis indicates Manningham Road has spare capacity of around 1,100 vehicles per hour between the AM and PM peak periods, and as such it would be able to accommodate the additional truck movements associated with the retrieval of the TBMs. Retrieval of the TBMs would occur prior to works commencing at the Manningham Road interchange site, which would minimise the overlap of construction vehicles at these sites.

Access to the site would be directly via Bridge Street and Banksia Street/Manningham Road, with vehicles removing spoil travelling south towards the Eastern Freeway. It is possible that some spoil could be hauled north, similar to the works at the Manningham Road interchange site. If hauling north, trucks could use Sydney Road, Plenty Road or High Street to access their destination.

The routes that would be used to transport the TBMs from either retrieval site have not been confirmed. A Transport Management Plan would be developed prior to retrieval of the TBMs (EPR T2). The Transport Management Plan would need to specify the TBM haulage route and any necessary permits for over-size or over-dimensional vehicles (as discussed in Section 9.4.1 'Delivery of materials, machinery and equipment'). It would also include details such as the permitted hours of operation and consideration of truck curfews, and would require approval from the applicable road authorities.





## Road closures and diversions

Road closures and diversions would be required for the construction of North East Link. There is the potential for these road closures and diversions to impact the road and freight network.

The location of proposed closures and diversions would be specified in the Transport Management Plan(s) (EPR T2). All closures and diversions would be undertaken in a way to minimise the impact to transport users and to the surrounding area, while allowing sufficient space for safe construction. Construction staging should be scheduled so that multiple roads are not closed at the same time to allow traffic detours around construction areas.

To further minimise the potential impacts of closures and diversions:

- Lane closures should only be permitted outside peak periods and full closures should only be possible overnight or over long weekends, when traffic volumes were at a level where road performance would not be significantly impacted.
- Transport Management Plans for each of the construction areas would identify detour routes and include traffic engineering assessments of the potential impacts. These plans would need to be developed before construction works started and in consultation with the relevant road authority.

With mitigation measures in place, no significant impacts are anticipated to existing access and egress arrangements (risks TR07 and TR08) although some new access points for construction vehicles are proposed as identified in Table 9-5. There would be some impacts to traffic movements as a result of road closures and diversions (risks TR02, TR03, TR09 and TR10), and these are discussed below.

Short-term closures may be required to allow some construction works to take place close to or above existing traffic lanes. These short-term closures would normally occur overnight or possibly over weekends, depending on the staging of the works. The delivery and installation of concrete beams or bridge sections are the most likely to require short-term closures. These are expected to be required:

- At the M80 Ring Road, Manningham Road and Eastern Freeway interchanges with North East Link
- Along the Eastern Freeway for braided ramps between Tram Road and Middleborough Road
- At Bulleen Road north of the Eastern Freeway and at Doncaster Road interchange with the Eastern Freeway
- For busway works at Chandler Highway and Burke Road
- At the existing Greensborough Bypass bridge over Kempston Street.

Long-term closures would also be required to allow for activities such as bridge construction, road widening, and excavation works. The locations of potential long-term closures during construction and their associated impacts on the road and freight network are outlined below.

**Greensborough Bypass** – Between Grimshaw Street and Watsonia Road, Greensborough Bypass would be rebuilt alongside North East Link. To allow for these works, north-south traffic on Greensborough Bypass would need to be diverted onto side-tracks that would be built next to Greensborough Bypass. The side tracks would operate for around one year and would be two lanes in each direction, which would be a slight reduction in capacity. This arrangement could result in traffic using local roads instead, such as Watsonia Road. To reduce this possibility, traffic signal changes could be implemented at the intersections of Watsonia Road/Greensborough Bypass and Watsonia Road/Grimshaw Street to make this route slower for through-vehicles. Advanced signage should be placed beyond the work site to inform motorists of the changes along Greensborough Road and the potential impacts to travel times. Where possible, it should be encouraged that motorists avoid the area and use alternative routes such as Plenty Road or Para Road to access their destinations.

**Kempston Street** – The existing Greensborough Bypass bridge over Kempston Street would be rebuilt during construction. Demolition of the existing bridge is expected to take around one week, during which time Kempston Street would be closed. During the closure, traffic that would have travelled along Kempston Street would need to detour via Yando Street to The Circuit, and then to Grimshaw Street. This may be problematic in the peak periods when traffic volumes are high on Grimshaw Street, and traffic controllers may be required to assist vehicles turning into and out of Frye Street.

**Grimshaw Street** – Grimshaw Street would be temporarily diverted onto a side track to the south of the existing road for approximately six months to allow for the construction of the new interchange with North East Link. The side track would still carry two lanes of traffic in each direction, traffic capacity could be slightly reduced due to the lower speed limit (typically 40 km/h through a work site) and the need for vehicles to divert onto the side track. Turning movements from Grimshaw Street onto the Greensborough Bypass would be maintained, although it is possible this would occur at a reduced capacity.

Modelling of this scenario predicts that traffic would divert away from the construction area and that traffic volumes along other sections of Grimshaw Street, Watsonia Road, the Greensborough Bypass and Diamond Creek Road would increase. To minimise these potential impacts, traffic signal phasing at the intersection of Grimshaw Street and Watsonia Road could be changed to restrict the amount of traffic diverting along this route, and the operation of the signalised intersection of The Circuit and Main Street could be reviewed to facilitate traffic movement around Greensborough. Traffic volumes in routes parallel to Grimshaw Street could be monitored to assess if 'rat-running' is occurring to avoid the construction area, and local area traffic management could be implemented to prevent this if required.

**Drysdale Street** – Between Greensborough Road and Borlase Street, Drysdale Street would require closure to allow for the tunnelling and trenching works along the eastern side of Greensborough Road. Given the large amount of works that would occur at this location, this section of Drysdale Street could be closed for up to around two and a half years. During this time, the low volume of vehicles that would usually use Drysdale Street would need to detour to Lower Plenty Road via Coleen Street and Crew Street. These low vehicle volumes could be accommodated on this proposed diversion route.

**Manningham Road** – Construction of the Manningham Road interchange is expected to require changed traffic arrangements on Manningham Road for around six months. During this time, traffic would be reduced to one lane eastbound to provide for right-turning vehicles at Bulleen Road, with two lanes of eastbound through-traffic diverted via a widened Bridge Street. Traffic would also be reduced to two lanes westbound between Greenaway Street and Bridge Street. To maintain traffic performance along Manningham Road, Bridge Street would be widened to two lanes in the eastbound direction, and the intersection of Bridge Street and Templestowe Road would be signalised.

**Bridge Street** – Construction of the Manningham Road interchange ramps is anticipated to require closure of Bridge Street for approximately six weeks. This closure would not be undertaken at the same time as the closures required for Manningham Road that are outlined above. There are two potential traffic management options for the closure of Bridge Street:

- A full closure, which would require the diversion of traffic between Manningham Road and Templestowe Road via the signalised intersection of Manningham Road and Bulleen Road. This would likely have large impacts to the performance of the Bulleen Road/Manningham Road intersection due to the large volume of vehicles that would need to travel between Templestowe Road and Manningham Road, and would require a large diversion of traffic away from the area to minimise impacts at this location.
- Construction of a diversion side track along the southern side of Bridge Street, after the existing buildings at this location have been removed. This option is expected to have the least impact to traffic performance and would enable traffic to remain in this area.

**Trinity Grammar School Marles Playing Fields** – The road that provides access to the Marles Playing Fields within Trinity Grammar School would be closed for around one year to allow for the construction of the North East Link tunnels. A diversion route may not be possible via the existing Marcellin College access road, although a connection may be possible via Barak Street to Thompsons Road. This could require an upgrade of the internal access road.

**Doncaster Road** – The Doncaster Road bridge over the Eastern Freeway would need to be removed and reconstructed to allow for the construction of additional lanes along the freeway. These works could take approximately one year, but capacity at this location would not be reduced for this whole period. Instead, the works would occur over multiple stages, realigning traffic to different sides of the bridge to provide sufficient space for construction.

During construction, the Doncaster Road bridge would be reduced to two lanes in each direction, which would reduce the turning capacity from two lanes to one. This would only impact the westbound turn lane from Doncaster Road onto the Eastern Freeway, as the eastbound turning lane is currently a single lane. Temporary ramps to and from the Eastern Freeway may be used to allow for the construction of the ultimate ramps. These temporary ramps would maintain the function of the existing ramps.



The reduction in turning capacity at the Doncaster Road/Eastern Freeway interchange is likely to have impacts on the traffic performance of this location, potentially resulting in up to 200 vehicles per hour redistributing away from the interchange during peak periods. It may be possible to redistribute the turning vehicles from Doncaster Road to Elgar Road to minimise impacts and maintain traffic performance. The single right-turn lane from Elgar Road onto the Eastern Freeway has a capacity of up to 400 vehicles per hour, however existing turning movement counts indicate that approximately 100 vehicles an hour make this movement.

**Eastern Freeway** – The Eastern Freeway would be widened between Springvale Road and Chandler Highway as part of the project. These works are likely to require a number of stages to accommodate the existing traffic volumes. It is possible that all sections of the Eastern Freeway could be under construction at the same time, although staging of these works may also occur.

The traffic lanes on the Eastern Freeway would be temporarily realigned to provide sufficient space for construction activities. Potential impacts associated with lane changes (risks TR02 and TR10) and associated driver behaviour (risk TR03) would be managed by adherence to EPR T2, which requires transport capacity to be maintained during the peak periods. This means the existing number of traffic lanes along the Eastern Freeway must be maintained during construction, at least in the AM and PM peak. As such, lane closures would only be permitted outside peak periods, while full closures of the freeway would only be possible overnight.

While it is anticipated there would still be some changes to traffic flow on the Eastern Freeway during construction activities, keeping all lanes open during the peak periods is expected to minimise the number of road users seeking diversions away from the freeway corridor due to the construction works (risk TR09). This is also supported by the lack of east-west capacity on alternative routes (such as Whitehorse Road and Doncaster Road) to accommodate any significant diversion away from the freeway corridor.

### 9.4.3 Public transport network

There would be some disruption to public transport movements during construction site clearance and establishment, the construction of surface roads and other civil infrastructure works and during the removal of spoil generated by tunnelling or trenching activities.

The risk pathways associated with disruption to the public transport network as a result of construction activities are described in Table 9-6. The potential impacts associated with each of these risk pathways are discussed in this section.

**Table 9-6** Risk table – construction – public transport

Risk ID	Risk pathway	Risk rating
TR01	Traffic movements associated with construction site clearance and establishment impedes the safe and efficient movement of local traffic, including public transport movements and cyclists and pedestrians	Medium
TR04	Public transport impeded by traffic movements associated with construction of surface roads and other civil infrastructure works, including potential temporary closures of bus routes and rail lines, and incidental damage to public transport infrastructure	Medium
TR10	Traffic associated with the construction of the ramp connections to the Eastern Freeway impedes the safe and efficient movement of traffic, including public transport movements, on the Eastern Freeway through temporary lane closures	Medium
TR12	Construction traffic associated with the removal of spoil generated by tunnelling or trenching activities impedes the safe and efficient movement of traffic and public transport movements on arterial and local roads in the vicinity of the work zones	Medium

Construction activities would be managed to reduce the impacts on the safe and efficient movement of public transport (risks TR01, TR10, TR12). Some impacts to public transport services would be unavoidable. As outlined in Section 9.4.2, Transport Management Plan(s) would be developed which would include measures for maintaining transport capacity, and a requirement to undertake monitoring so that impacts could be identified and responded to.

As part of the development of the Transport Management Plan, the contractors would be required to consult with relevant public transport authorities to minimise disruption to tram, bus and rail services, which may include VicTrack, Yarra Trams, Public Transport Victoria, Metro Trains Melbourne and the Department of Transport.

## Potential impacts to bus services during construction

Bus routes may be impacted by lane closures (outside peak periods) or speed reductions. Some bus stops may be temporarily relocated, with the relocated stops placed as close as possible to the original bus stop location.

The Doncaster Park and Ride would be impacted by the reconstruction of the Doncaster Road bridge, construction of the Doncaster Busway, and works required to change the vertical grade of Doncaster Road at the intersection of High Street and the entrance to the park and ride.

To maintain the existing number of car parks and bus bays at the Doncaster Park and Ride during construction, it is likely the facility would be temporarily relocated for two to three years. The most likely location for the temporary facility is within the Koonung Creek Reserve area bounded Doncaster Road, Gardenia Road and the Eastern Freeway, on the opposite side of the Eastern Freeway to the existing facility.

Additional works would be required for the temporary Doncaster Park and Ride site to provide a priority service equivalent to the existing site. These works are anticipated to include:

- A dedicated bus lane on Doncaster Road on the approach to the relocated Doncaster Park and Ride
- A new intersection on Doncaster Road (east of the Gardenia Road/Greythorn Road intersection) to allow buses and cars to access the temporary facility
- Installation of temporary signals to the new entrance and rephasing of signals at Gardenia Road/Doncaster Road and Greythorn Road.

The proposed temporary Doncaster Park and Ride site may also be used to provide space for a temporary ramp during the construction of the Doncaster Road bridge (discussed in Section 9.4.2 'Road closures and diversions').

Buses would need to travel approximately 400 metres further than the existing Doncaster Park and Ride to access the relocated facility and would pass through up to three additional sets of traffic lights, which could increase bus travel time by up to three minutes.

### Potential impacts to rail services during construction

It is expected that existing passenger rail operations would be impacted on the Hurstbridge rail line during:

- Strengthening or extension of the section of Grimshaw Street that crosses the Hurstbridge rail line
- Works to lengthen the existing rail underpass of Greensborough Road south of Grimshaw Street to accommodate a widened road formation for additional lanes as part of North East Link. These works would include changes to existing signalling arrangements and overhead electrical layouts.

It is anticipated these works would require the occupation of the railway due to the nature of the work and close proximity to the active rail line. Accordingly, the Hurstbridge rail line would most likely need to be closed for around six weeks to accommodate these works. Replacement buses are expected to be used to transfer passengers between stations during closure of the rail line.

Part of the existing Watsonia railway station car park adjacent to Greensborough Highway would be required to accommodate the proposed construction of North East Link and the provision of the local connection road between Watsonia Road and Grimshaw Street.

It is likely that at least half the existing car parks at Watsonia railway station would need to be relocated for two to three years. An alternate car park could be provided within the 4-metre wide high voltage power easement to the east of the station. Subject to the requirements of the owner, AusNet, it is expected that up to 534 bays could be accommodated at this location while leaving sufficient space around the power infrastructure to enable AusNet to access its asset.



It is expected that traffic impacts associated with temporary relocation of some car parking spaces to the high voltage power easement would be minor. Depending on the access arrangements to the temporary car park, traffic volumes along Elder Street and Frensham Road could increase during the peak periods. Both these roads have sufficient spare capacity and would be able to accommodate the potential increase.

Currently, the furthest parking space from the pedestrian access to Watsonia railway station is 270 metres. With the proposed relocation, the furthest parking space could be 580 metres from the station. This could increase journey times for pedestrians by up to eight minutes, allowing for the need to cross the Greensborough Bypass.

Parking restrictions in surrounding local roads would need to be reviewed to reduce the likelihood of drivers parking in these roads rather than in the relocated car park.

The contractors would be required to provide alternative parking where practicable to replace public and commuter parking lost as a result of project construction activities (as required through the development of a Transport Management Plan in EPR T2).

## 9.4.4 Walking and cycling network

There would be some disruption to the walking and cycling network during construction site clearance and establishment, the construction of surface roads and other civil infrastructure works, construction of the ramp connections to the Eastern Freeway and during the removal of spoil generated by tunnelling or trenching activities.

The risk pathways associated with this disruption are described in Table 9-7. The potential impacts associated with each of these risk pathways are discussed in this section.

**Table 9-7** Risk table – construction – traffic and transport

Risk ID	Risk pathway	Risk rating
TR01	Traffic movements associated with construction site clearance and establishment impedes the safe and efficient movement of local traffic, including public transport movements and cyclists and pedestrians	Medium
TR05	Cyclists and pedestrians impeded by traffic movements and activities associated with construction of surface roads and other civil infrastructure works	Low
TR11	Construction works associated with the ramp connections to the Eastern Freeway results in temporary closure or diversion of pedestrian and bicycle paths, due to proximity to construction activities	Low
TR13	Construction traffic associated with the removal of spoil generated by tunnelling or trenching activities impedes safe and efficient pedestrian and bicycle movement on arterial and local roads, including dedicated pedestrian and bicycle paths in the vicinity of the work zones	Low

During construction, the majority of shared use paths would remain open or suitable temporary diversions would be provided. Nevertheless, it is anticipated that construction activities that involve the delivery and installation of concrete beams would require temporary closure and diversion of existing walking and cycling routes (risks TR05, TR11). Closures would also be required to allow for activities such as bridge construction, road widening, and excavation works. In particular, temporary closures are expected to occur at locations identified in Section 9.4.2 ('Road closures and diversions') and as identified below.

**Macorna Street pedestrian bridge** – This pedestrian bridge would be demolished and reconstructed to allow for the widening of the M80 Ring Road and to upgrade it to the standards set by the *Disability Discrimination Act 1992* (Cwlth). This is anticipated to take approximately six months and during this period the bridge would be closed. A detour route would be developed for the small number of pedestrians and cyclists who use the Macorna Street pedestrian bridge. Pedestrians could detour via the existing pedestrian underpass at the Plenty Road, which could then connect to the underpass at Yando Street, or via the existing pedestrian facilities at Plenty Road. Both these detour routes would result in a long diversion.

It may be possible to provide a short-term treatment where the existing *Disability Discrimination Act 1992* (Cwlth) compliant ramps are replaced with stairs, however these stairs may only be in place for a few weeks until the main bridge structure was removed.

**Walking and cycling paths along the Eastern Freeway** – Existing walking and cycling paths crossing the Eastern Freeway as listed below would be closed for up to three months to allow for the Eastern Freeway widening works and to upgrade the bridges to the standards of the *Disability Discrimination Act*. Signage would advise of the bridge closures. These closures and potential diversion routes are discussed as follows:

- Koonung Creek Wetlands pedestrian bridge (connecting to Heyington Avenue), located between Doncaster Road and Elgar Road – during the closure, the closest alternative crossing of the Eastern Freeway would be at Elgar Road, with a crossing at Doncaster Road located slightly further away.
- Boronia Grove Reserve pedestrian bridge, located approximately midway between Middleborough Road and Blackburn Road – during the closure, the closest alternative crossing of the Eastern Freeway would be at Blackburn Road, with a crossing at Middleborough Road located slightly further away.
- Busana Way pedestrian bridge (near Kett Street), located west of Springvale Road – during the closure, the closest crossing of the Eastern Freeway would be at Springvale Road.

In addition to these closures and diversions, there is the potential for shared use paths to be affected by traffic movements associated with construction during site establishment (risk TR01) and by the additional truck traffic generated through the transport of spoil (risk TR13). Measures to ensure connectivity and safety for all transport network users during construction, including cyclists and pedestrians, would be required to be included as part of development of any Transport Management Plan(s) (EPR T2).

## 9.5 Operation impact assessment

This section discusses the operational impacts associated with North East Link that relate to traffic and transport.

As described in Section 9.1, impacts during operation of North East Link have been assessed for the year 2036, which is approximately 10 years after North East Link would open.

Between 2016 and 2036, the total population of Melbourne is forecast to increase by 38 per cent. This increase in population is anticipated to occur mostly in the outer growth areas, and is expected to significantly increase traffic on arterial roads and freeways across metropolitan Melbourne. Transport modelling for the 2036 'no project' scenario indicates that vehicle kilometres travelled along arterial and local roads in Melbourne's north-east are forecast to grow faster than for freeways. This is likely to place further pressure on the north-eastern arterial road network.

During the same 20-year period, overall employment across metropolitan Melbourne is forecast to increase 43 per cent. The growth in employment is anticipated to be concentrated in the CBD and inner areas. As such, there is disconnect between the locations of population growth and jobs which is expected to place additional pressure on Melbourne's transport system.

The impacts identified during operation of North East Link that relate to traffic and transport are grouped according to four main themes:

- Road network – including the potential for changes to traffic patterns, local access, traffic volumes and travel times; road network performance with North East Link; and a crash assessment
- Freight network – including the potential for changes to freight movement patterns; consideration of over-dimensional vehicles and vehicles carrying placarded loads; access for HPFVs; and changes to freight volumes
- Public transport network – including interaction with existing public transport services; forecast improvements to the performance of the bus and tram network; and the Doncaster Busway and improvements to DART services
- Walking and cycling network – including walking and cycling network improvements, local accessibility and road safety.

The potential for impacts associated with these main themes are discussed in the following sections.

## 9.5.1 Road network

### Changes to traffic patterns

During operation of North East Link, a significant proportion of medium and longer cross-city trips would be redistributed away from the arterial road network and onto the freeway network.

The risk pathways associated with changes to traffic patterns are described in Table 9-8. The potential impacts associated with each of these risk pathways are discussed in this section.

**Table 9-8** Risk table – operation – changes to traffic patterns

Risk ID	Risk pathway	Risk rating
TR14	Traffic patterns on arterial and local roads in surrounding residential neighbourhoods are adversely impacted by traffic diverting to avoid tolls or temporary closures due to maintenance activity	Low
TR15	Traffic patterns on arterial and local roads in surrounding residential neighbourhoods are adversely impacted by traffic diverting to avoid incidents on the freeway, or temporary closures due to incident response	Low
TR18	Tunnel closures for emergencies or maintenance activity result in impacts on traffic patterns in residential neighbourhoods	Low

By 2036, it is estimated that North East Link would carry up to 135,000 vehicles per day. The strategic transport model indicates the majority of traffic on North East Link (approximately 60 per cent) would be travelling southbound during the AM peak. This pattern would reverse as workers commute home in the PM peak. Outside peak times, there would be an even split between northbound and southbound traffic.

Most of this traffic is expected to be undertaking medium and longer trips across and through the north-east. Around 45 to 55 per cent of the traffic travelling southbound on North East Link from the M80 Ring Road is expected to travel the full corridor toward the Eastern Freeway. The majority of this traffic is then expected to continue east along the Eastern Freeway.

Compared with estimates for a 2036 'no project' scenario, the total daily number of vehicle kilometres travelled along the freeway network is forecast to increase 44 per cent within the north-east and 5 per cent across metropolitan Melbourne. The total daily non-freeway vehicle kilometres travelled is expected to decrease 4 per cent within the north-east and 1 per cent across metropolitan Melbourne. This illustrates the project would divert traffic away from arterial roads and onto the freeway network.



This diversion of traffic onto North East Link is anticipated to have a positive impact on the road network, resulting in a significant redistribution of medium and longer cross-city trips away from local and arterial roads compared with the 2036 'no project' scenario. These roads would still be at their capacity as a result of servicing local trips. They would still serve as arterial roads but would service a higher proportion of local trips.

The additional crossing of the Yarra River that would be provided as part of North East Link would increase the total number of traffic lanes crossing the river (from 22 to 28) and would reduce traffic across all five existing Yarra River crossings. This would increase the resilience of the road network, improving the ability to adapt when breakdowns, accidents or other incidents occur. For example, Table 9-9 lists the predicted changes to daily traffic as a result of a southbound single-lane closure on Rosanna Road in 2036 both with and without North East Link. This closure is predicted to have a lesser impact with North East Link, with traffic volume increases on nearby arterial roads anticipated to be lower than in the 'no project' scenario.

**Table 9-9** Total daily traffic volume changes, Rosanna Road one lane closure (southbound)

Road name	Per centage change in daily traffic volume	
	2036 no project	2036 with North East Link
Lower Plenty Road	+ 10%	+ 6%
Waterdale Road	+ 4%	+ 1%
Fitzsimons Lane	+ 3%	+ 1%
Williamsons Road	+ 4%	+ 1%
North East Link	-	+ 3%

It is possible that some drivers may choose not to use North East Link to avoid paying tolls (risk TR14). Other drivers could delay their entry to or exit early from North East Link to avoid a tolling point, causing localised increases in traffic around local interchanges. These situations have been accounted for in the strategic transport modelling. Even if some vehicles choose not to use all or part of North East Link to avoid paying tolls, the north-eastern arterial road network is still anticipated to experience an overall reduction in traffic volumes and vehicle kilometres travelled during operation of North East Link.

There is the potential for traffic patterns on the arterial and local network to change if the North East Link tunnels or sections of the freeway require temporary closure for maintenance or due to an emergency event (risks TR14, TR15, TR18). The design of the project would be optimised in consultation with appropriate road management authorities, public transport authorities, relevant land managers and local councils as part of the detailed design process (EPR T1), allowing for maintenance and enabling emergency access and incident management. The freeway sections would include emergency stopping bays, and the tunnels would have cross passages to allow for emergency access and for maintenance work. The tunnels would also be equipped with a smoke management system (for fire response), an emergency public address system and closed-circuit television surveillance. A motorway operations centre would coordinate an incident detection and response system, traffic management systems and emergency services communications.

### Would North East Link encourage greater car use?

Data from the strategic transport model was used to compare changes in transport mode for the 2036 'no project' and 'with project' scenarios within the study area and across metropolitan Melbourne.

The data indicated that North East Link would not result in a material increase in road vehicle trips relative to trips made using public transport and active transport (walking and cycling) as the project would provide upgrades across all transport modes.

Modelling of both the 'no project' and 'with project' scenarios for the year 2036 estimates that:

- Road vehicles would account for 73 per cent of trips across metropolitan Melbourne and 76 per cent of trips within the study area
- Public transport would account for 14 per cent of trips across metropolitan Melbourne and 12 per cent of trips within the study area
- Active transport (walking and cycling) would account for 13 per cent of trips across metropolitan Melbourne and 12 per cent of trips within the study area.

Tunnel closures for routine maintenance would generally occur at night-time to minimise traffic impacts on the surrounding road network. Traffic that would normally use North East Link during these periods would be required to divert onto key arterial roads such as Bulleen Road, Rosanna Road, Fitzsimons Lane and Burke Road. Heavy commercial vehicle curfews along Rosanna Road would continue to apply during these periods, unless a permit is sought by truck operators. Analysis of data from the strategic transport model indicates the maximum hourly traffic volumes along these key arterial roads during a night-time closure period would be less than the maximum hourly traffic volumes during peak periods. This suggests there would be sufficient capacity along the arterial road network to accommodate night-time North East Link tunnel closures.

The design redundancy, safety features and operational systems described above would effectively manage maintenance activities and emergency events, reducing the likelihood of road users seeking diversions from the freeway.

## Changes to local access

North East Link would alter local access arrangements at four locations, as described below:

**M80 Ring Road to Grimshaw Street** – Untolled access would be maintained between Grimshaw Street and the M80 Ring Road/Greensborough Road. A new ramp from the Greensborough Bypass to Plenty Road would service northbound and westbound traffic. The new arrangement is described in Chapter 8 – Project description and illustrated in Figure 9-24.

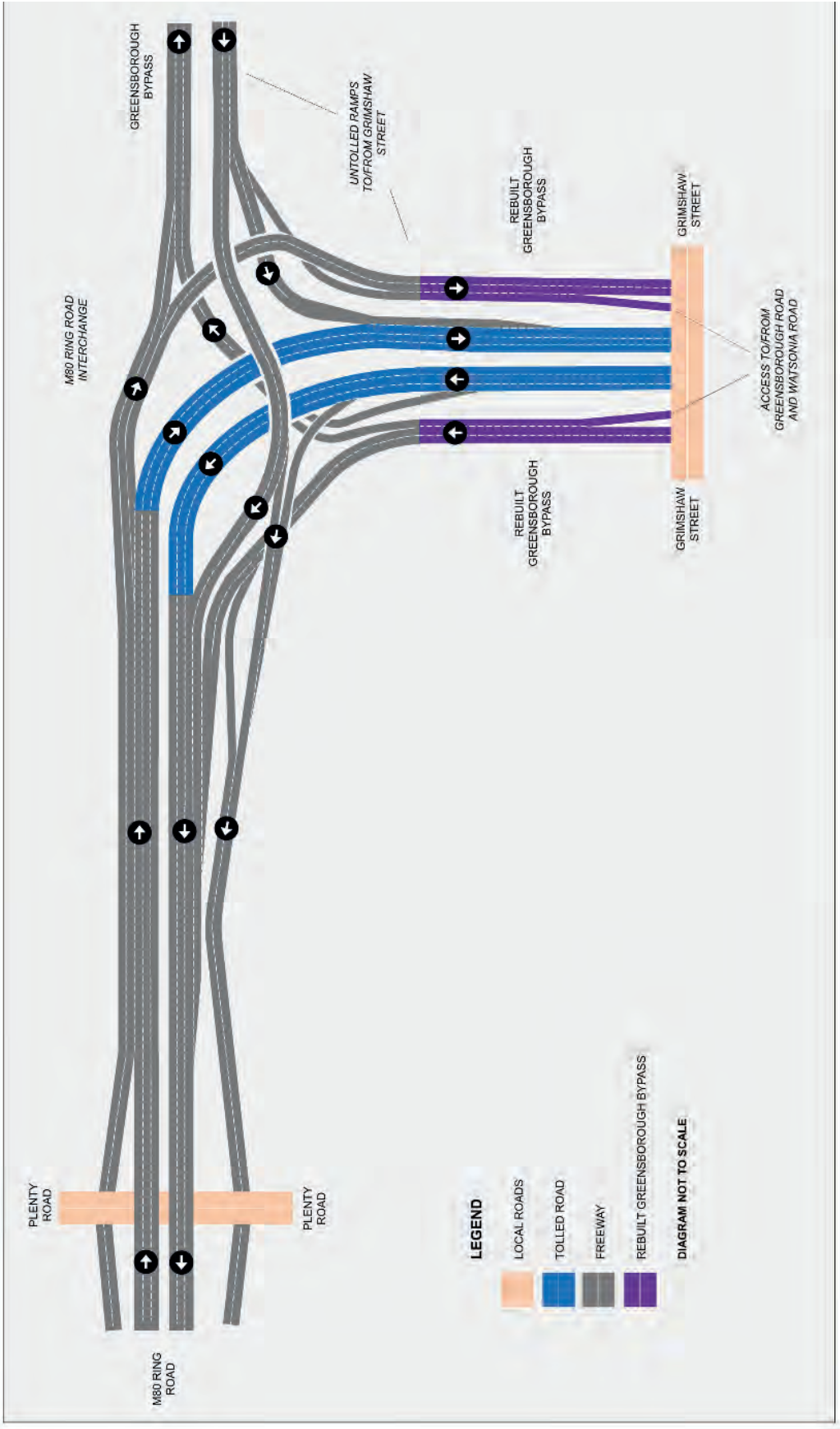


Figure 9-24 M80 Ring Road to Grimshaw Street – North East Link access arrangement



**Access to Watsonia railway station** – Access to Watsonia railway station from the eastern side of Greensborough Bypass would change. The new access arrangements are illustrated in Figure 9-25 and an overview is provided in Chapter 8 – Project description.

Currently, the existing signalised intersection at Elder Street provides direct access to the Watsonia railway station car park and also facilitates access to Watsonia Road via a left turn onto Greensborough Bypass. In the 'with project' scenario, Elder Street would no longer have direct access to Watsonia railway station. In this scenario, traffic destined for the station from Elder Street would need to perform a left turn onto the rebuilt Greensborough Bypass on the eastern side of North East Link, continue to Watsonia Road and perform a right turn into the station at the roundabout of Watsonia Road/Lambourn Road/Devonshire Road. This movement would be approximately 800 metres (or an estimated two minutes) longer than the current access arrangement.

A forecast reduction in daily traffic volumes on the rebuilt Greensborough Bypass would allow higher priority for local access movements. Traffic light signal phases at the intersection of Greensborough Bypass and Watsonia Road would be adjusted together with the signalised intersection at Elder Street to prioritise these local access movements without encouraging demand for additional 'through trips' between Greensborough Bypass and Grimshaw Street.

The rebuilt Greensborough Bypass would not be tolled, to maintain access for locals between Watsonia Road and the M80 Ring Road. Access from Elder Street to Watsonia Road would be largely unchanged from the existing arrangement. Access to Greensborough Road would be maintained from Yallambie Road and Blamey Road.

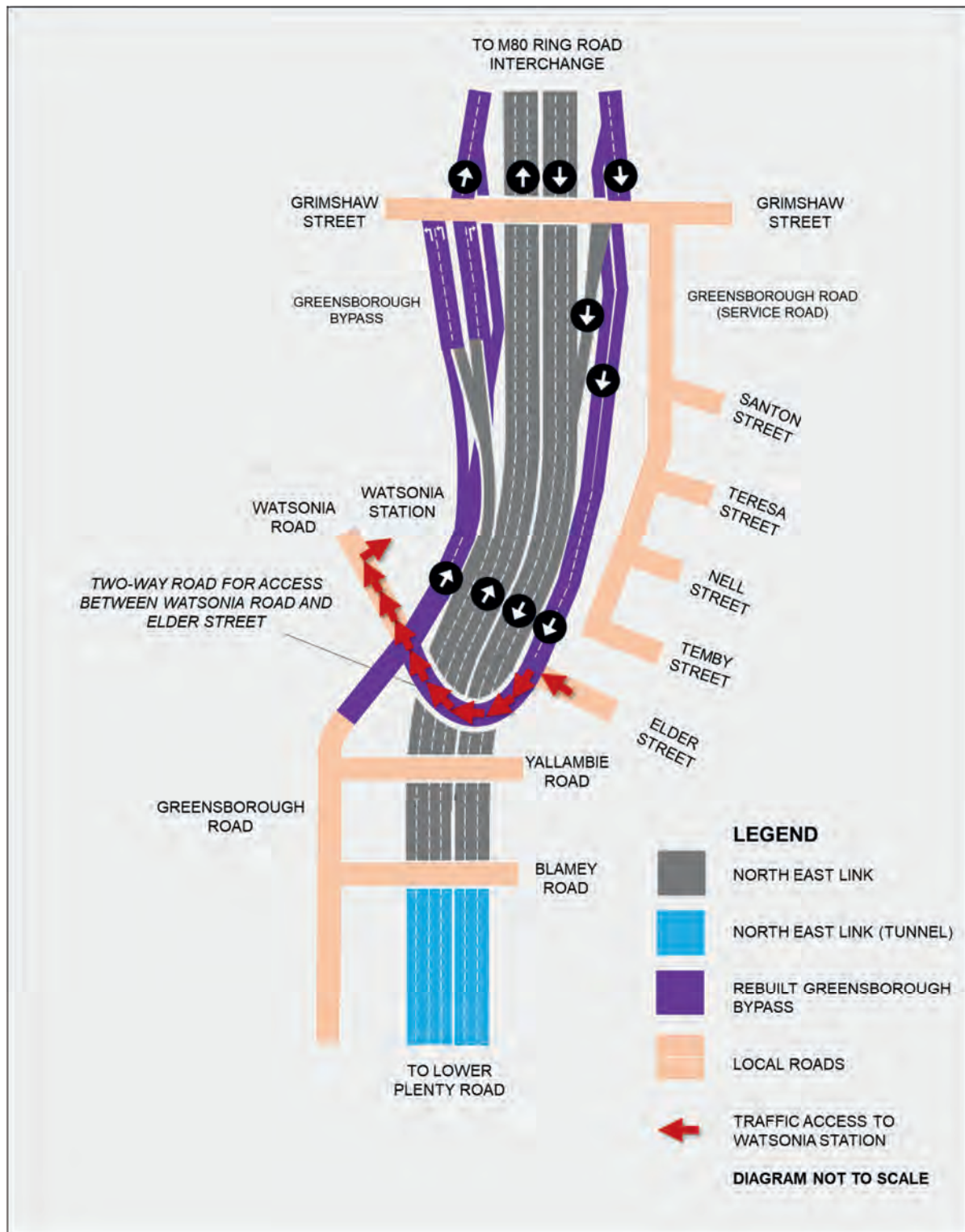


Figure 9-25 Watsonia railway station – North East Link access arrangement

**Manningham Road interchange** – The proposed design for the Manningham Road interchange would require some local access changes on the nearby road network, as shown in Chapter 8 – Project description and in Figure 9-26. There would no longer be direct access between Avon Street and Bulleen Road, and Austin Street would be reconfigured as left-in/left-out only. These measures have been deliberately incorporated into the reference project to protect Avon Street and Austin Street from potential ‘rat-running’ traffic to or from the North East Link ramps. Traffic bound for Bulleen Road from Avon Street would be required to use neighbouring connections at Austin Street and York Street/Manningham Road. This is an additional 500 metres to one kilometre travel distance, or approximately one to two minutes’ additional travel time. Given the small residential catchment along Avon Street, the impact on traffic volumes along Austin Street and York Street is anticipated to be negligible.

Traffic from Bulleen Road wishing to access Avon Street would be required to use Thompsons Road/Manningham Road and perform a left turn at York Street, which would add approximately two kilometres travel distance or two minutes’ travel time to this journey. Traffic may alternatively access Avon Street by performing a U-turn at the intersection of Bulleen Road/Manningham Road and performing a left turn into Austin Street. This may contribute an additional one kilometre or two to three minutes’ travel time. Additionally, Bridge Street would be reconfigured between Manningham Road and Templestowe Road. Access from the east would be improved by signalling the intersection at Bridge Street and Templestowe Road, and the intersection of Bridge Street and Manningham Road would be realigned, with improved signals and traffic light phasing arrangements. The northbound exit ramp from North East Link would connect to this intersection, but traffic exiting North East Link would not be permitted direct access to Bridge Street.

An alternative design option for the Manningham Road interchange is outlined in Chapter 8 – Project description. Impacts associated with the alternative design option are discussed further in this section (‘Changes to traffic volumes’).

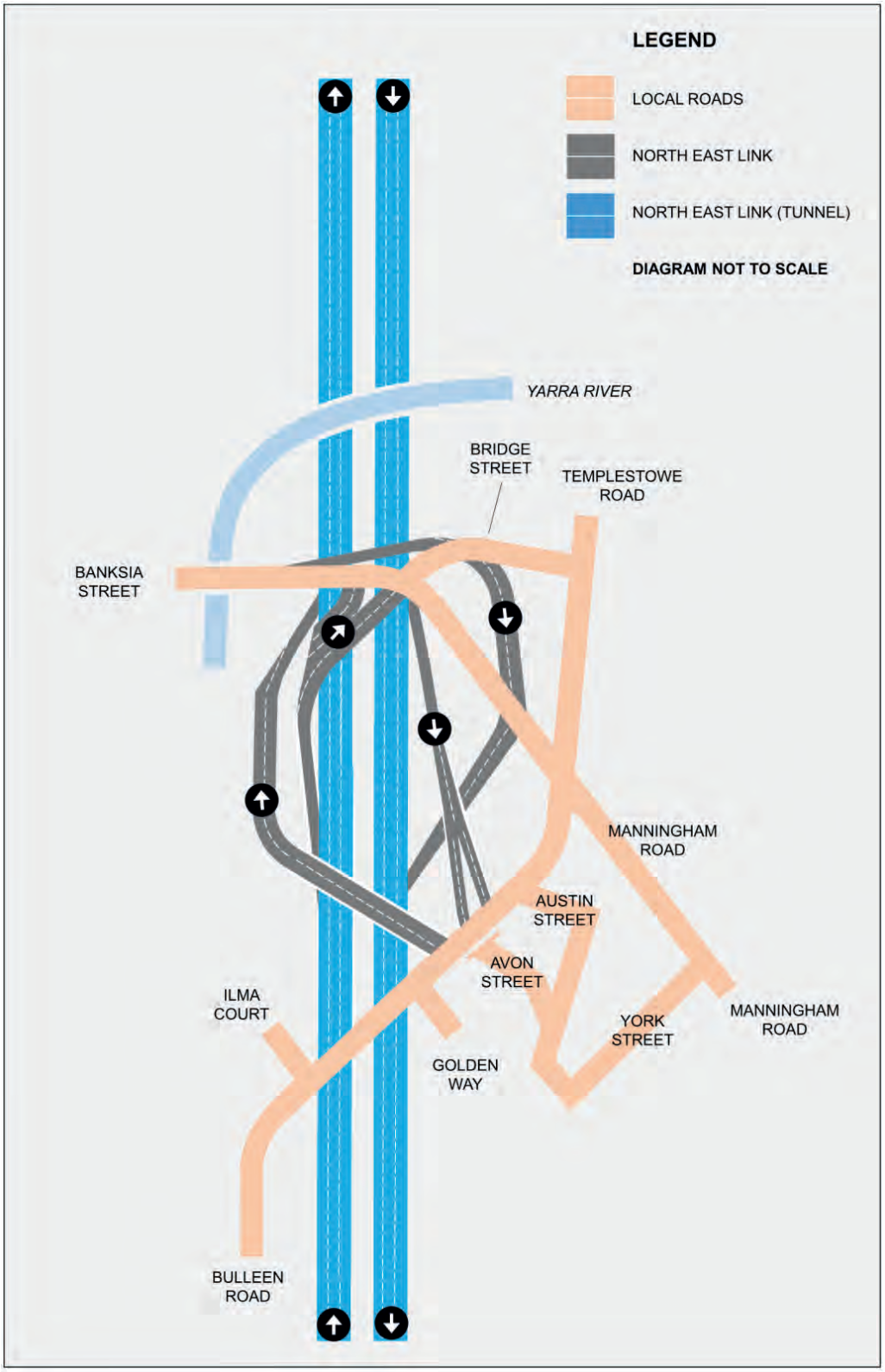


Figure 9-26 Manningham Road interchange – North East Link access arrangement



**Lower Plenty Road interchange** – The Lower Plenty Road interchange would alter access between Greensborough Road and existing side streets to the west, as shown in Figure 9-27. At present, Drysdale Street, Oban Way, Edward Street, Strathallan Road and Sydney Street connect to Greensborough Road via un-signalised intersections, with full movements permitted. North East Link would include the following changes to access arrangements:

- A new two-way link would be constructed between Greensborough Road and Lower Plenty Road. This untolled link would start near Erskine Road and end just east of the Lower Plenty Road/Greensborough Road intersection, and would provide connectivity to Drysdale Street.
- The reconfiguration of Greensborough Road would include a median strip to accommodate the North East Link ramps. As a result, traffic from Oban Way would no longer be able to turn right to travel south along Greensborough Road, and southbound traffic on Greensborough Road would be unable to turn right into Oban Way. Instead, traffic would use Erskine Road (approximately 600 metres to the south) for these movements to and from Oban Way.
- A new northbound service lane would connect Greensborough Road to Edward Street, Strathallan Road and Sydney Street to protect these side streets from potential ‘rat-running’ traffic from the new North East Link ramps. Traffic from Edward Street, Strathallan Road and Sydney Street would no longer be able to perform a right turn at Greensborough Road to travel south, and southbound traffic from Greensborough Road would be unable to perform a right turn into these side streets. Traffic from these roads wishing to travel south along Greensborough Road could use the signalised intersection at Erskine Road to the south, or Torbay Street to the north, where full movements would be permitted with the removal of the central median along Greensborough Road. This would require approximately one additional kilometre of travel, or approximately three minutes’ additional travel time.
- There may be some very small increases in traffic along Torbay Street to accommodate local access from Greensborough Road north for residents along Strathallan Road, Edward Street and Sydney Street.

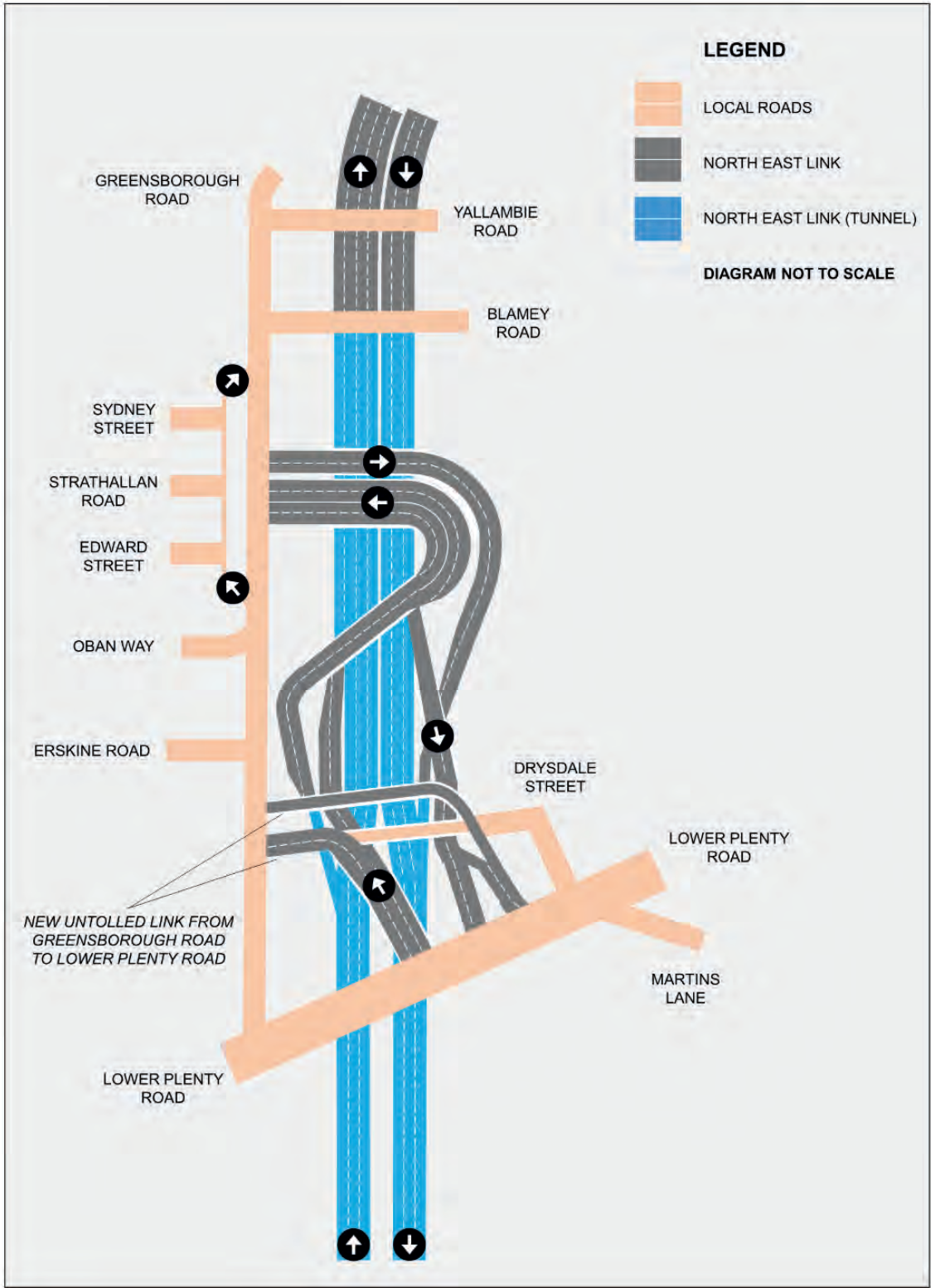


Figure 9-27 Lower Plenty Road interchange – North East Link access arrangement

## Changes to traffic volumes

Without North East Link, traffic volumes on almost every road within the north-east are anticipated to increase by 2036, particularly along the freeway corridors. North East Link is predicted to reduce traffic volumes on almost every arterial road between the M80 Ring Road and Eastern Freeway compared with the 'no project' scenario.

The biggest reductions in traffic volumes are anticipated along Rosanna Road (total reduction of approximately 12,000 vehicles per day in both directions by 2036 with North East Link compared with the 'no project' scenario) and Greensborough Road (total reduction of approximately 19,000 vehicles per day in both directions).

Traffic volumes on all five existing roads crossing the Yarra River are also anticipated to reduce significantly, by a total of approximately 50,000 vehicles per day (two-way).

The diversion of traffic away from arterial roads and onto the freeway network is anticipated to increase traffic volumes on the M80 Ring Road and Eastern Freeway, which would be accommodated by ITS upgrades and widening works as part of the project.

Traffic volumes are also projected to increase near the North East Link interchanges, due to traffic accessing and exiting the project at these locations. In addition, there would be some increases in traffic along north-south arterial roads to the south of the Eastern Freeway.

The forecast changes to average weekday traffic volumes between the 2036 'no project' and 'with project' scenarios are shown in Figure 9-28, Figure 9-29 and Figure 9-30 and discussed in this section.

### Predicted decreases in traffic volumes

- It is anticipated daily two-way traffic volumes on Greensborough Road would reduce by approximately 19,000 vehicles compared with the 2036 'no project' scenario. This would allow local traffic to have higher priority along Greensborough Road.
- Traffic volumes along Grimshaw Street east of Greensborough Bypass are forecast to decrease slightly across the day in the 2036 'with project' scenario.
- Traffic volumes along Plenty Road near La Trobe University are predicted to decrease overall (by approximately 9,900 vehicles per day, two-way) and the remaining traffic is more likely to use the M80 Ring Road east of its interchange with Plenty Road.
- In addition to Plenty Road, North East Link is also anticipated to remove traffic on other roads servicing the La Trobe NEIC, including:
  - Waiora Road – total reduction of approximately 7,600 vehicles per day across both directions
  - Upper Heidelberg Road – total reduction of approximately 3,300 vehicles per day across both directions

- Waterdale Road – total reduction of approximately 3,000 vehicles per day across both directions
- Kingsbury Drive – total reduction of approximately 2,600 vehicles per day across both directions.
- By 2036, the amount of traffic along Rosanna Road would have decreased significantly, with daily two-way traffic volumes anticipated to reduce by approximately 12,000 vehicles.
- In addition to Rosanna Road, other roads that feed onto the Yarra River crossings are also predicted to be relieved, including Main Road (a total reduction of approximately 4,600 vehicles per day across both directions) and Manningham Road east of the Yarra River (a total reduction of approximately 9,000 vehicles per day across both directions).
- Traffic volumes along the Yarra River crossings are anticipated to reduce significantly. This includes:
  - Banksia Street/Manningham Road – total reduction of approximately 13,300 vehicles per day across both directions
  - Fitzsimons Lane – total reduction of approximately 16,600 vehicles per day across both directions
  - Burke Road – total reduction of approximately 7,900 vehicles per day across both directions
  - Chandler Highway – total reduction of approximately 6,100 vehicles per day across both directions
  - Warrandyte Bridge – total reduction of approximately 6,200 vehicles per day across both directions.

Traffic volumes along some east-west arterial roads in Templestowe and Doncaster are predicted to decrease, such as Reynolds Road, Templestowe Road and Doncaster Road. This is likely due to traffic accessing these suburbs by diverting away from these arterial roads and onto the Eastern Freeway to access the region.



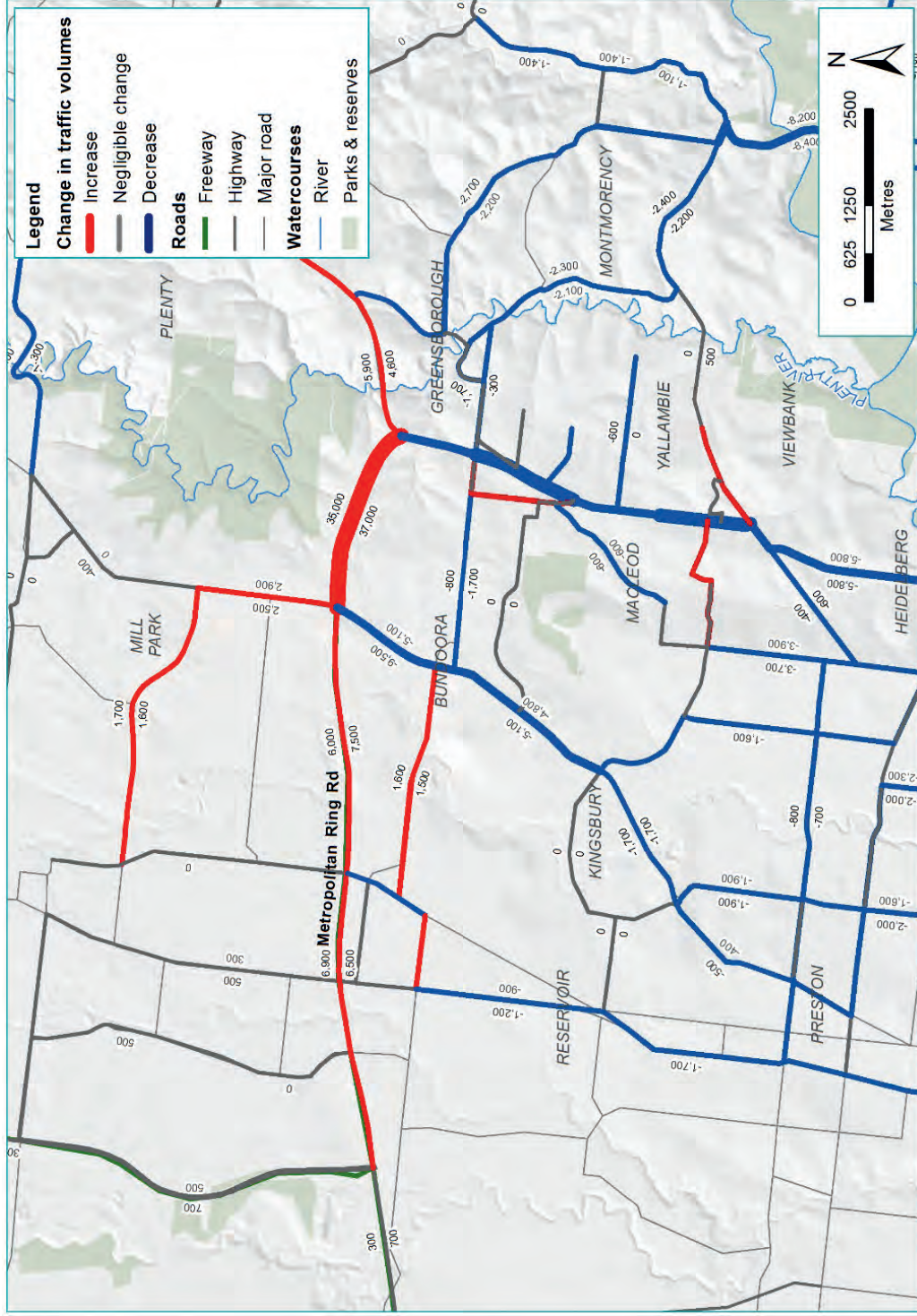


Figure 9-28 Change in total average weekday traffic volumes, 2036 'with project' versus 2036 'no project' – study area north

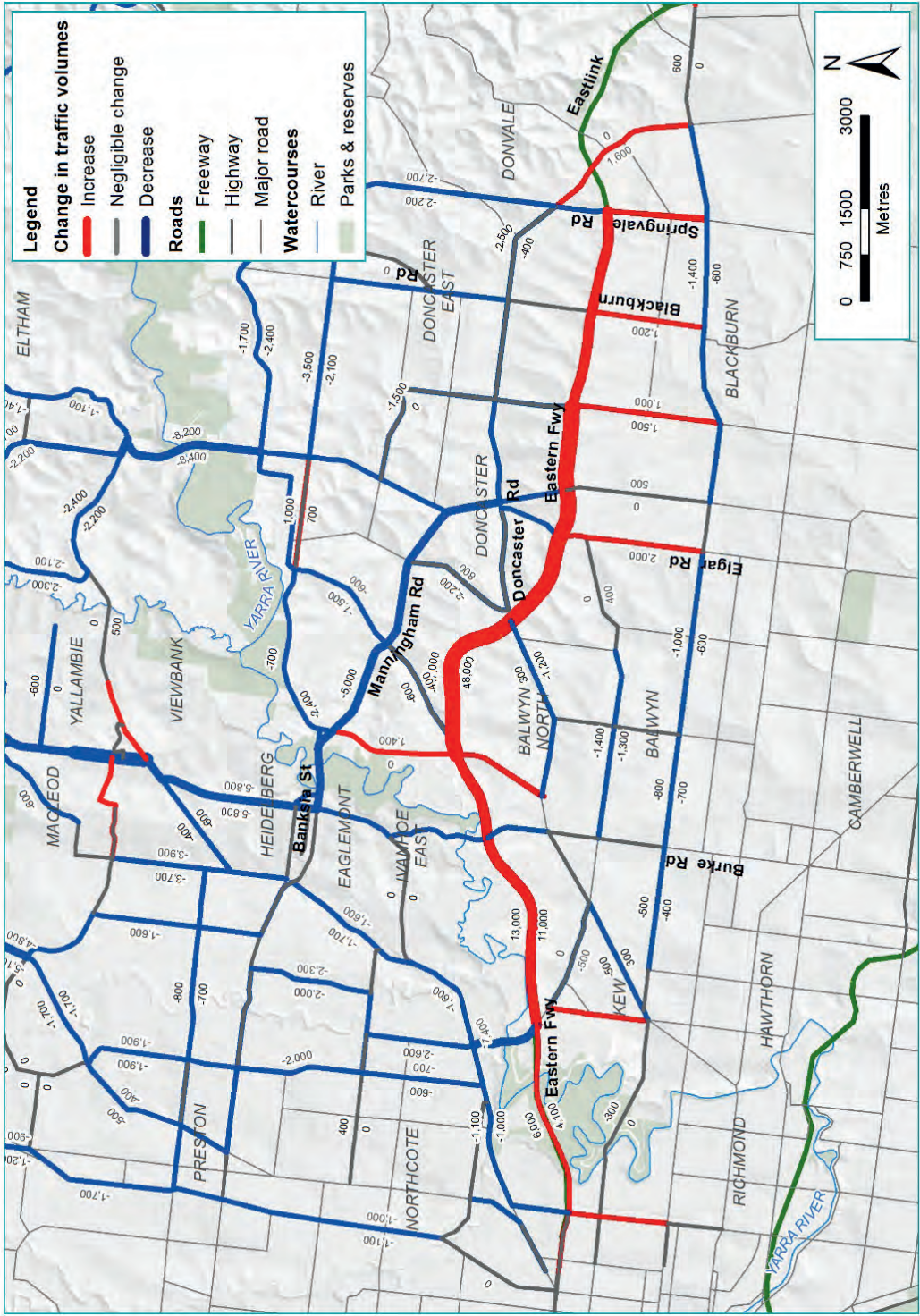
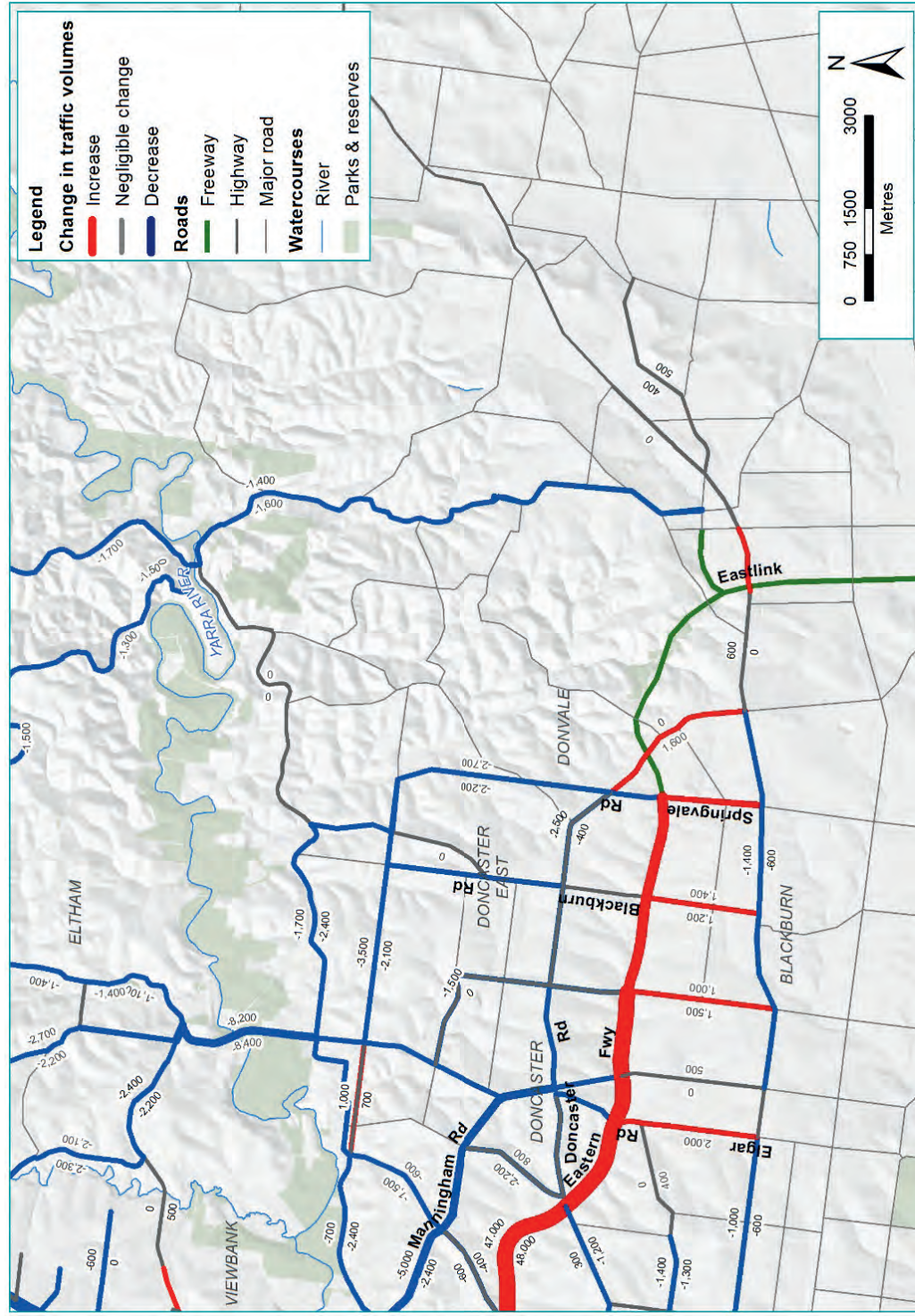


Figure 9-29 Change in total average weekday traffic volumes, 2036 'with project' versus 2036 'no project' – study area south





### Safe separation of traffic to improve freeway performance

As described in section 8.9.3 of Chapter 8 – Project description, at the following locations on the freeway network where there are complex traffic movements involving weaving and merging it is proposed to separate traffic into dedicated ‘channels’ separated by physical barriers:

- On the M80 Ring Road between the Greensborough Bypass/North East Link interchange and Plenty Road in the northbound and southbound directions
- On the Eastern Freeway between Bulleen Road and Middleborough Road in the eastbound direction, and between Tram Road and Bulleen Road in the westbound direction.

At these locations, the inner traffic lanes would be for ‘express’ travel and would be physically separated from the outer lanes. The outer lanes would be the ‘collector-distributor’ channels, providing dedicated access to freeway on- and off-ramps.

### Predicted increases in traffic volumes

- The number of vehicles travelling on the M80 Ring Road between Plenty Road and the Greensborough Bypass is forecast to increase by approximately 72,000 vehicles per day in both directions. The largest increase is anticipated between the M80 Ring Road and North East Link, where vehicles would be attracted to the accessibility of the new project corridor. This would be accommodated by adding lanes to the M80 Ring Road in both directions and providing a collector-distributor between Greensborough Bypass/North East Link and Plenty Road in the westbound direction.
- Daily traffic volumes along Watsonia Road are forecast to increase by 4,000 vehicles per day across both directions. This additional demand is predicted to be generated by vehicles travelling to the Grimshaw Street interchange to access North East Link, and would mostly occur during the off-peak period. Both Grimshaw Street and Watsonia Road are anticipated to operate without a material increase in congestion or delay as a result of the project. However, signalised intersections may need to be re-phased to allow for the changes in traffic patterns.
- Traffic volumes are predicted to increase along Erskine Road in Macleod. Based on the forecast numbers of vehicles turning into Erskine Road, it is considered that it would be able to accommodate the predicted increases in traffic volumes.
- Traffic along the Eastern Freeway is predicted to increase by approximately 10,000 to 95,000 vehicles per day (across both directions) with North East Link. The increase in demand would be accommodated by ITS upgrades and widening works that would be undertaken as part of the project.

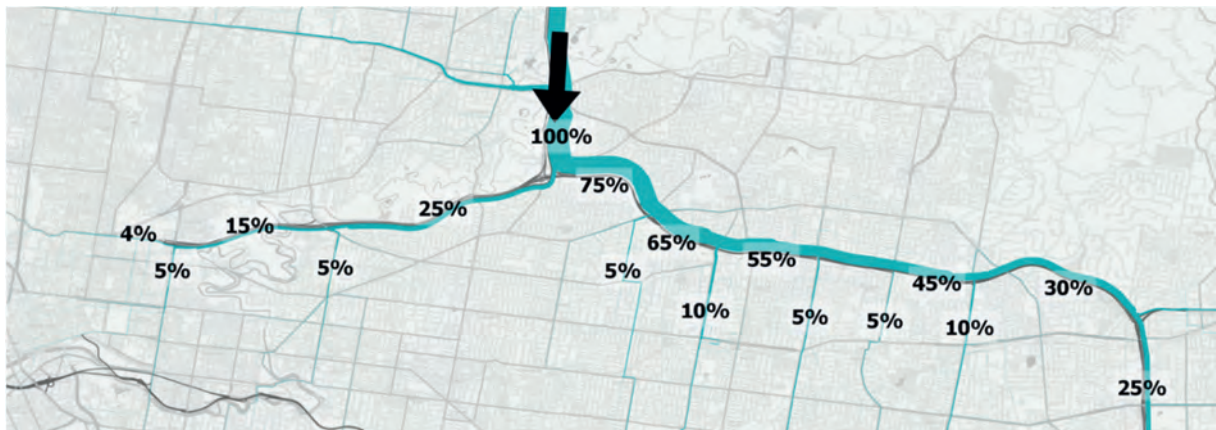
As shown in Figure 9-31, approximately 75 per cent of southbound North East Link traffic is predicted to travel east along the Eastern Freeway. Approximately 30 per cent of North East Link traffic would continue to the EastLink tunnels and 45 per cent would exit the Eastern Freeway between Doncaster Road and Springvale Road. Only 5 per cent of traffic on North East Link is destined for Hoddle Street.



Traffic modelling predicts that:

- The largest increases in traffic volumes would be between Bulleen Road and Doncaster Road.
- There would be a slight increase in traffic volumes between Hoddle Street and Chandler Highway, which would mostly occur outside peak periods – this increase would be due to traffic from arterial roads (such as High Street in Preston and Rosanna Road) diverting onto North East Link and the Eastern Freeway.

As traffic already travels from these arterial roads to the Eastern Freeway, there would only be a very small net increase in traffic at the city end of the freeway, with no change anticipated in the CBD. As an example, traffic volumes along Hoddle Street just south of the Eastern Freeway are forecast to increase by only 2 per cent across the day, which is within the margin of day-to-day traffic variability.



**Figure 9-31** Distribution of southbound North East Link traffic using the Eastern Freeway, 2036 ‘with project’

Note: the per centages shown in this figure are a distribution of traffic from North East Link, not a change in traffic volume.

- As a significant proportion of the North East Link’s traffic demand is to and from the eastern suburbs, an increase in traffic is predicted on some arterial roads south of the Eastern Freeway, including:
  - Bulleen Road – total increase of approximately 4,900 vehicles per day across both directions
  - Elgar Road – total increase of approximately 3,600 vehicles per day across both directions
  - Surrey Road – total increase of approximately 2,600 vehicles per day across both directions
  - Springvale Road – total increase of approximately 5,700 vehicles per day across both directions.

Most of the additional traffic demand along these arterial roads would be generated locally within the municipalities of Boroondara and Whitehorse. While the daily volumes are forecast to increase, there would be a minimal increase in traffic along these roads during the peak periods. As such, these roads are anticipated to operate without a material increase in congestion or delays during peak periods. However, signalised intersections may need to be re-phased to allow for the predicted changes in traffic patterns.

Sensitivity testing was undertaken to predict the traffic impacts if tolls were increased or decreased by 20 per cent. It was estimated that varying tolls in this way would result in only small increases in traffic (if tolls were reduced) or reductions (if tolls were raised) of less than 5 per cent. Trucks were less sensitive to toll changes than cars, which reflects the high value placed on freight efficiency. The results of sensitivity testing also indicated the Manningham Road interchange alternative design would have a negligible impact on daily car traffic, with all locations recording a change in volume of 3 per cent or less. Truck volume changes were similar with the exception of Bulleen Road, where a 10 per cent reduction was recorded from trucks diverting to North East Link.

## Changes to travel times

The strategic transport model was used to forecast travel times for the 'with project' and 'no project' scenarios. North East Link is broadly predicted to improve travel times across the north-east.

North East Link would significantly reduce travel times for 'through' traffic travelling between the M80 Ring Road and the Eastern Freeway. Travel times along North East Link are predicted to be in the order of 15 minutes during peak periods, which represents a time saving of up to 35 minutes compared with a trip undertaken along the Greensborough Road/Rosanna Road/Bulleen Road route in 2036 'no project' scenario, as listed in Table 9-10.

**Table 9-10** Comparison of forecast travel times (in minutes) along North East Link and the arterial road network, 2036

Route	Via	2017	2036 'no project'	2036 'with project'
AM peak southbound				
M80 Ring Road to Eastern Freeway	Greensborough Road – Rosanna Road – Bulleen Road	45	54	39
	North East Link	-	-	19
PM peak northbound				
Eastern Freeway to M80 Ring Road	Greensborough Road – Rosanna Road – Bulleen Road	34	42	28
	North East Link	-	-	16

Travel times were also forecast for 2036 along the six key routes analysed in the existing conditions assessment in Section 9.3.2. Forecast travel times across all routes are generally faster than the 'no project' scenario, with travel times on most routes shorter than in 2017. Key findings are:

- A reduction in traffic demand along the **Greensborough Road/Rosanna Road/Bulleen Road** corridor as vehicles divert from the arterial road network onto North East Link is predicted to reduce travel times along this route by 10 to 17 minutes.
- The additional capacity provided by Eastern Freeway widening works is anticipated to generate large travel time savings along the **Eastern Freeway between Springvale Road and Hoddle Street**, ranging from five to 11 minutes depending on the time period and direction of travel.
- Travel times between **Wattle Glen and the M80 Ring Road** are anticipated to increase slightly in the peak direction. This is likely due to additional traffic along the Greensborough Bypass approaching the M80 Ring Road and North East Link interchange. Travel times are predicted to decrease slightly for traffic travelling against the peak direction.
- Travel times from **Kangaroo Ground to Warrandyte Bridge, Lower Plenty Road and Manningham Road via Fitzsimons Lane** and from **Warrandyte Bridge to Ringwood** are generally forecast to decrease by several minutes each, as North East Link would reduce local congestion.

These travel time savings translate into improvements in overall accessibility to employment, education and other services across metropolitan Melbourne.

## Road network performance

As described in Section 9.1, overall road network performance was assessed at three levels: across metropolitan Melbourne, within the north-east study area, and along the project corridor.

The strategic transport model was used to assess road network performance across metropolitan Melbourne and within the north-east for both the 'with project' and 'no project' scenarios in 2036, approximately 10 years after North East Link opened. This network-wide model predicts that with North East Link:

- Time spent travelling in congested conditions would decrease by 2 per cent within metropolitan Melbourne and by approximately 5 per cent within the north-east, daily and during peak times
- Average vehicle speeds within the north-east would improve by approximately 6 per cent. This is higher than the average forecast improvement of 1 per cent across metropolitan Melbourne.

The microsimulation model was used to assess the road network performance along the project corridor in more detail. Freeway and intersection performance was modelled for both the 'with project' and 'no project' scenarios in 2036, along the Eastern Freeway from Hoddle Street to Springvale Road and along the North East Link corridor from the M80 Ring Road to the Eastern Freeway. The following road performance metrics were assessed:

- Peak period traffic volumes – traffic volumes were modelled for the two-hour AM peak and PM peak period.

- Peak period traffic speeds – traffic speeds were modelled for the AM peak period and PM peak period.
- Peak period Level of Service – congestion on the road network is typically ranked by ‘Levels of Service’ from A to F based on the Highway Capacity Manual 2010. Level of Service A represents free-flowing traffic conditions where individual users are virtually unaffected by the presence of others. Level of Service F represents flow breakdown with demand exceeding capacity and low comfort and convenience. A road in constant traffic jam is considered Level of Service F. Both freeways and intersections are designed to operate at a Level of Service D or better in peak periods. Intersections are targeted at an overall Level of Service which is weighted by the performance of each individual approach. At this level, while drivers should be able to get through a set of traffic lights in a single phase, some longer delays may occur on minor approaches. At a Level of Service D traffic along freeways is still stable but approaching unstable flow where minor incidents may cause delays.

Level of Service rankings were generated based on:

- The forecast volume of traffic demand per unit length along the M80 Ring Road, North East Link and the Eastern Freeway
- The time spent waiting at signals at freeway intersections and at signalised arterial road intersections.

Key findings from the microsimulation modelling are outlined in this section.

### M80 Ring Road

- With the project, the M80 Ring Road would generally operate at a Level of Service of B to D across the AM and PM peak times.
- Removing the freeway terminus at the M80 Ring Road/Greensborough Bypass interchange would reduce queueing at this location, which led to a breakdown of the traffic flow along the M80 Ring Road and Level of Service F for this interchange in the ‘no project’ scenario. It would also increase vehicle speeds along the M80 Ring Road east of Plenty Road from less than 45 kilometres per hour during peak times in the ‘no project’ scenario to over 85 kilometres per hour with North East Link.

### North East Link

- North East Link would generally operate at a Level of Service of B to D across the AM and PM peak times.
- All North East Link interchanges (at Grimshaw Street, Lower Plenty Road and Manningham Road) would operate at a Level of Service D or better.



## Eastern Freeway

Along the Eastern Freeway, all eastbound and westbound lanes and collector-distributors would operate at a Level of Service D or better with North East Link. This performance is significantly better than the 'no project' scenario, where the westbound lanes of the Eastern Freeway are forecast to typically operate at a Level of Service E or F at the height of the AM and PM peaks.

The main improvements from the 'no project' scenario would be:

- Separating express movements with the collector-distributor would alleviate congestion for both eastbound and westbound traffic between Tram Road and Bulleen Road.
- Combined with ramp metering, the collector-distributor arrangement would also improve travel for eastbound traffic between Chandler Highway and Doncaster Road. Modelling of the 'no project' scenario predicted an average vehicle speed of 45 km/hr or less along this section of the freeway during the PM peak. With North East Link, the average vehicle speed is anticipated to be over 85 kilometres per hour.
- The performance of the Chandler Highway/Yarra Boulevard intersection would improve from a Level of Service F to B/C, primarily due to improvements at the Eastern Freeway interchange. This would include additional storage on the eastbound entry ramp which reduces queueing for southbound traffic along Chandler Highway.
- Upgrading the westbound off-ramp at Chandler Highway to two lanes and adding ramp metering along Burke Road and Bulleen Road/North East Link would reduce queues on the Eastern Freeway, improve travel between Burke Road and Chandler Highway, and increase westbound travel speeds between Bulleen Road and Chandler Highway in the PM peak.
- Improvements to the interchange of the Eastern Freeway with Doncaster Road would generally reduce delays and congestion at this interchange and at the intersection of Doncaster Road and High Street.
- The addition of a fourth westbound lane between Blackburn Road and Springvale Road would improve traffic flow in the vicinity of the Springvale Road interchange. In addition, ramp metering on the Blackburn Road westbound merge onto the Eastern Freeway would assist in controlling westbound traffic that enters the freeway.
- Vehicle speeds for eastbound and westbound traffic travelling along the Eastern Freeway would improve significantly with the project, with an average speed above 85 kilometres per hour.
- There would be a slight reduction in speed (approximately 2 kilometres per hour in the AM peak period and 3 kilometres per hour in the PM peak period) for eastbound traffic travelling in the EastLink tunnel during peak periods, due to a small increase in demand at these times. This change in vehicle speed is unlikely to be noticed by drivers.

### Arterial road network

- A reduction in overall traffic demand along Greensborough Bypass and Greensborough Road would reduce the likelihood of queues at signalised intersections. The Greensborough Bypass intersection with Grimshaw Street would operate at a Level of Service D with North East Link, compared with a Level of Service F without the project.
- The Greensborough Bypass intersections at Elder Street and Watsonia Road generally operated at a Level of Service E/F in the 'no project' scenario. Traffic performance at these intersections is forecast to improve with North East Link to a Level of Service C or better due to the significant reduction in traffic volumes along Greensborough Road.
- The Greensborough Road/Erskine Road intersection would improve from a Level of Service E to F, to a Level of Service C.
- The performance of the Lower Plenty Road/Rosanna Road and Bulleen Road/Manningham Road intersections in the PM peak would improve significantly, from a Level of Service E/F in the 'no project' scenario to a Level of Service D or better with North East Link.
- The Bulleen Road intersection at Thompsons Road would improve in both the AM peak and the PM peak. This is due to improvements at the interchange with the Eastern Freeway, specifically the merge from the eastbound entry ramp.
- This means that queueing and delays on the nearby arterial road network would be reduced, particularly for the southbound movement along Bulleen Road.
- In the AM peak, the Burke Road/MacArthur Road intersection would improve from a Level of Service F to D. This is primarily due to the reduction in north-south traffic along Burke Road, which would improve the ease of access of traffic from MacArthur Road.
- The performance of the Doncaster Road intersection at High Street would improve in both the AM peak (from a Level of Service E to D) and the PM peak (from a Level of Service E to C/D). This is due to the proposed changes at the Doncaster Road interchange which would allow for a more streamlined operation of the interchange and the intersection with High Street. This is anticipated to reduce delays and congestion at both intersections.
- In the AM peak, the performance of the Springvale Road interchange and the intersection at Ashwood Drive in Nunawading (south of the Eastern Freeway) would improve significantly with North East Link. This is forecast primarily due to the additional storage that would be provided on the westbound ramps, which would prevent queueing along Springvale Road. In the 'no project' scenario this queueing impedes traffic attempting to travel north across the Eastern Freeway, causing extensive delays.

The performance of intersections at Doncaster Road/Gardenia Road and Elgar Road/Eastern Freeway is also predicted to decrease by one Level of Service, but these intersections would still operate at a Level of Service C or better with North East Link. The performance improvements predicted for neighbouring intersections are likely to offset this decrease.

## Crash assessment

North East Link would be designed to incorporate safe system principles in accordance with the Safe System Approach outlined in *Towards Zero 2016-2020: Victoria's Road Safety Strategy and Action Plan*. Major safety improvements would include the reduction of truck traffic on local streets, the introduction of managed motorway features, and an increase in separate bicycle paths to help protect cyclists from traffic.

A crash assessment was undertaken using the method described in Section 9.1. The modelled vehicle kilometres travelled and VicRoads CrashStats were used to project the incidence of crashes in 2036 for the 'no project' and 'with project' scenarios.

Overall, North East Link is forecast reduce the total number of crashes across north-east Melbourne, despite a projected increase in vehicle kilometres travelled.

The project would provide 135 lane-kilometres of additional freeway with the new North East Link and widening works along the Eastern Freeway and M80 Ring Road. As traffic is diverted onto the freeway network, crashes on local and arterial roads are forecast to decrease by 109 incidents per year (down from an estimate of 2,808 crashes on non-freeway roads estimated for the 2036 'no project' scenario).

It is anticipated that managed motorway safety features such as ramp metering and overhead lane control would reduce the rate of crashes on the new and upgraded freeway sections by 30 per cent. As a result, even though more traffic would be travelling on the freeway network, there is predicted to be an increase of one additional crash occurring on this network. It is likely the safety benefits of separating traffic movements with a collector-distributor arrangement on the Eastern Freeway could reduce the incidence of crashes, although there is insufficient data available to confirm this.

## 9.5.2 Freight network

As discussed in Section 9.3.3, the current road network in Melbourne's north-east is not generally suitable for high-volume freight movements. The primary freight route within the north-east is the Greensborough Road/Rosanna Road/Bulleen Road corridor, despite the predominantly residential land uses fronting these roads. Truck curfews also limit the times when freight vehicles can travel on the arterial road network.

North East Link would provide a freeway-standard road for freight travel, reducing the volume of heavy vehicle movements on the local and arterial road network in the north-east. The project is a key element of the Victorian Government's long-term strategy as outlined in the *Victorian Freight Plan* (2018), which seeks to improve the efficiency and grow productivity of freight movements.

## Changes to freight movement patterns

Victoria's total freight volumes are forecast to more than double over the next three decades. By 2036 it is anticipated that freight would continue to be distributed primarily via trucks and commercial vehicles. Growth in industrial areas in north and south-east Melbourne is expected to impact traffic performance within the north-east due to the movement of freight between these locations.

North East Link would provide for increased freight movement along the freeway network, via the upgraded M80 Ring Road, the Hume Freeway, the new North East Link, an upgraded Eastern Freeway and EastLink. The proportion of truck travel on non-freeway links within the north-east is predicted to be 57 per cent with North East Link, which is significantly lower than an estimated 72 per cent without the project. This represents the diversion of a large number of trucks away from arterial and local roads. As listed in Table 9-11, this would bring the proportions of freeway and non-freeway truck travel within the north-east in line with the metropolitan Melbourne average.

**Table 9-11** Heavy vehicle kilometres travelled, with freeway and non-freeway proportions

Metric	Metropolitan Melbourne		North-east	
	2036 'no project'	2036 'with project'	2036 'no project'	2036 'with project'
Total Heavy Vehicle Kilometres Travelled	15,209,000	15,195,000	2,191,000	2,396,000
Freeway proportion	42%	44%	28%	43%
Non-freeway proportion	58%	56%	72%	57%

The existing truck curfews described in Section 9.3.3 would be retained. Sensitivity testing was undertaken to understand the impact of extending the existing truck curfews so these applied over a 24-hour period.

Truck volumes were estimated to decrease on roads such as Greensborough Road and Main Road, and divert to curfew-free roads such as Manningham Road and North East Link.

Truck volumes were estimated to increase along North East Link. Changes to car volumes were generally immaterial.



## Over-dimensional vehicles and vehicles carrying placarded loads

Over-dimensional vehicles and vehicles carrying placarded loads would be able to travel on above-ground sections of North East Link. These vehicles would not be permitted to travel within the North East Link tunnels, as described in Chapter 6 – Project development and Chapter 8 – Project description.

The risk pathway associated with the movement of placarded loads and over-dimensional vehicles is described in Table 9-12. The potential impacts associated with this risk pathway are discussed in this section.

**Table 9-12** Risk table – operation – freight network

Risk ID	Risk pathway	Risk rating
TR20	Placarded loads and over height vehicles are unable to be identified in sufficient time to avoid tunnel closures	Low

The results of truck classification surveys indicate that less than 2 per cent of the truck fleet would need to detour around the tunnel sections of North East Link. These few heavy vehicles are therefore still likely to use Bulleen Road and Rosanna Road.

As shown in Figure 9-32, over-dimensional vehicles would travel on North East Link between the M80 Ring Road and Grimshaw Street. South of Grimshaw Street, over-dimensional vehicles would operate along Greensborough Road.

Information on vehicles that are restricted from entering the tunnels would be provided to the freight industry, so that over-dimensional vehicles and vehicles carrying placarded loads are able to be identified with sufficient time to plan an appropriate route and avoid tunnel closure (risk TR20). An over-height detection plan and tunnel closure procedure would also be developed.

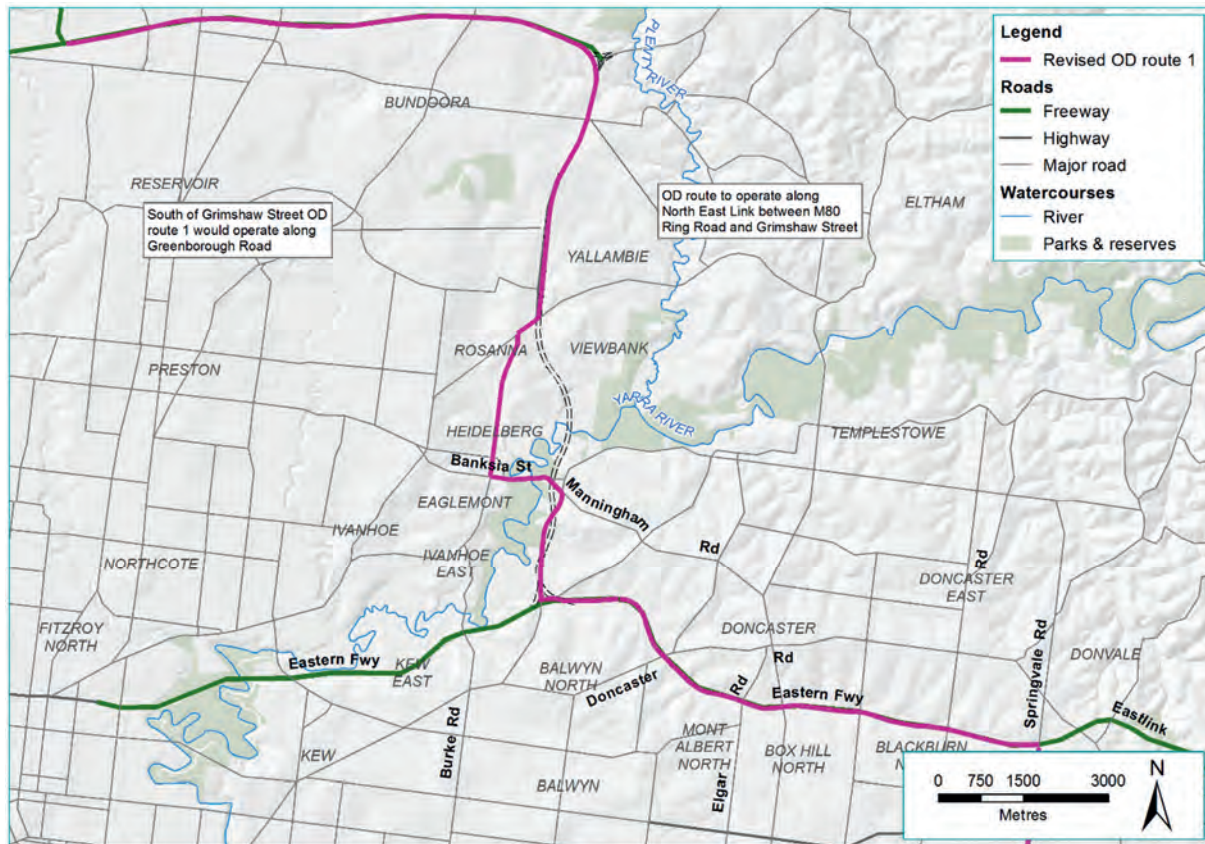


Figure 9-32 Proposed over dimensional vehicle route

## High Productivity Freight Vehicle (HPFV) access

North East Link would be designed to be able to carry trucks up to 160 tonnes (SM1600 standard) and so be able to cater for the increasingly larger and heavier truck fleet of HPFVs that operates on Melbourne's road network. The Eastern Freeway would also be upgraded to 75 per cent of SM1600 standard to provide connectivity for vehicles travelling to and from the east.

The project has also been designed to allow for A-double trucks, which would assist in taking these larger vehicles off the arterial road network.

## Changes to freight volumes

The strategic transport model was used to forecast how truck volumes would change with North East Link. Figure 9-33, Figure 9-34 and Figure 9-35 show the change in average weekday truck volumes for 2036 with North East Link vs. the 'no project' scenario. Key findings are:

- There are forecast increases in truck volumes south of the Eastern Freeway, but the bulk of these increases are light commercial vehicles rather than large articulated trucks. Of the additional trucks along the Eastern Freeway, the proportion of light commercial vehicles are:
  - Elgar Road – 90 per cent
  - Surrey Road – 90 per cent
  - Springvale Road – 80 per cent.

The exception to this is Middleborough Road, where 70 per cent of the predicted increases are heavy commercial vehicles. These vehicles are accessing the activity centre of Box Hill.

The majority of these trucks would travel along Middleborough Road outside the peak periods, when there is spare capacity on the road.

- Truck volumes are generally forecast to decrease across the north eastern arterial road network. Large decreases are predicted along Greensborough Road (-7,400 trucks per day based on average weekday volumes), Bulleen Road (-2,400 trucks per day), Manningham Road (-3,000 trucks per day) and Rosanna Road (-2,800 trucks per day). These reductions represent trucks diverting onto North East Link.
- Truck volumes are forecast to increase along feeder routes to North East Link, including the M80 Ring Road (up to +8,200 trucks per day), the Eastern Freeway (up to +7,200 trucks per day) and Greensborough Bypass east of the M80 Ring Road (+200 trucks per day).
- A small increase in trucks is predicted along Erskine Road (+300 per day) which may be caused by trucks travelling between North East Link and the La Trobe precinct. Approximately 60 per cent of these trucks are anticipated to be light commercial vehicles. Given the primarily residential land uses adjoining this road, demand for this route could be controlled via the implementation of truck bans by VicRoads.

The predicted decrease in the cross-city truck traffic travelling along Rosanna Road represents a reduction of up to approximately 75 per cent with North East Link compared with the 2036 'no project' scenario. It is expected this significant reduction in truck volumes would allow more local traffic to use Rosanna Road. However, some trucks would still be required to use the Greensborough Road/Rosanna Road/Bulleen Road corridor to service local retail and business precincts.

Rosanna Road would remain a designated over-dimensional route once North East Link opens, as over-dimensional vehicles would not be permitted to use North East Link tunnels. As stated above, truck classification surveys have shown that relatively few trucks (less than 2 per cent of the truck fleet) are expected to require detouring along Rosanna Road.



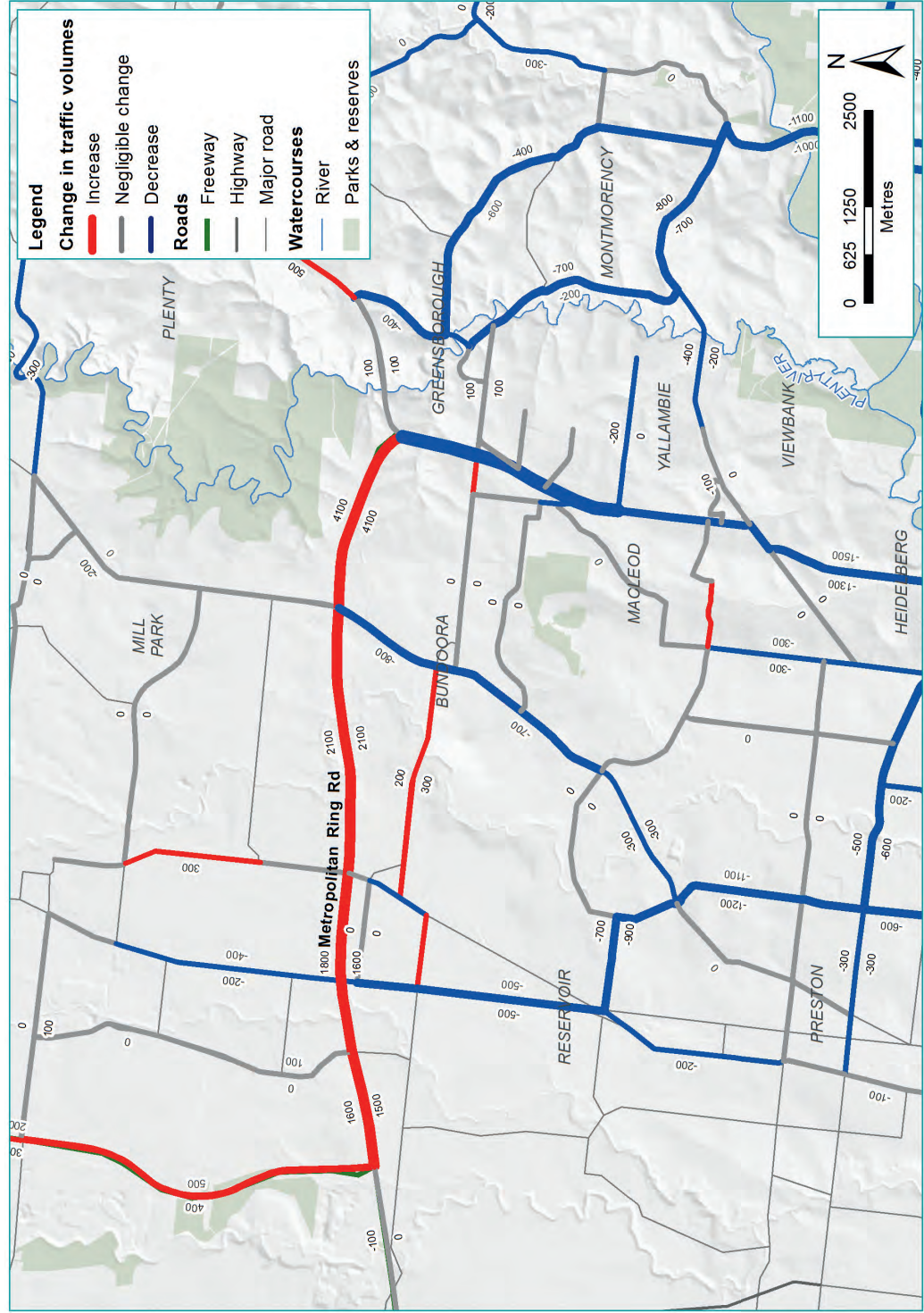


Figure 9-33 Change in average weekday truck volumes (AWDT), 2036 'with project' versus 2036 'no project' – study area north



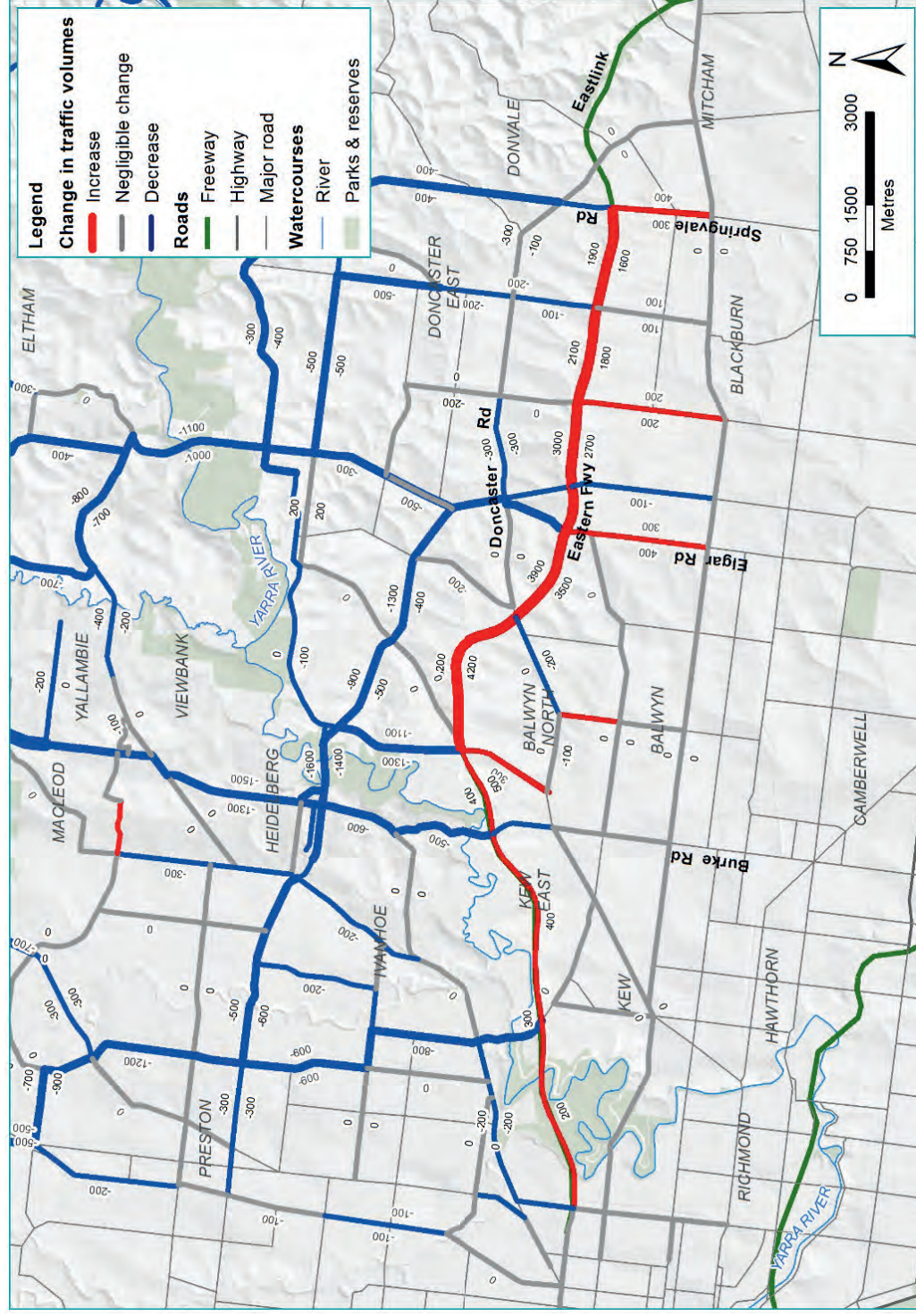
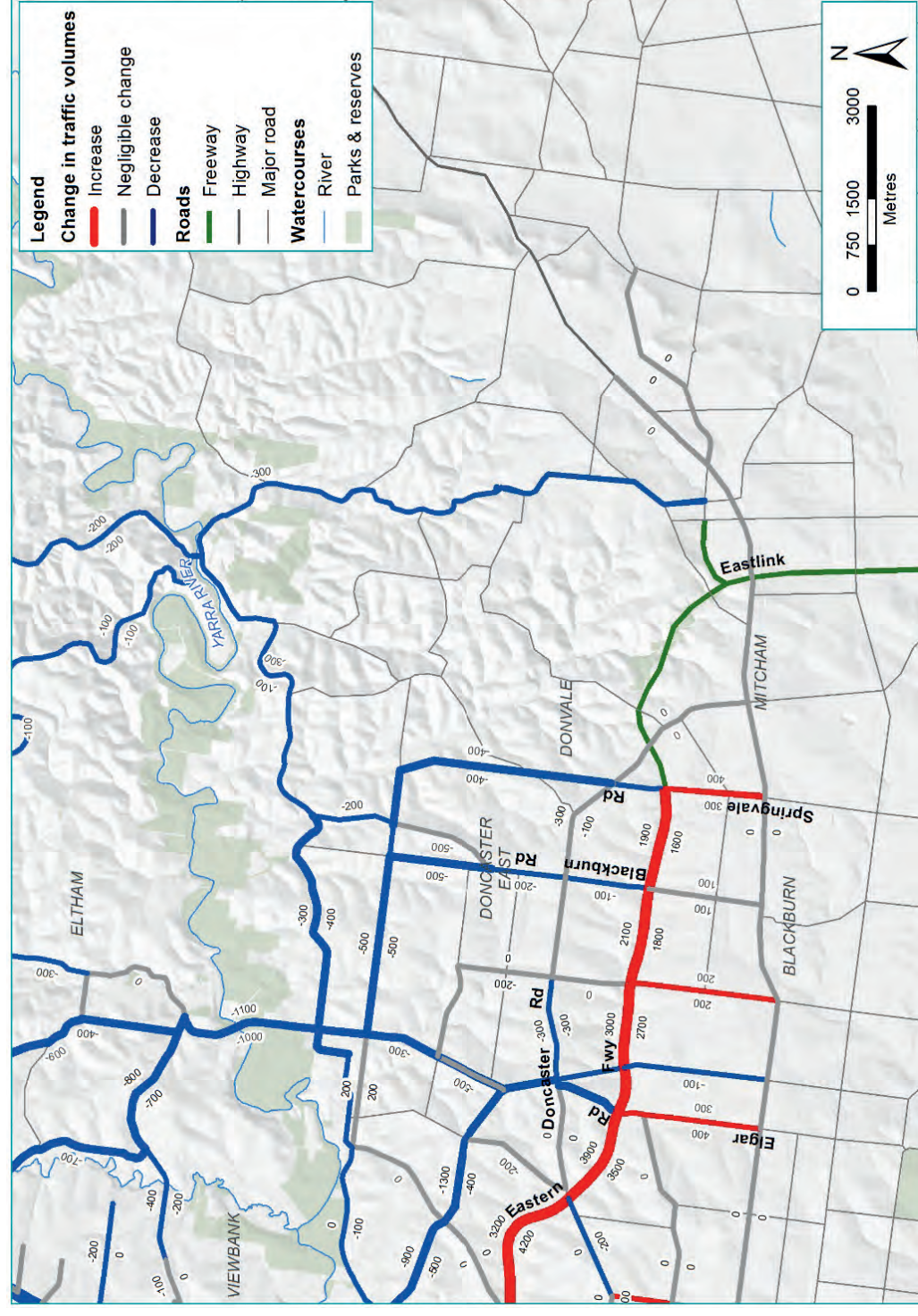


Figure 9-34 Change in average weekday truck volumes (AWDT), 2036 'with project' versus 2036 'no project' – study area south





**Figure 9-35** Change in average weekday truck volumes (AWDT), 2036 'with project' versus 2036 'no project' – study area east

### 9.5.3 Public transport network

North East Link is expected to improve travel times and speeds across all bus and tram services within the north-east. This would be achieved by reducing congestion, and by incorporating improvements to the public transport network into the project design. These improvements are outlined in Chapter 8 – Project description and include:

- The Doncaster Busway (discussed further in this section)
- Upgrades to the Doncaster Park and Ride facility, including reconfiguration of the intersections with Doncaster Road and the Eastern Freeway, and construction of a multi-level car park to maintain current parking capacity
- A new bus station and park and ride facility near the corner of Bulleen Road and Thompsons Road – the scope of this facility is being developed with Transport for Victoria
- Provision of ‘queue-jump’ bus lanes at the Doncaster Road and Grimshaw Street intersections – these bus lanes provide space for buses to reach the start of the queue at signalised intersections, and allow buses to be given priority by traffic signals. This ultimately reduces intersection and queueing delay for these services. These lanes are anticipated to improve travel times for DART services accessing the Doncaster Park and Ride, as well as bus routes 506 and 902 at Grimshaw Street.

There would be no reduction in bus services once North East Link is operating. Although a small number of intersection approaches worsen for bus routes in the ‘with project’ scenario, these delays are more than offset by decongestion elsewhere which leads to a general net reduction in travel times for buses. Overall, modelling of the 2036 ‘with project’ scenario predicts that travel speeds across the bus and tram network in the north-east are predicted to increase by approximately 3 per cent in the AM and PM peaks compared with the ‘no project’ scenario, and by 2 per cent across the day. Travel time on the bus and tram network within the north-east (based on existing routes) is predicted to decrease by approximately 9 per cent across the day.

As well as predicting these improvements, the traffic and transport assessment considered risk pathways associated with North East Link’s interaction with the public transport network. These are described in Table 9-13. The potential impacts associated with each of these risk pathways are discussed in this section.

**Table 9-13** Risk table – operation – public transport network

Risk ID	Risk pathway	Risk rating
TR16	Public transport services are adversely affected by delays or loss of travel time reliability due to additional traffic through key intersections, due to altered local traffic patterns or temporary closures due to maintenance activity	Medium
TR19	Tunnel closures for emergencies or maintenance activity result in temporary impacts on public transport services and on pedestrian and cycle movements on arterial and local roads	Low

As described in Section 9.5.1, North East Link is expected to change travel patterns so that more traffic is travelling on the freeway network instead of on arterial and local roads. In this scenario, intersection performance is generally forecast to improve but some sections of the road network would experience an increase in traffic volumes. Increases are predicted along the Greensborough Bypass, Watsonia Road, and south of the Eastern Freeway along Bulleen Road, Elgar Road, Surrey Road and Springvale Road.

These changes in traffic conditions have the potential to affect public transport services (risk TR16). In particular, the performance of a small number of individual intersection approaches servicing bus routes is predicted to reduce with North East Link. In the AM peak, this includes the Elgar Road northbound approach at Belmore Road (routes 281, 293 and 302). In the PM peak, this includes the Katrina Street westbound approach at Middleborough Road (route 270), and the Yarra Boulevard eastbound approach at Chandler Highway (route 609). Overall, the whole-of-route travel time for these buses is still expected to improve as North East Link would reduce congestion of the north-eastern arterial road network.

The improved traffic flow that is anticipated as a result of the proposed new link between Greensborough Road and Lower Plenty Road (discussed in Section 9.5.1 'Changes to local access') would also benefit buses. Bus services would use the same movements as general traffic through this intersection, including the route 513 bus that operates between Greensborough Road and Rosanna Road, as well as Lower Plenty Road and Rosanna Road. Existing bus stops along Lower Plenty Road at the approach to the Greensborough Road intersection may need to be relocated slightly to avoid the traffic signals that would be constructed on Lower Plenty Road.

### **Watsonia railway station**

Facilities at Watsonia railway station are proposed to be reconstructed as part of North East Link.

It is proposed to provide bicycle parking as well as taxi, 'kiss and ride' and car parking spaces that are compliant with the *Disability Discrimination Act 1992* (Cwlth). The existing car parking areas would need to be reconfigured but the existing number of car parks would be maintained or increased with a multi-level car park.

The existing bus bays would potentially be relocated from within the Watsonia railway station car park to a dedicated facility on Watsonia Road. This would be likely to impact upon bus travel times and routes. Transport for Victoria is reviewing the bus routes in the area and will optimise these to take into consideration the proposed changes to the Watsonia railway station.

Works associated with the North East Link crossing of the Hurstbridge rail line near Grimshaw Street may also necessitate modification to the rail signalling and electrical networks along this line.



## Doncaster Busway and improvements to DART services

As part of North East Link, the Doncaster Busway would provide bus lanes between Doncaster Road and Hoddle Street that would fully segregate buses from other traffic travelling along the Eastern Freeway. This is expected to be a significant improvement on the existing arrangement for buses travelling along the Eastern Freeway. Currently, these buses are able to travel along the freeway shoulders for a set time during the morning and evening. They travel at a reduced speed and are required to merge and diverge with general traffic at every interchange due to the entry and exit ramps.

As shown in Chapter 8 – Project description and in Figure 9-36, the Doncaster Busway would largely be located north of the Eastern Freeway, with the westbound lane crossing over to the south of the freeway between Chandler Highway and Hoddle Street. A connection at Thompsons Road would allow the 905 bus route to exit the freeway at this point, maintaining its existing route. The intersection of the Doncaster Park and Ride, Doncaster Road and the Eastern Freeway would be reconfigured, with a connection between the Doncaster Busway and the Doncaster Park and Ride. There would also be a left-in/left-out access point from the Doncaster Park and Ride onto Doncaster Road west of Hender Street.

It is also proposed to provide the following at the Doncaster Park and Ride:

- Maintain or increase the number of car parks within the facility through the use of a multi-deck structure
- Maintain or increase the number of bus stops, with separate inbound and outbound stations
- Bicycle parking
- Taxi, 'kiss and ride' and car parking spaces that are compliant with the Disability Discrimination Act.

No changes to the on-road bus network are proposed east of the Doncaster Park and Ride.

As covered in Chapter 6 – Project development, a future Doncaster Rail option would not be precluded by North East Link and the Doncaster Busway, should the project be recommended in the future.

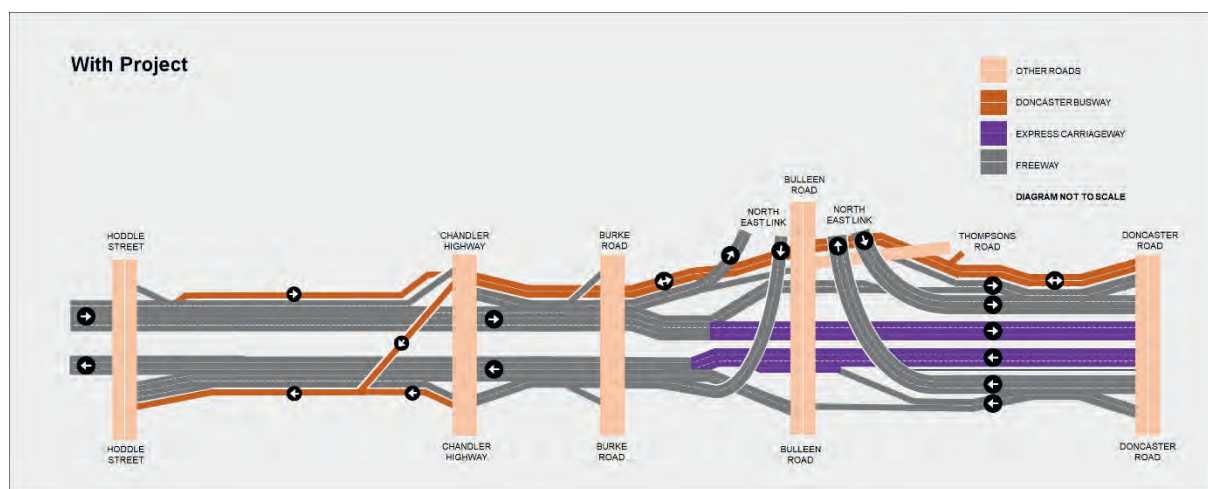


Figure 9-36 Doncaster Busway layout

Travel times on the Doncaster Busway along the Eastern Freeway between Doncaster Road and Hoddle Street are predicted to be approximately 20 to 30 per cent faster by 2036 with North East Link compared with the 'no project' scenario. This would be achieved through the full separation of bus services from general traffic which results in the bypassing of entry/exit ramps and delays/incidents on the Eastern Freeway, as well as an overall increase in bus operating speeds.

Travel times for DART services along non-freeway route segments (that is, in the inner city and in the eastern suburbs) are forecast to improve up to 15 per cent over the 'no project' scenario as North East Link reduces congestion on the arterial road network.

Transport for Victoria is also undertaking planning to improve bus services to meet growing demand and to take advantage of the Doncaster Busway.

As a result of the forecast travel time savings, as well as the forecast increase in overall services, patronage across all four DART routes (905, 906, 907 and 908) is predicted to increase by 2036 with North East Link. The largest increase in patronage is predicted along the route 908, which runs from The Pines Shopping Centre to the CBD via Templestowe and the Eastern Freeway.

## Managing potential impacts to public transport

A strategy would be developed with relevant public transport authorities to minimise the potential impacts of the project on buses, trams and rail and, where practicable, enhance public transport facilities and services that cross or run parallel to the alignment of North East Link (EPR T1).

It is expected that adequate planning for network redundancy and advance notice of lane or tunnel closures would reduce the potential for impacts to public transport services during maintenance activities (risk TR19).

## 9.5.4 Walking and cycling network

North East Link would provide extensive upgrades with a continuous off-road path along its entire length to greatly improve conditions for pedestrians and cyclists along the Greensborough Road corridor and the Eastern Freeway. The project would also generally reduce traffic and truck volumes in the north-east, which is expected to provide a lower stress environment for pedestrians and cyclists.

The risk pathway associated with North East Link's interaction with the walking and cycling network is described in Table 9-14. The potential impacts associated with this risk pathway are discussed in this section.

**Table 9-14** Risk table: Operation – walking and cycling network

Risk ID	Risk pathway	Risk rating
TR17	Pedestrians and cyclists are adversely affected by delays or loss of travel time reliability as a result of additional traffic through key intersections, due to altered local traffic patterns or temporary closures due to maintenance activity	Low

The project would change travel patterns and traffic volumes on some sections of the road network are expected to increase, as outlined in Section 9.5.1. These changes have the potential to cause delays or a loss of travel time reliability for pedestrians and cyclists (risk TR17). This risk would be managed by optimising the design to maintain and, where practicable, enhance pedestrian movements, bicycle connectivity, and shared use paths (EPR T1).

On-road cycling routes and off-road shared paths may require temporary closure during maintenance periods. It is expected that adequate notice of any temporary closures would be provided to pedestrians and cyclists to reduce potential impacts to these groups (risk TR17).

### Walking and cycling network improvements

The upgrades to the walking and cycling network included in the reference project are described in detail in Chapter 8 – Project description. These new walking and cycling links would improve pedestrian and cyclist access to the Watsonia and Heidelberg town centres and to the community facilities along Bulleen Road. Key components include:

- New shared use paths to complete the missing link in the Greensborough Bypass path between Grimshaw Street and Yallambie Road
- New shared use paths along Bulleen Road to improve access to schools and sporting facilities

- A new crossing of the Yarra River next to the Eastern Freeway in Kew/Fairfield
- Completion of the North East Bicycle Corridor – a new commuter cycling route to the inner city along the Eastern Freeway between Chandler Highway and Merri Creek.

Other proposed upgrades to the walking and cycling network would significantly expand the Strategic Cycling Corridor network in Melbourne's north-east, with new routes to Greensborough, Watsonia, Heidelberg and La Trobe University.

### Local accessibility and road safety

**Greensborough Road/Bulleen Road corridor –**  
The additional shared use path infrastructure along Greensborough Road would improve both accessibility and safety for pedestrians and cyclists throughout this corridor.

Following completion of North East Link, there would be 11 crossings for pedestrians and cyclists across Greensborough Road and Greensborough Bypass that would maintain east west access between residential areas and community facilities. These crossings are anticipated to minimise the potential for community severance (which is discussed further in Chapter 17 – Social) and their frequency would also make it easier for pedestrians and cyclists to travel from one side of Greensborough Road to another.

The shared use paths running parallel to Greensborough Road would eliminate the need for cyclists to complete on-road trips along this corridor, which is expected to reduce the likelihood of incidents and improve the overall amenity of cycling trips.





The shared use paths in this northern section of the study area also support connections to several educational facilities and retail destinations as shown in Figure 9-37, and would provide connectivity to a number of transport links, including:

- Watsonia railway station, via a new bridge near Elder Street
- The 513 bus along Greensborough Road
- The 566 and 902 buses along Grimshaw Street
- Macleod railway station, via the Erskine Street on-road path.

New off-road shared use paths would also provide walking and cycling access to several community facilities further to the south along Bulleen Road.

**Eastern Freeway corridor** – The North East Bicycle Corridor is an endorsed proposal of the Northern Regional Trails Strategy developed cooperatively by the Banyule, Darebin, Hume, Moreland, Whittlesea and Nillumbik councils. It addresses one of the key gaps within the Strategic Cycling Corridor network and would provide a more direct route between the inner city and the eastern suburbs. It includes upgrades to sections of the existing Main Yarra Trail that are steep and in poor condition. The corridor would provide connectivity between the inner suburbs and all major cycling paths and trails throughout Melbourne's eastern and northern suburbs, as shown in Figure 9-38.

The North East Bicycle Corridor is also predicted to offer time savings for cyclists and pedestrians:

- Between the Chandler Highway and Hoddle Street, the North East Bicycle Corridor would shortcut the existing Main Yarra Trail (to the north of the freeway) by approximately 1.1 kilometres. This translates into a time saving of approximately four to five minutes for a cyclist.
- At Burke Road, the corridor would follow the Doncaster Busway alignment, creating a direct path parallel to the Eastern Freeway. This would shortcut the existing Main Yarra Trail (which encircles the Burke Road Billabong Reserve) by approximately 700 metres. This equates to three minutes' travel time saving for a cyclist.

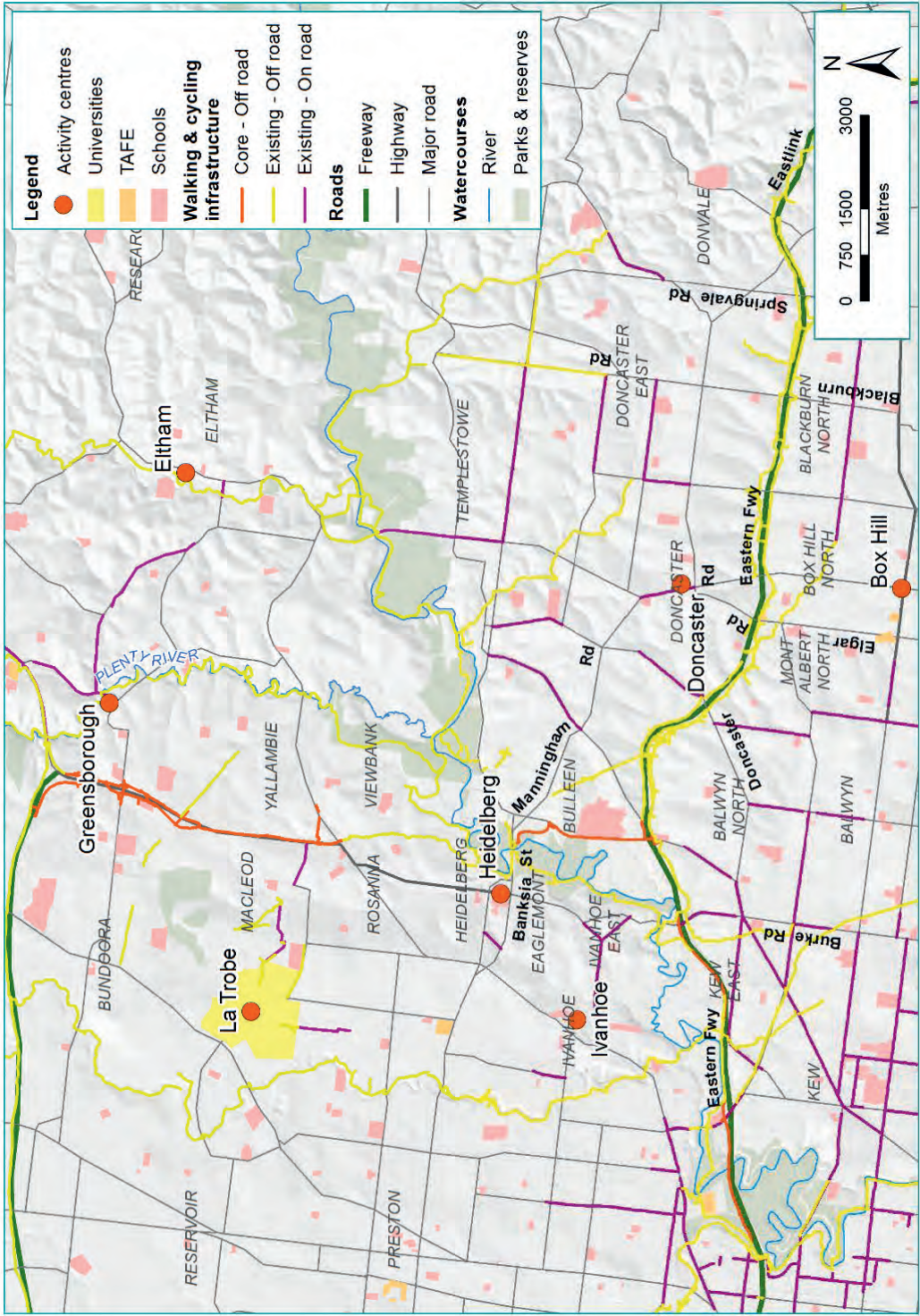


Figure 9-37 Greensborough Road corridor upgrades, with schools and activity centres



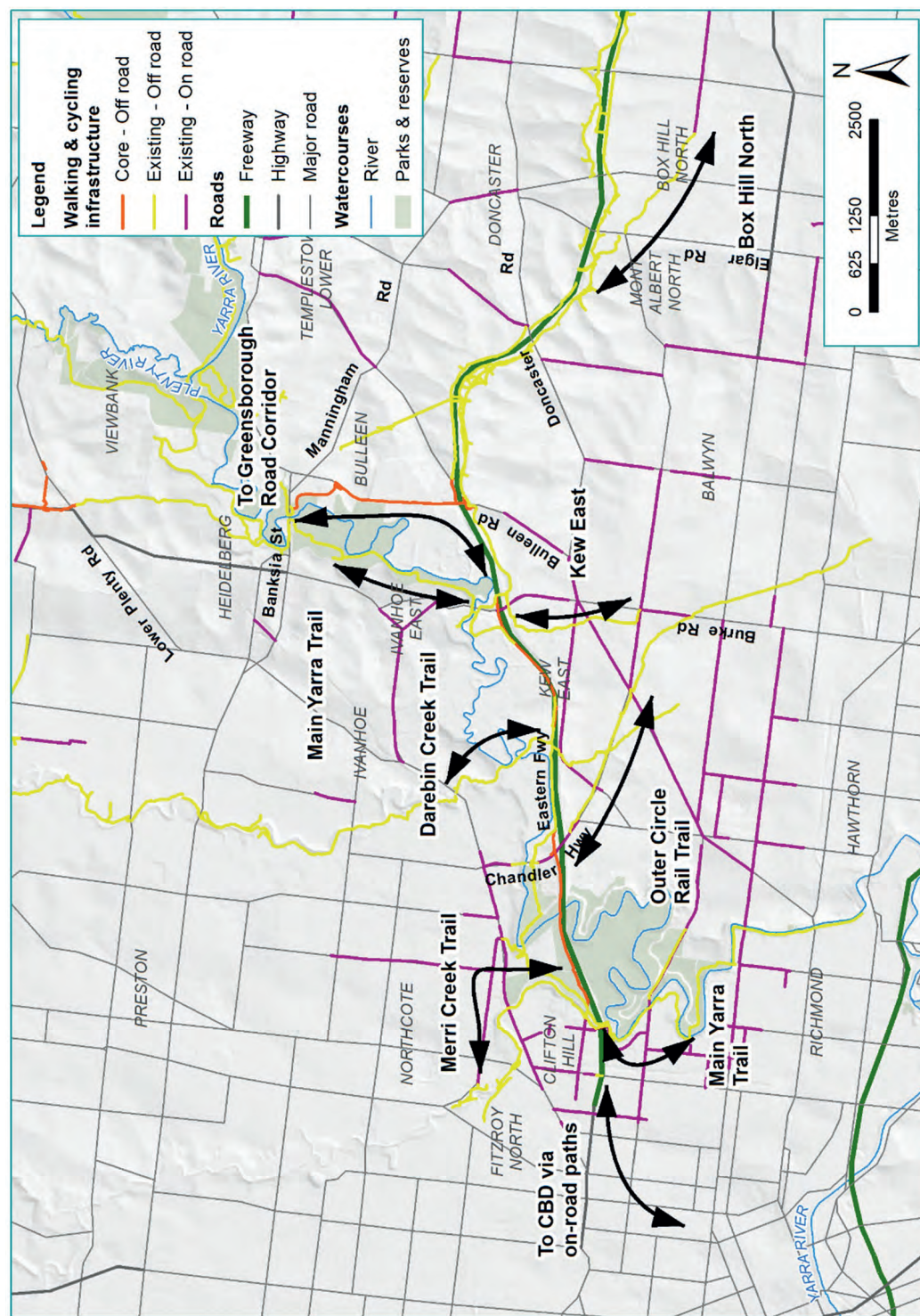


Figure 9-38 North East Bicycle Corridor linkage to alternative trails

## 9.6 Cumulative impact assessment

As described in Section 9.4, Transport Management Plans would be developed and implemented before construction of North East Link started (EPR T2). These plans would consider construction activities for other relevant major projects occurring concurrently with construction activities for North East Link which would potentially impact modes of transport in the same area.

At the time of preparing this EES, there were no known commitments to undertake significant works in the immediate vicinity of North East Link. Based on current commitments, no cumulative impacts of construction have been identified due to the geographic separation and different timing of the construction of other proposed major projects.

The traffic and transport impacts associated with the operation of North East Link as discussed in this chapter are based on modelling for the year 2036 that takes into account all major road and public transport projects that are Victorian Government commitments, including:

- Mernda Rail Extension (completed 2018) – extension of the South Morang rail line to town centre with an additional three railway stations at Hawkstowe Parade (Hawkstowe), Marymede College (Middle Gorge) and Mernda. The new stations include park and ride facilities, bicycle storage and bus interchanges to draw upon the surrounding population catchments at South Morang, Mernda and Doreen.
- Metro Tunnel (under construction) – comprising two new rail tunnels between South Kensington and South Yarra railway stations and five new underground railway stations. The project is anticipated to significantly increase capacity across Melbourne's rail network by reducing reliance on the City Loop.
- West Gate Tunnel Project (under construction) – includes new tunnels and an elevated road connecting the West Gate Freeway with CityLink via the Port of Melbourne. The project also includes widening the West Gate Freeway between the M80 Ring Road to Williamstown Road to ultimately serve as an alternative to the West Gate Bridge.
- M80 Ring Road upgrades (under construction) – involves widening and improvements along the full 38 kilometres of the M80 Ring Road from the Princes Freeway to Greensborough Bypass.
- CityLink-Tulla Widening (completed 2018) – has provided 24 kilometres of upgrades from Melbourne Airport to Power Street in the city. It has added a lane in each direction and converted the freeway to a fully managed motorway.
- Chandler Highway upgrades (completed 2018) – involved widening the Chandler Highway from two to six lanes as well as intersection and signalling upgrades at Heidelberg Road and Yarra Boulevard. The original bridge was converted into a shared use path to improve walking and cycling connectivity across the Yarra River.
- Northern, South-Eastern and Western Roads Upgrades (under construction) – The Suburban Roads Upgrade includes a package of arterial road upgrades in the northern, south-eastern and western suburbs.



- Monash Freeway widening (under construction) – the project will widen the Monash Freeway between Warrigal Road and Cardinia Road and provide new and upgraded ramp signals along interchanges to improve traffic flow.
- Hurstbridge Stage 2 upgrades (to commence in 2020) – includes the duplication of rail tracks between Greensborough and Montmorency railway stations, and between Diamond Creek and Wattle Glen railway stations. It will allow additional train services to operate along the Hurstbridge line in peak periods.

The Metro Tunnel 2 was not included in the modelling, as it is anticipated to be completed beyond 2036. This project would link Clifton Hill Station with Newport via the CBD and Fishermans Bend. It is likely to see a shift to public transport, reducing traffic volumes across Melbourne. However, given its location it is unlikely to have a significant impact on the north-east of Melbourne.

Sensitivity testing was undertaken to understand how the Outer Metropolitan Ring/E6 transport corridor project would interact with North East Link. This project would comprise a new freeway starting at the M80 Ring Road between Dalton Road and Plenty Road and ending at the Hume Freeway north of Donnybrook Road. The E6 project sensitivity testing indicated there would be changes to car and truck volumes along North East Link, which were modelled as increasing by up to 8 and 3 per cent respectively.



## 9.7 Conclusion

This chapter has identified and assessed existing conditions, impacts and associated risks to traffic and transport for North East Link.

North East Link would redistribute traffic away from local and arterial roads and onto the freeway network. The project would also benefit public transport users by introducing the new Doncaster Busway and improve accessibility for pedestrians and cyclists through the construction of new and upgraded shared use paths.

The biggest reductions in traffic volumes are anticipated on the parallel routes of Rosanna Road (reduction of approximately 12,000 vehicles per day) and Greensborough Road (reduction of approximately 19,000 vehicles per day). Large decreases in truck volumes are also anticipated along Greensborough Road, Bulleen Road, Manningham Road and Rosanna Road. This is predicted to improve travel times across north-east Melbourne, North East Link users forecast to save up to 35 minutes of travel time between the M80 Ring Road and the Eastern Freeway by 2036 compared with the 'no project' scenario.

However, traffic volumes are forecast to increase along some arterial roads south of the Eastern Freeway and near the Greensborough Bypass/Grimshaw Street interchanges. These increases are primarily anticipated to occur outside peak periods. The increase in traffic travelling on the freeway network would be accommodated by providing additional traffic lanes on the M80 Ring Road and Eastern Freeway. No net increase in traffic is anticipated for roads in the Melbourne CBD.

During the project's construction, the number of trucks on the road network would increase to deliver construction materials and to remove excavated soil. The construction area forecast to generate the highest number of truck trips per day (regardless of whether the TBM was launched from the north or south) is the section from Kempston Street to the northern tunnel portals. Construction in this area would likely be occurring at the same time as a TBM launch from the north, and these activities combined could generate up to 240 truck trips per hour if existing truck curfews were maintained. The southern TBM launch option site near Manningham Road could generate up to 80 truck trips per hour.

It is also anticipated a number of short-term road closures would be required. These would typically occur overnight or on the weekend. Longer-term closures would require the construction of side tracks to divert traffic around the work sites and maintain traffic flow. This may result in some small redistribution of traffic away from construction areas that would need to be managed.

Application of the project EPRs would minimise the potential impacts associated with construction and operation. Transport Management Plan(s) would be prepared and implemented before construction works started that would identify appropriate construction traffic routes, measures to maintain transport capacity and connectivity and safety for pedestrians and cyclists, and measures to limit construction haulage in peak periods. The project design would be optimised to provide safe vehicle movements around construction and to allow for maintenance access during operation of North East Link. Monitoring would be undertaken to assess traffic performance before, during and after the project's construction.

In response to the EES evaluation objective described at the beginning of this chapter, impacts on traffic and transport have been assessed and EPRs identified to minimise these potential impacts (EPRs are described in full in Chapter 27 – Environmental management framework). Overall, North East Link is anticipated to increase transport capacity and improve connectivity to, from and through the north-east of Melbourne. The project would provide benefits for the broader and local road, public transport, cycling and pedestrian transport networks.